

Healthy Fertility Study:
**Operations research to address unmet need for
contraception in the postpartum period
in Sylhet District, Bangladesh**

Postpartum 30 Month Follow-up Survey Report

October 2012



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List of Acronyms

Antenatal care	ANC
Bangladesh Demographic Health Survey	BDHS
Behavior Change Communication	BCC
Community Health Workers	CHWs
Community Mobilizers	CMs
Essential newborn care	ENC
Family Planning and Maternal and Neonatal Health	FP/MNH
Family Welfare Centers	FWCs
Family Welfare Visitors	FWVs
Healthy Fertility Study	HFS
Institutional Review Board	IRB
Johns Hopkins Bloomberg School of Public Health	JHU
Lactational Amenorrhea Method	LAM
Ministry of Health and Family Welfare	MoHFW
Nongovernment Organization	NGO
Postpartum family planning	PPFP
Project to Advance the Health of Newborns and Mothers	Projahnmo
Upazila Health Complex	UHCs
U.S. Agency for International Development	USAID
Village Health Workers	VHWs

Section 1.0 Background

This report presents findings from the 30 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 (JHU). 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 JHU. 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>).

1.1 Study Objectives

The specific objectives of this study are:

- ***Integrated FP/Maternal Neonatal Health (MNH) Intervention:*** To develop and test an integrated FP/maternal and newborn health (MNH) service delivery approach in Bangladesh rural settings, building on the MNH service delivery system developed by the Projahnmo (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 on birth spacing.

1.2 Study Design

The research group “Projahnmo” conducted a cluster-randomized, community-based trial during the years 2002-2006 in Sylhet district of rural north-eastern Bangladesh. This trial developed and tested a community-based MNH program delivered through home visits by female CHWs and complemented by community mobilization activities [1].

In December 2007, enrolment began in four unions for a nested 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 consented women 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, and the target sample size was 1,330 participants to be recruited over seven months (through June 30, 2008). Subsequently, additional funding was received to increase the study area and sample size to eight union totals (four interventions, four comparisons) in order to measure an improvement in birth intervals (reduction in the proportion of births spaced less than 24 months) as the primary outcome.

1.3 Study Area

Located in northeastern Bangladesh, Sylhet district is home to 2.68 million of Bangladesh’s total population of 145 million. Comprised of 12 sub-districts or upazilas, Sylhet was part of the Assam state in northeastern India until 1947 when it formally became East Pakistan (Figure 2).

Figure 2. HFS study area in Sylhet, Bangladesh

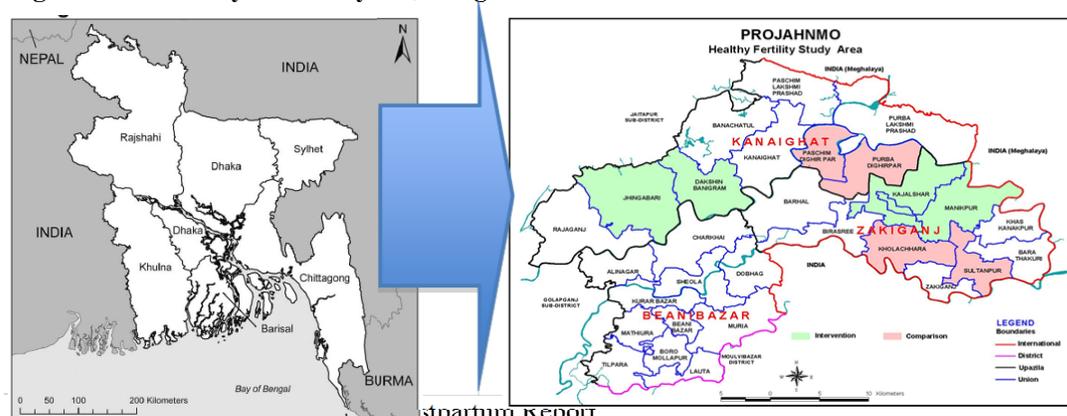


Table 1. Population health status and care seeking practices [2]

	Bangladesh		Sylhet	
	2004	2009	2004	2009
Total Fertility Rate	3.0	2.7	4.2	3.7
Births in the last 5 years				
< 24 months	9.9%	15%	14%	26%
< 36 months	26%	37%	31%	57%
Contraceptive Prevalence Rate (any method)	58%	56%	32%	31%
Receipt of any Antenatal care	56%	52%	48%	47%
Delivery by skilled provider	13%	18%	11%	11%
Postnatal care	18%	21%	20%	16%

Table 1 outlines basic population health status characteristics for Bangladesh nationally and Sylhet Division. While national estimates of key maternal health indicators have improved for many indicators including the total fertility rate (TFR), since the Bangladesh Demographic and Health Survey (BDHS) of 2004, findings from the latest BDHS published in 2009 still demonstrate that Sylhet falls behind all other divisions in Bangladesh, reporting some of the poorest health indicators in South Asia and globally [2].

1.4 Selection of Study Unions

The study unions were purposively selected. The study unions were selected so that: (1) unions would not be adjacent to the ACCESS project; (2) intervention and comparison unions would not be adjacent to each other, to minimize contamination; (3) no unions would include the Upazila Health Complex (UHCs); 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 Total	Comparison Total
Family Welfare Clinic		
<i>Number of health facilities</i>	4	4
<i>Medical personnel</i>		
Medical Officers	0	0
Health Assistant	18	16
Sub-Assistant Community Medical Officers (SACMO)	4	1
FWV*	4	4
Family Welfare Assistant (FWA)*	15	15
HFS Community based cadres of staff		
CHW*	27	21
Community Mobilizers	8	0

*Key family planning providers

Among government personnel, FWVs and Family Welfare Assistants (FWAs) are most critically associated with the provision of FP services. In the intervention and comparison both area, each of the four FWCs were staffed with a FWV and on average 3-4 FWAs. While intervention area facilities did have greater numbers of sub-assistant community medical officers (SACMOs) and health assistants, these medical personnel are not traditionally tasked with the provision of FP services.

1.4 Sample Size

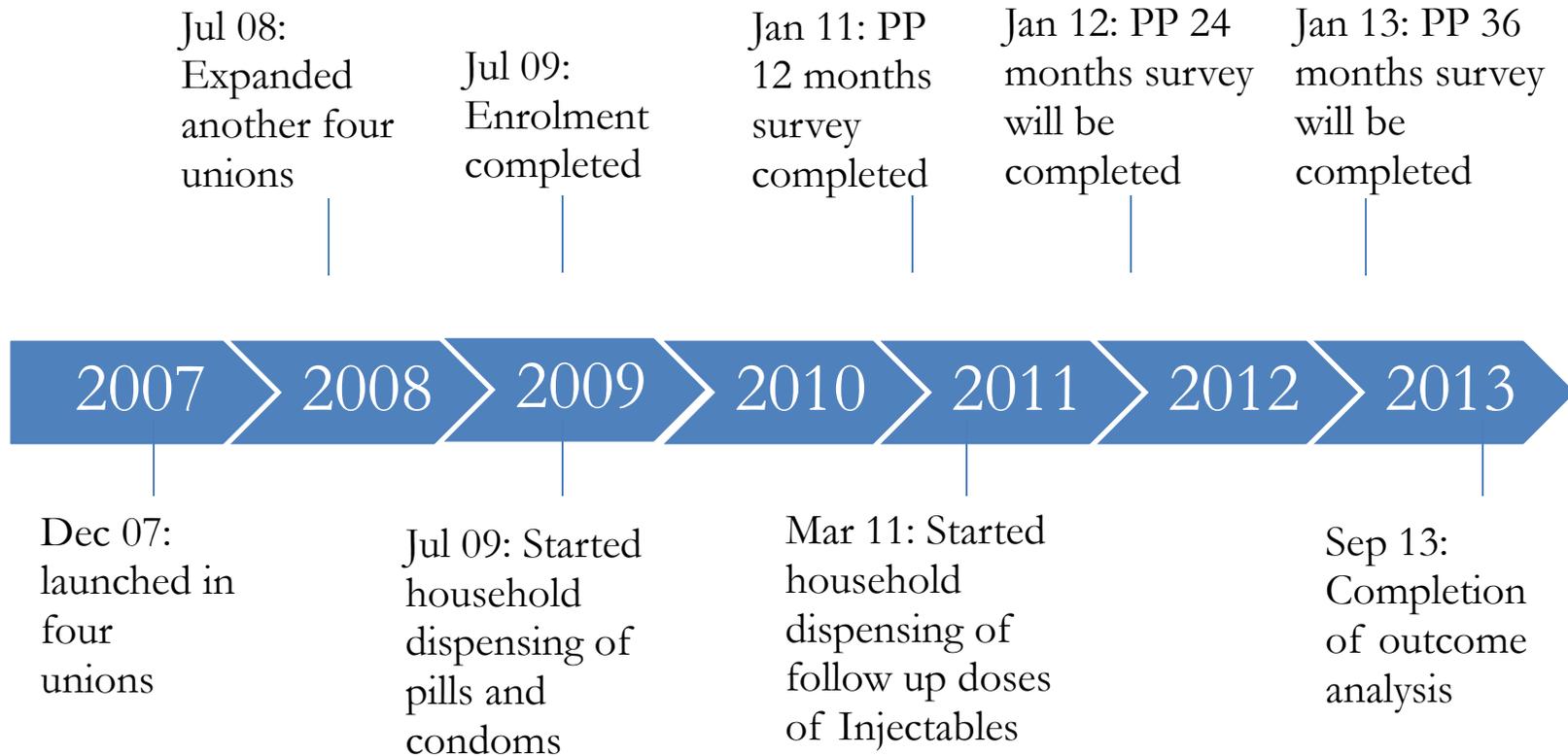
We have conservatively hypothesized that the proportion of women having another birth within 24 months of the last birth will be 12% in the intervention area, 25% lower than the 16% in the comparison area (BDHS, 2004.)

To measure a 25% decrease in the proportion of women with a birth interval of <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 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, as 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 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 powered to look at birth outcomes. If we consider an “adverse birth outcome” to be a stillbirth, preterm birth, low birth weight (<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 1620 in each arm. If we follow the study participants through January 2013, there will be approximately 1,700 births among the sample cohort women which will allow examination on the effect on adverse pregnancy outcome.

Figure 3. Timeline of study implementation



1.5 Intervention Package

CHW Home Visits: CHWs each serve 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 (Figure 4). Among intervention area participants, one additional visit was carried out by CHWs as part of ongoing pregnancy surveillance and that focused on the distribution of oral contraceptives and condoms. Following delivery, postpartum visits were carried out in both study arms on days six and 29/35 to (a) assess the newborn's health using a modified IMCH algorithm through a combination of direct observation and questions directed to the mother; and (b) reinforce messages about essential newborn care. In the intervention area two additional visits were carried out between months 2/3 and 4/5 focused on contraceptive provision.

Figure 4. Key messages and demonstrations for birth and newborn care preparedness

Pregnancy Care <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.
Birth Planning <ul style="list-style-type: none">• Plan for delivery in health facility.• If facility-based delivery is not feasible, 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.
Newborn Care Planning <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, 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. Practice wrapping a doll. Hold baby at all times during and immediately after the delivery, avoid contact with floor or other unclean or cold places. Use gentle stimulation or resuscitation if baby does not breathe immediately.• 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 over than what might be provided by Projahnmo project workers.• Practice exclusive breastfeeding until six months. Feed the baby frequently in the proper position day and night.
Emergency Care Planning <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.

Behavior Change Communications: BCC messages related to PFP were added to the intervention package in the intervention unions for the HFS¹, as described in Figures 4 and 5. During the ANC visit, CHWs discuss the benefits of birth-to-pregnancy intervals of at least 24 months, the risks of closely spaced births, return to fertility and promote use of the lactational 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 fertility intentions. Pictorial fliers are given to women in the intervention areas serve as reminders for the information given.

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 provided only after the completion of a verbal screening to rule out risk factors that would preclude pill usage. The training was provided according to 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 reach each household every two months. Beginning in March 2011, CHWs also began distributing follow up doses of injectables in the pregnancy surveillance visits.

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

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

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 3. 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	√	√	√	√	√
Essential newborn care, including exclusive breastfeeding	√	√	√		
LAM, promotion of six months' exclusive breastfeeding	√	√	√	√	√
Timing of return to fertility		√	√	√	√
Transition from LAM to other modern methods of contraceptives			√	√	√
Discussion of contraceptive methods, potential side effects, strategies to minimize side effects			√	√	√
Referral to health facility for contraceptive methods, if needed			√	√	√

Figure 5. BCC messages specific to pregnancy spacing

<p>RECOMMENDATIONS ON HEALTHY TIMING AND SPACING OF PREGNANCY</p> <p>➤ 24 months between pregnancies After a live birth, the recommended interval before attempting the next pregnancy should be at least 24 months in order to reduce the risk of adverse maternal, perinatal, and infant outcomes.</p> <p>➤ 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 in order to reduce risks of adverse maternal and perinatal outcomes.</p>
<p>HEALTH OUTCOMES RELATED TO SHORT BIRTH INTERVALS</p> <p>➤ Less than 24 months from the last live birth to the next pregnancy:</p> <ul style="list-style-type: none">○ Newborns can be born too soon, too small, or with a low birth weight.○ Infants and children may not grow well and are more likely to die before the age of five. <p>➤ Less than six months from the last live birth to the next pregnancy:</p> <ul style="list-style-type: none">○ Mothers may die in childbirth.○ Newborns can be born too soon, too small, or with a low birth weight.○ Infants and children may not grow well and are more likely to die before the age of five. <p>➤ When pregnancies occur less than six months after a miscarriage or abortion:</p> <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 low birth weight.
<p>BENEFITS OF HEALTHY TIMING AND SPACING</p> <p>➤ For Newborns, Infants, and Children under Five</p> <ul style="list-style-type: none">○ Reduced risk of pre-term births, low birth weight, small for gestational age, and, in some populations, stunting or underweight conditions.○ Reduced risk of death for newborns, infants, and children under five.○ Increases the chance that children will experience the health benefits of breastfeeding for a full two years. <p>➤ For Mothers</p> <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 avoid 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. <p>➤ For Men</p> <ul style="list-style-type: none">○ Helps men safeguard the health and wellbeing of their partners and children.○ Allows men 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. <p>➤ For Communities</p> <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.

1.6 Data Collection

Table 4 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 CHW during 30-32 weeks of pregnancy and seven follow-up visits during postpartum period (on months three, six, 12, 18, 24, 30 and 36). Enrolment of pregnant women was completed on July 14, 2009. This report details findings up to 30 months postpartum.

Table 4. 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 condom 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	√ √ √ √	√ √ √ √ √ √ √ √ √	√ √	√ √ √ √ √ √ √ √ √

1.7 Data Collection at Thirty Months Postpartum

Apart from the implementation of the intervention, independent data collection for the 30 months postpartum survey began June 19, 2010 and was completed in July 2012. Survey completion rates are comparable between study arms, as shown in Table 5. This table also explains the different denominators that are used in subsequent tables.

Table 5. Data collection interview coverage by study arm

	Intervention	Comparison
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 three months follow-up/cohort size	2,247	2,257
Completed three months 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	2118 (94.3)	2132 (94.5)
Completed 24-month postpartum interview	2127 (94.7)	2120 (93.9)
Completed 30-month postpartum interview	2132 (94.9)	2110 (93.5)
Woman was absent	47 (2.1)	67 (3.0)
Dwelling vacant/destroyed	22 (1.0)	32 (1.4)
Woman/Respondent died	17 (0.8)	9 (0.4)
Not interviewed due to other reasons	29 (1.3)	39 (1.7)
Total	2,247	2,257

In the intervention arm, 94.9% of the cohort of 2,247 women successfully completed the 24-month postpartum interview. The ~5% of women among whom interviews were not completed were either absent (2.1%); their home vacant / destroyed (1%); deceased (0.8%); or not interviewed due to other reasons (1.3%). Amongst individuals in the comparison arm, 93.5% of the cohort of 2,257 women was successfully interviewed while 3% were absent; 1.4% had dwellings that were vacant / destroyed; 0.4% deceased; and 1.7% were not interviewed due to other reasons.

Section 2.0 Household Survey Findings

Independent data collection teams administered a household survey aimed at determining contraceptive use practices, health outcomes, and other key indicators at 30-months postpartum among women enrolled in the intervention and comparison arms. These visits, carried out between the 30th and 36th month postpartum, focused solely upon the collection of research data. In the section that follows, findings related to the 30-month postpartum visit carried out by an independent data collection team are considered in turn and in conjunction with baseline, three, six, twelve, eighteen and twenty-four month postpartum visits data.

2.1 Background Characteristics

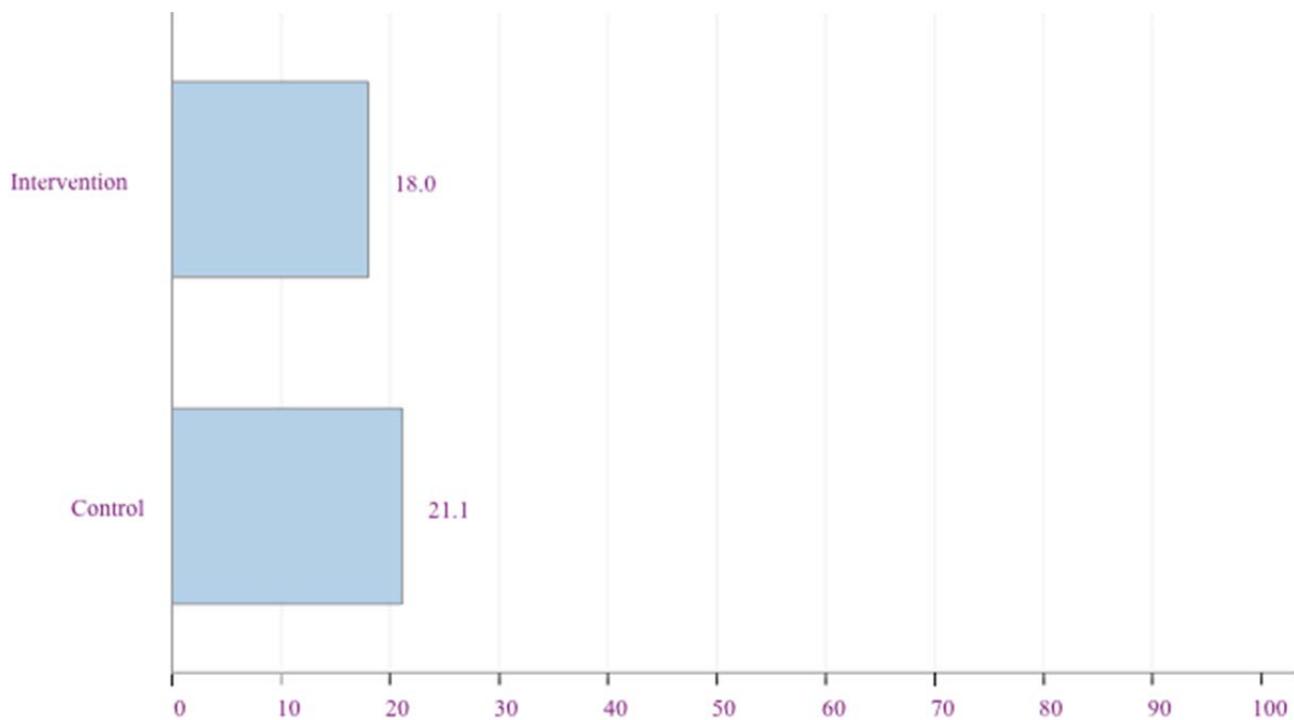
Table 6. Baseline characteristics by study arm for 30 month respondents

	Intervention (n=2132)	Comparison (n=2110)	P-value
Participant's age			
15-24	791 (37.1)	741 (35.1)	0.052
25-29	728 (34.2)	720 (34.1)	
30-34	376 (17.6)	468 (22.2)	
35+	237 (11.1)	181 (8.6)	
Women education			
No education	697 (32.7)	772 (36.6)	0.000
1 - 5 years	659 (30.9)	698 (33.1)	
> 5 years	776 (36.4)	640 (30.3)	
Parity			
0	28 (1.3)	23 (1.1)	0.861
1	484 (22.7)	480 (22.8)	
2	445 (20.9)	419 (19.9)	
3	394 (18.5)	393 (18.6)	
4+	781 (36.6)	795 (37.7)	
Household wealth quintile			
Lowest	385 (18.1)	469 (22.2)	0.000
Second	367 (17.2)	488 (23.1)	
Third	423 (19.8)	434 (20.6)	
Fourth	485 (22.8)	361 (17.1)	
Highest	472 (22.1)	358 (17.0)	

Table 6 presents baseline household member characteristics for women interviewed at 30 months by study arm. Baseline survey findings suggest that there is a statistically significant difference between baseline characteristics of women's education, and household wealth status in the

intervention and comparison arms.³ In the comparison area 36% of women have no education, as compared to 33% in the intervention area. Household wealth status across the two study arms was comparable, although the proportion of individuals in the lowest two wealth quintiles was slightly higher in the comparison area than in the intervention. Maternal contraceptive use prior to pregnancy at baseline (i.e. index pregnancy) was slightly higher in the comparison area at 21.1% as compared to 18% in the intervention area (Figure 6).

Figure 6. Maternal ever contraceptive use rate prior to pregnancy at baseline



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.

2.2 Maternal Contraception and Health

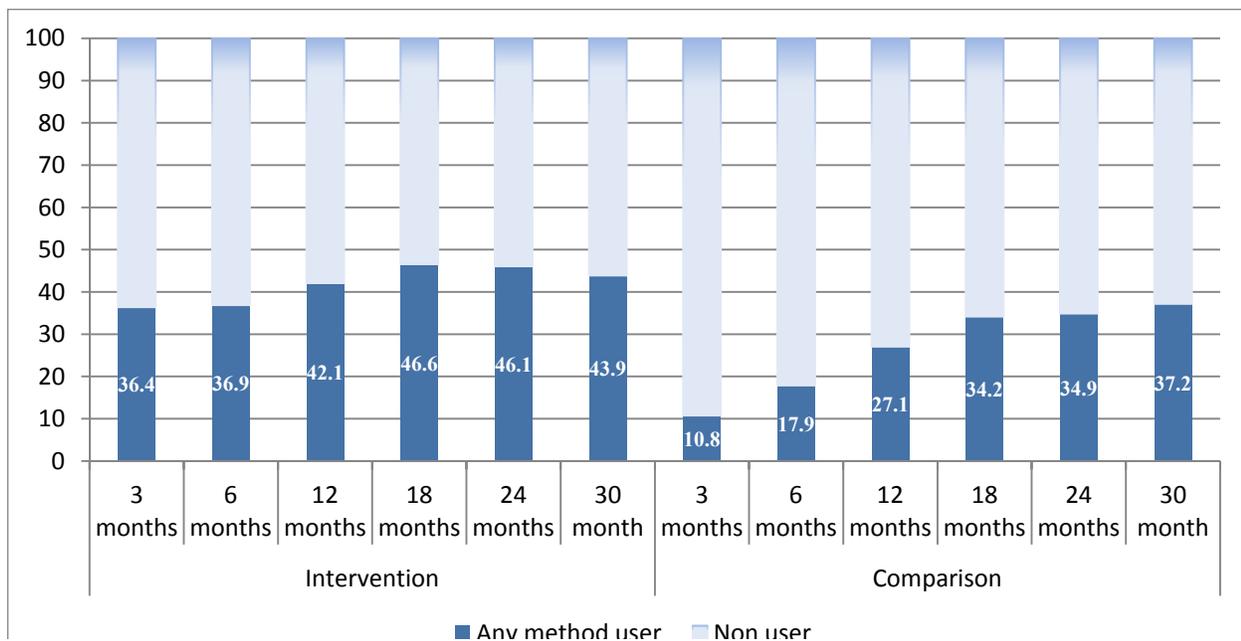
HFS activities have sought to determine the impact of integrating a community-based system of FP delivery into a continuum of MNCH services. The impact of FP at 30 months was considered on (a) contraception use, including method and source, and (b) pregnancy outcomes.

2.2.1 Use of Contraception

Contraceptive uptake

HFS activities were associated with a 26% increase in contraceptive uptake in the intervention arm from baseline (18%) to 30-months postpartum (43.9%). Figure 7 presents postpartum contraceptive use among women with a surviving infant at three, six, 12, 18, 24 and 30 month's follow-up. In both study arms, contraceptive use rates (any method) increased from three, six, 12, and 18 months postpartum. However, between 18 and 30 months contraceptive use rates in both arms stabilized and did not increase significantly. In the intervention arm, any method use of contraception increased from 36% (23% LAM and 13% any modern method) at three and six months to 46.6% at 18 months and then remained about the same (46.1%) at 24 months and slightly decrease (43.9%) at 30 months. In the comparison arm, any method use increased from slightly more than 10% at three months to 34.2% at 18 months and 37.2% at 30 months (Figure 7). Overall any method contraceptive use was higher among intervention area participants (n=904; 43.9%) as compared to those in the comparison arm (n=753; 37.1%). Among specific types of contraceptives, 99% of users relied on modern methods in intervention arms as compared to 97% in comparison arm.

Figure 7. Any contraceptive method use at 3, 6, 12, 18, 24 and 30 months postpartum



Contraceptive use by maternal characteristics

Table 7 presents the contraceptive use rate at 30 months postpartum by household and maternal characteristics according to method and by study arm.

When stratified by key background characteristics, modern method use of contraception 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 (64% in the intervention, 67% in the comparison area) were more likely to use any method than those with no education. In the intervention area, a slightly higher proportion of women with no education (36%) reported use of modern contraceptives as compared to the control area modern method users (33%). In the comparison area, no method use was higher among women (38%) with no education, while method use was highest among those with one to five years of education (34%).

Table 7. Current contraceptive use rate at 30 months postpartum among women with a surviving infant by maternal characteristics and study arm (column percentages)

	Intervention			Comparison		
	Modern method (n=878)	Periodic abstinence, withdrawal (n=26)	No method (n=1156)	Modern method (n=700)	Periodic abstinence, withdrawal (n=53)	No method (n=1271)
Participant's Age						
15-24	244 (27.8)	5 (19.2)	502 (43.4)	235 (33.6)	12 (22.6)	463 (36.4)
25-29	330 (37.6)	6 (23.1)	379 (32.8)	249 (35.6)	23 (43.4)	424 (33.4)
30-34	182 (20.7)	8 (30.8)	178 (15.4)	167 (23.9)	12 (22.6)	268 (21.1)
35+	122 (13.9)	7 (26.9)	97 (8.4)	49 (7.0)	6 (11.3)	116 (9.1)
P value			0.000			0.129
Women education						
No education	312 (35.5)	9 (34.6)	349 (30.2)	230 (32.9)	19 (35.9)	484 (38.1)
1 - 5 years	287 (32.7)	6 (23.1)	343 (29.7)	229 (32.7)	17 (32.1)	433 (34.1)
> 5 years	279 (31.8)	11 (42.3)	464 (40.1)	241 (34.4)	17 (32.1)	354 (27.9)
P value			0.003			0.037
Parity						
1	142 (16.2)	3 (11.5)	326 (28.2)	135 (19.3)	10 (19.0)	318 (25.0)
2	145 (16.5)	6 (23.1)	283 (24.5)	113 (19.0)	4 (7.6)	266 (20.9)
3	183 (20.8)	2 (7.7)	204 (17.7)	131 (18.7)	9 (17.0)	242 (19.0)
4+	408 (46.5)	15 (57.7)	343 (29.7)	301 (43.0)	30 (56.6)	445 (35.0)
P value			0.000			0.000
Household Wealth quintile						
Lowest	212 (24.2)	4 (15.4)	264 (22.8)	114 (16.3)	15 (28.3)	211 (16.6)
Second	159 (18.1)	4 (15.4)	223 (19.3)	141 (20.1)	10 (18.9)	275 (21.6)
Third	165 (18.8)	6 (23.1)	198 (17.1)	153 (21.9)	12 (22.6)	287 (22.6)
Fourth	173 (19.7)	3 (11.5)	212 (18.3)	149 (21.3)	9 (17.0)	266 (20.9)
Highest	169 (19.3)	9 (34.6)	259 (22.4)	143 (20.4)	7 (13.2)	232 (18.3)
P value			0.379			0.482

Contraceptive use by method

Table 8 depicts postpartum contraceptive use by method for both intervention and comparison study arms. Among contraceptive methods, LAM was an important method of contraception at three and six months postpartum in the intervention area. However, at 12, 18, 24 and 30 months postpartum, pills were the preferred method for users in both study arms followed by condoms and injectables (Table 8). Reported use of sterilization was higher in intervention arm in all surveys at 12, 18, 24 and 30 months postpartum. Among categories of traditional methods, periodic abstinence and withdrawal accounted for 1.3% of methods in the intervention area and 2.6% in the comparison area at 30 months postpartum.

Table 8. Postpartum contraceptive use by method among women with a surviving infant by study arm and survey period

	Intervention						Comparison					
	3 months n=2014	6 months n=1852	12 months n=1964	18 months n=1944	24 months n=2056	30 months n=2060	3 months n=2000	6 months n=1786	12 months n=1945	18 months n=1932	24 months n=2031	30 months n=2024
LAM	459 (22.8)	220 (11.9)	0 (0.0)	0 (0.0)	9 (0.4)	18 (0.9)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Pill	64 (3.2)	157 (8.5)	398 (20.3)	423 (21.8)	411 (20.0)	339 (16.5)	87 (4.4)	118 (6.6)	207 (10.6)	274 (14.2)	305 (15.0)	298 (14.7)
Condom	74 (3.7)	133 (7.2)	191 (9.7)	189 (9.7)	143 (6.9)	148 (6.9)	34 (1.7)	36 (2.0)	65 (3.3)	65 (3.4)	53 (2.6)	65 (3.2)
Injectables	93 (4.6)	112 (6.1)	153 (7.8)	181 (9.3)	214 (10.2)	209 (10.2)	56 (2.8)	104 (5.8)	176 (9.1)	193 (10.0)	206 (10.1)	209 (10.0)
IUD /Implants	1 (0.1)	4 (0.2)	23 (1.2)	32 (1.7)	53 (2.6)	73 (3.5)	10 (0.5)	19 (1.1)	28 (1.4)	40 (2.1)	53 (2.6)	63 (3.1)
Sterilization	21 (1.0)	38 (2.1)	37 (1.9)	60 (3.1)	70 (3.4)	96 (4.7)	7 (0.4)	14 (0.8)	17 (0.9)	29 (1.5)	45 (2.2)	65 (3.2)
Withdrawal or periodic abstinence	21 (1.0)	20 (1.1)	24 (1.2)	20 (1.0)	23 (1.1)	26 (1.3)	22 (1.1)	28 (1.6)	35 (1.8)	60 (3.1)	46 (2.3)	53 (2.6)
Any method user	733 (36.4)	684 (36.9)	826 (42.1)	905 (46.6)	947 (46.1)	904 (43.9)	216 (10.8)	319 (17.9)	528 (27.1)	661 (34.2)	708 (34.9)	753 (37.2)

Source of contraceptives

Table 9 presents data on the source from where women obtained the contraceptives they used at 30 months postpartum. At 30 months postpartum, HFS CHWs were the primary source of pills (76%) and condoms (86%) in the intervention area. In the comparison area, pharmacies and/or shops were the main source for pills (56%) and condoms (88%) followed by government health facilities. In the intervention area, injectables were received from HFS CHWs (53%), NGOs (21%), government facility (20%), or pharmacy/ shop (6%). In the comparison arm, injectables were received overwhelmingly from government health facilities (76%) followed by pharmacies/shops (21%), and NGO clinics (3%). 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 too have influenced the preferred source. Among long acting permanent methods (LAPM) of contraception, government health facilities were the preferred source, accounting for 78% sterilizations and 100% of IUDs/implants in the intervention arm as compared to 86% and 98%, respectively, in the comparison area. The women in both arms did not report obtaining any form of contraceptive from an unqualified doctor.

Method source among contraceptive users at 30 months postpartum by study arm

Intervention					Comparison				
Pill (n=352)	Condom (n=148)	Injectables (n=214)	IUD/ Implant (n=75)	Sterilization (n=101)	Pill (n=303)	Condom (n=)	Injectables (n=214)	IUD/ Implant (n=64)	Sterilization (n=69)
(76.4)	127 (85.8)	114 (53.3)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
(17.9)	19 (12.8)	12 (5.6)	0 (0.0)	0 (0.0)	170 (56.1)	57 (87.7)	44 (20.6)	0 (0.0)	0 (0.0)
(4.6)	1 (0.7)	42 (19.6)	75 (100.0)	79 (78.2)	127 (41.9)	8 (12.3)	163 (76.2)	63 (98.4)	59 (85.5)
(1.1)	1 (0.7)	45 (21.0)	0 (0.0)	1 (1.0)	6 (2.0)	0 (0.0)	7 (3.3)	1 (1.6)	1 (1.5)
(0.0)	0 (0.0)	1 (0.5)	0 (0.0)	13 (12.9)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	7 (10.1)
(0.0)	0 (0.0)	0 (0.0)	0 (0.0)	8 (7.9)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	2 (2.9)

2.2.2 Non-use of Contraceptives

Those who did not use contraceptives at 30 months were asked to provide reasons during the 30 month postpartum survey interview (Table 10). Mirroring trends observed in the 12, 18 and 24 month postpartum follow-up reports, “Husband abroad” was the primary reason why women reported not using a contraceptive method at 30-months postpartum in the intervention area (43%). In the comparison area, “Husband’s disapproval” was the leading reason for non-use cited by 39% of respondents at 30 months. In both study arms, the reported “desire to become pregnant” increased from 12 to 30 months postpartum. Additional reasons cited among intervention women included religious prohibition (12%), dislike on the part of the woman (8%), and health concerns (5%). In the comparison area at 30 months, followed by husband’s disapproval (39%), religious prohibition (22%), and desire to become pregnant (32%), the leading reasons for non-use included the absence of a suitable method (10%), husband abroad (14%), and health concerns (14%).

Table 10. Leading reasons for not using contraceptive method among non-users at 12, 18, 24 and 30 months postpartum by study arm

	Intervention				Comparison			
	12 months (n=955)	18 months (n=784)	24 months (n=677)	30 months (n=594)	12 months (n=1473)	18 months (n=1230)	24 months (n=1081)	30 months (n=951)
Husband abroad	411 (43.0)	341 (43.5)	306 (45.2)	258 (43.4)	190 (12.9)	166 (13.5)	137 (12.7)	136 (14.3)
Postpartum amenorrhea	195 (20.4)	77 (9.8)	33 (4.9)	29 (4.9)	489 (33.2)	216 (17.6)	113 (10.5)	111 (11.7)
Husband disapproves	131 (13.7)	156 (19.9)	185 (27.3)	195 (32.8)	255 (17.3)	340 (27.6)	402 (37.2)	375 (39.4)
Wanted to become pregnant	129 (13.5)	111 (14.2)	129 (19.1)	150 (25.3)	175 (11.9)	186 (15.1)	242 (22.4)	304 (32.0)
Religious prohibition	75 (7.9)	68 (8.7)	51 (7.5)	70 (11.8)	164 (11.1)	208 (16.9)	249 (23.0)	210 (22.1)
No method suitable	56 (5.9)	48 (6.1)	32 (4.7)	25 (4.2)	243 (16.5)	242 (19.7)	176 (16.3)	99 (10.4)
Health concern	51 (5.3)	41 (5.2)	40 (5.9)	28 (4.7)	96 (6.5)	148 (12.0)	135 (12.5)	133 (14.0)
Respondent dislikes	31 (3.3)	48 (6.1)	46 (6.8)	48 (8.1)	61 (4.1)	96 (7.8)	112 (10.4)	113 (11.9)
Infrequent sex	22 (2.3)	12 (1.5)	1 (0.2)	5 (0.8)	49 (3.3)	35 (2.9)	19 (1.8)	15 (1.6)
Other family	15 (1.6)	20 (2.6)	12 (1.8)	8 (1.4)	141 (9.6)	90 (7.3)	74 (6.9)	48 (5.1)

members disapprove								
Other*	56 (5.9)	52 (8.2)	46 (6.8)	49 (8.3)	141 (9.6)	147 (12.0)	118 (10.9)	104 (10.9)

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

2.2.3 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 prior to 30 months discontinued use. Among women discontinuing, the largest percentage of women in both arms listed side effects as their reasons for discontinuing pills (46% in the intervention and 47% in the comparison) and injectables (55% and 65%). The most frequent reasons for discontinuation of condom use in both arms were husband's disapproval and a desire for a more effective method.

Table 11. Reasons for discontinuation for three most common methods, by study arm (column percentages)

	<u>Intervention</u>			<u>Comparison</u>		
	Pill (n=617)	Condom (n=268)	Injectables (n= 278)	Pill (n= 350)	Condom (n=50)	Injectables (n=267)
Infrequent sex/ husband away	3 (0.5)	1 (0.4)	0 (0.0)	6 (1.7)	1 (2.0)	1 (0.4)
Became pregnant	9 (1.5)	36 (13.4)	1 (0.4)	8 (2.3)	11 (22.0)	1 (0.4)
Wanted to become pregnant	53 (8.6)	17 (6.3)	21 (7.6)	26 (7.4)	5 (10.0)	14 (5.2)
Husband disapproved	34 (5.5)	86 (32.1)	13 (4.7)	15 (4.3)	6 (12.0)	15 (5.6)
Wanted more effective method	53 (8.6)	60 (22.4)	14 (5.0)	22 (6.3)	10 (20.0)	8 (3.0)
Health concerns	5 (0.8)	0 (0.0)	7 (2.5)	3 (0.9)	0 (0.0)	4 (1.5)
Side effects	285 (46.2)	6 (2.2)	153 (55.0)	166 (47.4)	1 (2.0)	174 (65.2)
Lack of access/ too far	3 (0.5)	2 (0.8)	16 (5.8)	7 (2.0)	1 (2.0)	8 (3.0)
Costs too much	0 (0.0)	0 (0.0)	0 (0.0)	6 (1.7)	0 (0.0)	1 (0.4)
Inconvenient to use	30 (4.9)	29 (10.8)	0 (0.0)	14 (4.0)	7 (14.0)	0 (0.0)
Difficult to get	0 (0.0)	0 (0.0)	6 (2.2)	0 (0.0)	0 (0.0)	4 (1.5)

pregnant/menopausal						
Marital dissolution	1 (0.2)	0 (0.0)	1 (0.4)	0 (0.0)	0 (0.0)	0 (0.0)
Other/don't know	141 (22.9)	31 (11.6)	46 (16.6)	77 (22.0)	8 (16.0)	37 (13.9)

2.2.4 Pregnancy and Delivery Incidence

Beyond consideration of the larger implications of the increased early and sustained adoption of contraceptive use, the incidence of self-reported pregnancy incidence and delivery were also considered. The probability of becoming pregnant by 30 months was 44.8% in the control arm, compared to 36.5% in the intervention arm ($p < 0.001$) (Figure 8). Particular emphasis on the time period of 9 to 30 months illustrates a growing differentiation between the two study areas as the probability of pregnancy incidence increases over time in both study areas. Probability of a subsequent birth after the delivery of index child within 30 months was significantly low in intervention area (25% in the intervention arm and 30% in the Control arms, $p < 0.001$) (Figure 9).

Figure 8. Probability of self-reported pregnancy incidence during 30 months of postpartum follow-up period by study arm

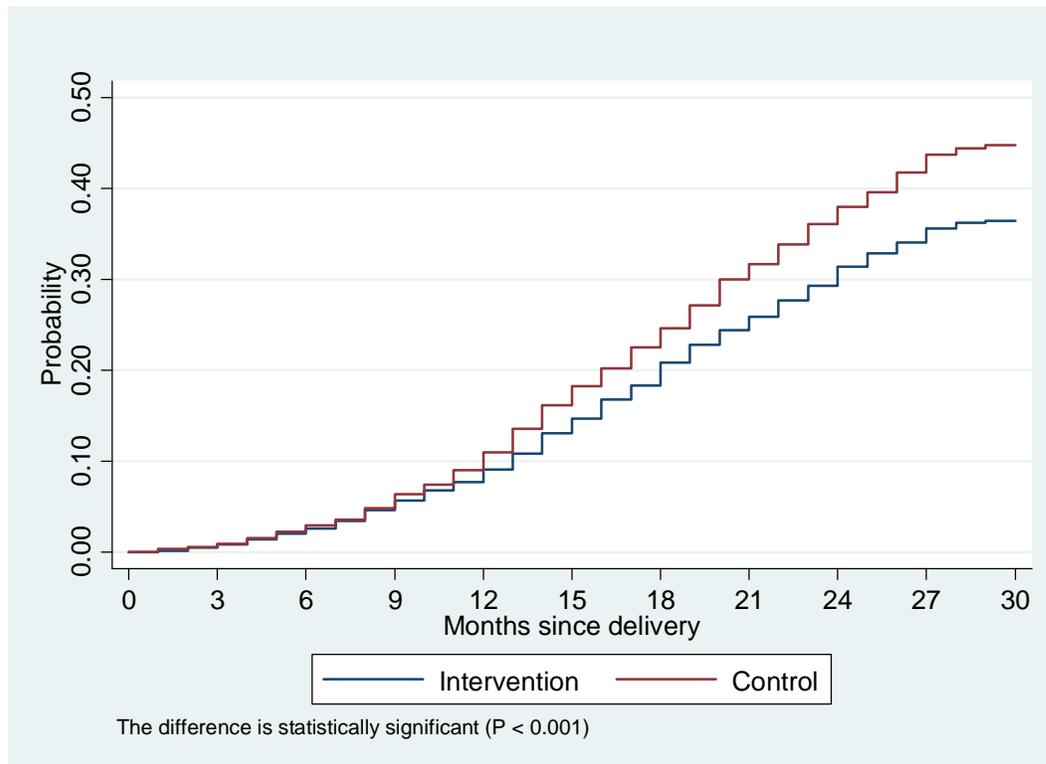
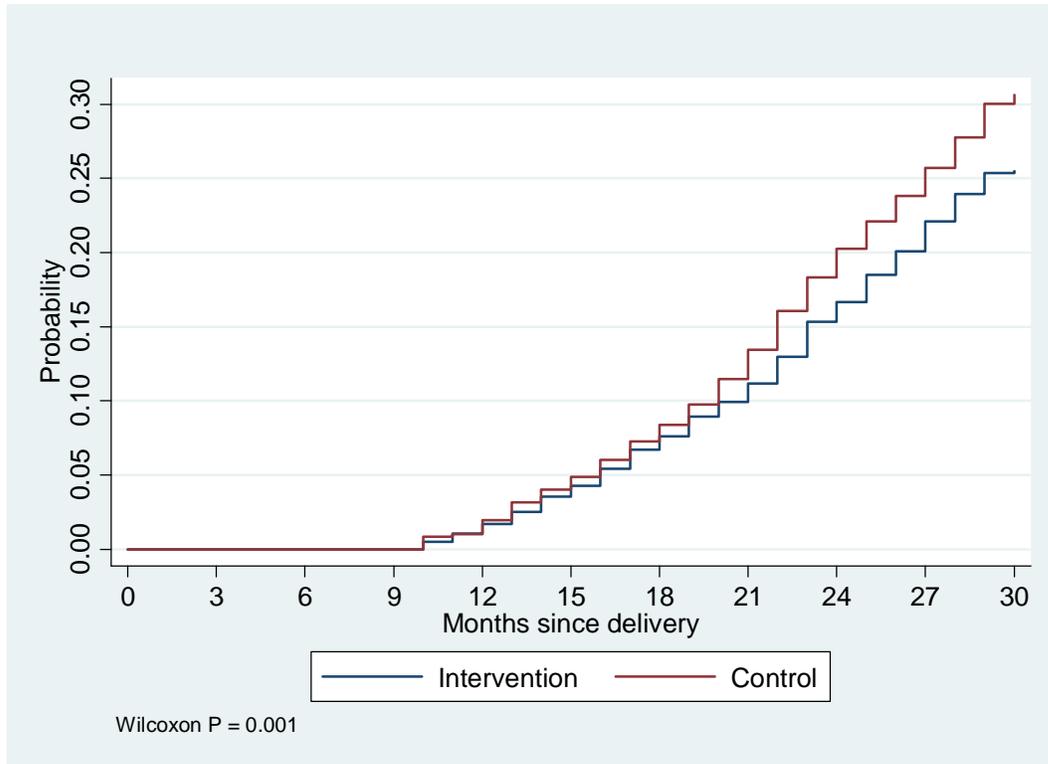


Figure 9. Probability of delivery incidence during 30 months of postpartum follow-up period by study arm



Section 3.0 Summary results and conclusion

3.1 Summary Results

Contraceptive use

Findings suggest that there was a substantial increase in the probability of contraceptive adoption in the 30 months postpartum in the intervention clusters compared to control clusters. Time-to-event analysis with Cox proportional hazards models was carried out to explore the cumulative probability of contraceptive adoption through 30 months postpartum.

Differentials in modern contraceptive use were observed according to key maternal characteristics, including participant's age, women's 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 three and six months postpartum in the intervention area. However, at 12, 18, 24 and 30 months postpartum, pills were the preferred method for users in both study arms followed by injectables and condoms. Sterilization acceptance was increase 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. At 30 months postpartum, HFS CHWs were the primary source of pills (76%) and condoms (86%) in the intervention area. In the comparison area, pharmacies and/or shops were the main source for pills (56%) and condoms (88%) followed by government health facilities. In the intervention area, the March 2011 introduction of community-based provision of injectables through HFS

CHWs has corresponded to slight increases in injection use from 12 months (7.8%) to 30 months (10.2%) postpartum. HFS CHW did not provide first dose of injectable, they provide follow up doses. User preferences on the source for injectables suggest that HFS CHWs provided injectables to 53% women in intervention arm. By comparison, 76% 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 for non-use in the intervention area was the husband abroad (43%); husband's disapproval (27%); followed by a desire to become pregnant (19%). In the comparison area, husband's disapproval was the leading reason cited by 39% of respondents; followed by desire to become pregnant (32%); and religious prohibition (22%).

Discontinuation of contraceptives

Beyond trends in current contraceptive use and non-use, women who were using contraceptives prior to 30 months but discontinued use were also assessed. In both study arms, side effects were the leading reason cited for discontinuing use of oral contraceptives (46% in the intervention and 47% in the comparison) and injectables (55% and 65%). The most frequent reasons for discontinuation of condom use in both arms were husband's disapproval and a desire for a more effective method in both study arms.

Pregnancy incidence

In an effort to capture the larger implications of study activities, self-reported pregnancy outcomes were assessed at 30 months postpartum. The probability of becoming pregnant by 30 months was 8.3% lower in intervention arm compared to control arm (36.5% in the intervention arm vs. 44.8% in the control arm; $p < 0.001$).

3.2 Conclusions

The HFS findings to date demonstrate that the integration of comprehensive PFP services at the community level through a MNCH platform improved contraceptive acceptance throughout first 30 months postpartum period. While findings from 18 to 30

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 30 months postpartum was higher in lowest wealth quintiles (lowest quintile 24% vs. 19% in highest quintile) in the intervention arm. However, in the comparison area any modern method use at 30 months postpartum was significantly lower among the poorest households (lowest quintile 16% vs. 20% in highest quintile).

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 long acting permanent methods, underscores the critical nature of having a functional public sector which can provide FP services.

Variations were observed in the reported reasons for non-use of contraceptive across both study arms. The large proportion of “husband’s 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 25% and 32% of intervention and comparison area recipients citing this as 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. Trends through 30 months postpartum indicated that the incidence of reported pregnancies is lower in the intervention area as compared to that reported in the comparison area. As the project continues and follow up data from 36 months emerges, this trend of a higher probability of self-reported pregnancy is anticipated to become more pronounced. Figure 10 summarizes these and additional key findings to date at 30 months postpartum.

Figure 10. Summarizing intervention components and key findings to date

<u>Summary of key intervention components</u>	<u>Key findings to date</u>
<ol style="list-style-type: none"> 1. Antenatal counseling and care 2. Birth and newborn care preparedness 3. Counseling, negotiation and demonstration 5. Delivery and immediate newborn care 6. Postpartum care and counseling 7. Return to fertility, LAM+, EBF, Healthy spacing of pregnancy 8. Community based distribution of pills condoms and injectables method and refer to facility for other methods 9. Community mobilization and advocacy 	<ul style="list-style-type: none"> ➤ Significant increase in the probability of contraceptive adoption through 30 months postpartum period in the intervention arm ➤ The rate of increase in contraceptive uptake from 18 to 30 months postpartum has slowed in both study arms. ➤ HFS activities have led to a decrease in the incidence of pregnancy within first 30 month of delivery –the period of highest risk for mother and baby. ➤ Integration of family planning services within a larger MNCH platform is feasible and does not have a negative impact on service coverage

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