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Healthy Fertility Study: Operations Research to Address Unmet Need for Contraception in the Postpartum Period in Sylhet District, Bangladesh

Final Report

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Acronyms

ANC	Antenatal Care
BDHS	Bangladesh Demographic Health Survey
BCC	Behavior Change Communication
CDPA	Center for Data Processing and Analysis
CHW	Community Health Worker
CM	Community Mobilizer
ENC	Essential Newborn Care
FP	Family planning
FWA	Family Welfare Assistant
FWC	Family Welfare Center
FWV	Family Welfare Visitor
HFS	Healthy Fertility Study
HR	Hazards Ratio
IRB	Institutional Review Board
IUD	Intrauterine Device
JHSPH	Johns Hopkins Bloomberg School of Public Health
LAM	Lactational Amenorrhea Method
LAPM	Long-Acting Permanent Method
LBW	Low Birth Weight
MCHIP	Maternal and Child Health Integrated Program
MNCH	Maternal, Newborn, and Child Health
MNH	Maternal and Neonatal Health
MoHFW	Ministry of Health and Family Welfare
NGO	Nongovernment Organization
PPFP	Postpartum Family Planning
Projahnmo	Project for Advancing the Health of Newborns and Mothers
SACMO	Sub-Assistant Community Medical Officer
UHC	Upazila Health Complex
USAID	U.S. Agency for International Development
WHO	World Health Organization

Background

This report presents findings from the 36-month postpartum follow-up survey of the study “*Operations research to address unmet need for contraception in the postpartum period in Sylhet District, Bangladesh*,” also known as the “Healthy Fertility Study.” Funded by the U.S. Agency for International Development (USAID), this project began in 2007 as a partnership of the Bangladesh Ministry of Health and Family Welfare (MoHFW), the Bangladeshi nongovernmental organization (NGO) Shimantik, the Center for Data Processing and Analysis (CDPA), ACCESS-FP, and the Johns Hopkins Bloomberg School of Public Health (JHSPH). In December 2010, the study transitioned from ACCESS-FP to the USAID-funded Maternal and Child Health Integrated Program (MCHIP), which seeks to contribute to reductions in maternal, newborn, and under-five child mortality in USAID priority countries. The MCHIP partners on the Healthy Fertility Study include Jhpiego and the Institute for International Programs of JHSPH. Shimantik has long provided family planning (FP) services through its clinics in the service areas and carried out other development projects (<http://www.shimantik.org>).

STUDY OBJECTIVES

The specific objectives of this study are:

- **Integrated FP/Maternal Neonatal Health (MNH) Intervention:** To develop and test an integrated FP/MNH service delivery approach in rural settings of Bangladesh, building on the MNH service delivery system developed by the Projahnmo¹ (Project for Advancing the Health of Newborns and Mothers) Study Group. Intervention activities include behavior change communications (BCC) on optimum pregnancy spacing and expansion of contraceptive options for postpartum women, including provision of oral contraceptive pills, condoms, and injectables through household visits by community health workers (CHWs).
- **Integrated Service Delivery Approach:** To assess the strengths and limitations of integrating FP into an ongoing community-based MNH care program.
- **Intervention Impact:** To assess the impact of the intervention package on exposure to key messages, knowledge of contraceptive methods and the benefits of healthy fertility practices, contraceptive prevalence and method mix at different points during the extended postpartum period, and birth spacing.

STUDY DESIGN

The research group “Projahnmo” conducted a cluster-randomized, community-based trial from 2002 to 2006 in Sylhet District of rural, northeastern Bangladesh. This trial developed and tested a community-based MNH program delivered through home visits by locally recruited and trained female CHWs and complemented by community mobilization activities [1].

In December 2007, enrolment began in four unions for a quasi-experimental study designed to test an integrated package of FP/MNH. Referred to as the Healthy Fertility Study (HFS), in this trial, two unions were selected to receive the intervention—an integrated MNH/FP package—and two comparison unions to receive MNH care promotion, as described further below. All pregnant women identified by CHWs in these four unions were offered enrolment in the HFS. A baseline survey of the women who consented to take part in the study was conducted at the time of enrolment. The initial research design aimed to measure a difference in contraceptive prevalence at six months and one-year postpartum between the intervention and comparison unions; the target sample size was 1,330 participants to be recruited over seven months (through June 30, 2008). Subsequently, additional funding was received to expand the study area to eight unions (four intervention, four comparison) and to increase the sample size to 4,430 postpartum women to measure an improvement in birth intervals (reduction in the proportion of births spaced less than 24 months) as the primary outcome.

STUDY AREA

Located in northeastern Bangladesh, Sylhet District (Figure 1) is home to 3.43 million of the country's total population of 16 million (census 2011). Composed of 12 sub-districts or *upazilas*, Sylhet was part of the Assam state in eastern India until 1947 when it formally became part of East Pakistan and ultimately Bangladesh in 1971 (Figure 2).

Figure 1. HFS Study Area in Sylhet, Bangladesh

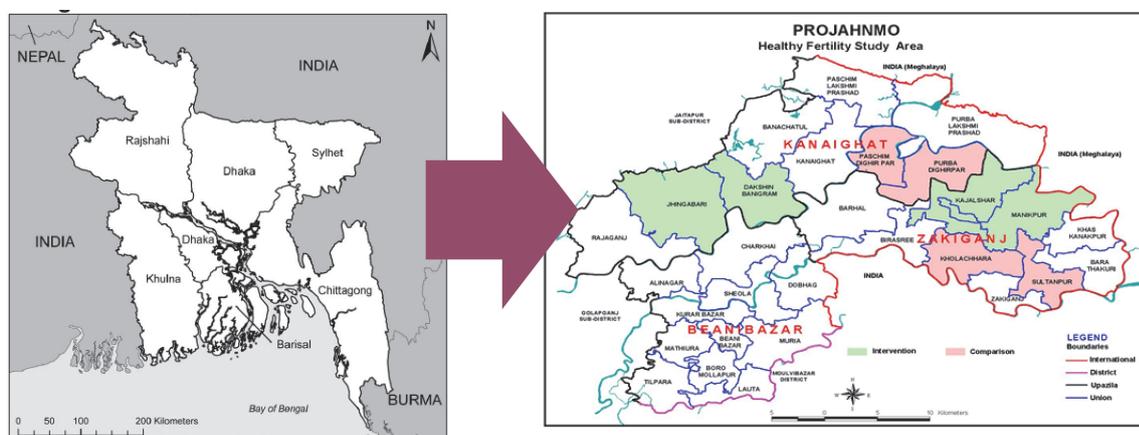


Table 1 outlines basic population health status characteristics for Bangladesh as a whole and Sylhet District. Although national estimates of key maternal health indicators have improved for many indicators, including the total fertility rate, since the Bangladesh Demographic and Health Survey (BDHS) of 2004 (the most recent available during the designing of the study), findings from the latest BDHS published in 2013 still demonstrate that Sylhet falls behind all other districts. Sylhet has reported some of the poorest health indicators in South Asia and globally.¹

Table 1. Population Health Status and Care-Seeking Practices, Bangladesh and Sylhet District [2]

	BANGLADESH		SYLHET	
	BDHS 2004	BDHS 2011	BDHS 2004	BDHS 2011
Total fertility rate	3.0	2.3	4.2	3.1
Short births intervals				
< 24 months	9.9%	11.9%	14%	18.6%
< 36 months	26%	32.2%	31%	46.5%
Contraceptive prevalence rate (any method)	58%	61.2%	32%	44.8%
Receipt of any antenatal care	56%	67.7%	48%	51.8%
Delivery by skilled provider	13%	31.7%	11%	24.4%

SELECTION OF STUDY UNIONS

The study unions were purposely selected so that: 1) unions would not be adjacent to the existing ACCESS project; 2) intervention and comparison unions would not be adjacent to each other to minimize contamination; 3) no unions would include any from the Upazila Health Complex (UHC); and 4) all unions (both intervention and comparison) would include functional government family welfare centers (FWCs) with posted family welfare visitors (FWVs).

Table 2. Health Systems Functionality by Study Union in Sylhet in 2007

	INTERVENTION	COMPARISON
	Total	Total
Family Welfare Clinic		
<i>Number of health facilities</i>	4	4
<i>Medical personnel</i>		
Medical Officers	0	0
Health Assistants	18	16
Sub-Assistant Community Medical Officers (SACMOs)	4	1
FWVs*	4	4
Family Welfare Assistants (FWAs)*	15	15
HFS Community-Based Cadres of Staff		
CHWs*	27	21
Community Mobilizers	8	0

*Key FP providers

Among government personnel, FWVs and FWAs are the main providers of FP services. In the intervention and comparison areas, each of the four FWCs was staffed by an FWV and, on average, three to four FWAs. While intervention area facilities had greater numbers of SACMOs and health assistants, these medical personnel are not traditionally tasked with providing FP services.

SAMPLE SIZE

We have conservatively hypothesized that the proportion of women having another birth within 24 months of the last birth will be 12% in the intervention area, which is 25% lower than the 16% in the comparison area (BDHS, 2004.)

To measure a 25% decrease in the proportion of women with a birth interval of less than 24 months with 80% power and 5% significance level would require a sample size of 1,181 per study arm. Taking into account a design effect of 1.5, we conservatively estimated the sample size to be 1,772 per study arm. We assumed a 20% loss to follow-up (10% per year), which further increased the sample size to 2,215 per study arm. Therefore, we planned to **enroll a total of 4,504 pregnant women in the study.** This sample size is also sufficient to examine the differentials in birth-to-next pregnancy interval between the study arms, given that the number of pregnancies is higher than the number of births. As an example, the sample size required is reduced to 3,398 if birth-to-next pregnancy is conservatively considered to be 20% in the control area and 25% reduction is expected in the intervention arm with design-effect of 1.5, loss to follow-up of 20%, power 80%, and alpha of 0.05.

This sample size also allows for the examination of adverse birth outcomes related to birth spacing, although the study was not originally intended for this purpose. If we consider an “adverse birth outcome” to be a stillbirth, preterm birth, low birth weight (LBW) (< 2,500 g) or neonatal death, we can expect approximately 30% of adverse birth outcomes in the comparison area. For an assumed 25% reduction of adverse outcomes in the intervention area, the required sample to ensure at least 80% power with design-effect of 1.5 and a significance level of 0.05 is 1,620 in each arm. Following the study participants through January 2013, there would be approximately 1,700 births among the sample cohort women, which would allow examination of the effect on adverse pregnancy outcomes.

Figure 2. Timeline of Study Implementation

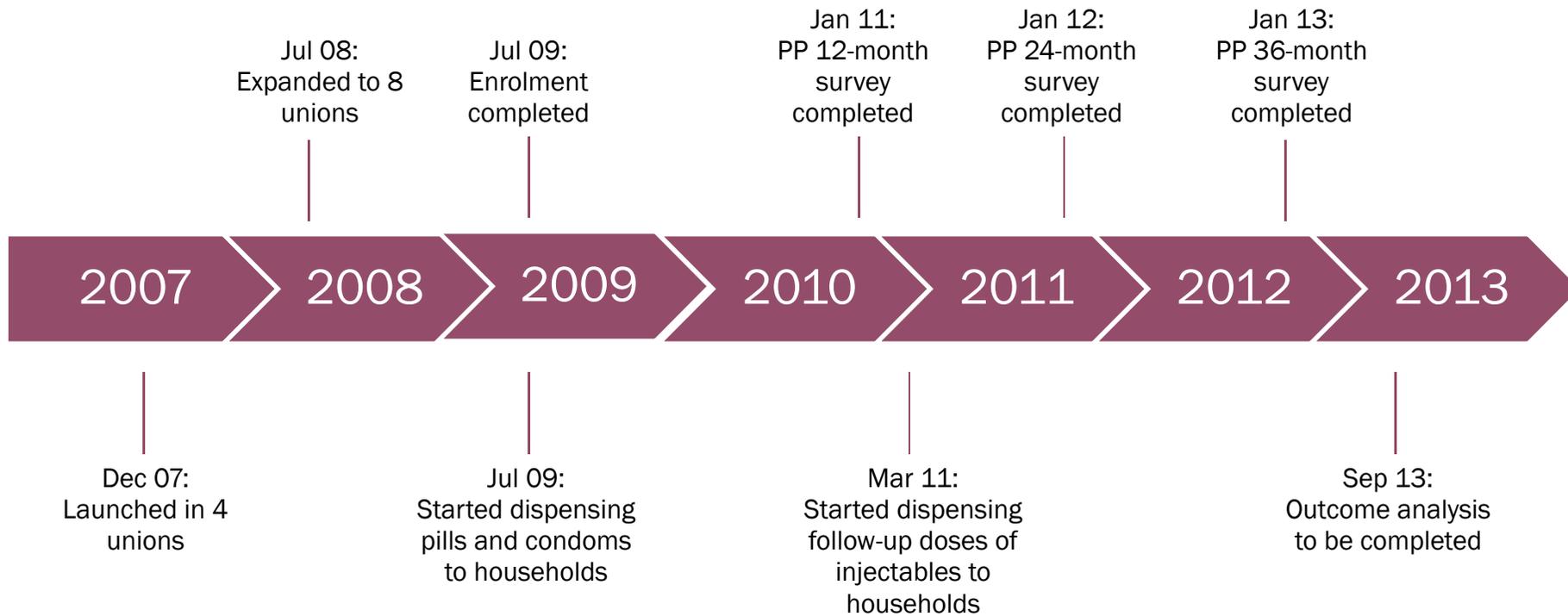


Table 3. Key Messages and Demonstrations for Birth and Newborn Care Preparedness

<p>Pregnancy Care</p> <ul style="list-style-type: none"> ▪ Have at least three antenatal check-ups from a nearby health center or satellite clinic ▪ Receive at least two doses of tetanus toxoid vaccine ▪ Take iron-folic acid supplementation ▪ Eat extra food
<p>Birth Planning</p> <ul style="list-style-type: none"> ▪ Plan for delivery in health facility ▪ If facility-based delivery is not feasible: <ul style="list-style-type: none"> - Choose a trained birth attendant - Prepare site of delivery in the house - Obtain birth kit or boil blade and thread - Plan for emergency transport - Save money for emergency transport
<p>Newborn Care Planning</p> <ul style="list-style-type: none"> ▪ Choose a household member to take care of the baby immediately after birth ▪ Prepare for treatment of breathing problems and practice treatment of breathing problems on a doll ▪ Dry and wrap the baby head to toe soon after delivery and before delivery of placenta, using two separate cloths ▪ Give colostrum ▪ Avoid prelacteal feedings and initiate breastfeeding immediately after birth ▪ Delay bathing of baby for at least 72 hours ▪ Take care of umbilical area: apply no substance other than what might be provided by Projahnmo project workers ▪ Practice exclusive breastfeeding until six months, feeding the baby frequently in the proper position day and night
<p>Emergency Care Planning</p> <ul style="list-style-type: none"> ▪ Seek care for the following maternal danger signs: prolonged labor; hemorrhage; convulsion; edema of the face, hands or legs; or blurred vision ▪ Monitor the baby for signs of infection ▪ Seek care immediately from CHW or health facility if the newborn has the following: no cry or breathing at birth; convulsions; unconsciousness; difficulty breathing; feeling hot or cold to the touch; skin pustules or blisters; umbilical pus or redness; weak, abnormal or absent cry; lethargic or less than normal movement; yellow color of the body; or feeding problem

INTERVENTION PACKAGE

CHW home visits: Each CHW serves a population of about 4,000, or about four villages. In both study arms, ongoing activities included pregnancy surveillance every two months and during the pregnancy period (at 30–32 weeks gestation) to counsel pregnant women about essential newborn care (ENC) practices and maternal and newborn care-seeking (Table 3). Among intervention area participants, one additional visit, which focused on the distribution of oral contraceptives and condoms, was carried out by CHWs as part of ongoing pregnancy surveillance. Following delivery, postpartum visits were conducted in both study arms on day 6 and between days 29 and 35 to: 1) assess the newborn’s health using a modified integrated MCH algorithm through a combination of direct observation and questions posed to the mother; and 2) reinforce messages about ENC. In the intervention area, two additional visits were carried out between months 2 and 3 and months 4 and 5, which focused on contraceptive provision.

Behavior change communications: BCC messages related to postpartum family planning (PPFP) were added to the intervention package in the intervention unions for the HFS¹, as described in Tables 3 and 5. Table 4 outlines details on the timing of delivery of BCC messages specific to the intervention area. During the antenatal care (ANC) visit, CHWs discuss the benefits of birth-to-pregnancy intervals of at least 24 months, the risks of closely spaced births, and return to fertility. They also promote use of the lactational

¹ The training manual is available online: <http://www.pfp-toolkit.org/countrySpecific/files/Bangladesh/HFS%20Training%20manual%20for%20CHW%20and%20CM.pdf>

amenorrhea method (LAM) and exclusive breastfeeding for six months. These messages are reinforced during the postpartum visits and are combined with counseling about specific methods, depending on the individual woman's family planning intentions. Pictorial fliers are given to women in the intervention areas to serve as reminders for the information provided.

Distribution of contraceptives: In the original study design, CHWs were to serve as counselors, but not to distribute FP methods. It was later decided that CHWs should be trained to distribute oral contraceptive pills² and condoms. Pills are distributed only after a woman goes through a verbal screening to rule out risk factors that would preclude pill usage. The training was based on Bangladeshi Government protocols for in-home provision of contraceptives by community-based workers. After receiving institutional review board (IRB) approval for this protocol change in July 2009, CHWs integrated pill and condom provision into their routine pregnancy surveillance visits, which are conducted in each household every two months. Beginning in March 2011, CHWs also began distributing follow-up doses of injectables during pregnancy surveillance visits.

Community-based meetings: In addition to the one-on-one counseling CHWs provide, male and female community mobilizers (CMs) organize monthly meetings at the cluster level to discuss the importance of pregnancy spacing practices and PFP, including LAM. These community meetings are intended to sensitize the community in favor of HFS activities, increasing the number of men exposed to PFP messages (men are typically absent from the homes or do not participate in visits by CHWs) and reaching mothers-in-law who can also be influential in terms of infant feeding and contraceptive use. In addition, community meetings offer a chance to recognize women who practice LAM successfully. Some of these women are designated as "LAM Ambassadors," serving as role models for the successful adoption of LAM and promoting use of LAM to other women in the community.

² Progestin only pills were not available in Bangladesh at the time of the study's inception. For breastfeeding mothers, oral contraceptives are only provided after the screening checklist and when women are six months postpartum.

Table 4. Timing of Delivery of BCC Messages Specific to the Intervention Area

BEHAVIOR CHANGE COMMUNICATION MESSAGES	VISITS INTEGRATED WITH MNH PROGRAM			ADDITIONAL VISITS IN INTERVENTION ARM ONLY	
	During pregnancy	Day 6 postpartum	Day 29–35 postpartum	Months 2–3 Postpartum	Months 4–5 Postpartum
Benefits of longer birth intervals, risks of shorter birth intervals	√	√	√	√	√
ENC, including exclusive breastfeeding	√	√	√		
LAM, promotion of six months of exclusive breastfeeding	√	√	√	√	√
Timing of return to fertility		√	√	√	√
Transition from LAM to other modern contraceptive methods			√	√	√
Discussion of contraceptive methods, potential side effects, strategies to minimize side effects			√	√	√
Referral to health facility for contraceptive methods, if needed			√	√	√

Table 5. BCC Messages Specific to Pregnancy Spacing

<p>Recommendations on healthy timing and spacing of pregnancy</p> <ul style="list-style-type: none"> ▪ 24 months between pregnancies ▪ After a live birth, the recommended interval before attempting the next pregnancy should be at least 24 months to reduce the risk of adverse maternal, perinatal, and infant outcomes ▪ 6 months following miscarriage/induced abortion ▪ After a miscarriage or induced abortion, the recommended interval to the next pregnancy should be at least six months to reduce risks of adverse maternal and perinatal outcomes
<p>Health outcomes related to short birth intervals</p> <ul style="list-style-type: none"> ▪ Less than 24 months from the last live birth to the next pregnancy: <ul style="list-style-type: none"> - Newborns can be born too soon, too small, or with a LBW - Infants and children may not grow well and are more likely to die before the age of five ▪ Less than 6 months from the last live birth to the next pregnancy: <ul style="list-style-type: none"> - Mothers may die in childbirth - Newborns can be born too soon, too small, or with a LBW - Infants and children may not grow well and are more likely to die before the age of five ▪ When pregnancies occur less than 6 months after a miscarriage or abortion: <ul style="list-style-type: none"> - Mothers are at a higher risk of developing anemia or premature rupture of membranes - Newborns can be born too soon, too small, or with a LBW
<p>Benefits of healthy timing and spacing</p> <ul style="list-style-type: none"> ▪ For newborns, Infants, and children under-five: <ul style="list-style-type: none"> - Reduced risk of preterm births, LBW, small for gestational age, and, in some populations, stunting or underweight conditions - Reduced risk of death for newborns, infants, and children under-five - Increased chance that children will experience the health benefits of breastfeeding for a full two years ▪ For mothers: <ul style="list-style-type: none"> - More time to prepare physically, emotionally, and financially for the next pregnancy (if desired) - For young mothers, reduced risk of pregnancy-induced high blood pressure and associated complications; obstructed or prolonged labor; iron deficiency; anemia; and maternal death - More time to focus on her infant, partner, and other children - Reduced risk of pregnancy complications like pre-eclampsia - May increase duration of breastfeeding, which is linked with reduced risk of breast and ovarian cancer ▪ For men: <ul style="list-style-type: none"> - Helps men safeguard the health and wellbeing of their partners and children - Allows time to plan financially and emotionally for their next child (if desired) - Contributes to a man's sense of satisfaction from supporting his partner in making healthy decisions regarding and raising a healthy family ▪ For communities: <ul style="list-style-type: none"> - Reduces deaths and illnesses among mothers, newborns, infants, and children - Helps to reduce poverty and improve the quality of life among community residents

DATA COLLECTION

Table 6 summarizes intervention delivery and data collection visits. A team of data collectors, independent of the CHWs and CMs who implement the intervention, conduct a maximum of eight data collection visits for each study participant. These include one visit during the antenatal period and before the second antenatal counseling visit by the CHW during 30–32 weeks of pregnancy and seven follow-up visits during the postpartum period (on months 3, 6, 12, 18, 24, 30, and 36). Enrolment of pregnant women was completed on July 14, 2009. This report details findings up to 36 months postpartum.

Table 6. Summary of Intervention Delivery and Data Collection Visits

Timeframe	INTERVENTION UNIONS		COMPARISON UNIONS	
	Home visit by CHWs for delivery of intervention	Data collection for monitoring and evaluation	Home visit by CHWs for delivery of intervention	Data collection for monitoring and evaluation
Ongoing				
Pregnancy surveillance every 2 months	√		√	
Distribution of pills and condoms integrated with pregnancy surveillance	√			
Pregnancy				
Baseline survey		√		√
30–32 weeks gestation	√		√	
Postpartum				
Day 6	√		√	
Days 29–35	√		√	
Month 2 or 3	√	√		√
Month 4 or 5	√			
Month 6		√		√
Month 12		√		√
Month 18		√		√
Month 24		√		√
Month 30		√		√
Month 36		√		√

DATA COLLECTION AT 36 MONTHS POSTPARTUM

Apart from the implementation of the intervention, independent data collection for the 36-month postpartum survey began December 17, 2010, and was completed in January 2013. Survey completion rates are comparable between study arms, as shown in Table 7. This table also explains the different denominators that are used in subsequent tables.

Table 7. Data Collection Interview Coverage by Study Arm

	INTERVENTION N (%)	COMPARISON N (%)
Baseline visit status		
Consented to participate in the study	2,409	2,459
Completed baseline interview	2,280	2,290
Completed baseline interview and successfully merged with Projahnmo-3 dataset	2,251	2,264
Women with delivery information at 3-months follow-up/cohort size	2,247	2,257
Completed 3-month postpartum interview	2,183 (97.2)	2,216 (98.2)
Completed 6-month postpartum interview	2,011 (89.8)	1,973 (87.5)
Completed 12-month postpartum interview	2,138 (95.2)	2,157 (95.6)
Completed 18-month postpartum interview	2,118 (94.3)	2,132 (94.5)
Completed 24-month postpartum interview	2,127 (94.7)	2,120 (93.9)

	INTERVENTION N (%)	COMPARISON N (%)
Completed 30-month postpartum interview	2,132 (94.9)	2,110 (93.5)
Completed 36-month postpartum survey	2,117 (94.2)	2,122 (94.0)
Woman was absent	46 (2.1)	51 (2.3)
Dwelling vacant/destroyed	28 (1.3)	33 (1.5)
Woman/respondent died	19 (0.9)	11 (0.5)
Not interviewed for other reasons	37 (1.7)	40 (1.8)
Total	2,247	2,257

In the intervention arm, 94.2% of the cohort of 2,247 women successfully completed the 36-month postpartum interview. Of the approximately 5% of women who did not complete interviews were: absent (2.1%); their home vacant/destroyed (1.3%); deceased (0.9%); or not interviewed for other reasons (1.7%). Among individuals in the comparison arm, 94.0% of the cohort of 2,257 women was successfully interviewed, while 2.3% were absent; 1.5% had dwellings that were vacant/destroyed; 0.5% deceased; and 1.8% were not interviewed for other reasons.

Feasibility and Impact of Integrated FP and MNH Service Delivery

Independent data collection teams administered a household survey aimed at determining contraceptive use practices, health outcomes, and other key indicators at critical points throughout the postpartum period (Section 1.6, Table 6). This section presents critical findings on the feasibility, acceptability, and impact of integrating FP and MNH services.

STUDY POPULATION AND BACKGROUND CHARACTERISTICS

Table 8 presents baseline household member characteristics for women interviewed at 36 months postpartum by study arm. Baseline survey findings suggest that there are statistically significant differences in women’s ages and education, and household wealth status between the intervention and comparison arms.³ In the comparison area, 36% of women have no education, compared to 33% in the intervention area.

Table 8. Baseline Characteristics by Study Arm for 36-Month Respondents

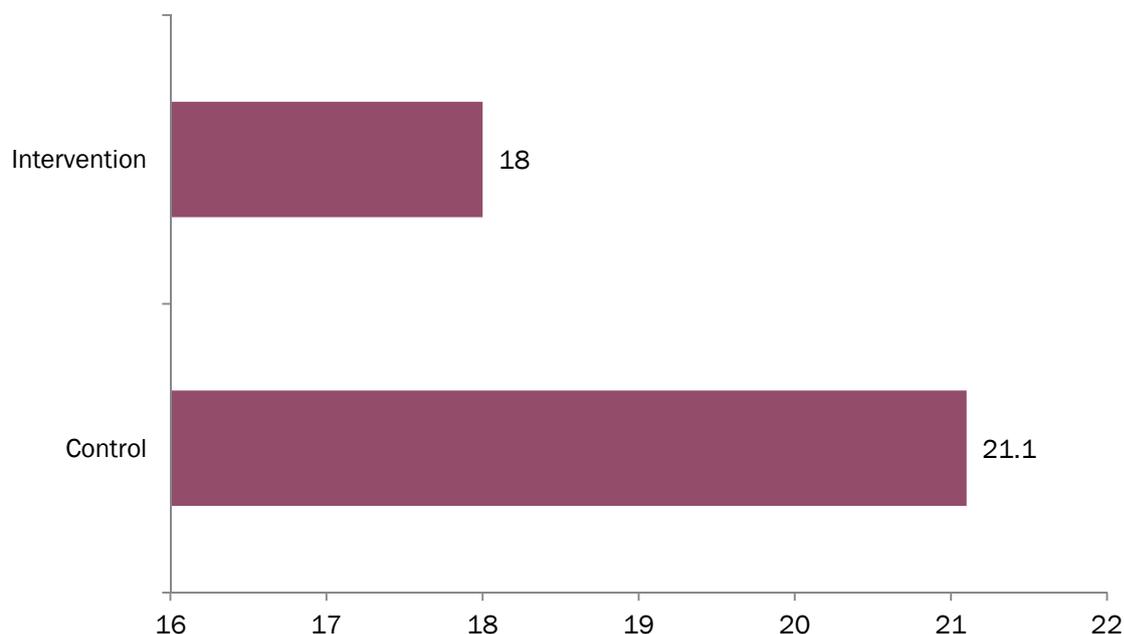
	INTERVENTION (n=2,117)	COMPARISON (n=2,122)	P-VALUE
Participant’s age			
15-24	787 (37.2)	759 (35.8)	0.001
25-29	717 (33.9)	716 (33.7)	
30-34	376 (17.8)	466 (22.0)	
35+	237 (11.2)	181 (8.5)	
Women’s education			
No education	697 (32.9)	771 (36.3)	0.000
1-5 years	656 (31.0)	706 (33.3)	
> 5 years	764 (36.1)	645 (30.4)	
Parity			
0	19 (0.9)	13 (0.6)	0.864
1	485 (22.9)	488 (23.0)	
2	441 (20.8)	434 (20.5)	
3	391 (18.5)	398 (18.8)	
4+	781 (36.9)	789 (37.2)	
Household wealth quintile			
Lowest	371 (17.5)	355 (16.7)	0.049
Second	412 (19.5)	447 (21.1)	
Third	430 (20.3)	471 (22.2)	
Fourth	433 (20.5)	448 (21.1)	
Highest	471 (22.3)	401 (18.9)	

Maternal contraceptive use before pregnancy at baseline (i.e., index pregnancy) was higher in the comparison area at 21.1%, compared to 18% in the intervention area (Figure 3). HFS activities have sought to determine the impact of integrating a community-based system of FP delivery into a continuum of maternal, newborn, and child health (MNCH) services. The

³ Selection processes for intervention and comparison areas were based upon measures of facility functionality (Table 2). In light of the significant differences in characteristics across study arm, more robust regression analyses are indicated to control for baseline differences.

impact of FP at 36 months was considered based on contraception use, including method and source, and pregnancy outcomes.

Figure 3. Maternal Contraceptive Use Rate Prior to Pregnancy at Baseline



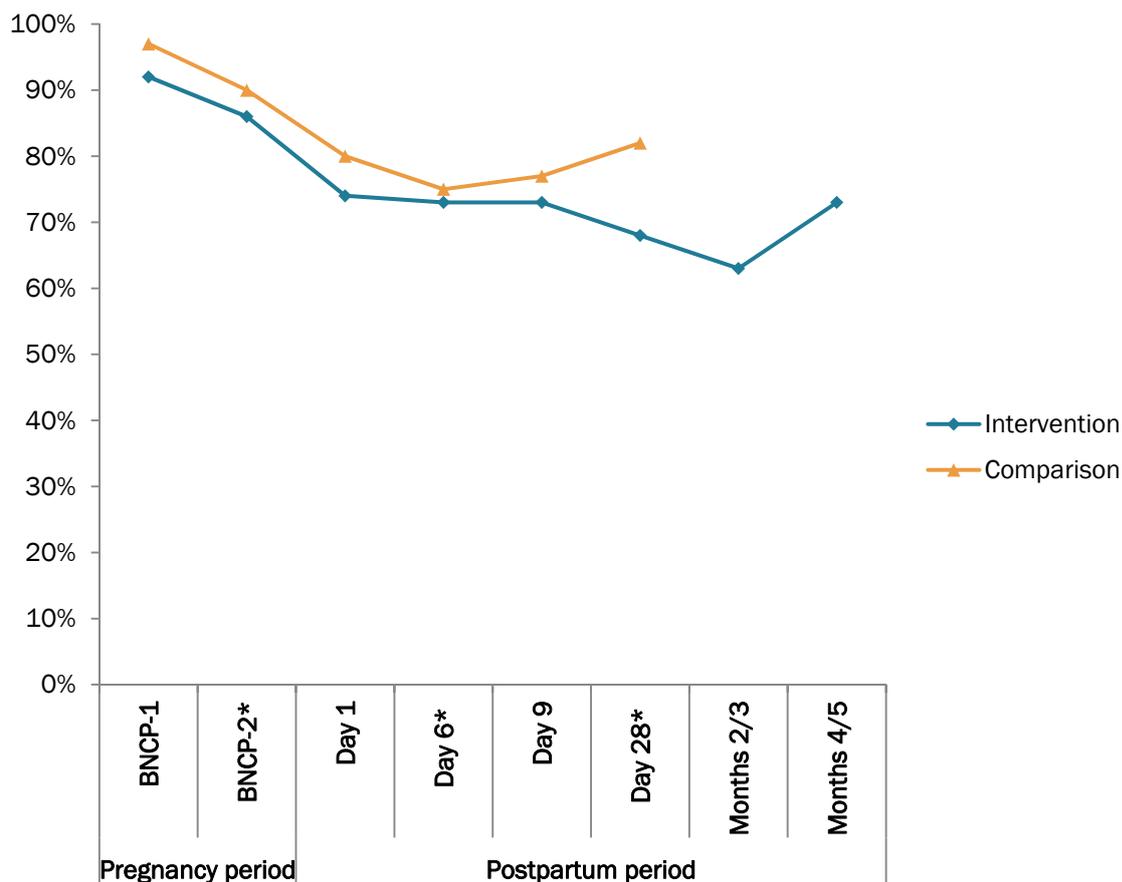
FEASIBILITY AND ACCEPTABILITY OF INTEGRATED SERVICE DELIVERY

The feasibility and acceptability of FP-MNH integration was assessed according to domains of CHW visit coverage, attendance of community meetings, and exposure to BCC materials.

Coverage of home visits

Data on the reported coverage of critical MNH home visits and additional postpartum visits in the intervention arm were used to ascertain whether HFS activities were feasible at high coverage rates and to determine whether they had a negative impact on MNH service provision (Figure 4). Coverage rates for the two pregnancy visits were comparable across study arms for the first (92% and 97%) and second (86% and 90%) pregnancy visits in the intervention and comparison areas respectively. In the 28 days following delivery, coverage for home visits was comparable across study arms; however, CHWs in the intervention area continued to report lower coverage for all visits. Coverage specific to integrated visits—or those during which FP messages were integrated into existing MNH activities—during pregnancy and on days 6 and 28 postpartum followed this trend and also were lower in the intervention area. Despite these differences across study arms, it is noteworthy that overall coverage remained high in intervention and control areas, exceeding 70% for the majority of visits. Finally, coverage for the additional HFS postpartum visits at months 2 or 3 and 4 or 5 was 63% and 73%, respectively. Home visits in the comparison area concluded at 28 days following delivery.

Figure 4. Reported CHW Visit Coverage



Attendance of community meetings

Beyond coverage of home visits, rates of attendance at community mobilization meetings were used as a measure of HFS feasibility and acceptability. CMs recruited LAM Ambassadors and worked collaboratively with them to raise awareness of BCC messages during community meetings and one-on-one engagement with key stakeholders in the intervention area. During follow-up visits, HFS participants were asked about their participation in community mobilization meetings (Table 9). By 36 months postpartum, 100% of study participants had attended at least one community mobilization meeting. Study participants reported lower, but increasing trends over time in the attendance of these community meetings by their husbands (from 21% at 3 months to 71% at 36 months) and/or mothers-in-law (from 23% at 3 months to 63% at 36 months).

Exposure to BCC materials

Women enrolled in the study were asked about exposure to BCC tools on birth spacing, LAM, and postpartum care. Exposure to all three materials was nearly universal (Table 9).

Table 9. Exposure to BCC Materials and Attendance of Community Mobilization Meetings among Intervention Arm Study Participants*

	3 MONTHS (n=2,183)	6 MONTHS (n=2,011)	12 MONTHS (n=2,138)	18 MONTHS (n=2,118)	24 MONTHS (n=2,125)	30 MONTHS (n=2,132)	36 MONTHS (n=2,117)
Exposure to program communication materials							
Birth spacing pamphlet	91%	94%	93%	-	-	-	-
Leaflet on postpartum care	90%	94%	-	-	-	-	-
Leaflet on LAM	91%	95%	-	-	-	-	-
Attendance at community mobilization meeting							
By study participant (mother)	78%	86%	97%	98%	99%	99%	100%
By her husband	21%	26%	29%	40%	54%	60%	71%
By her mother-in-law	23%	29%	36%	46%	48%	58%	63%

IMPACT OF INTEGRATED SERVICE DELIVERY

The effectiveness of FP-MNH integration was assessed in two critical ways: 1) use of contraceptives; and 2) impact of HFS activities on newborn care practices.

Contraceptive use

HFS activities were associated with a 27% increase in contraceptive uptake in the intervention arm from 18% at baseline to 45% at 36 months postpartum. Figure 5 presents postpartum contraceptive use among women with a surviving infant at 3, 6, 12, 18, 24, 30 and 36 months follow-up. In both study arms, contraceptive use rates (any method) increased from 3, 6, 12, and 18 months postpartum. However, between 18 and 36 months, contraceptive use rates in both arms stabilized and did not increase significantly. In the intervention arm, any contraceptive method use increased from 36% (23% for LAM and 13% for any modern method) at 3 and 6 months to 47% at 18 months. Contraceptive use then plateaued through 36 months. In the comparison arm, any method use increased from slightly more than 10% at 3 months to 34% at 18 months, and 37% at 30 months to 39% at 36 months (Figure 5). Overall, any contraceptive method use at 36 months postpartum was higher among intervention area participants (n=915; 45%), compared to those in the comparison arm (n=784; 39%). Among specific types of contraceptives, 99% of users relied on modern methods in the intervention arms, compared to 97% in comparison arms. Sterilization significantly increased in the intervention arm (n=113; 5.5%) compared to the control arm (n=86; 4.2%).

Figure 5. Use of Any Contraceptive Method at 3, 6, 12, 18, 24, 30, and 36 months Postpartum

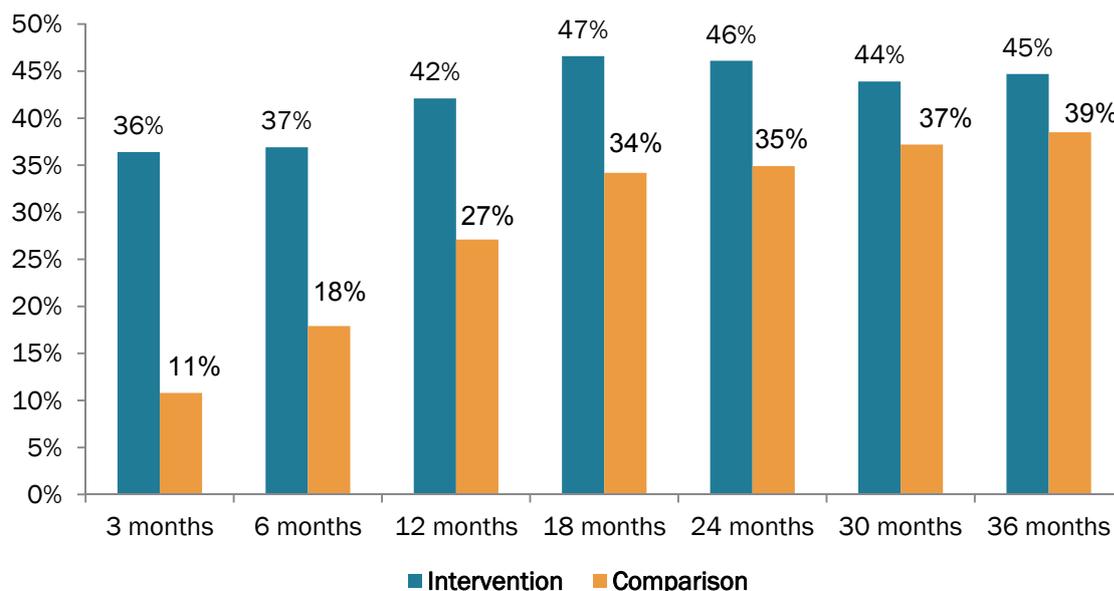
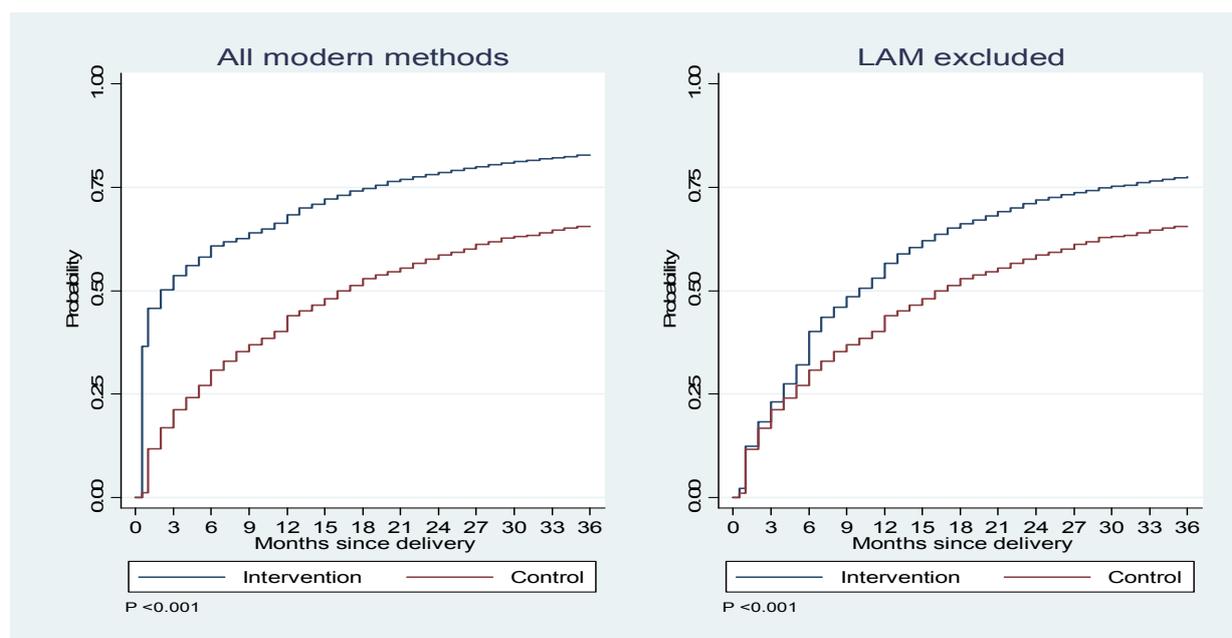


Figure 6. Probability of Adoption of Contraceptive Method by 36 Months Postpartum, with and without LAM



Contraceptive use by maternal characteristics

Table 10 presents the contraceptive use rate at 36 months postpartum by household and maternal characteristics according to method and by study arm. When stratified by key background characteristics, modern contraceptive method use was highest among women 25–29 years of age in both study arms. Women’s educational status was significantly associated with method use in both study areas, as women with any education were more likely to use any method (43% in the intervention, 39% in the comparison area) than those with no education. In the intervention arm, the use of any modern method at 36 months postpartum was slightly, but significantly higher in the lowest quintile. In the comparison arm, use of any modern method was lowest in the lowest quintile although the difference was not statistically significant.

Table 10. Current Rate of Contraceptive Use at 36 Months Postpartum among Women with a Surviving Infant by Maternal Characteristics and Study Arm (Column Percentages)

	INTERVENTION			COMPARISON		
	Modern method (n=883)	Periodic abstinence withdrawal (n=32)	No method (n=1,132)	Modern method (n=718)	Periodic abstinence, withdrawal (n=66)	No method (n=1,252)
Participant's age						
15-24	259 (29.3)	7 (21.9)	483 (42.7)	238 (33.2)	17 (25.8)	474 (37.9)
25-29	319 (36.1)	8 (25.0)	377 (33.3)	257 (35.8)	21 (31.8)	413 (33.0)
30-34	187 (21.2)	5 (15.6)	176 (15.6)	172 (24.0)	19 (28.8)	254 (20.3)
35+	118 (13.4)	12 (37.5)	96 (8.5)	51 (7.1)	9 (13.6)	111 (8.9)
P value	0.000			0.028		
Women's education						
No education	309 (35.0)	14 (43.8)	348 (30.7)	249 (34.7)	23 (34.9)	458 (36.6)
1-5 years	283 (32.1)	7 (21.9)	342 (30.2)	239 (33.3)	23 (34.9)	425 (34.0)
> 5 years	291 (33.0)	11 (34.4)	442 (39.1)	230 (32.0)	20 (30.3)	369 (29.5)
P value	0.034			0.818		
Parity						
1	154 (17.4)	3 (9.4)	310 (27.4)	142 (19.8)	9 (13.6)	321 (25.6)
2	139 (15.7)	8 (25.0)	279 (24.7)	137 (19.1)	11 (16.7)	266 (21.3)
3	176 (19.9)	2 (6.3)	209 (18.5)	134 (18.7)	11 (16.7)	238 (19.0)
4+	414 (46.9)	19 (59.4)	334 (29.5)	305 (42.5)	35 (53.0)	427 (34.1)
P value	0.000			0.001		
Household wealth quintile						
Lowest	209 (23.7)	4 (12.5)	268 (23.7)	109 (15.2)	16 (24.2)	218 (17.4)
Second	155 (17.6)	6 (18.8)	217 (19.2)	143 (19.9)	18 (27.3)	270 (21.6)
Third	165 (18.7)	8 (25.0)	197 (17.4)	167 (23.3)	8 (12.1)	277 (22.1)
Fourth	189 (21.4)	3 (9.4)	194 (17.1)	157 (21.9)	9 (13.6)	260 (20.8)
Highest	165 (18.7)	11 (34.4)	256 (22.6)	142 (19.8)	15 (22.7)	227 (18.1)
P value	0.037			0.155		

Contraceptive use by method

Table 11 depicts postpartum contraceptive use by method for both intervention and comparison study arms. Among contraceptive methods, LAM was an important method of contraception at 3 and 6 months postpartum in the intervention area. At 12, 18, 24, 30, and 36 months postpartum, pills were the preferred method for users in both study arms, followed by injectables and condoms. Reported use of sterilization was higher in the intervention arm in all surveys at 12, 18, 24, 30, and 36 months postpartum. Among categories of traditional methods, periodic abstinence and withdrawal accounted for 1.6% of methods in the intervention area and 3.2% in the comparison area at 36 months postpartum.

Table 11. Postpartum Contraceptive Use by Method among Women with a Surviving Infant by Study Arm and Survey Period

	INTERVENTION							COMPARISON						
	3 months	6 months	12 months	18 months	24 months	30 months	36 months	3 months	6 months	12 months	18 months	24 months	30 months	36 months
	n=2,014	n=1,852	n=1,964	n=1,944	n=2,056	n=2,060	n=2,047	n=2,000	n=1,786	n=1,945	n=1,932	n=2,031	n=2,024	n=2,024
LAM	23%	12%	0%	0%	0%	1%	1%	0%	0%	0%	0%	0%	0%	0%
Pill	3%	9%	20%	22%	20%	17%	15%	4%	7%	11%	14%	15%	15%	15%
Condoms	4%	7%	10%	10%	7%	7%	6%	2%	2%	3%	3%	3%	3%	4%
Injectables	5%	6%	8%	9%	10%	10%	10%	3%	6%	9%	10%	10%	10%	9%
Intrauterine device (IUD)/implants	0%	0%	1%	2%	3%	4%	5%	1%	1%	1%	2%	3%	3%	3%
Sterilization	1%	2%	2%	3%	3%	5%	6%	0%	1%	1%	2%	2%	3%	4%
Withdrawal or periodic abstinence	1%	1%	1%	1%	1%	1%	2%	1%	2%	2%	3%	2%	3%	3%
Any method user	36%	37%	42%	47%	46%	44%	45%	11%	18%	27%	34%	35%	37%	39%

Figure 7. Adoption Patterns of Postpartum Contraceptive Methods

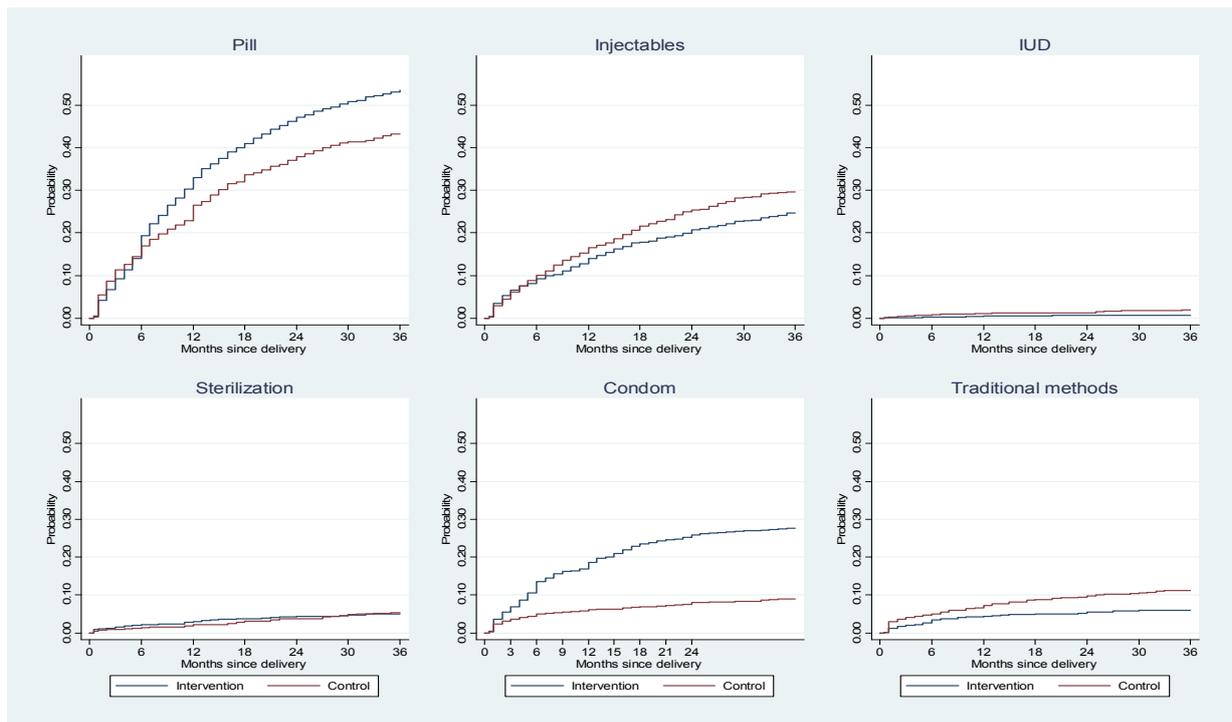


Figure 8. Postpartum Contraceptive Continuation Rates

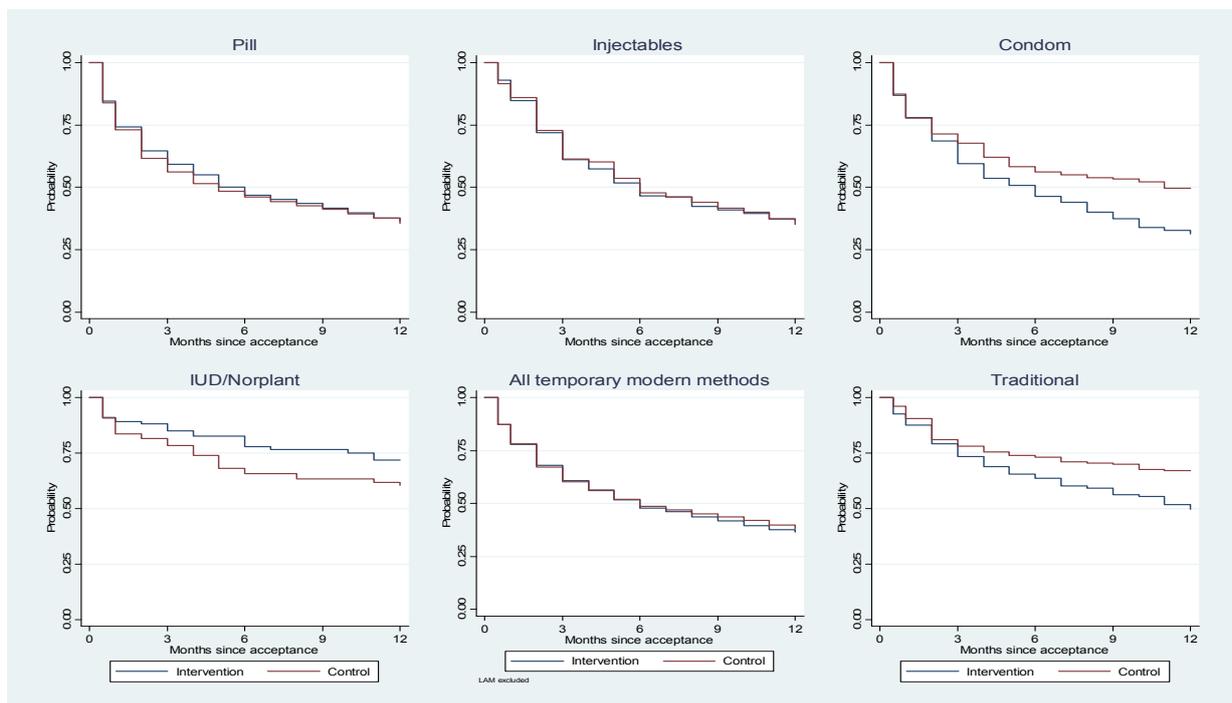


Figure 7 builds upon point estimates of users' preferences for contraceptive methods by depicting the cumulative probability of adoption by method. For the first method of contraception adopted, the hazards of pill adoption is approximately 10% higher and the probability of condom adoption approximately 20% higher for the 18–36 months postpartum window in the intervention area, compared to the control area. Figure 8 illustrates contraceptive continuation rates by method. Findings suggest that continuation rates are still not largely different, except for IUD/Norplant. However, up to 6 months, pill continuation probabilities are higher in the intervention area, but later decline.

Source of Contraceptives

Table 12 presents data on the source from where women obtained the contraceptives they used at 36 months postpartum, with HFS CHWs shown to be the primary source for condoms (88%) and pills (71%) in the intervention area. In the comparison area, pharmacies or shops were the main source for condoms (88%) and pills (57%), followed by government health facilities. In the intervention area, injectables were received from HFS CHWs (65%), government health facilities (19%), NGOs (10%), or pharmacies/shops (5%). In the comparison arm, injectables were provided overwhelmingly by government health facilities (75%), followed by pharmacies/shops (20%), and NGO clinics (4%). This difference in rates of care-seeking from government health facilities between study arms may be attributable to the higher functionality of government health facilities in the comparison area. However, it is noteworthy that the introduction of community-based provision of injectables through HFS CHWs in March 2011 may also have influenced the preferred source. Among long-acting permanent methods (LAPMs) of contraception, government health facilities were the preferred source, accounting for 80% of sterilizations and 100% of IUDs/implants in the intervention arm compared to 87% and 99%, respectively, in the comparison area.

Non-use of Contraceptives

Those who did not use contraceptives at 36 months were asked to provide reasons during the 36-month postpartum survey interview (Table 13). Mirroring trends observed in the 12, 18, 24, and 30 months postpartum follow-up reports, “husband abroad” was the primary reason why women reported not using a contraceptive method at 36 months postpartum in the intervention area (49%). In the comparison area, “husband’s disapproval” was the leading reason for non-use cited by 42% of respondents at 36 months. In both study arms, the reported “desire to become pregnant” increased from 12 to 36 months postpartum. Additional reasons cited among intervention women included religious prohibition (14%), dislike on the part of the woman (9%), and health concerns (11%). In the comparison area at 36 months, the leading reasons for non-use were husband’s disapproval (42%), desire to become pregnant (39%), and religious prohibition (23%), followed by husband abroad (16%), health concerns (16%), and absence of a suitable method (8%).

Discontinued Use of Contraceptives

Beyond the identification of trends regarding contraceptive use and non-use, it is noteworthy that in some cases women who were using contraceptives before 36 months postpartum discontinued use. Among women discontinuing use, the largest percentage of women in both arms listed side effects as their reasons for discontinuing pills (45% in the intervention and 51% in the comparison) and injectables (57% in the intervention and 70% in the comparison). Becoming pregnant was the most frequently cited reason for condom discontinuation in the comparison arm (26%), followed by wanting a more effective method (20%), husband disapproval (15%), and wanting to become pregnant (15%). Husband disapproval (35%) and wanting a more effective method (22%) were the major reasons for discontinuation in intervention arm.

Table 12. Method Source among Contraceptive Users at 36 Months Postpartum by Study Arm

	INTERVENTION					COMPARISON				
	Pill	Condoms	Injectables	IUD/ Implant	Sterilization	Pill	Condoms	Injectables	IUD/ Implant	Sterilization
	(n=307)	(n=129)	(n=212)	(n=96)	(n=113)	(n=304)	(n=76)	(n=186)	(n=66)	(n=86)
HFS CHW	71%	88%	65%	0%	0%	0%	0%	0%	0%	0%
Pharmacy or shop	22%	10%	5%	0%	0%	57%	87%	20%	0%	0%
Government facility/ clinic/FWA	6%	1%	19%	100%	80%	41%	13%	75%	99%	87%
NGO clinic/depot holder/ field worker	0%	1%	10%	0%	2%	2%	0%	4%	2%	2%
Qualified doctor	0%	0%	0%	0%	11%	0%	0%	1%	0%	6%
Other	1%	1%	0%	0%	8%	0%	0%	0%	0%	5%

Table 13. Leading Reasons for not Using Contraceptive Method among Non-Users at 12, 18, 24, 30, and 36 Months Postpartum by Study Arm

	INTERVENTION					COMPARISON				
	12 months	18 months	24 months	30 months	36 months	12 months	18 months	24 months	30 months	36 months
	(n=955)	(n=784)	(n=677)	(n=594)	(n=519)	(n=1,473)	(n=1,230)	(n=1,081)	(n=951)	(n=864)
Husband abroad	43%	44%	45%	43%	49%	13%	14%	13%	14%	16%
Postpartum amenorrhea	20%	10%	5%	5%	7%	33%	18%	11%	12%	18%
Husband disapproves	14%	20%	27%	33%	37%	17%	28%	37%	39%	42%
Wanted to become pregnant	14%	14%	19%	25%	39%	12%	15%	22%	32%	39%
Religious prohibition	8%	9%	8%	12%	14%	11%	17%	23%	22%	23%
No method suitable	6%	6%	5%	4%	3%	17%	20%	16%	10%	8%
Health concern	5%	5%	6%	5%	11%	7%	12%	13%	14%	16%
Respondent dislikes	3%	6%	7%	8%	9%	4%	8%	10%	12%	11%
Infrequent sex	2%	2%	0%	1%	1%	3%	3%	2%	2%	1%
Other family members disapprove	2%	3%	2%	1%	2%	10%	7%	7%	5%	6%
Other*	6%	8%	7%	8%	9%	10%	12%	11%	11%	11%

*Includes lack of access, too costly, not available, and concern that it would interfere with breastfeeding

Table 14. Reasons for Discontinuation of Three Most Common Methods at 36 Months Postpartum, by Study Arm (Column Percentages)

	INTERVENTION			COMPARISON		
	Pill	Condoms	Injectables	Pill	Condoms	Injectables
	(n=725)	(n=330)	(n= 318)	(n=432)	(n=65)	(n=322)
Infrequent sex/husband away	5%	2%	4%	4%	2%	3%
Became pregnant	3%	12%	0%	3%	26%	0%
Wanted to become pregnant	9%	14%	6%	10%	15%	7%
Husband disapproved	4%	35%	3%	2%	15%	2%
Wanted more effective method	9%	22%	7%	5%	20%	2%
Health concerns	1%	0%	2%	0%	0%	0%
Side effects	45%	1%	57%	51%	2%	70%
Lack of access/too far	1%	3%	4%	3%	2%	5%
Costs too much	0%	0%	0%	1%	0%	0%
Inconvenient to use	4%	6%	1%	4%	5%	0%
Fatalistic	0%	0%	0%	0%	0%	0%
Difficult to get pregnant/menopausal	0%	0%	4%	1%	0%	3%
Marital dissolution	0%	0%	0%	0%	0%	0%
Other/don't know	19%	6%	12%	16%	14%	8%

Birth-to-pregnancy interval analysis

Beyond consideration of the larger implications of the increase in early and sustained adoption of contraceptive use, the incidence of pregnancy and the interval between pregnancies were considered. During the 36 months of postpartum observation, HFS activities were associated with a 21% reduction in the cumulative probability of postpartum pregnancy after the delivery of the index child (Figure 7; hazards ratio [HR]: 0.79; 95% CI: 0.70–0.89). Findings indicate that in the intervention area, 40% of women became pregnant by 24 months, compared to 48% in the control area. By 36 months postpartum, 47% of women in the intervention area became pregnant compared to 56% in the control area. In addition to significant declines in pregnancy incidence, the hazards of shorter birth intervals reduced by 21% (Figure 8; HR: 0.79; 95% CI: 0.70–0.88).

Figure 9. Probability of Postpartum Pregnancy after the Delivery of the Index Child

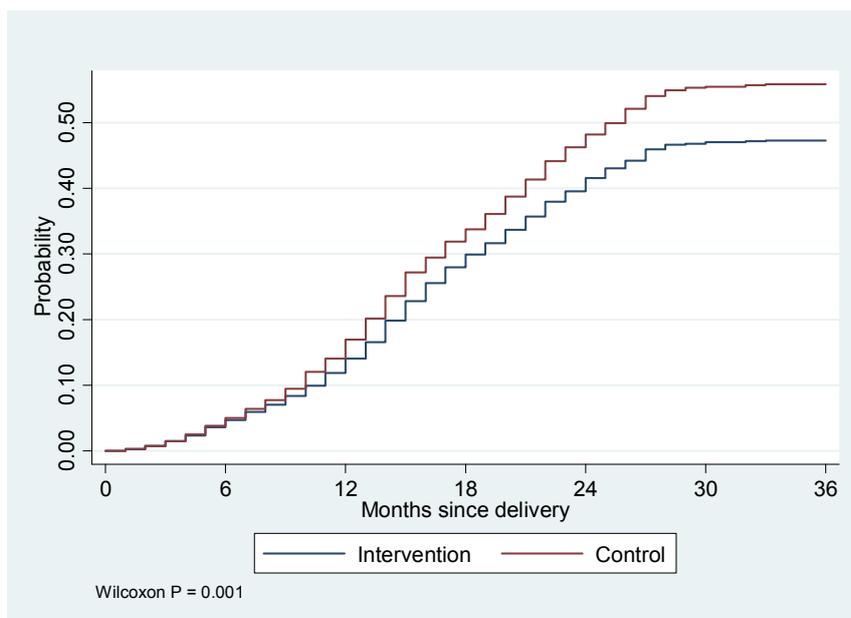
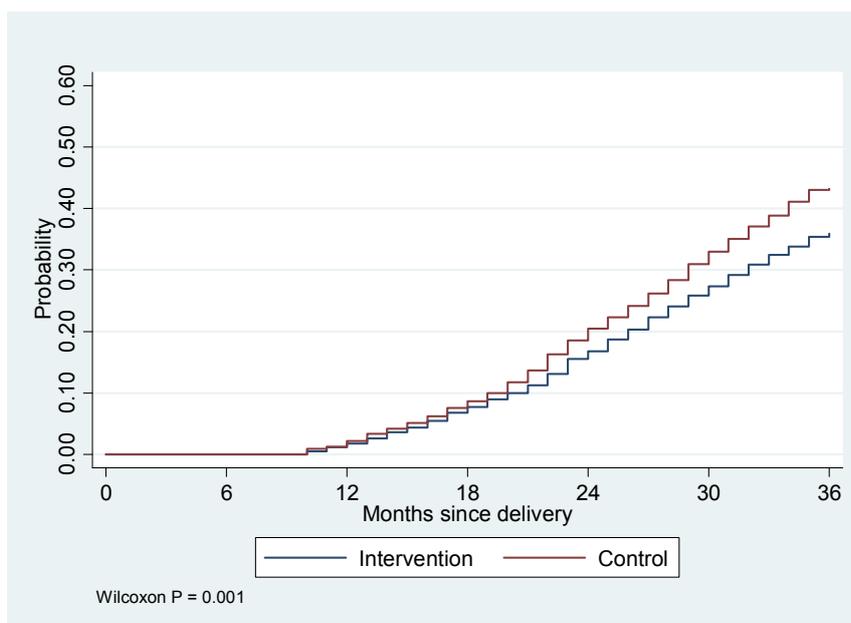


Figure 10. Birth Interval Analysis (Birth to Birth)



Health impact

A major concern of an integration health program is that the process may overload the health workers with added tasks that may compromise the performance of health workers and thus adversely affect the main program. As part of efforts to evaluate the adverse effects of integration, data analyses sought to determine the differences in neonatal and infant mortality rates. The neonatal mortality rates (deaths within 28 days of birth per 1,000 live births) were not significantly different by study arm (37 per 1,000 live births in the intervention area versus 35 in the control area) and as such, no adverse consequences on health impact were observed.

We also examined the positive impact of FP integration with the MNCH program by the difference in preterm and LBW of subsequent births. We expected comparatively longer birth intervals in the intervention area, which may improve maternal health and thus may reduce preterm births.

Findings suggest that odds of preterm birth outcomes were 20% lower in the intervention area compared to the control area; a finding that is only marginally significant. A statistically significant reduction in the incidences of LBW was not observed.⁴ Note that we could not collect birth weight data for those babies who died immediately, who were predominately preterm as well.

⁴ OR 0.94 (95% CI 0.71-1.25) without imputation; OR 0.98 (95% CI 0.74 - 1.30) with multiple imputation of birth weights to account for the ~ 12% of missing variables on weight.

Economic Costs of Integrating FP and MNH

BACKGROUND

Evidence on the health impact of FP is well-supported in the literature. However, there remains a paucity of evidence about the costs of packages of community-based MNCH services, particularly those including FP at the community level. In an effort to address the need for data on the costs of FP-MNH integration, we conducted a sub-study to determine the incremental costs of integrated FP-MNH, including implications for CHWs and personnel time allocation. Preliminary findings are presented below.

METHODS

Data on program costs were obtained through a retrospective review of financial records maintained by Shimantik and carried out in late 2012 and early 2013. Financial costs were obtained from the study inception in 2007 through 2012. Capital costs, defined as all costs with a life expectancy of greater than one year, included initial training, furniture, equipment, and vehicle costs. Recurrent costs, defined as all costs with a life expectancy of less than one year, focused on personnel salary, transport, materials, supplies, and commodity costs. The latter included BCC materials and contraceptive commodities. Costs incurred by the Government of Bangladesh in providing the latter free of cost to patients and the project were also included.

Additional costs of household out-of-pocket expenditures for care-seeking were not available, including likely savings as a result of home-based provision of contraceptives and improvements in health outcomes (pregnancies averted, improved birth spacing). Costs were collected by study arm and for programmatic, non-research activities only. Incremental costs were defined by the difference in costs by study arm and thus for the addition of FP into existing MNH services. All costs were transferred into 2012 USD using Consumer Price Indices to adjust for inflation and mid-year 2012 currency valuations. Annualization factors used a 3% discount rate and drew upon World Health Organization (WHO) CHOICE standardized life expectancies for major capital items, including motorcycles.

Economic Costs

What's included?

- **5-year incremental program costs**
 - Capital costs: Initial training, furniture and equipment, vehicles
 - Recurrent costs: Personnel, transport, refresher training, BCC materials, other support costs
- **Incremental government costs for contraceptive supplies**

What's not included?

- **Household out of pocket expenditures, including cost savings** from home based provision of health services and improvements in health outcomes, including pregnancies averted and/or delayed through improved birth spacing

RESULTS

Costing results are presented in Tables 13 and 14. For a five-year time period, the incremental costs of adding FP into community-based MNH services is \$101.24 USD for every 100,000 of the population. This amounts to an annualized incremental cost of \$20.25 USD per 100,000. Among major cost categories, recurrent costs made up 94% of total costs, with personnel (30%) and refresher training (29%) accounting for the greatest overall proportion of costs.

Refresher training activities ranged from review meetings, orientation of Ministry of Health staff, to capacity-building workshops and additional training (e.g., injectable methods). Personnel costs included the incremental human resource requirements specific to HFS additions. Findings from in-depth interviews with CHWs (Figure 11) suggest that no additional time costs were associated with HFS activities—rather CHWs reportedly modified their existing time allocation to accommodate the addition of FP. Overall, FP services constituted approximately 27% of total CHW working time and were provided during

pregnancy surveillance, the second home visit during pregnancy, postpartum visits on days 6 and 28, and during the extended postpartum window at 2 to 3 months and 4 to 5 months. The latter two extended postpartum visits were unique to the intervention area and concentrated on FP promotion and product distribution.

Figure 11. Reported Time Allocation of CHWs on FP and other MNH activities

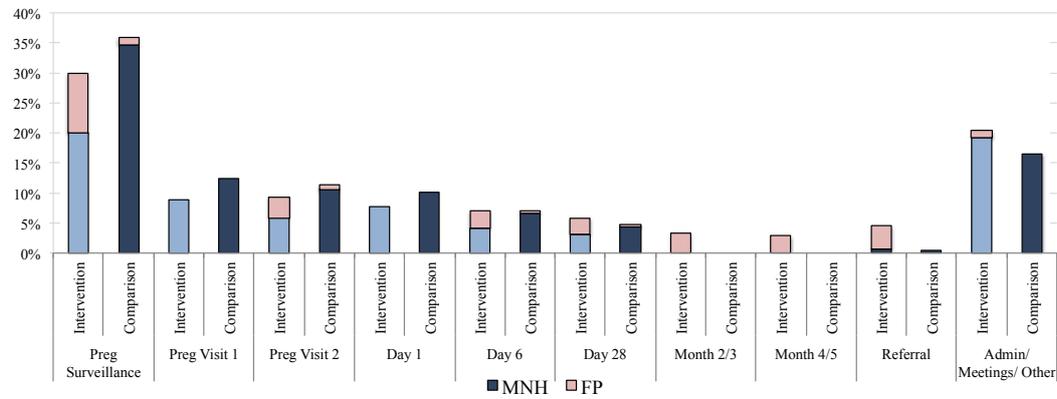


Table 15. Annual Incremental Costs for the addition of Family Planning services

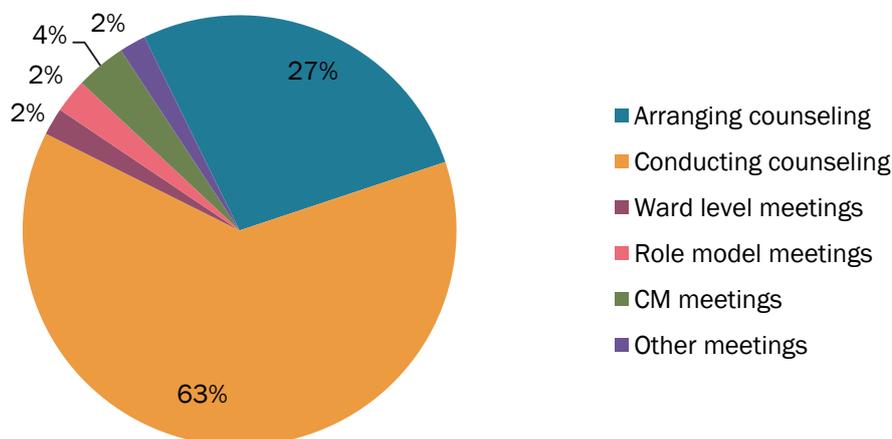
	ANNUAL INCREMENTAL COSTS FOR THE ADDITION OF FP SERVICES						
	2007-2008	2008-2009	2009-2010	2010-2011	2011-2012	Total 5-year cost	Mean annual cost
Annualized capital costs							
Training	\$1,596	\$2,544	\$2,544	\$2,544	\$2,365	\$11,592	\$2,318
Furniture and Equipment	\$67	\$67	\$63	\$263	\$48	\$508	\$102
Vehicles	\$161	\$161	\$221	\$221	\$323	\$1,086	\$217
<i>Subtotal capital</i>	\$1,823	\$2,771	\$2,828	\$3,029	\$2,736	\$13,187	\$2,637
Recurrent Costs							
Personnel	\$9,231	\$14,820	\$11,037	\$15,785	\$16,737	\$67,610	\$13,522
Vehicle/transport	\$3,535	\$7,438	\$2,812	\$5,575	\$8,434	\$27,794	\$5,559
Refresher training	\$5,778	\$14,237	\$17,637	\$15,452	\$13,248	\$66,353	\$13,271
BCC materials	\$974	\$2,663	\$3,371	\$3,371	\$1,247	\$11,627	\$2,325
Contraceptives	\$-	\$-	\$7,623	\$4,056	\$1,485	\$13,164	\$2,633
Miscellaneous supplies	\$2,397	\$4,069	\$8,765	\$6,696	\$5,448	\$27,376	\$5,475
<i>Subtotal recurrent</i>	\$21,916	\$43,227	\$51,244	\$50,935	\$46,600	\$213,923	\$42,785
<i>Total</i>	\$23,740	\$45,998	\$54,072	\$53,963	\$49,335	\$227,109	\$45,422

Table 16. Summary of Costs per Enrollee

	N=	PER WOMAN ENROLLED		PER 100,000 POPULATION		INCREMENTAL COST	
		Total cost (2008-2012)	Mean annual cost	Total cost (2008-2012)	Mean annual cost	PER 100,000 POPULATION	
						5-year cost	Annual
Intervention	2,247	\$313,719.48	\$62,743.90	\$139.62	\$27.92	\$101.24	\$20.25
Comparison	2,257	\$86,610.29	\$17,322.06	\$38.37	\$7.67		

Among other critical personnel, CMs were recruited and trained to promote FP within the intervention area. Personnel costs for all eight CMs and their supervising Project Officer (1) are contained within final cost estimates. Figure 12 illustrates reported CM time allocation across critical intervention area activities. Nearly 80% of CM activities focus on either the provision of counseling (63%) or arrangements to facilitate CHW counseling (27%).

Figure 12. Reported Time Allocation of Community Mobilizers



STUDY IMPLICATIONS AND FURTHER ANALYSES

Preliminary costing findings are promising. HFS activities were delivered through existing community-based platforms at minimal incremental cost. By optimizing the allocation of CHW time, FP messages were integrated into select MNH counseling sessions and the overall number of visits expanded to include two additional postpartum visits. This ability to optimize efficiency in service delivery is promising; particularly given the high coverage of home visits attained and corresponding effectiveness findings, which demonstrate improvements in contraceptive uptake as well as health outcomes. Improvements in health outcomes, including pregnancies averted or delayed through improved birth spacing, correspond to un-quantified cost savings to the household. Additional analyses are under way to determine the incremental cost effectiveness of HFS activities.

Summary Findings

FEASIBILITY AND ACCEPTABILITY

Study findings suggest that the integration of FP services into a community-based MNH service delivery platform is feasible and effective without inadvertently affecting the coverage of MNH interventions. Data on the reported coverage of critical MNH home visits and additional postpartum visits in the intervention arm were used to ascertain whether HFS activities were feasible at high coverage rates, as well as to determine whether they had a negative impact on MNH service provision. Findings suggest that overall coverage remained high in both intervention and control areas, exceeding 70% for the majority of visits. Finally, coverage for the additional HFS postpartum visits at months 2 or 3 and 4 or 5 was 63% and 73%, respectively.

Beyond coverage of home visits, rates of attendance of community mobilization meetings were used as a measure of HFS feasibility and acceptability. CMs recruited LAM Ambassadors and worked collaboratively with them to deliver BCC through community meetings and one-on-one engagement with key stakeholders in the intervention area. During follow-up visits, HFS participants were asked about their attendance at community mobilization meetings. By 12 months postpartum, 87% of study participants had attended at least one community mobilization meeting.

Finally, women enrolled in the study were asked about exposure to BCC tools on birth spacing, LAM, and postpartum care. Exposure to all three topics was nearly universal.

CONTRACEPTIVE USE

HFS activities were associated with a significant increase in the probability of contraceptive adoption 36 months postpartum in the intervention clusters compared to control clusters. This is an important finding, given that this is the time period when women are at a higher risk for a subsequent pregnancy. Time-to-event analysis with Cox proportional hazards models was carried out to explore the cumulative probability of contraceptive adoption through 36 months postpartum. Differentials in modern contraceptive use were observed according to key maternal characteristics, including participant's age, education, parity, and household socioeconomic status. Among intervention area participants, modern contraceptive use was highest among women 25–29 years of age; 64% of users had received one or more years of education; 47% of users reported having four or more children; and perhaps, most notably, current modern contraceptive use was highest among individuals in the lowest wealth quintile.

CONTRACEPTIVE METHODS

Among contraceptive methods, LAM was an important method of contraception at 3 and 6 months postpartum in the intervention area. However, at 12, 18, 24, 30, and 36 months postpartum, pills were the preferred method for users in both study arms, followed by injectables and condoms. Sterilization acceptance increased over time.

CONTRACEPTIVE SOURCE

In both study arms, slight variations in the sources from which contraceptives were obtained were observed by method and study arm. As mentioned previously, at 36 months postpartum, HFS CHWs were the primary source for condoms (88%) and pills (71%) in the intervention area. In the comparison area, pharmacies or shops were the main source for condoms (87%) and pills (57%), followed by government health facilities. In the intervention area, the March 2011 introduction of community-based provision of injectables through HFS CHWs corresponded to increases in injection use from 12 months (8%) to 36 months (10%) postpartum. HFS CHWs did not provide the first dose of the injectable, but they did provide follow-up doses. User preferences on the source for injectables suggest that HFS CHWs

provided injectables to 65% women in the intervention arm. By comparison, 75% of control area participants obtained injectables from government health facilities, highlighting the willingness of individuals to utilize functioning public sector services.

NON-USE OF CONTRACEPTIVES

Among non-users of contraceptives, the leading reasons cited in the intervention area were that the husband was abroad (49%), followed by a desire to become pregnant (39%) and husband's disapproval (37%). In the comparison area, the husband's disapproval was the leading reason cited by 42% of respondents, followed by the desire to become pregnant (39%); and religious prohibition (23%).

DISCONTINUATION OF CONTRACEPTIVES

Side effects were the foremost reason cited in both study arms for discontinuing pills and injectables. Becoming pregnant was the most frequent reason for discontinuation of condoms in the comparison arm, followed by "wanting a more effective method." In the intervention arm, the most common reasons for condom discontinuation were husband's disapproval and a desire for a more effective method.

PREGNANCY, BIRTH OUTCOMES, AND HEALTH IMPACT

In an effort to capture the impact of study activities, self-reported pregnancy outcomes were assessed at 36 months postpartum. HFS activities were associated with a 21% reduction in the cumulative probability of postpartum pregnancy after the delivery of the index child (HR: 0.79; 95% CI: 0.70–0.89). HFS activities were also associated with a 21% reduction of probability of shorter birth intervals (HR: 0.79; 95% CI: 0.70–0.88) and 20% lower risk of preterm birth (HR: 0.80; 95% CI: 0.63–1.03). Significant differences in the odds of LBW or neonatal mortality were not observed.

Conclusions

The HFS findings to date demonstrate that the integration of comprehensive PFP services at the community level through an MNCH platform improved contraceptive acceptance throughout the 36-month postpartum period. While findings from 18 to 36 months postpartum suggest that increases in contraceptive uptake plateaued, contraceptive use remains significantly greater in the intervention area. Efforts to identify trends in contraceptive use over time suggest that rates of contraceptive adoption have increased over time in the months following delivery across both study areas.

Among socioeconomic status quintiles, the use of any modern method at 36 months postpartum was higher in lowest wealth quintiles in the intervention arm. However, in the comparison area, any modern method use at 36 months postpartum was significantly lower among the poorest households.

Among available contraceptives, in both study areas, pills were the favored contraceptive method. However, increased availability of injectables has subtly increased uptake over time in the intervention area. User preferences for contraceptive source continue to vary by method. The strong user preferences for utilizing public sector health facilities in the comparison area, and in both study arms, as a source for LAPMs, underscores the critical nature of having a functional public sector that can provide FP services.

Variations were observed in the reported reasons for non-use of contraceptives across both study arms. The large proportion of “husband abroad” in the intervention area continues to play a significant role in contraceptive use as does husband’s disapproval (both study arms). These findings highlight the importance of engaging husbands and other family members in FP promotional activities if uptake is to be observed. Increases in the “reported desire to become pregnant” continued to be observed with 39% of intervention and comparison area recipients citing this as an important reason for current non-use of contraceptives. Among individuals who have discontinued use of contraceptives, husband’s disapproval, desire for a more effective method, and side effects were leading reasons for discontinuation in both arms.

Efforts to explore the larger implications of study findings on pregnancy outcome sought to identify trends in the incidence of reported pregnancies, as well as the influence of HFS activities on health impact. Trends through 36 months postpartum indicated that the incidence of reported pregnancies is lower in the intervention area, compared to that reported in the comparison area. In addition, HFS activities were associated with a 21% reduction in the hazards of shorter birth intervals (HR: 0.79; 95% CI: 0.70–0.88). A significant difference in neonatal mortality was not observed by study arm, affirming hypotheses that HFS activities will not overload CHWs and cause adverse inadvertent consequences on newborn health outcomes.

Figure 13. Summarizing Intervention Components and Key Findings to Date

Summary of key intervention components

- Antenatal counseling and care
- Birth and newborn care preparedness
- Counseling, negotiation, and demonstration
- Delivery and immediate newborn care
- Postpartum care and counseling
- Return to fertility, LAM+, exclusive breastfeeding, healthy spacing of pregnancy
- Community-based distribution of pills, condoms, and injectables and refer to facility for other methods
- Community mobilization and advocacy

Key findings

- The HFS model led to **more than 20% increased cumulative probability of modern method adoption** through 36 months postpartum period.
- HFS activities have led to **a decrease in the incidence of pregnancy within first 36 month of delivery**, which is the period of highest risk for mother and baby.
- HFS activities were associated with a **21% reduction of probability of shorter birth intervals** (HR: 0.79; 95% CI: 0.70–0.88) and **20% lower risk of preterm birth** (HR: 0.80; 95% CI: 0.63–1.03).
- Integration of FP services within a larger MNCH platform is feasible and does not have a negative impact on service coverage or health impact.

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