

Segmented-Client Communication Intervention for Improving the Use of Long-Acting Reversible Contraceptives and Permanent Methods in Rural Bangladesh



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Abbreviations

BCC	behavior change communication
CPR	contraceptive prevalence rate
DGFP	Directorate General of Family Planning
DGHS	Directorate General of Health Services
DID	difference-in-differences
FP	family planning
FWA	family welfare assistant
FWV	family welfare visitor
icddr,b	International Centre for Diarrhoeal Disease Research, Bangladesh
IUD	intrauterine device
LARC	long-acting reversible contraceptive
MCH	maternal and child health
MOHFW	Ministry of Health and Family Welfare
MR	menstrual regulation
NSV	non-scalpel vasectomy
PM	permanent method
PSI	Population Services International
RDM	Research for Decision Makers
TFR	total fertility rate
UH&FWC	union health and family welfare center
UHC	upazila health complex
USAID	United States Agency for International Development

Executive Summary

Background

Approximately two out of three women of reproductive age in Bangladesh do not want to give birth to any more children, and 62 percent use contraceptive methods. Despite this high demand for methods to limit fertility, only 9 percent of married women of reproductive age use long-acting reversible contraceptives (LARCs) (e.g., the implant and intrauterine device [IUD]) and permanent methods (PMs) (i.e., tubectomy, and non-scalpel vasectomy [NSV]). Although the government has placed a high priority on increasing the use of LARCs and PMs, this is nonetheless not taking place.

Segmented-Client Communication Intervention

The Research for Decision Makers (RDM) project supported by the United States Agency for International Development (USAID), in collaboration with the Data for Impact (D4I) project, conducted the intervention “Segmented-Client Communication Intervention to Increase LARC and PM Use” in Gurudaspur, a subdistrict of Natore district where contraceptive prevalence is high at just below 70 percent.

Segmentation

The intervention focused on three segments of women—(a) those who did not want to have any more children and were currently using short-acting methods, (b) those who wanted to space their next pregnancy for more than two years and were currently using short-acting methods, and (c) those who did not want to have any more children or wanted to space their next pregnancy for two years or more and were not using any method.

We trained providers to remain neutral in providing tailored counseling and to ensure that the counseling was unbiased, comprehensive, and supportive of full informed choice. Regardless of segment, women were given information on all modern methods, with an aim to empower them with information on the advantages and disadvantages of each method relative to their needs. As a result, it was expected that a higher proportion of the first segment would consider using PMs and LARCs, a higher proportion of the second segment would consider using LARCs, and a higher proportion of the third segment would consider using short-acting methods. Women in the third segment who did not want to have any more children but were not using any method might have more reservations about contraceptive use, such as being more conservative, having misconceptions about contraceptive methods, or feeling worried about stigma, especially with regard to LARCs or PMs. It was thought that these women might feel more comfortable accepting short-acting methods initially, given that they are noninvasive and can be discontinued easily if they find the method unsuitable.

Key Elements of Intervention

Information and messages were developed separately based on the specific needs of each segment of women. Clinical providers were trained on the provision of methods and quality of care, including providing information and counseling. Community workers (family welfare assistants [FWAs]) were trained on quality of care, counseling, and providing information. FWAs counseled women according to their respective segments through home visits, courtyard meetings, and the distribution of leaflets. Detailed, method-specific information on LARCs and PMs was provided during pre- and post-counseling. Proactive follow-up of LARC and PM clients was done by family welfare visitors (FWVs) or FWV-equivalent paramedics working with nongovernmental organizations (NGOs), who were required to call the clients within 72 hours of method provision.

Intervention Implementation

The intervention was implemented in the entire Gurudaspur Upazila (subdistrict) of Natore District in the high-performing Rajshahi Division from November 2018 through December 2019. Lalpur Upazila, in the same district, was selected as the comparison area with no intervention. A baseline survey of currently married women of reproductive age was conducted in September to October 2018, and an endline survey was conducted in January

to February 2020 in both Gurudaspur and Lalpur. A follow-up survey of new acceptors of LARC during the intervention period was conducted in both intervention and comparison areas.

Intervention Impact

Survey data based on a before-after and intervention-comparison framework indicated a significantly greater increase in LARC (implant and IUD) use in the intervention area than in the comparison area, indicating that the intervention had an impact on LARC use. LARC use increased from 3.8 percent to 5.5 percent in the intervention area (Gurudaspur), while declining from 3.9 percent to 2.8 percent in the comparison area (Lalpur). LARC and PM use increased from 13.1 percent to 15.3 percent in the intervention area, while it declined slightly from 12.6 percent to 12.2 percent in the comparison area.

The higher increase of LARC use in Gurudaspur than in Lalpur is explained by greater contact of women with FWAs in the former area through home visits and courtyard meetings, greater availability of method-specific behavior change communication (BCC) materials, and more exposure to high-quality pre- and post-counseling and information on methods. The segmented-client intervention empowered FWAs to better focus on clients' needs, disseminate precise information through the project's BCC materials, encourage community engagement that helped minimize misconceptions and stigma around LARCs and PMs, and build community trust through proactive follow-up of new LARC and PM clients.

The significant improvement in LARC use was achieved in 14 months. The annual growth rate of LARC use in Gurudaspur intervention area was 1.28 percentage points, substantially higher than the Rajshahi Divisional annual growth rate of 0.18 percentage points. The percentage share of LARCs and PMs in the contraceptive prevalence rate (CPR), a measure of effective method mix, increased to 23 percent from 20 percent due to the intervention. As a reference, the Rajshahi Divisional contraceptive method mix of LARCs and PMs was 16 percent in 2017–2018.

This improvement in LARC use occurred in the existing government system without any external technical assistance. The only additional work was FWAs' collection of information to form the segments of women, based on the question, "When do you want to have another child—within two years, after two years, or do you want no more children?" Clinical and BCC training of providers was done prior to the intervention, a necessary activity of any high-quality family planning (FP) program that should be conducted every two years. Bangladesh's FP program is weak in staff training, as indicated by the 2017 Bangladesh Health Facility Survey, which showed that less than 40 percent of FP staff received training in the previous 24 months (NIPORT, Ministry of Health and Family Welfare [MOHFW], 2020).

Recommendations

We recommend that the segmented-client communication intervention be scaled up in the national FP program. Scaling up can begin in the western region (Khulna, Rajshahi, and Rangpur Divisions), as women's preference for family limitation is strongest in that part of the country. It can then be gradually rolled out in other regions. An initial small-scale pilot of this intervention was done in the eastern region (Chittagong and Sylhet Divisions), where demand for family limitation is lower than in the western and central regions and where the intervention also saw success.

Any agencies devoted to improving FP programs in Bangladesh should come forward to technically assist the Directorate General of Family Planning (DGFP) to scale up this intervention, which can be done at low cost.

Background

Bangladesh is one of the most densely populated countries in the world. Various social, demographic, cultural, and programmatic aspects hinder Bangladesh's FP program and its achievements. The current total fertility rate (TFR) has become stagnant at 2.3 births per woman in recent years and is still above the replacement level (DGFP, Medical Education and Family Welfare Division, MOHFW, Government of the People's Republic of Bangladesh, 2017; National Institute of Population Research and Training [NIPORT], Mitra Associates, & ICF International, 2019).

There is a considerable gap between wanted and actual fertility. The total wanted fertility rate and TFR in Bangladesh are 1.6 and 2.3 children, respectively. Hence, Bangladeshi women have 0.7 children more than their desired number. The TFR would be 30 percent lower if unwanted births could be avoided (NIPORT, Mitra Associates, & ICF International, 2016).

In recent years, the contraceptive prevalence rate has been increasing at a slow pace (NIPORT, et al., 2016). There is high use of short-acting methods like oral pills (25 percent), injectables (11 percent), and condoms (7 percent). These methods have early discontinuation, measured by high 12-month discontinuation rates (42 percent for pills, 34 percent for injectables, and 45 percent for condoms). In contrast, LARCs have relatively low discontinuation rates; for example, the 12-month discontinuation rate of implants is 11 percent. The 12-month failure rates for short-acting methods are 4.5 percent for pills, 1.1 percent for injectables, and 5.8 percent for condoms (NIPORT, et al., 2019). In contrast, LARCs and PMs rarely fail; the failure rate of both IUDs and implants is less than 1 percent in the first year of use (Staveteig, Mallick, & Winter, 2015), while one study found the failure rate of NSV to be approximately one in every 2,000 men (Marie Stopes Bangladesh, n.d.). The high prevalence of unintended pregnancy leads to high levels of menstrual regulation (MR) or abortion and unwanted births, all of which are associated with a heavy reliance on methods that are prone to early discontinuation and method failure.

The use of LARCs and PMs, including IUDs, implants, and sterilization, is very low (9 percent) and constitutes only 14.5 percent of all contraceptive users. Even among older age groups, such as 45–49-year-old women, the use of PMs has declined considerably from 14 percent in 2011 to 9 percent in 2017 (NIPORT, et al., 2019), even though women have often achieved their desired family size by age 30. Use of less effective short-acting methods at ages 30 and older is high, exposing women to early discontinuation and method failure and thus to some increased risk of pregnancy for a large portion of their reproductive life, even after achieving their desired family size (Step Up, 2014; NIPORT, et al., 2016). For example, 37 percent of women older than 30 who had a birth during 2012–2014 reported that their birth was unwanted (NIPORT, et al., 2016). Increased use of more effective LARCs and PMs can reduce the high burden of unintended pregnancies, resulting in lower unintended births and MR or abortions. Hence, increasing voluntary LARC and PM use has been emphasized in the Fourth Health, Population, and Nutrition Sector Program (2017–2022) (MOHFW, 2017).

Programmatically, LARC and PM services are harder to deliver than SA methods (MEASURE Evaluation, 2014; Rahman, Haider, Curtis, & Lance, 2016). In Bangladesh, weak interpersonal communication and a hierarchical, noncommunicative attitude of many FP workers leads to poor understanding of side effects and encourages discontinuation of LARC methods among users (Rahman, et al., 2016). There are also supply- and demand-side barriers resulting in low demand for and use of LARCs and PMs (MEASURE Evaluation, 2014). The supply-side barriers are associated with the inherent systemic weakness of the public-sector program through which the majority of the LARC and PM services are provided. These factors include poor infrastructure, low-quality service provision, vacancies among key staff, and poor client-provider interactions (MEASURE Evaluation, 2014). The demand-side barriers are mainly sociocultural in nature (Rahman, et al., 2016). However, evidence suggests that women will opt for LARCs and PMs if they are provided with high-quality services that include options for a full range of methods (Stunning popularity of LARCs..., 2015).

Pills and condoms are available from FWAs and are provided during their home visits, while injectables are provided by FWVs from union health and family welfare centers (UH&FWCs) and satellite clinics. FWAs can now also provide second or higher dose injectables at clients' homes. FWVs are responsible for providing IUDs at the first-level health facility, UH&FWCs. Implants and PMs are provided at the upazila (subdistrict) health complex (UHC) by the medical officer, maternal and child health.

FWAs are the community-level providers whose primary responsibilities include disseminating FP and maternal and child health (MCH)-related information, counseling on FP methods, supplying pills and condoms to clients, and referring potential LARC and PM clients to UH&FWCs and UHCs.

Pills, injectables, and condoms are sold in pharmacies and convenience shops. The public sector is still the dominant source of LARC and PM, though the share of the private sector as a source of these methods has increased in recent years.

Shifting the Focus to LARCs and PMs

Due to the age-structure-mediated “population momentum effect,” population growth will continue to be an issue for Bangladesh even after reaching replacement-level fertility (DGFP, et al., 2017). The gap between wanted and actual fertility shows that despite their desire to limit family size, a considerable proportion of couples fail to do so and end up having unintended pregnancies. As shown above, contraceptive use in Bangladesh is heavily skewed toward short-term methods, and dominance of these methods in the method mix results in unintended pregnancies and abortions, especially among older women (Rahman, DaVanzo, & Razzaque, 2004; Rahman, DaVanzo, Razzaque, Ahmen, & Hale, 2009). LARCs and PMs give couples freedom from the daily use of short-term methods and the associated risks of method failure, unintended pregnancy, MR, or abortion (MEASURE Evaluation, 2014). Hence, to reduce unintended pregnancies and help couples reach their desired reproductive goals, a more effective contraceptive mix with more use of LARCs and PMs is needed (Rahman, DaVanzo, & Razzaque, 2001).

Universal vs. Segmented Service Delivery Approach

Health service delivery is usually a universal approach in that the program attempts to reach each and every client regardless of their characteristics. The current Bangladesh FP program follows such a universal approach. However, a segmented approach to reach a particular group of clients in ways tailored to their needs may be useful to enhance coverage and service utilization. For example, currently, teenage women have the highest level of unmet need for FP. To reduce this unmet need, a segmented approach could be devised to reach them with tailored information and services and, thus, increase their contraceptive use.

With a similar idea in mind, we designed a communication intervention suited to spacing and limiting needs of women in three existing groups (Table 1): (1) those who did not want to have any more children, (2) those who wanted to wait at least two years before having another child, and (3) those who wanted to have a child immediately or within two years. The percentages shown in Table 1 (taken from the 2014 Bangladesh Demographic and Health Survey; NIPORT et al. 2016) represent the groups.¹ Within each group were four subgroups defined according to use and nonuse of contraceptives—no use or using traditional, using short-acting method, using LARC, and using PM. The 12 cells represent the possible 12 groups with respect to fertility desire and method use-nonuse.

The cells A, B, and C in Table 1 represent the segments of women for our intervention. The purpose of segmenting these women was to inform them of all their contraceptive method options so that they could choose the best option for their needs, considering the effectiveness and convenience of the method.

We hypothesized that women’s method use would follow a progression of nonuse, to use of short-acting and noninvasive methods, to use of more invasive long-acting methods as their needs changed and their familiarity with contraception increased. This hypothesis assumed that women who did not want to have any more children and had the strongest desire to use a method, along with those already using a short-acting method, would consider using a long-acting or permanent method if empowered with the required information and counseling.

¹ The remaining 6 percent of women were either undecided about their fertility preferences (3 percent) or declared that they were infecund (3 percent) and were not considered here.

Thus, women in segment A (Table 2) were counseled about the comparative advantages of using a LARC or PM over the currently used short-acting methods (Table 1). Women who did not want to have any more children but were not using any method or using traditional method (cell C in Table 1) were considered to be more conservative or to potentially have misconceptions or stigma against method use, especially against LARCs and PMs. Counseling included the benefits of using short-acting methods, which are noninvasive and may be discontinued quickly if women do not feel confident about using contraception.

Table 1. Women by their spacing and limiting needs and method use

Segment	% of Women*	Method Use			
		No or Traditional Method	Short-acting Method	LARC	PM
Women who do not want any more children	63	C >>>	A >>>		
Women who want to space their next pregnancy for more than two years	20	C >>>	B >>>		
Women who want to have their pregnancy immediately or within two years	11				

*Source: NIPORT, et al., 2016; the symbol >>> indicates the progression from no or traditional method to short-acting method and from short-acting method to LARC or PM.

Women in each segment would need information, counseling, and different types of services. Specifically, we hypothesized that counseling on LARCs and PMs would resonate more with women who did not want to have any more children, counseling on LARCs would resonate more with those who wanted to wait for more than two years to have another pregnancy, and that counseling on short-acting methods would resonate more with women who wanted to wait for their next pregnancy, but for less than two years. Therefore, provision of complete but tailored information and services for these three segments was likely to be more effective than uniform counseling. Nonetheless, we wanted to underscore the need for providers to remain unbiased when helping women choose a method. Accordingly, we trained providers to provide tailored counseling that was unbiased, comprehensive, and supportive of full informed choice.

Table 2. Client segmentation

Segment	Segment Description	Progression Method
A	Women who did not want to have any more children and were currently using short-acting methods	Tubectomy, NSV, IUD, or implant
B	Women who wanted to space their pregnancy for more than two years and were currently using a short-acting method	IUD or implant
C	Women who did not want to have any more children or wanted to space their pregnancy for two years or more and were not currently using any modern method	Pill, injectables, or condoms

Research on the Segmented Approach

Studies in multiple countries have identified segmented approaches as improving MCH and FP service utilization. In Southern Tanzania, for example, a person's risk status was found to influence a woman's decision to seek hospital care (Kowalewski, Jahn, & Kimatta, 2000). Ensor et al. (2002) showed that a segmented approach can improve access to key services at facilities. Programmatic evidence from different countries has shown that comprehensive service delivery models with innovative approaches, social franchising, and provision of high-quality services increase LARC uptake. In Rwanda and Zambia, counseling based on stated fertility goals and intentions increased the use of LARCs among HIV serodiscordant couples (Khu, et al., 2013). In Zambia,

dedicated providers of LARCs helped expand contraceptive choices (Neukom, Chilambwe, Mkandawire, Mbewe, & Hubacher, 2011).

In Mali, dedicated staff held discussions with postpartum mothers attending immunization clinics on the full range of modern contraceptives, including LARCs, and addressed individual questions and misconceptions (Population Services International [PSI], 2012). These discussions were followed by individual counseling and service provision to willing acceptors, leading to improved uptake of LARCs (Ensor, et al., 2002). Evaluation of LARC expansion in sub-Saharan Africa indicated that method-specific marketing and interpersonal communication to raise awareness, public-private partnerships, media campaigns, and capacity building of providers can increase LARC and modern contraceptive use (Ngo, Nuccio, Pereira, Footman, & Reiss, 2017). Multilevel demand-generation activities were found to help increase the use of modern contraceptives among urban users (Speizer, et al., 2014). The USAID-funded PSI helped increase the uptake of LARCs in Nepal by increasing access to modern contraceptives through innovative approaches, high-quality service provision, and counseling (Maxine, 2016).

Use of Segmented Approach in Bangladesh

The International Centre for Diarrhoeal Disease Research, Bangladesh (icddr,b) tested a “segmented-client” communication intervention to improve the use of LARCs and PMs in two unions (population of 25,000–30,000 per union) in each of two low-performing districts (Brahmanbaria and Sylhet) in 2014–2015. Key activities included client segmentation, segment-specific counseling and services, and proactive follow-up of LARC and PM acceptors. The effect of the intervention was measured by comparing survey data before and after the intervention from both the intervention and comparison areas. Difference-in-differences (DID) estimation showed a significant improvement in the use of both short-acting methods (4.7 percentage points) and LARCs and PMs (by 1.1 percentage points) in a period of 15 months. The 12-month discontinuation rate of LARCs was significantly lower in the intervention areas than in the comparison areas. The segmented-client communication approach was effective in improving FP method use and continuation (icddr,b, 2016). One criticism of this intervention, however, was that icddr,b provided a significant amount of technical assistance during implementation which would not be available in the existing government system.

Building upon the experience gained from that intervention, we conducted a larger-scale study covering an entire upazila within the existing government health system, with the aim of improving LARC and PM use.

Objectives

The objective of the study was to increase the use of LARCs and PMs through a segmented-client communication intervention in the government FP service delivery system.

The intervention had three key elements:

- Collecting information from women on their spacing and limiting needs to determine the appropriate segment for each woman
- Providing high-quality pre- and post-counseling and information to clients to empower them to voluntarily choose a method and continue it with satisfaction
- Proactive follow-up of LARC and PM acceptors by the providers within 72 hours of acceptance, with the aim of providing timely counseling and assurances, and to connect the client with an appropriate provider in case of side effects or method complications to reduce LARC discontinuation

Client Segmentation

Segmentation was done through FWA's collection of women's responses to the following question: "When do you want to have another child—within two years, after two years, or do you want no more children?" Information on contraceptive use was available from the FWA register that contained FP management information system data for individual women. The three segments are shown in Table 2.

Women in the third segment (C) who did not want to have any more children but were not using any method were thought to potentially have more reservations about contraceptive use, such as being more conservative or having misconceptions or stigma against contraceptive methods, especially LARCs or PMs. It was assumed that these women might feel more comfortable accepting short-acting methods initially, since they are noninvasive and can be discontinued easily if women find that the method is not suited to them.

Counseling of Women on Contraceptive Methods by Segment

FWAs counseled women based on their segment through home visits, courtyard meetings, and distribution of leaflets. Detailed, method-specific information on LARCs, PMs, and short-acting methods was provided. At the facility where methods were delivered, systematic pre- and post-counseling was provided by the relevant providers.

Proactive Follow-up of LARC and PM Clients

New acceptors of a LARC or PM were contacted by FWVs or FWV-equivalent paramedics over the phone within 72 hours of provision of the method to reassure them and provide help for any discomfort or side effects, and to remind them to seek treatment, if needed.

The intervention was implemented in the entire Gurudaspur Upazila in Natore District in Rajshahi Division, a high-performing region for health and FP. The intervention was implemented from November 2018 to December 2019.

Pre-Intervention Activities

Most routine essential activities required for maintaining an acceptable quality of FP program were already being done prior to implementation of the intervention. These included clinical and counseling training for providers, preparation of BCC materials for providers and clients, and minor improvements to facilities. In January through October 2018, several additional activities in these areas were conducted in preparation for the intervention:

- **Clinical training:** The one-week clinical training for the intervention included IUD and implant insertion, tubectomy, and NSV procedures. Training was conducted by highly experienced trainers from EngenderHealth Bangladesh using a training curriculum which included hands-on practice by trainees under the supervision of the trainers. Medical officers (MCH), FWVs (from the DGFP), resident medical officers, nurses from the Directorate General of Health Services (DGHS), and medical officers and nurses from selected private sector clinics participated in the training.
- **Counseling training:** Experienced trainers from EngenderHealth provided counseling training to FWAs, FWVs, paramedics from NGOs, and nurses from DGHS facilities in Gurudaspur Upazila who routinely conduct pre- and post-counseling. Medical officers were given counseling and BCC orientation. Emphasis was placed on ensuring that medical officers discussed information on the advantages and disadvantages of the selected LARC method or PM and that they obtained the client’s final consent based on that discussion.
- **BCC materials:** The BCC materials developed for the initial small-scale segmented-client communication intervention were also used for this intervention. These materials were reviewed by the Information, Education, and Communication office at the DGFP and by communication specialists at the USAID-supported Social and Behavior Change Communication-Ujjiban project and then produced for providers and clients.
- **Minor refurbishment:** Minor improvements to facilities were suggested to the staff and then implemented. These included keeping the bathrooms and waiting rooms/spaces clean and functional and enhancing the counseling rooms to maintain the privacy of clients.

Evaluation of the Intervention

We conducted both an impact evaluation and a process evaluation of the intervention. The data sources for the impact evaluation were the baseline (September–October 2018) and endline (January–February 2020) surveys conducted in Gurudaspur Upazila (intervention area) and in Lalpur Upazila (comparison area in Natore District). Lalpur Upazila is not adjacent to the intervention area and thus had a minimal chance of contamination effects.

Face-to-face interviews using a structured questionnaire were conducted with randomly selected currently married women of reproductive age (ages 15–49 years). Clusters of households were randomly selected from the DGHS list of the Expanded Program for Immunization clusters covering every union. Thirty-five households were randomly selected from each selected cluster list, and all currently married women of reproductive age were interviewed. Table 1.1 shows the sample of women and the response rates.

From September through October 2019, a one-time follow-up survey was conducted among new LARC users who had accepted the methods from November 2018 through September 2019 in both intervention and comparison areas. The purpose was to estimate the discontinuation rate of implants and IUDs and to understand various aspects related to quality of care during the method acceptance process.

We also conducted qualitative data collection among service providers and clients to get an in-depth understanding of the intervention process and service provision environment. This included 18 in-depth interviews, three focus group discussions, and 13 key informant interviews.

Data Analysis

Quantitative data were analyzed using advanced statistical techniques to estimate the net effects of the intervention on the outcome indicators after controlling for individual-level demographic and socioeconomic factors. The DID estimation technique was used to assess the change in LARC use. Multinomial logit regression was used to estimate the intervention effect on choosing (a) a LARC (i.e., implant or IUD) and (b) another method (i.e., pill, injectable, condom, PM, and traditional methods). In the LARC model, the omitted category contained pill, injectable, condom, traditional method, and no method. In the other methods model, the omitted

category contained LARCs and no method use. Both models had control variables (i.e., age, parity, education, asset quintile, and religion) as well as variables referring to area (i.e., intervention vs. comparison) and time of the survey (i.e., baseline vs. endline). The intervention effect was estimated by including an interaction term with area and time. When the interaction between area and time was found to be significant, we concluded that the intervention had a significant effect on the outcome variable. STATA data analysis software (version 15) was used for analysis.

Qualitative data were transcribed and translated into English. Data were then analyzed using content analysis, which began on the first day of field data collection activities and led to refinements as the study progressed. Data analysis consisted of reading, coding, displaying of organized data, and reducing the data, followed by data interpretation. We used ATLAS.ti software (version 6.2) to analyze the qualitative data.

Results

Respondent Characteristics and Intervention and Comparison Area Comparability

More than 3,000 women in the intervention area and approximately 2,200 in the comparison area were interviewed in the baseline and endline surveys, with a response rate of about 98 percent (Table 3).

Table 3. Sample size and response rate

Result	Intervention Area (Gurudaspur)		Comparison Area (Lalpur)	
	Baseline	Endline	Baseline	Endline
Household interviews				
Households selected	3,220	3,524	2,240	2,323
Households interviewed	3,208	3,513	2,238	2,315
Response rate (%) ¹	99.6	99.9	99.9	99.7
Interviews with women ages 15–49				
Eligible women selected	3,131	3,570	2,242	2,297
Eligible women interviewed	3,052	3,507	2,198	2,259
Response rate (%) ²	97.5	98.2	98.0	98.3

¹Households interviewed/households occupied

²Respondents interviewed/eligible respondents

The households in the intervention area were better off in terms of household characteristics than households in the comparison area, as shown in Table 4 for most indicators.

Table 4. Distribution of respondents by household characteristics, land ownership, and possessions

Household Characteristics	Intervention Area		Comparison Area	
	Baseline n=3,208	Endline n=3,513	Baseline n=2,238	Endline n=2,315
Household has any land other than homestead	48.9**	50.6	53.8	54.0
Main wall material (cement)	20.5*	23.2	22.9	28.3
Household has improved ¹ sanitation facility	91.5*	93.2	89.4	95.5
Household has shared sanitation facility	40.3*	33.9	36.9	34.7
Household has electricity	94.9	97.7	95.6	96.4
Household has television	48.2**	55.0	57.0	63.7
Household has mobile phone	94.2	95.6	94.5	96.0
Household has refrigerator	28.5**	38.3	22.7	28.8
Household has electric fan	94.8	96.6	94.7	95.2
Household has domestic animals	71.0**	75.1	78.5	78.4

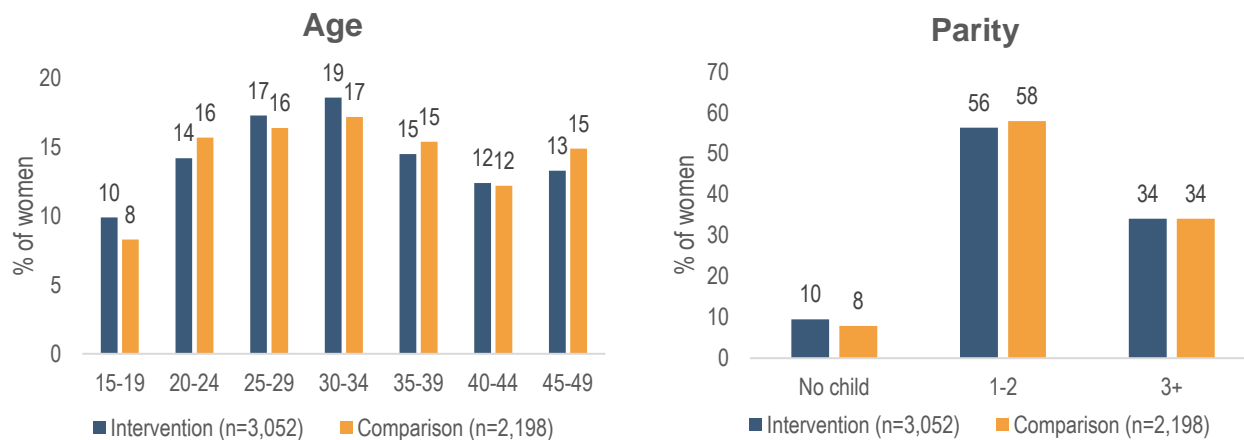
¹Improved sanitation facilities consist of a flush latrine/pit latrine with slab.

*p<0.05 and **p<0.01 for the difference between the intervention and comparison areas at baseline

Demographic and Socioeconomic Characteristics of Respondents

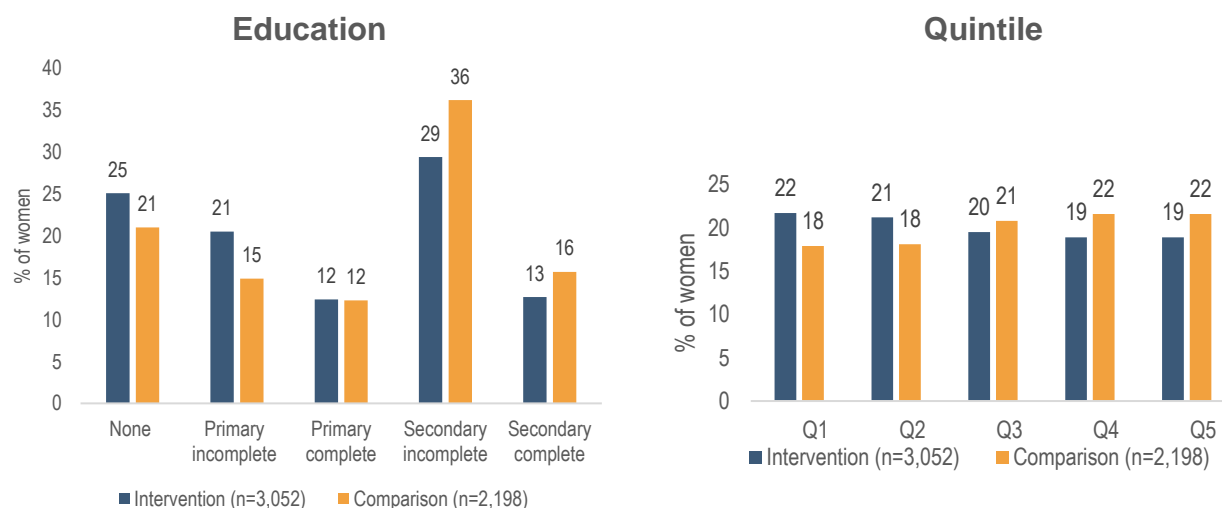
Respondents were comparable between the intervention and comparison areas in terms of age and parity as indicated by statistical tests (Figure 1).

Figure 1. Age and parity distribution of women at baseline, by area



Respondents were also comparable socioeconomically, although those in the comparison area were slightly better off (Figure 2). For example, the proportion of women with secondary or higher education was higher in the comparison than in the intervention area. (Conversely, the proportion of respondents with no education or incomplete primary education was lower in the comparison than in the intervention area.)

Figure 2. Percentage of women by education and household asset quintile at baseline, by area



Similarly, the proportion of women in the upper quintiles was higher in the comparison area than in the intervention area. Women in the comparison area watched television more often than those in the intervention area (Table 5). The better socioeconomic conditions (measured by education and quintile distributions) in the intervention area were statistically significant.

Table 5. Percentage distribution of respondents by exposure to media and cohabitation with husband

Background Characteristics	Intervention Area		Comparison Area	
	Baseline	Endline	Baseline	Endline
	n=3,052	n=3,507	n=3,052	n=2,259
Watch television regularly	57.3**	56.1	67.7	66.6
Living with husband	93.4	91.0	93.4	93.3

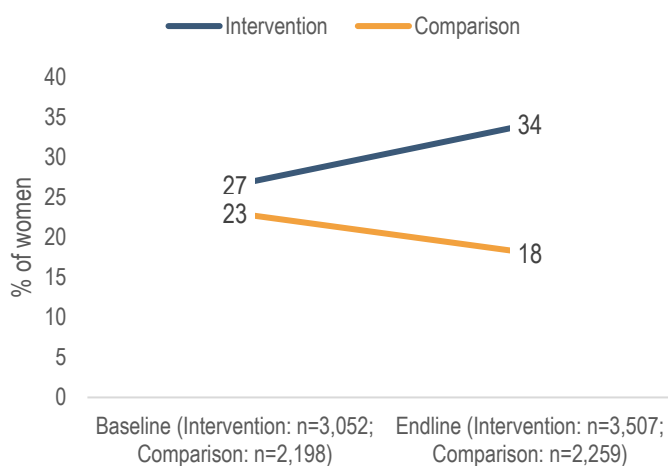
**p<0.01 (difference between intervention and comparison areas at the baseline)

Intervention Effect on Program Outcomes

Client-Worker Contact, Attendance at Clinic and Courtyard Meeting, and Exposure to BCC Materials

Women’s contact with field workers increased from 26.5 percent at baseline to 34.1 percent at endline in the intervention area (Figure 3). In contrast, women’s contact with field workers in the comparison area did not increase, but rather declined from 23 percent to 18 percent.

Figure 3. Percentage of women contacted by FP field workers in last six months, by area



Similarly, women’s attendance at courtyard meetings increased from 0.6 percent to 16.7 percent in the intervention area, while no courtyard meetings were held in the comparison area (Figure 4).

Figure 4. Percentage of women who attended courtyard meetings in last six months, by area

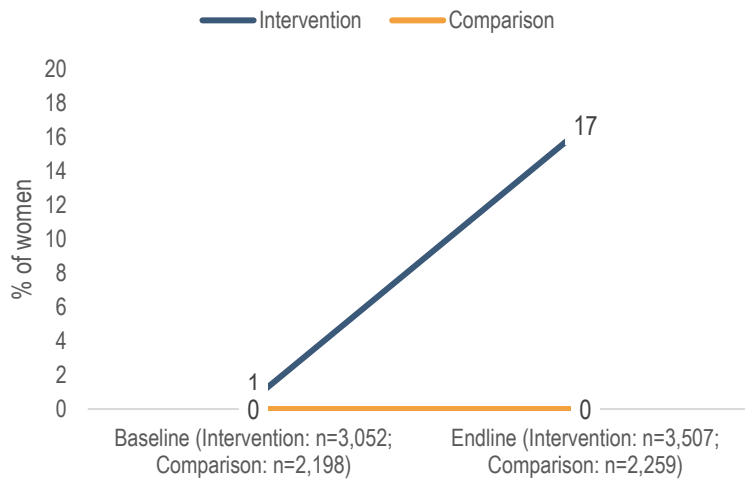
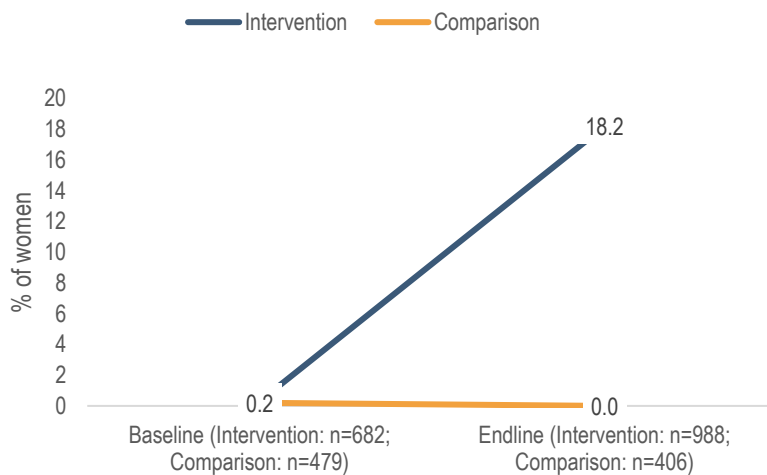


Figure 5 shows a substantial improvement (0.3 percent to 18.2 percent) in exposure to FP leaflets between the baseline and endline surveys among women in the intervention area. No exposure to leaflets was reported by women in the comparison area during the last six months of data collection.

Figure 5. Percentage of women exposed to leaflets during FP workers' home visits or courtyard meetings in last six months, by area



Exposure to Information about LARCs or PMs

Respondents were asked if they had heard about LARCs and PMs in the previous six months. There was a significant increase in the proportion of respondents who reported hearing about LARCs and PMs between the baseline and endline surveys in the intervention area, with no marked improvement in the comparison area (Table 6). The increase was statistically significant for all methods in the intervention area.

The proportion of women who reported having heard about methods was relatively low in general, and particularly low for IUDs and NSV. At baseline, about one-third of women reported having heard about implants

or tubectomy in both intervention and comparison areas. The proportion who had heard about IUDs or NSV was about half that of those who had heard about implants and tubectomy.

The project seems to have widely promoted information on the availability of postpartum LARCs and PMs in the intervention area, where the proportion of respondents who reported having heard about the availability of postpartum LARCs and PMs doubled over the intervention period (last row of Table 6). There was no positive change in the comparison area.

Table 6. Percentage of women who had heard about LARCs or PMs in the last six months

Methods (LARCs and PMs)	Intervention Area			Comparison Area			DID
	Baseline n=3,052	Endline n= 3,507	Endline– Baseline	Baseline n=2,198	Endline n=2,259	Endline– Baseline	
	(1)	(2)	(3)	(4)	(5)	(6)	(3-6)
Implant	35.3	46.4***	11.1	35.3	29.0***	-6.3	17.4***
IUD	14.6	23.4***	8.8	12.7	11.9	-0.8	9.6***
Tubectomy	29.1	38.2***	9.1	30.1	23.4***	-6.7	15.8***
NSV	12.1	18.2***	6.1	8.2	8.7	0.5	5.6***
Facilities providing LARCs and PMs after delivery	16.7	32.8***	16.1	20.2	18.4	-1.8	17.9***

***<0.01 (statistically significant)

Quality of Information and Counseling on LARCs and PMs

Figure 6 shows that a higher proportion of implant acceptors in the intervention area reported receiving essential information about the method than in the comparison area. Implant users were also asked during the follow-up survey if they had received information on possible side effects, follow-up visits and the appropriate time for follow-up services, and which health facility to visit for services for side effects or complications after accepting the method.

Figure 6. Percentage of women who received information related to potential side effects and routine follow-up after accepting the implant.

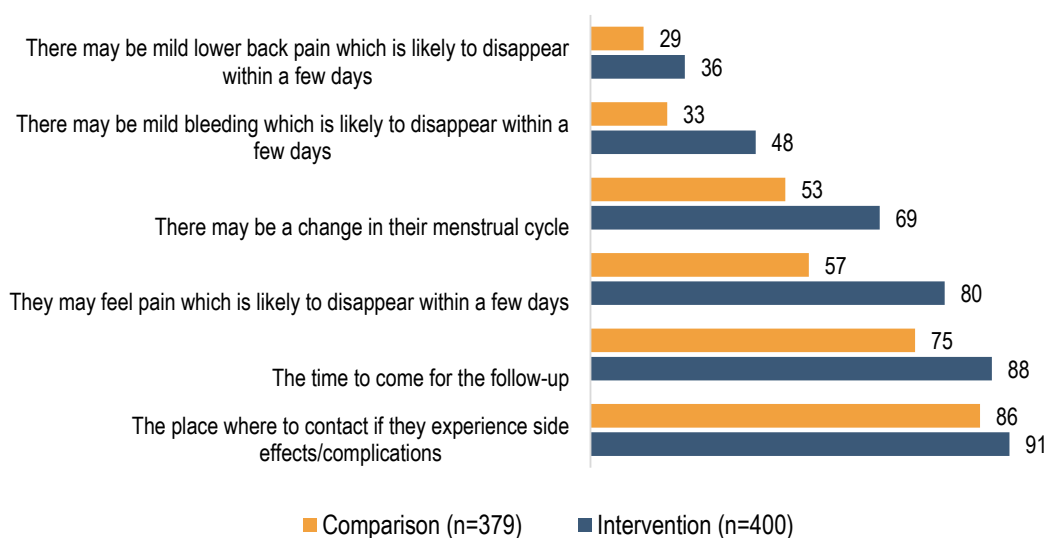
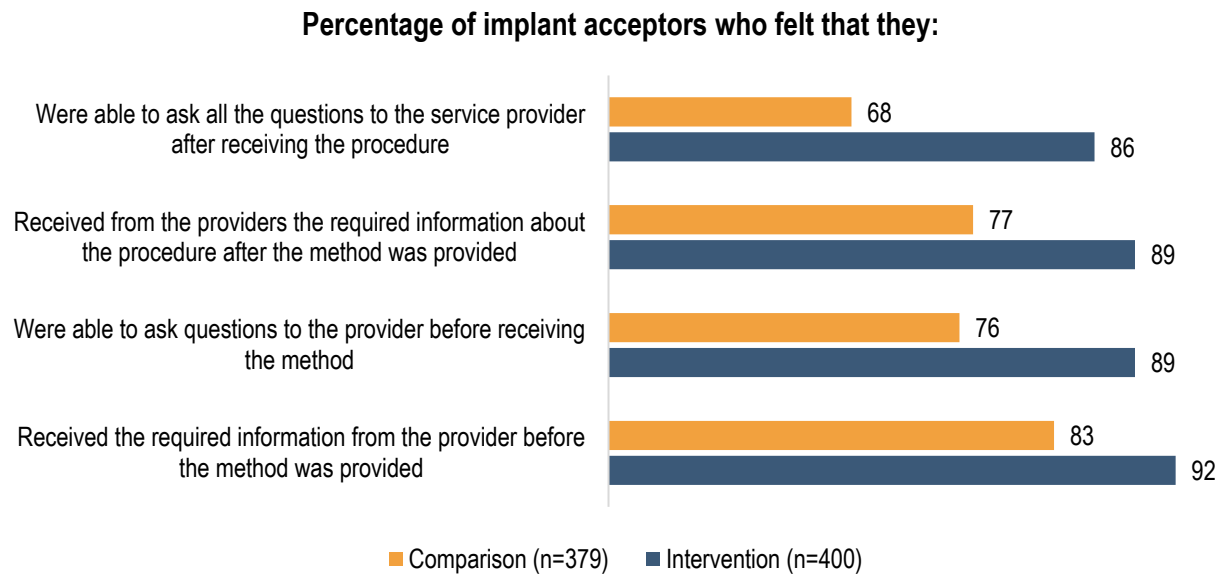


Figure 7 shows that a higher percentage of women who received implants in the intervention area felt that they were able to ask questions and received the required information compared to women in the comparison area.

Figure 7. Quality of care among implant acceptors in the intervention and comparison areas



Provision of Required Information and Counseling Prior to Method Provision

Four key pieces of information related to method provision are required: (a) how long the method is effective, (b) how the procedure is done, (c) how the method works, and (d) advantages and disadvantages of the method. These elements are important in terms of the quality of care related to LARCs and PMs. The provision of this information and counseling for both the implant and IUD was the same for the intervention and comparison areas (data not shown).

However, when two additional indicators were considered, findings in the intervention were better than in the comparison area. In the intervention area, 92 percent of implant acceptors felt that they had received the required information from the provider before the method was provided, compared to 83 percent in the comparison area (Table 7). Similarly, 89 percent of implant acceptors in the intervention area compared to 76 percent in the comparison area felt that they were able to ask the provider all of their questions before receiving the method. This was true for the implant acceptors only and not for IUD acceptors.

Provision of Required Information after Method Provision

More respondents in the intervention area than in the comparison area also reported receiving the required information after the method was given to them (Table 7). Among implant acceptors, 89 percent reported that they had received the required information about the particular LARC procedure, and 86 percent reported being able to ask the provider all of their questions. The corresponding numbers are 77 percent and 67 percent in the comparison area.

A significantly higher proportion of implant acceptors in the intervention area than in the comparison area were informed about (a) where to go to or whom to contact in case of method side effects or complications and (b) where to go for follow-up services. Similarly, a significantly higher proportion of implant acceptors in the intervention area than in the comparison area were told that they may experience some mild side effects but that those would likely disappear in a few days (e.g., mild pain, lower back pain, mild bleeding, change in menstrual cycle).

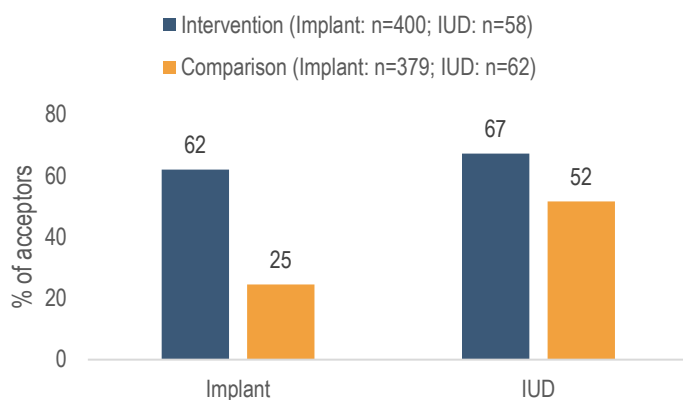
Table 7. Percentage of implant and IUD users who received various types of information about their methods in the intervention and comparison areas

Information	Implant (%)		p-value	IUD (%)		p-value
	Intervention	Comparison		Intervention	Comparison	
	n=400	n=379		n=58	n=62	
Received required information from providers <i>before</i> accepting the method	92.3	82.8	<0.001	93.1	95.2	0.631
Were able to ask service provider questions <i>before</i> receiving the method	89.3	75.7	<0.001	94.8	90.3	0.349
Type of information received <i>after</i> receiving the method						
Facility to contact in the event of side effects/complications	91.3	86.0	0.021	94.8	95.2	0.933
When to come for follow-up	88.3	74.7	<0.001	84.5	74.2	0.165
Possibility of feeling pain	80.3	57.3	<0.001	82.8	80.7	0.765
Changes in menstrual cycle	69.3	53.0	<0.001	70.7	80.7	0.203
Possibility of bleeding	48.3	32.7	<0.001	60.3	69.4	0.301
Possibility of pain in the waist	35.8	28.8	0.040	55.2	61.3	0.497
Received required information from providers <i>after</i> receiving the method	89.0	76.8	<0.001	93.1	93.5	0.922
Were able to ask service provider questions <i>after</i> receiving the method	86.0	67.5	<0.001	94.8	91.9	0.526

Post-Method Follow-Up Services and Client Experience

A significantly higher proportion of respondents in the intervention area were contacted after the method was given compared to respondents in the comparison area (Figure 8). Roughly half of the post-method contacts were made within 72 hours. Most of the contacts were made by the FWAs, followed by FWVs or paramedics.

Figure 8. Percentage of implant and IUD acceptors who were followed up by providers within 72 hours, by area



Intervention Outcomes

Table 8 shows that contraceptive method use increased from 64.6 percent at baseline to 66.2 percent at endline in the intervention area. In the comparison area, it increased from 65.2 percent to 66.9 percent. Use of any modern method increased in a similar fashion, from 58.8 percent to 59.8 percent in the intervention area and from 57.3 percent to 60.0 percent in the comparison area.

Overall, contraceptive use was higher in the comparison area than in the intervention area at both baseline and endline surveys, and the increase in use was higher in the comparison area than in the intervention area (1.7 percentage points vs. 1.6 percentage points). An increase in modern method use was notably higher in the comparison area than in the intervention area (2.7 percent vs. 1.4 percent). The changes in the use of LARCs, PMs, LARCs and PMs together, and short-acting methods are shown in the last four rows of Table 8. The change in use for each method between baseline and endline is also shown. Implant use increased significantly from 3.3 percent to 4.8 percent in the intervention area, but declined from 3.6 percent to 2.5 percent in the comparison area. IUD use increased from 0.5 percent to 0.7 percent in the intervention area, but remained at 0.3 percent in the comparison area. LARC use (including both implant and IUD) increased significantly in the intervention area but not in the comparison area.

The higher increase in modern method use in the comparison area than in the intervention area is explained by the significantly higher increase in short-acting methods in the former area. Short-acting method use increased by 3.2 percentage points in the comparison area while it declined by 0.8 percentage points in the intervention area. LARC and PM use increased by 2.2 percentage points in the intervention area compared to a 0.4 percentage points decline in the comparison area. Both pill and injectable use declined in the intervention area while they increased in the comparison area.

Table 8. Percentage of women using contraceptive methods, by area

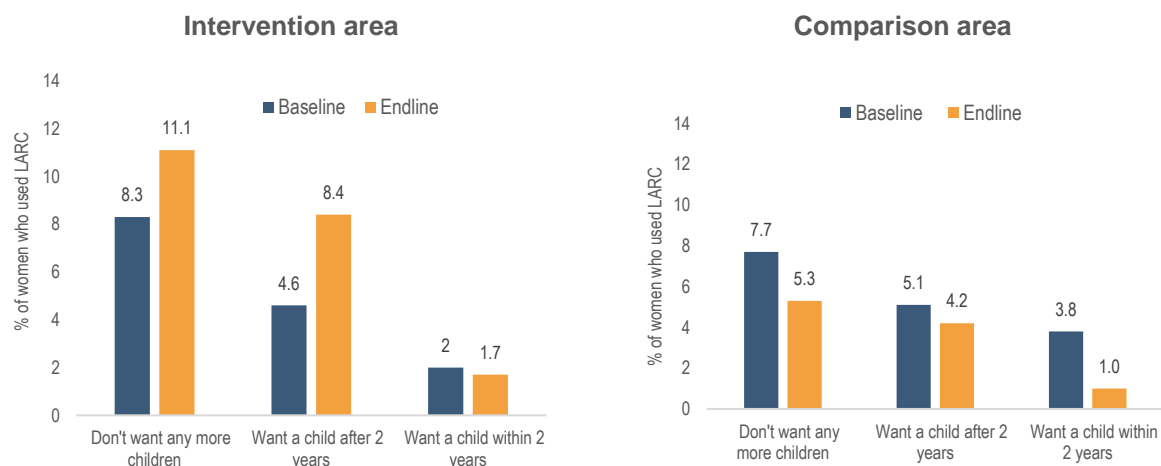
Method	Intervention Area			Comparison Area			DID
	Baseline (n=3,052)	Endline (n=3,507)	Difference	Baseline (n=2,198)	Endline (n=2,259)	Difference	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Any method (CPR)	64.6	66.2	1.6	65.2	66.9	1.7	-0.1
Any modern method	58.4	59.8	1.4	57.3	60.0	2.7	-1.3
Pill	28.3	26.8	-1.5	24.5	25.5	1.0	-2.5
Injectable	9.8	8.7	-1.1	12.4	13.5	1.1	-2.2
Condom	7.2	9.0**	1.8	7.7	8.8	1.1	0.7
Tubectomy	8.5	9.0	0.5	8.6	9.0	0.4	0.1
NSV	0.8	0.8	0.0	0.1	0.4	0.3	-0.3
IUD	0.5	0.7	0.2	0.3	0.3	0.0	0.2
Implant	3.3	4.8**	1.5	3.6	2.5*	-1.1	2.6*
Any traditional method	6.2	6.4	0.2	8.0	6.9	-1.1	1.3
Safe period	4.2	3.5	-0.7	4.7	4.9	0.2	-0.9
Withdrawal	2.0	2.9*	0.9	3.2	2.0*	-1.2	2.1**
Other	0.0	0.0	0.0	0.1	0.0	-0.1	0.1

Method	Intervention Area			Comparison Area			
	Baseline (n=3,052)	Endline (n=3,507)	Difference	Baseline (n=2,198)	Endline (n=2,259)	Difference	DID
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
LARCs (IUD and implant)	3.8	5.5**	1.7	3.9	2.8*	-1.1	2.8**
PMS (tubectomy and NSV)	9.3	9.8	0.5	8.7	9.4	0.7	-0.2
LARCs and PMS	13.1	15.3*	2.2	12.6	12.2	-0.4	2.6
Short-acting methods	45.3	44.5	-0.8	44.6	47.8*	3.2	-4.0*

*p<0.05 and **p<0.01

Figure 9 shows the LARC use rate for the three segments of women (Table 1)—(a) those who did not want to have any more children and were currently using short-acting methods, (b) those who wanted to space their next pregnancy for more than two years and were currently using short-acting methods, and (c) those who did not want to have any more children or wanted to space the next pregnancy for two years or more and were not using any methods. LARC use increased in groups a and b in the intervention area, but it did not increase in the comparison area.

Figure 9. Percentage of women who used LARC (implant and IUD) according to their intention of limiting or spacing pregnancy, in intervention and comparison areas



The intervention effect on LARC use is shown in Table 9. Multinomial logit coefficients are shown for the intervention area, endline, and interaction between intervention area and endline. Coefficients of control variables (i.e., age, parity, education, asset quintile, and religion) are also shown. The last row shows the intervention effect.

A significant interaction between intervention and endline (comparison and baseline being treated as the reference category) means that the intervention effect is statistically significant. This indicates that the change in LARC use (in our case, positive change or increase in the use of LARC) in the intervention area was greater than the change in the comparison area, and thus the greater change is attributable to the intervention. This interaction is significant, as shown in the last row of Table 9. In the “other methods” model, the interaction effect was not significant, meaning that the intervention did not have any impact on other methods.

The results related to the control variables show that LARC use was significantly lower among women in their forties than women in their early twenties. It was higher among women with three or more children than those with less than three children. LARC use was lower among women with secondary or higher education, and lower among women in the highest wealth quintile than in the lowest quintile.

Table 9. Multinomial logit regression coefficients and estimated intervention (interaction) effect for LARC use and other method use (N=11,016)

Factors	LARCs			Other Methods		
	Coefficient	SE	p-value	Coefficient	SE	p-value
Intervention area (ref: comparison area)	-0.127	0.153	0.406	-0.030	0.061	0.630
Endline (ref: baseline)	-0.281	0.177	0.112	0.072	0.066	0.275
Intervention area x Endline	0.711	0.217	0.001	-0.033	0.085	0.704
Age of women (ref: 20–24)						
15–19	-0.712	0.229	0.002	-0.359	0.083	<0.001
25–29	0.096	0.171	0.575	0.100	0.075	0.185
30–34	-0.033	0.177	0.851	0.289	0.077	<0.001
35–39	-0.158	0.193	0.413	0.301	0.084	<0.001
40–44	-1.046	0.226	<0.001	-0.310	0.089	0.001
45–49	-2.302	0.268	<0.001	-1.284	0.091	<0.001
Parity (ref: < 3 children)						
3+ children	1.001	0.124	<0.001	0.633	0.056	<0.001
Education of women (ref: no education)						
Primary incomplete	0.391	0.151	0.010	0.180	0.069	0.009
Primary complete	0.039	0.189	0.836	0.278	0.081	0.001
Secondary incomplete	0.064	0.165	0.696	0.364	0.070	<0.001
Secondary complete or higher	-0.625	0.256	0.014	0.236	0.086	0.006
Asset quintiles (ref: Q ₁)						
Q ₂	-0.155	0.149	0.298	-0.003	0.068	0.969
Q ₃	0.054	0.143	0.706	0.059	0.068	0.387
Q ₄	-0.296	0.158	0.062	-0.060	0.068	0.377
Q ₅	-0.849	0.204	<0.001	-0.065	0.072	0.366
Religion (ref: Muslim)						
Non-Muslim	0.456	0.252	0.071	0.200	0.116	0.085
Intervention effect ^a						
Interaction	0.028	0.007	<0.001	-0.026	0.018	0.163

SE = standard error

^a Estimated from the predicted probabilities of LARC use or other method use obtained from the model for each study area by project year combination, in line with the difference-in-difference approach to estimate intervention impact

Discussion and Policy Implications

Women were segmented according to their pregnancy spacing and limiting needs and use of methods to provide them with appropriate and contraceptive-method-specific counseling and information. From November 2018 through December 2019, in Gurudaspur Upazila in the high-performing Rajshahi Division, three segments of women received information and counseling through home visits and courtyard meetings, with interested women being referred to facilities for LARCs (implant and IUD) or PMs (tubectomy and NSV) services. New LARC and PM acceptors were contacted by providers within 72 hours of method acceptance to provide further counseling. Survey data collected before and after the intervention in Gurudaspur and Lalpur (comparison area) show that there was a significantly greater increase of LARC use in Gurudaspur than in Lalpur. Systematic clinical and BCC training of providers were essential pre-intervention activities.

The greater increase in LARC use in Gurudaspur than in Lalpur is explained by three main factors: a greater level of contact between women and FWAs in Gurudaspur through home visits and courtyard meetings, more availability of method-specific BCC materials, and greater exposure to high-quality pre- and post-counseling and information on methods. The segmented-client intervention empowered FWAs to better focus on clients' needs, disseminate precise information through the project's BCC materials, encourage community engagement that helped minimize misconceptions and stigma, and build community trust through proactive follow-up of new LARC and PM clients.

The significant improvement in LARC use was achieved in 14 months. The annual growth rate of LARC in Gurudaspur was 1.28 percentage points, substantially higher than the Rajshahi Divisional annual growth rate of 0.18 percentage points. The percentage share of LARCs and PMs in the CPR, a measure of effective method mix, increased to 23 percent from 20 percent due to the intervention. In comparison, the Rajshahi Divisional contraceptive method mix of LARCs and PMs was 16 percent in 2017–2018 (NIPORT, et al, 2019).

This increase in LARC use occurred within the government system without any external technical assistance. The only additional task was a question posed by FWAs to women regarding “When do you want to have another child—within two years, after two years, or do you want no more children?” to form the segments of women. Providers received clinical and BCC training prior to the intervention, a necessary activity for any high-quality FP program that should be conducted every two years. Bangladesh's FP program lacks sufficient staff training, as indicated by the 2017 Bangladesh Health Facility Survey, which showed that less than 40 percent of FP staff received training in the last 24 months (NIPORT, MOHFW, 2020).

The segmented intervention should be scaled up at least in the high-performing western region (Khulna, Rajshahi, and Rangpur Divisions), mainly because the demand for family limitation is high in the region. Women in this region experience a high incidence of MR and abortion, presumably due to a high incidence of unintended pregnancy despite their high use of contraception—most of which consists of short-acting methods (pill, injectable, and condoms), which have high early discontinuation and use-failure rates (Singh, et al., 2017). Greater use of LARCs and PMs can reduce the high incidence of MR and abortion, which is both a cause of and concern for maternal morbidity and mortality.

Although the intervention increased LARC uptake significantly, most of the increase was for implants, while uptake of IUDs was low. The IUD is a highly effective, low-cost, 10-year method. IUD use is extremely low in Bangladesh but is popular in other countries with highly successful FP programs, such as China and Vietnam (Department of Economic and Social Affairs, United Nations, 2019). In our intervention, IUD use increased from 0.5 percent to 0.7 percent. The primary reason for the low demand for IUDs is associated with a poor programmatic environment. IUDs are provided by FWVs, who are all women, have only 10 years of schooling, receive training for only 18 months, and begin their careers at a very young age—some of them as teenagers (MOHFW, 2016).

Moreover, they do not receive training of adequate depth. For example, IUD insertion training and practice is done primarily on anatomical models. In an ideal scenario, trainees would be allowed to insert IUDs in real clients under the supervision and mentorship of a trainer, but they do not have access to such in-person insertions

because of a shortage of clients. It is recommended that during a training program, a trainee insert IUDs in five to seven clients under supervision, but this very rarely happens. Often after training in IUD insertions, FWVs go back to their workplace without having gained any confidence in insertions and feel nervous about providing IUDs to clients. This leads to a reluctance among FWVs to encourage women to accept this method. In addition, the lack of long-term positive supervision and monitoring of FWVs prevents them from enhancing their skills in a systematic manner.

Similarly, in our IUD insertion training and practice for this intervention, it was not possible to have a sufficient number of clients for each FWV. We experienced a lack of demand for IUDs and thus low IUD uptake. Our follow-up data analysis showed higher discontinuation rates for IUDs than for implants, and similar discontinuation rates between the intervention and comparison areas. However, our discontinuation results were not robust—only a few cases reached 12 months of follow-up due to the short project duration of only 14 months.

The project was unable to generate viable demand for tubectomy and NSV, mostly because of supply-side weaknesses in which the medical officer (MCH) in Gurudaspur did not have any training in these methods and thus depended on external technical assistance, which was infrequent and intermittent. Thus, it may be possible to increase the use of implants within the system with an intervention like such as this one, but larger demand-side and system barriers make it difficult to increase use of other LARCs (i.e., IUDs) and PMs.

The strength of this segmented-client communication intervention was that it was done without significant external assistance. A previous but smaller-scale intervention was conducted with similar results, but it did have external technical assistance.

Lessons Learned

Opportunities

Simple microplanning can be extremely useful in timely and routinely organizing sessions to provide LARCs and PMs at the UHC and field levels. In the preparatory period, the intervention team observed that LARC and PM sessions were often canceled without prior notice, and clients returned home without services. The team helped the medical officer (MCH) develop a six-monthly schedule of sessions with time and place, which was approved through consensus of the personnel involved in running the sessions. An auxiliary arrangement was made to loan personnel from neighboring upazilas or the district headquarters in case of staff absence or other issues so that no session would be canceled because of such issues.

DGHS providers have the right skills and are highly competent in providing LARCs and PMs, yet they do not offer these services because FP is not included in their responsibilities. The government should devise policies to effectively utilize this opportunity.

Private sector health facilities are in abundance throughout the country. Private providers should be engaged to widen the availability of LARCs and PMs.

Challenges

Significant fundamental human resource challenges exist that have never been addressed in the health system. Provider vacancies have remained widespread for decades, but no solution has been found or attempted. Provider job satisfaction is a serious issue. Medical officers (MCH) are the only providers for LARCs and PMs, but they rarely get promoted to the next level, likely because of the weak health systems approach. At the grass-roots level, FWAs are the backbone of the FP program, yet there is little incentive for good performance. They remain in the same position for their entire careers and are rarely promoted to FP inspector (the FWA supervisor), even if the FWA has a college degree. The situation is similar for FWVs, who have an even weaker supervisory system.

LARC and PM clients and providers receive allowances from the government which is channeled through the medical officer (maternal and child health) office at the UHC under the control of DGFP. Both clients and providers face difficulties in receiving the allowances when LARC and PM services are provided through the DGHS and private sector because of delayed release of funds from DGFP. A more robust system should be developed to avoid the difficulties faced by both clients and providers where services are delivered.

These are simple things—a matter of systemic changes—that should be considered to make the FP program more efficient and ensure that providers are competent and deliver quality services. However, experience suggests that systemic changes rarely happen in the DGFP.

Recommendations

We recommend that the segmented-client communication intervention be scaled up in the national FP program. Scale-up should begin in the western region (Khulna, Rajshahi, and Rangpur Divisions), as women's preference for family limitation is strongest in that part of the country. It can gradually be rolled out to other regions subsequently. An initial pilot of this intervention was done in the eastern region (Chattogram and Sylhet Divisions), where demand for family limitation is lower than in the western and central regions; it worked very well there, albeit with external assistance.

Any agencies devoted to improving FP programs in Bangladesh should come forward to provide technical assistance to the DGFP to scale up this intervention, which can be done at low cost, as the findings suggest.

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