

Building Capacity to use m-Health in Maternal, Newborn and Child Health Interventions



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Building Capacity to use m-Health in Maternal, Newborn and Child Health Interventions

Table of Contents

1. The Research Problem	3
2. Objectives	3
3. Methodology.....	4
4. Project Activities	8
5. Project Outputs.....	12
6. Project Outcomes	13
7. Overall Assessment and Recommendations.....	20

Annexes:

Annex 1: Quantitative Endline Survey

Annex 2: m-Health Forum Program

Annex 3: Quantitative Research Report

Annex 4: Qualitative Research Report

Annex 5: Learning Review Report

Building Capacity to use m-Health in Maternal, Newborn and Child Health Interventions

1. The Research Problem

A basic package of maternal and neonatal health services can save the lives of mothers and newborns during pregnancy, birth, and the post-natal period, including skilled birth attendance, ante-natal care and post-natal care¹. However, making such services accessible to all women remains a challenge. Improving maternal, new-born and child health (MNCH) requires more than the provision of services; mothers must be motivated and able to seek health care, and have appropriate self-care practices.

The use of mobile technology in MNCH has become increasingly popular and is showing promising results in facilitating emergency medical referrals, point of care support, health counselling and health system monitoring². Preliminary evidence also suggests that mobile health (m-Health) can effectively promote knowledge and care-seeking behaviour amongst pregnant women through timed messages³. Given that mobile phone ownership is widespread around the globe, m-Health has tremendous potential to reach those living in remote and isolated areas. However, more evidence is needed on the impact of m-Health interventions on MNCH outcomes, as well as understanding of how to effectively implement and scale-up such interventions in low-resource settings. While m-Health is being used around the world, there is still relatively little collaboration and cross-sharing of ideas amongst Canadian organizations using it to improve MNCH.

It is well known that support from family members, particularly husbands, is important for enabling women's access to health care³. However, engaging men is difficult due to time constraints, lack of clinic space and health workers trained in counselling men, and stigma from men's involvement in "women's issues"². With m-Health, information can be delivered discreetly, independent of place or time, thus evading the challenges of direct counselling. There is a dearth of research on the impact of using m-Health targeted to husbands on women's access to maternal health services. In this project, Canadian and Indian researchers collaboratively piloted an m-Health application to engage and educate husbands, building Canadian and Indian capacity to use m-Health in an MNCH context, and contributing to the global evidence base on the feasibility and impact of this technology.

2. Objectives

The long-term goal of this project was to build capacity within Canada and India to effectively use m-Health in MNCH interventions and ultimately, reduce maternal and newborn mortality. To achieve this goal, the project had two separate but complementary components:

¹ Surviving the first day: State of the world's mothers 2013. Save the Children. ISBN I-888393-26-2.

² Tamrat T & Kachnowski S. (2012). Special delivery: An analysis of m-Health in maternal and newborn health programs and their outcomes around the world. *Maternal and Child Health Journal*, 16: 1092-1101.

³ Davis J, Luchters S, Holmes W. (2013). Men and maternal and newborn health: Benefits, harms, challenges and potential strategies for engaging men. Centre for International Health, Burnet Institute, Australia.

Building Capacity to use m-Health in Maternal, Newborn and Child Health Interventions

The first component, a Collaborative Research pilot project, contributed to the global evidence base while building local capacity to use m-Health in MNCH interventions. HealthBridge worked with its Indian partner Evangelical Fellowship of India Commission on Relief (EFICOR) and Dimagi India (a mobile technology enterprise) to design, implement and evaluate the impact of using m-Health to engage husbands in their wives' maternal health care. To our knowledge, there are very few interventions that have evaluated the impact of using m-Health to engage husbands. The objectives of the Collaborative Research component were:

- i. To assess the feasibility and impact of an m-Health intervention targeted to husbands on women's utilization of maternal healthcare in rural India
- ii. To increase capacity of HealthBridge and EFICOR to use m-Health in MNCH interventions

Both of the above Collaborative Research objectives were achieved by the project. An m-Health intervention that sent voice messages to husbands of pregnant women was pilot tested in a rural district of India. The evaluation assessed the impact of the intervention on women's utilization of maternal health care, and also the challenges faced throughout the process of implementation. Lessons learned in designing the research and m-Health application, training field staff and implementing the intervention were also documented.

The second component, a Knowledge-Sharing component, convened Canadian researchers and practitioners who have used or are interested in using m-Health for MNCH, to share results, experiences and lessons learned. The objectives of the Knowledge Sharing component were:

- i. To increase knowledge amongst Canadian organizations of promising approaches for using m-Health to improve MNCH.
- ii. To identify best practices for designing, implementing and scaling up m-Health approaches in MNCH interventions.

The project team organized a half-day Knowledge Sharing Forum which provided a unique opportunity for Canadian organizations to learn and discuss how m-Health has been used to improve MNCH in low and middle income countries. Given how young the field of m-Health is and limitations in the existence of well documented studies, we were not able to identify *best* practices but rather the Forum enabled us to identify *promising* practices and approaches for using m-Health in an MNCH context. In addition to identifying promising practices, the Forum identified lessons learned and key gaps in m-Health evidence and recommendations for future research.

3. Methodology

Collaborative Research Component

This project pilot tested an m-Health intervention to educate husbands of pregnant women about maternal health care and increase their involvement in supporting maternal health.

Building Capacity to use m-Health in Maternal, Newborn and Child Health Interventions

The intervention was called “3M: Men using Mobile phones to improve Maternal health”. Men were sent timed voice messages with health information, recommended actions to take and reminders of their important role in supporting the health of their pregnant wives. The research project was implemented from September 1 2014 – April 30 2016 in Pakur district, Jharkhand State, India. The research protocol was finalized by the research team and ethics approval was obtained from the Institutional Ethics Committee at St. John’s National Academy of Health Sciences, Bangalore.

Research Design: The research design comprised a before-after-control-impact quasi-experimental design. The project took place in 50 villages of Hiranpur block; 25 intervention and 25 control villages. The inclusion criteria for husbands’ participation in the project were: a) his wife must be 12-20 weeks pregnant; and b) he must own a functional mobile phone. The project team aimed to recruit 230 husbands (115 each in intervention and control blocks) who met these criteria to participate in the project.

In both the intervention and control blocks, ASHAs⁴ counselled pregnant mothers using Smartphones and Dimagi’s CommCare⁵ application which included interactive messages and videos with health information. This was different from the standard counselling method, which involved only a flip book with pictures. In the intervention block, the husbands were registered to receive the m-Health voice messages, while those in the control block were not. Figure 1, below, depicts the research design.

⁴ Accredited Social Health Activists – village level health workers who are compensated by the government to counsel and support pregnant and lactating mothers. In Jharkhand, they are also called Sahiyas.

⁵ CommCare (www.commcarehq.org) is an open source mobile and web cloud product used by Frontline Workers (FLWs) across a variety of sectors, including community health workers, agricultural extension workers, mobile trainers, and supervisors. In this project, it was used by ASHAs to aid in counseling and collection of health information from the mothers.

Building Capacity to use m-Health in Maternal, Newborn and Child Health Interventions

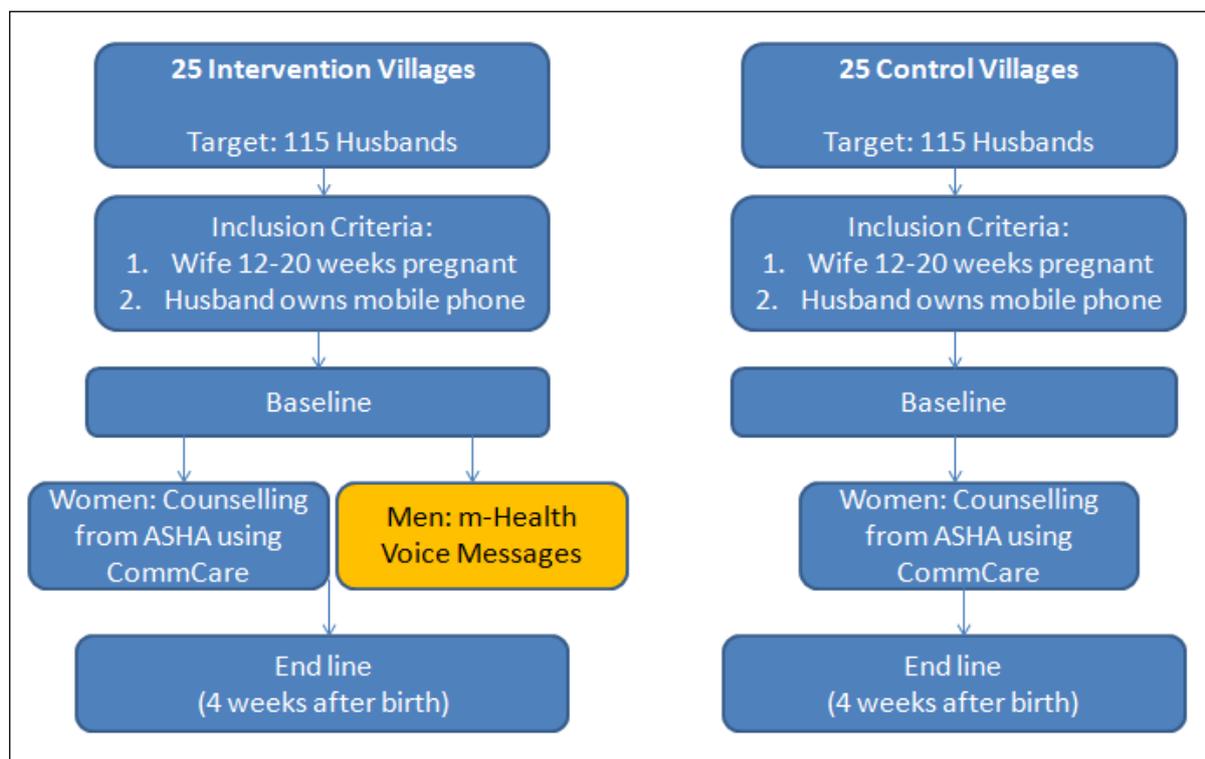


Figure 1: Diagram of Research Study Design

The use of CommCare for counselling by ASHAs was a new intervention in both the intervention and control villages. Thus, in reality, the research design involved an intervention group (ASHA CommCare counselling) and an “Intervention-Plus” group (ASHA CommCare counselling + m-Health voice messages for husbands). The fact that two new interventions were being implemented made it difficult to assess the impact attributable to the voice messages delivered to husbands on their behaviour and women’s use of health care. The CommCare counselling by ASHAs had a novelty effect on its own that may have improved the performance of ASHAs and increased the engagement of pregnant women, above and beyond the original flipchart method of counselling. A key lesson learned was that it would have been better to only implement one intervention, the m-Health voice messages for husbands, in order to better assess the impact of this intervention alone.

Recruitment: Men and women who met the inclusion criteria were identified and recruited from April 1-30th, 2015. 50 ASHA workers were provided android-based phones to register the husbands using the CommCare application and counsel the pregnant women using the mobile phones. Two levels of informed consent were obtained: 1. ASHAs or EFICOR field staff first informed the pregnant mother about the 3M project and got permission to recruit her husband. 2. ASHAs or EFICOR staff informed the husband about the 3M project and obtained their permission to participate. Husbands’ mobile numbers were registered in the system, along with his wife’s week of pregnancy and the relevant language.

Baseline Assessments: A household survey was conducted with 102 couples in the intervention and control areas to assess men’s knowledge and behaviour and women’s utilization of key maternal health services. The data were entered in EPI INFO version 7.0

Building Capacity to use m-Health in Maternal, Newborn and Child Health Interventions

and analyzed based on key project indicators. Qualitative assessments were also conducted in 6 villages through Focus Group Discussion (FGDs) with 60 husbands (30 each in intervention and control villages) to assess attitudes and beliefs towards men's involvement in maternal health. A total of 6 FGDs were conducted, with 10 participants in each. The baseline survey tool and FGD guide were included with the Interim Report.

Intervention Implementation: 115 Husbands in the intervention villages were registered to receive the messages. Details on their phone numbers, preferred time and language to receive the messages, and wife's pregnancy stage were entered into the CommCare application on ASHAs' Smartphones. The data were automatically uploaded to Dimagi's server, and messages were sent to husbands on a weekly basis, with the message content linked to their wife's pregnancy stage. In both intervention and control villages, ASHAs counselled 115 pregnant women (in each of intervention and control; 230 total) on a periodic basis, using Dimagi's CommCare application.

Endline Assessments: Endline assessments were conducted with the same households that completed the survey at baseline, 4-5 weeks after women gave birth, in both intervention and control villages. A quantitative household survey (Annex 1) collected information on men's knowledge and behaviour, and women's utilization of key maternal health services. The project aimed to collect data from a target of 115 couples, but due to the unavailability of couples and a few miscarriages, data was collected from 103/104 couples in the control/intervention villages, respectively. The data was entered and analyzed using Epi Info version 7.0.

Endline qualitative assessments were held with the men, women and ASHAs to collect feedback on the usefulness of 3M messages and changes in men's knowledge regarding MNCH and their involvement in maternal health care. Six FGDs were conducted, four FGDs, two with husbands and two with mothers, were conducted in the intervention village where the husbands were exposed to 3M messages. Two FGDs, one with husbands and mothers, were conducted in control villages. Additionally, in-depth interviews collected information on the perceptions of key stakeholders on the feasibility and usefulness of the 3M intervention. Interviews were conducted with 2 participating EFICOR staff, men, women, 4 ASHAs (from 2 intervention and 2 control villages), and one Block Medical Officer of Health. The qualitative data were analyzed on a basis of systematic coding, which comprises breaking down the data according to a code list to identify relevant patterns. The coded segments are then grouped and synthesized into broader categories, which in turn get linked to more general themes and concepts.

In addition to the above assessments, a learning review was conducted to synthesize key lessons learned, challenges and successes of the project, and collect case studies on project impact.

Knowledge Sharing Component

HealthBridge organized a half-day Knowledge Exchange Forum in Ottawa, Ontario which convened researchers, government and NGO practitioners to share promising practices and

Building Capacity to use m-Health in Maternal, Newborn and Child Health Interventions

lessons learned about using m-Health in an MNCH context. During the Forum, two representatives from HealthBridge Foundation of Canada recorded notes of the discussion amongst presenters and participants. Information from the presentations and the recorded notes were reviewed to identify main themes related to promising practices, lessons learned and recommendations. Participants of the Forum were also asked to complete a short questionnaire on their perceptions of the event.

4. Project Activities

Collaborative Research

Recruitment: One Project Manager and two local persons were recruited as cluster supervisors for monitoring the project. Literate ASHA workers were identified in the 50 project villages in Hiranpur block. They were introduced to the project and given Smartphones. They were oriented over 2 days as to their role in the project, which included identification of the study couples and providing counselling to the pregnant mothers using the CommCare m-Health application.

Message Development: Messages, adopted from MAMA (Mobile Alliance for Maternal Health) were translated to local dialects and were delivered using Dimagi's CommConnect mobile technology platform which allows customization of messages to the mothers' pregnancy stage, as well as voice messaging. Due to high rates of illiteracy in the district, voice messages were favoured over text. Formative Research was conducted to inform the content of the voice messages. Three focus groups were held with local men (2) and women (1) to gather input on the types of messages husbands should receive to reduce barriers and increase support for pregnant women in accessing health care and self-care practices. A survey was also conducted with the 115 men in the intervention villages to identify their language preference and a convenient time to listen to the messages. This information was used to adapt the MAMA messages to the local context. The English version of the messages was submitted with the Interim Report. Key-informant interviews were also conducted with community health workers and local leaders to identify the best channels for recruiting husbands of pregnant mothers.

Software Development: EFICOR worked closely with Dimagi to develop the m-Health application, and HealthBridge provided technical input on the content of the messages and the overall process. The application was designed such that when husbands were registered for the 3M intervention, the mobile application automatically sent messages that were in their preferred language and applicable to their wives pregnancy stage.

The Commcare application used by ASHAs was previously developed by Dimagi and the project did not make any changes to this application. It included voice messages and videos on issues surrounding MNCH that could be played during the counselling sessions to enhance the understanding of both ASHAs and the pregnant mother.

Trainings: Project staff and selected ASHAs were trained on Dimagi's CommCare application, the 3M application, and how to register husbands of pregnant mothers to receive messages.

Building Capacity to use m-Health in Maternal, Newborn and Child Health Interventions

A Training of Trainers approach was used, wherein EFICOR staff and ASHA supervisors were first trained over a four day period on the technical aspects of the application itself, and then on how to train the 50 ASHAs. The ASHA supervisors and EFICOR staff then trained the 50 ASHAs on: navigating a touch phone, installing & maintaining the CommCare app, using the app to register pregnancy details, phone numbers and preferred time to send 3M messages, and using the videos to counsel women. Throughout the project, ASHAs provided health counselling and assistance to pregnant mothers in both intervention and control communities using Dimagi's CommCare application. ASHAs also followed up with husbands receiving the 3M messages, encouraged them to listen to the messages and follow through with their wives. ASHAs also reported to EFICOR when men were not receiving messages, and EFICOR staff followed up to resolve the problem.

Message Delivery: In the 25 intervention villages, 115 husbands whose wife's pregnancy was between 3 to 5 months were registered and started to receive the 3M messages in May 2015. The messages were sent on a weekly basis and continued until the husband's wife gave birth. Regular monitoring was done to check message delivery; call log reports were regularly checked and follow up was conducted when undelivered messages were identified. The messages were delivered to 104 husbands from May 2015 to March 2016. The messages could not be delivered to the other 11 husbands, as their mobile numbers were registered on the "Do Not Disturb List". This list prevents someone from receiving tele-marketing calls, and only the mobile owner him/herself can have their number removed from the list.

Monitoring: The project cluster supervisors had scheduled visits to every village at least once a month. Their first stop would be to visit the ASHA. They would observe and check the counselling and teaching skills of the ASHA. They would also meet with husbands, although this was not always possible due to the husbands' work schedule. If husbands indicated they were not receiving the messages, the cluster supervisors would inform the Project Manager who would consult a technical staff at Dimagi. Dimagi would direct EFICOR staff to check the online monitoring server website, CommCare HQ, which showed details of registration, counselling episodes and whether the messages were delivered, listened to, and the duration of listening.

Key Lessons Learned about Project Implementation & Management

- Some husbands migrated for work, and on migration the phone numbers registered in the CommCare system were either switched off or replaced. For such cases, it may have been helpful to select another family member (such as the mother-in-law) to receive the messages, rather than the husband.
- To minimize cell phone errors, the requirements for online registration should have been streamlined. ASHA's username and password entry to use the CommCare application were occasionally corrupted due to internet requirements to connect with the server. In the rural setting, the mobile reception was often poor. Sometimes, pre-registered username and passwords were not accepted by the server, and it took approximately 24 hours to get a reply from the online technical support service. This

Building Capacity to use m-Health in Maternal, Newborn and Child Health Interventions

affected their ability to register husbands and upload their information in a timely manner.

- The ASHA were trained by Dimagi through a training of trainers process. This enabled EFICOR staff and ASHA Supervisors to hone their teaching skills and their knowledge of the CommCare application, which proved useful for troubleshooting later on during implementation. At the same time, it was easier for the ASHA to understand local staff teaching in the local language. That being said, the training programmes should have been longer and repeated after a period of time so that the Project Staff and ASHAs were fully equipped to carry out their tasks.
- Monitoring capacity of the field staff was an important factor for the project success. Continuous monitoring to check if husbands were receiving and listening to the messages, and checking and solving software problems with ASHAs led to better implementation of the study. The field staff were able to identify software problems even without being notified by ASHAs by checking the CommCare online logs which tracked actual use of the software by ASHAs and delivery of messages to husbands.
- For a programme heavily dependent upon technology, the service provider needs to be able to help trouble shoot over the phone when required. This was not always possible, and made things more difficult for the field staff. In the event of a technical error, the staff would be asked to file an online complaint. The written response would take 24-48 hours, which would not always solve the problem, leading to another written complaint. In addition, it would have been helpful to have a periodic visit by the service provider to the Project site to provide technical support.
- The intended focus of the project was to evaluate an m-Health intervention targeted at men. However, a large amount of time, energy and resources were used for acquiring the Smartphones for ASHAs, loading the CommCare software, ensuring that the phones were working and that ASHAs were doing their job of counselling women. During the time period from August 2015 – February 2016, the project staff spent most of their time trouble shooting and solving mobile phone problems related to the CommCare application. For the purposes of this project, it would have been more effective if only the 3M intervention targeted to husbands was implemented, and not the ASHA CommCare counselling intervention. Project staff could have spent more time following up with husbands each week to ensure that they had received, listened to and understood the messages, and solving problems with message reception immediately.

Knowledge Sharing Component

Knowledge Exchange Forum: HealthBridge hosted a half-day Knowledge Exchange Forum on March 11th, 2016 in Ottawa, Ontario. Dr. Gail Webber from the University of Ottawa helped to plan and organize the event, and presented her own m-Health research at the event. The overall purpose of the Forum was to facilitate knowledge exchange between researchers

Building Capacity to use m-Health in Maternal, Newborn and Child Health Interventions

and development practitioners who have used, or are interested in using, m-Health to support MNCH. The specific objectives were:

1. To exchange knowledge on different approaches, results and lessons learned from using m-Health to support MNCH.
2. To identify promising practices, lessons learned and recommendations for implementing and/or scaling up of m-Health interventions to support MNCH.

Presenters were purposefully selected to represent a variety of m-Health intervention approaches and geographical contexts. The Program can be found in Annex 2. The presentations were as follows:

- *Role of Mobile Communications Technology and Social Media in Breastfeeding Support.* Prof. Daniel Sellen, University of Toronto.
- *Emerging Results from IDRC's e-Health Portfolio in 7 Countries.* Zoe Boutilier, IDRC (International Development Research Centre)
Opportunities and Challenges in m-Health: Perspectives from the Technology Sector. Medic Mobile (presented by Dr. Gail Webber), followed by Amelia Sagoff, Dimagi.
- *Using m-Health to engage men and maternal health in India.* Lisa MacDonald, HealthBridge Foundation of Canada.
- *Community health workers using m-Health in rural Tanzania.* Dr. Gail Webber, University of Ottawa
- *Smartphone support for frontline health workers to improve uptake of maternal health services in Tanzania.* Kristy Hackett, University of Toronto.
- *Empowering community health workers with HELP in Kenya.* Dr. Githinji Gitahi, Amref Health Africa.
- *Recent trials of cell phone based breastfeeding support.* Prof. Daniel Sellen, University of Toronto

The event was advertised on HealthBridge's website, in the Canadian MNCH Network's Newsletter, and through HealthBridge's existing network of contacts. The event was attended by 30 participants representing government, academia, non-government organizations and the mobile technology sector. A report was developed to outline the main content and themes of the Forum. The report will be shared with the Forum participants, members of the Canadian MNCH Network, and on HealthBridge's website.

Key Lessons Learned about the Knowledge Exchange Forum

The feedback we received from participants indicated that they would have liked to have more time for questions and discussion. We had originally planned to have a full day event, however, some participants said that they could only participate for half a day due to conflicting work priorities. For this reason, we decided to organize a half day event to

Building Capacity to use m-Health in Maternal, Newborn and Child Health Interventions

maximize participation. It may have been better to have fewer presenters and dedicated breakout sessions to facilitate more discussion amongst participants.

5. Project Outputs

Collaborative Research Component

Research Reports: Three research reports on the study findings were produced:

1. Quantitative research report (Annex 3).
2. Qualitative research report (Annex 4).
3. Learning review report, which captures the process, key lessons learned, challenges and case studies of project impact (Annex 5).

Technologies: The project produced a series of m-Health messages targeted to men at different stages along the pregnancy continuum tailored to the local context of Pakur and translated into three local languages. The English version of the messages was submitted with the interim report. In addition, an m-Health application was developed by Dimagi to enable customized delivery of the messages on a weekly basis, according to preferred time of day, language and pregnancy stage.

Capacity: A two-day training of trainers (TOT) workshop was organized for EFICOR project staff and 4 ASHA Supervisors to understand the concept of the CommCare application, the 3M application and trouble shooting of the Smartphones. Subsequently, a two-day training was organized for 50 ASHAs on using the Smartphone, the CommCare application and registering husbands. The local ASHA workers are part of minority groups in India called Scheduled Tribes and Scheduled Castes, which represent vulnerable and marginalized social groups. The sustainability of the capacity built within ASHAs to use the Smartphones is unknown. In some cases, ASHAs have started to use Whatsapp for sending updates and photographs of their programmes to their supervisors. However, in other cases, the Smartphones stopped working, or were stolen, which will prevent further use of the technology. The m-Health intervention generated much interest and excitement in the project area, and it is hoped that this will influence the government of Jharkhand to take up the intervention and continue it in the district. However, the possibility of this happening remains unknown at the present time.

Policy/ Practice Influence: Culturally, men do not help women with household chores, but the 3M messages prompted men to support their pregnant wife in completely new ways. Men in the village were observed doing things for their wives they had never done before, which has generated much curiosity in the village and, in turn, awareness on the care to be provided to pregnant women.

Knowledge Sharing Component

Capacity: A half-day Knowledge Exchange Forum was organized on “Using m-Health for MNCH” in Ottawa. The Forum was attended by 30 participants from the academic,

Building Capacity to use m-Health in Maternal, Newborn and Child Health Interventions

government and NGO sectors and involved presentations from 6 Canadian researchers and 1 Kenyan researcher who shared their experiences using m-Health for MNCH.

Policy/Practice Influence: A Report was produced describing the main content and outcomes of the Forum, including promising practices, lessons learned, and key gaps and recommendations for future research. It will be disseminated to all Forum participants, members of the Canadian MNCH Network, and on HealthBridge's website and social media to influence programming related to using m-Health in an MNCH context.

6. Project Outcomes

Collaborative Research Component

Changes in Capacity

Capacity of HealthBridge and EFICOR

Using m-Health to educate men about maternal health is a new approach for both EFICOR and HealthBridge. The project built the capacity of both organizations in terms of understanding how this technology can be used as an educational and counseling tool. Through the training and project implementation, the project staff gained knowledge on how to trouble shoot the CommCare Application and provide technical support to the ASHAs. They also have gained knowledge on how to use the CommCare HQ website to assess the day-to-day work of the ASHAs and monitor the delivery of the voice messages to the husbands.

Capacity of ASHAs to use m-Health for Counselling

The capacity of ASHAs was built in several ways through this project, especially through use of technology and by teaching others with audio-visual tools. The Smartphones and CommCare application are new technologies for ASHA's to use in counseling pregnant mothers. Through this project, ASHAs have learned how to use Smartphones and the audio-visual tools within the CommCare application to counsel mothers. Smartphones are new to the village and it has generated great interest amongst both the ASHAs and the pregnant mothers they counsel. The ASHAs expressed that counseling through mobile phones enhanced their status in the village. Women, and their families, would listen to her advice assuming that she had relevant and useful information.

Feasibility of using m-Health to engage husbands in rural India

The project team learned many lessons about the feasibility of using m-Health to engage husbands in maternal health care in rural India. While it was fairly easy to develop the m-Health application and recruit husbands to participate in the intervention, the difficult part was getting husbands to actually listen to the messages. According to the call log, 69% of husbands listened to at least one of the messages, while 31% did not listen to any. Although

Building Capacity to use m-Health in Maternal, Newborn and Child Health Interventions

messages came every week, none of the husbands heard all the messages. According to the call log, on average husbands listened to 9 out of the 29 messages (33%), ranging from 1-23 messages.

Modifications that may increase the likelihood that husbands would listen to and understand the messages, based on the project findings:

- *Mechanism to identify the 3M intervention messages:* Husbands said that they could not differentiate between the 3M calls and tele-marketing, and this deterred them from answering their phones. It was suggested to include an accompanying SMS, or some other mechanism, to identify the 3M calls.
- *Mechanism for repeating the messages:* The majority of husbands found the content and language of the messages useful, but some found the messages too fast and short. They wanted a system in which they could request for a repeat message they had missed or misunderstood.
- *Message format and timing:* The project team selected voice messages, rather than text, because a large proportion of the population is illiterate. However, this meant that a call had to be delivered at a specific time of day, and husbands had to be available to answer it. If the call was not answered the first time, it would repeat every 30 minutes up to 4 times. Despite setting preferred times of day to receive calls, husbands were not always available to answer calls due to conflicts with their work schedule, Indian restrictions on calls after 9 pm, family members borrowing the phone, phone being on silent mode, and failure to recharge the phone. Delivering the message in another format, such as a voice or video SMS that could be stored on the phone, or having a mechanism to enable husbands to replay the messages, would have allowed them to listen to the messages at a time that was convenient for them.
- *Follow-up System:* The project staff indicated that it would have been helpful to have a follow-up system through face-to-face or group meetings with husbands. This would have help to resolve issues with changing phone numbers, migration and failure to listen to messages, and would have also enabled the project staff to reinforce the message content.

Feasibility of using m-Health to support ASHA Counseling of Pregnant Mothers

Although the project did not set out to evaluate the use of m-Health by ASHA workers to counsel pregnant mothers, it was part of the project and our research findings provided insight into the feasibility of this intervention. Some key challenges and lessons learned have been mentioned previously in Section 4. The key finding with respect to feasibility was that a tremendous amount of time and energy was needed to provide technical support and troubleshooting to the ASHAs when they experienced a problem with the phones or the CommCare application. Projects need to build in sufficient time and budget to provide

Building Capacity to use m-Health in Maternal, Newborn and Child Health Interventions

repeat trainings and have dedicated technical support personnel for resolving technical issues efficiently. Poor signal, speed and connectivity in the rural area also hindered ASHA's ability to upload data to the server, and in some cases they had to go to the marketplace or public health centre. Our experience has shown us that although the use of m-Health for counseling is esteemed by the ASHAs and local beneficiaries and could prove to be very useful and effective, it is important that the time spent resolving technical issues and finding good connectivity does not create an extra burden for the ASHA or interfere with her work.

Impact of using m-Health to engage husband in rural India

The project evaluated the impact of the 3M intervention on husband's knowledge and behaviour in relation to maternal health, and women's utilization of maternal health care. Our hypothesis was that regularly sending information and prompts to husbands throughout their wives' pregnancy would lead to increased knowledge and actions to support their wives' maternal health, and increase their wives' use of maternal health care. Results are described below.

As shown in Annex 3, for most indicators, both the intervention and control villages showed a significant improvement from baseline to endline. This is likely due to the fact that the ASHA m-Health intervention was implemented in both the intervention and control communities and it also had a positive impact on project outcomes. Although ASHAs were already counselling pregnant mothers prior to this project, the novelty of m-Health may have increased the likelihood that women and their families would listen to and take the advice of the ASHA workers. Implementing two new m-Health interventions at the same time made it difficult to determine the impact of the 3M intervention alone. In hindsight, it would have been better to implement only the m-Health intervention for husbands in order to better evaluate its true impact.

The following paragraphs summarize the results related to changes in knowledge, attitudes and behaviour of husbands and utilization of maternal health care by women. Results are taken from the Quantitative Research Report (Annex 3), Qualitative Research Report (Annex 4) and Learning Review Report (Annex 5).

Changes in Knowledge and Attitudes of Husbands about Maternal Health

Husbands' knowledge of key maternal health issues (maternal danger signs during pregnancy and postpartum period and the need for 4+ ANC checkups) increased significantly ($p < 0.01$ - $p < 0.001$) in both the intervention and control communities. Given that knowledge improved in both groups, it is difficult to determine if there was any added benefit of the 3M intervention above and beyond the counselling provided by the ASHAs using CommCare.

In both the control and intervention groups, the qualitative findings showed that men agreed that their role is to support their wife during pregnancy. The agreeable attitudes may have been influenced by the previous DFATD MNCH project that EFICOR and HealthBridge had recently implemented, which emphasized male engagement in MNCH. That being said,

Building Capacity to use m-Health in Maternal, Newborn and Child Health Interventions

men exposed to the 3M messages were better able to explain the role of husbands, in comparison to men in the control villages. Men who had received the messages mentioned the need to support their wife with household work, accompany her to check-ups, follow-up with the ASHA and ANM, arrange money and vehicle for delivery, and support newborn care. Men in the control villages were aware of the care that should be given to their wife during pregnancy, but they were not able to explain exactly what should be done by husbands. This suggests that there may have been an added benefit of the 3M intervention, although it is difficult to draw this conclusion given the limitation of our research design.

Changes in Behaviour of Husbands

Supportive Actions

The baseline and endline household survey asked women about the types of support they received from their husbands. As shown in Table 1, below, in both intervention and control communities, there was a significant increase in the percentage of mothers who said that their husbands encouraged them or provided practical support during pregnancy to attend ANC and to take adequate rest. However, the percentage of mothers who said their husbands encouraged them to eat healthy during pregnancy increased significantly in only the intervention communities, and not the control communities.

Table 1: Changes in supportive actions by husband during their wives' pregnancy

Type of Supportive Action	Intervention area			Control area		
	Baseline n=102	Endline n=104	P value, sig	Baseline n=102	Endline n=103	P value, sig
% mothers whose husbands encouraged them or provided practical support to attend ante-natal check-up	35.4	65.2	<0.001	22.6	52.9	<0.001
% mothers whose husbands encouraged them or provided practical support to take adequate rest	32.3	60.7	<0.001	25.5	47.1	<0.01
% mothers whose husbands encouraged them or provided practical support to eat healthy	53.1	85.4	<0.001	61.8	72.4	>0.05

The fact that supportive actions for ANC and taking adequate rest increased significantly in the intervention and control communities makes it difficult to attribute any improvements to the 3M messages delivered to husbands. It may be that husbands in both groups also listened to the ASHA's counseling and watched the videos, and this influenced their behaviour.

With respect to husbands supporting their wives to eat healthy, this only increased in the intervention group. Interestingly, findings from FGDs with men in the intervention group showed that, although they were not able to remember the content of all the messages,

Building Capacity to use m-Health in Maternal, Newborn and Child Health Interventions

they did remember the messages about diet and food intake of pregnant women, as well as messages about regular health check-ups.

Results from the FGDs with women revealed that, prior to receiving the 3M messages, their husbands were not much aware or concerned about them during pregnancy. However, after receiving the messages, they started giving attention to the care of their wife and reminded them to go for a check-up, take proper rest, eat properly and even helped with housework. The findings suggest that the 3M messages may have influenced men's behaviour, particularly with respect to encouraging their wife to eat a nutritious diet. On asking women their opinion of the changes they observed in their husbands, two women responded:

"When the messages started coming in mobile phone, our husbands suddenly started asking us regarding the health check-ups and eating nutritious foods as green vegetables, fruits, eggs, etc. They had also been discussing regarding the messages."

"Earlier our husbands were not known and aware about the issues related to mother's health care...After getting messages they were started asking us to take proper care and also help in household works."

Birth Preparations

The project assessed the types of birth preparations that were made before the birth of the child. This was asked at baseline and endline. As shown in Table 2 below, the proportion of husbands who had made birth preparations increased significantly from baseline to endline for both intervention and control, except for "finding a blood donor", which did not increase in either group. That said, a certain level of increase would be expected since the baseline survey was conducted early in the pregnancy (12-20 weeks), and more preparations would have been made as time went on closer to the delivery date.

The overall proportion of husbands that had made birth preparations at endline was higher in the intervention group compared to control. In particular, the proportion of husbands who had decided on the place of delivery (70.9% intervention; 48.2% control), arranged transport (60.6% intervention; 43.5% control) and contacted a health worker to help with delivery (59.7% intervention; 34.1% control). Further analyses are needed to determine if these differences are statistically significant. Findings from the FGDs and case studies support the notion that the 3M intervention led to increased birth preparations. The findings indicated that prior to receiving the messages, although husbands may have provided support, they rarely discussed or followed up with their wife on issues of maternal care. After they started receiving the messages, they started to follow-up with their wife and discuss with each other on the needs and requirements during pregnancy, delivery and post delivery.

As one woman said: *"Receiving the messages, husbands started taking an interest in our health care. They used to ask about healthy food intake. Also tell us about the messages. We had also discussed regarding arrangements for delivery. These were not happening earlier."*

Building Capacity to use m-Health in Maternal, Newborn and Child Health Interventions

Table 2: Changes in birth preparations made by husbands.

Responses	HUSBANDS					
	Intervention			Control		
	Baseline N=102	Endline N=72	P value, sig	Baseline N=101	Endline N=85	P value, sig
Save money	44.1	70.9	<0.001	45.5	62.3	<0.05
Decide upon place of delivery	16.7	70.9	<0.001	3.0	48.2	<0.001
Find blood donor	3.0	7.0	>0.05	1.0	5.9	>0.05
Arrange transport	13.9	60.6	<0.001	11.9	43.5	<0.001
Contact health worker to help with delivery	15.8	59.7	<0.001	10.9	34.1	<0.001
Arrange with mother/ other relations for assistance	8.8	19.5	<0.05	5.9	16.5	<0.05
No preparations/ don't know	41.2	2.8	<0.001	44.5	9.4	<0.001

Changes in Women's Utilization of Maternal Health Care

As shown in Table 3 below, there was no significant difference between the intervention and control villages in the percentage of mothers who received 4+ ANC check-ups or consumed the recommended number of iron folic acid tablets. However, the percentage of mothers who gave birth in a health facility was significantly higher in the intervention group (93%) compared to the control (62%).

The baseline assessments showed no difference in the proportion of women in the intervention (65%) and control (68%) groups whose last birth was in a hospital, which suggests that the difference observed at endline may be attributed to the 3M messages delivered to husbands. This notion is supported by the findings related to birth preparations (discussed above), which revealed that a larger proportion of husbands in the intervention group had identified the place of delivery, arranged transport and contacted a health worker (although statistical significance was not assessed).

Table 3: Utilization of maternal health care

Indicator	Intervention area n=104	Control area n=103	P value
Percent mothers who received 4+ ante-natal check-ups	68.3	58.3	>0.05
Percent mothers who consumed 100 iron folic acid tablets	33.7	27.2	>0.05
Percent mothers who gave birth in a health facility.	93.3	62.1	<0.001

Building Capacity to use m-Health in Maternal, Newborn and Child Health Interventions

Knowledge Sharing Component

Scientific Knowledge

The m-Health Knowledge Exchange Forum enabled sharing of knowledge of promising m-Health interventions being used to improve MNCH by Canadian researchers and development practitioners in low and middle income countries. Promising practices identified in the forum included:

- m-Health as a job-aid support Community Health Workers with counselling, tracking client information, training, peer support and supervision.
- m-Health as an engagement tool through sending voice messages to husbands of pregnant women to educate them about maternal health care.
- m-Health to strengthen social support for breastfeeding mothers through peer counselling.

Two presenters shared results that demonstrated mobile phone support to Community Health Workers led to improvements in the quality of health counselling and women's utilization of maternal health care. Additionally, another presenter found that cell phone based peer counselling for mothers led to increased rates of exclusive breastfeeding.

In addition, the presenters shared lessons learned and challenges in implementing and scaling up m-Health interventions. We learned about the importance of providing technical support, tailoring interventions to the local context, and having government engagement and support.

The Forum also stimulated discussion on key gaps in research related to m-Health, including the need for more evidence that m-Health interventions lead to changes in health outcomes and the need for regulatory frameworks. The issue was also raised about the importance of investigating whether m-Health is meeting the real MNCH needs of local health systems and beneficiaries, and not simply being driven by the technology sector. The knowledge produced by the Forum can be used by researchers, practitioners and donors to improve the implementation of m-Health interventions and to direct future research priorities.

Building Relationships

The m-Health Knowledge Exchange Forum was the first time, to our knowledge, that Canadian researchers and development practitioners were brought together to share and discuss about m-Health specifically related to MNCH. Our experience organizing the Forum has revealed that although there are a variety of organizations piloting m-Health interventions, there is a lack of awareness, collaboration and sharing between organizations about successes and lessons learned, as well as evidence to support best practices. Through the event, participants were able to network and learn from each other, and many expressed a desire to continue doing so. After the event, HealthBridge was approached by

Building Capacity to use m-Health in Maternal, Newborn and Child Health Interventions

another NGO about organizing another m-Health Forum in the future. Thus, the event appears to have stimulated an existing need for more collaboration and sharing about m-Health for MNCH.

7. Overall Assessment and Recommendations

The use of mobile technology in MNCH has become increasingly popular and is showing promising results in facilitating health counselling, social support and in some cases, improving health care utilization. At the start of this research project, HealthBridge and EFICOR were nearing the end of a 3 year MNCH project funded by the Department of Foreign Affairs, Trade and Development (DFATD, now Global Affairs Canada). The strong relationships that had been established between HealthBridge and EFICOR and with the local communities contributed immensely to the smooth implementation of this project. Trust had already been built with the local authorities, ASHAs and families, so it was very easy for the project staff to recruit participants for this project.

The project made several important contributions to development. The Collaborative Research component built capacity of HealthBridge, EFICOR and local ASHA workers to use m-Health to improve MNCH. The pilot test of the 3M intervention has also generated evidence on the feasibility and impact of using m-Health to engage husbands in rural India. Our findings suggest that sending voice messages to husbands may lead to increased care and support from husbands during their wife's pregnancy, and may increase women who give birth in a health facility. Further research is needed to generate evidence to support these claims, given the limitations of our research design.

The Knowledge Sharing component has raised awareness of Canadian researchers, development practitioners, and government representatives of promising m-Health approaches being used to improve MNCH, lessons learned and key research gaps. It also established new relationships between researchers and development practitioners who are using m-Health in an MNCH context, which may lead to future sharing and collaboration.

Lessons Learned for Improving Future Projects:

Perhaps one of greatest lessons learned from both organizations is the complexity of implementing m-Health interventions. The main purpose of this project was to pilot test an m-Health application to educate husbands (the "3M intervention"). The project team decided to include an m-Health component (CommCare) for ASHAs to use in counseling pregnant women, given that our mobile technology partner (Dimagi) was already implementing this m-Health application with ASHAs in other parts of the district. Also, providing the ASHAs with a mobile phone facilitated registration of husbands and linking the 3M messages to his wife's pregnancy stage. It was assumed that this would be a relatively simple feature to add-on to the project, however, it ended up requiring a huge amount of energy and resources to trouble shoot and solve ASHA's mobile phone related problems. Additionally, it was difficult for us to determine the true impact of the 3M intervention, as improvements in the key indicators were also seen in the control group. We do not know if

Building Capacity to use m-Health in Maternal, Newborn and Child Health Interventions

the improvements would have occurred from ASHA counseling with m-Health alone, or if sending messages to husbands had an added benefit. Therefore, in hindsight, it would have been simpler and more informative (from a research perspective) to only implement the m-Health intervention for husbands.

Additional lessons learned with regard to m-Health interventions:

- Adequate training and technical support is imperative for project staff and front-line health workers. There should be a contact person that can be reached directly for technical support as needed. These details should be included in the contract and budget with the mobile technology partner.
- Scaling up the intervention needs support from the government; government should be engaged from the very beginning if possible.
- For messages delivered to mobile phones of local beneficiaries, having an option to repeat the message will increase the likelihood that the respondent will listen to and understand the content of the message. There should also be a mechanism to distinguish project messages from tele-marketing messages.
- Weekly follow-up calls or meetings with husbands would have identified problems with message delivery and resolved problems without delay. The meetings could also verify that the husband listened to and understood the content of the messages.

Recommendations

As identified in the outcomes of the Knowledge Sharing Component, there is a need for more systematic study of the impact of m-Health interventions on health outcomes and health systems strengthening. While there are a large number of interventions using m-Health, most are in the pilot stage and have not systematically measured effectiveness. As well, there is lack of evidence that m-Health is an intervention that has been identified by the end-user as an actual need, rather than being driven by the technology sector itself. Furthermore, there are examples where the introduction of m-Health has created additional burden on health care providers. There is therefore a need to better understand the actual and potential role of m-Health in strengthening health systems. The findings of this study indicate that a better understand of the effectiveness and appropriateness of m-Health is required before going to scale. This would require studies that allow for longer-term and more rigorously designed research.

EFICOR/Health Bridge
3M project – ENDLINE SURVEY

PART - 1
Introduction and Informed consent

EFICOR/Health Bridge
3M project – ENDLINE SURVEY

Identification	
Section 1 – before going to the village	
Area	Intervention (Hiranpur) / Control ()
Subject Number I - (001-115) C- (116-230)	
Village name	
Name of Interviewer	
Interview date-(Date/month/year)	
Name of Supervisor	

Section 2 – at the village	
Name of Husband	
Name of Wife	

Section 3 – after return from the village		
Supervisors signature /date (after checking the questionnaire)		
Data Entered by	Data entry Code.....	Date: ___/___/___ day/month/year

EFICOR/Health Bridge
3M project – ENDLINE SURVEY

Questionnaire
PART 1 – for the WIFE

No	Questions and Filters	Coding Categories	Skip
1	Where did your last birth (THE MOST RECENT) take place ?	Home Your Home.....1 Other Home.....2 Health Facility Govt Hospital.....3 Private hospital/Clinic.....4 Other Health Facility _____ 5 (Specify)	

I will now ask you about your current pregnancy

2	Did you go for any pregnancy check ups WHEN YOU WERE PREGNANT WITH YOUR LAST CHILD	Yes1 No2 Don't know9	➡ 5 ➡ 5		
3	Whom did you see for the check up? Anyone else? PROBE FOR THE TYPE OF PERSON AND RECORD ALL PERSONS MENTIONED BY THE MOTHER.	Health professional Doctor.....A NurseB Auxiliary midwife (ANM).....C Other person Traditional birth Attendant.....D Anganwadi worker.....E Community health worker/ ASHA.....F Traditional healer/ witch doctor.....G Relative/ friend.....H Other _____ X (specify) No one.....Z			
4	How many times did you go for check ups to a doctor or nurse or ANM or other trained person WHEN YOU WERE PREGNANT WITH YOUR LAST CHILD WRITE NUMBER AS "01" "02" "03" ETC	NUMBER OF <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td style="width: 20px; height: 20px;"></td><td style="width: 20px; height: 20px;"></td></tr></table> TIMES			
5	Have you received any iron tablets or iron syrup WHEN YOU WERE PREGNANT WITH YOUR LAST CHILD? SHOW TABLET/SYRUP	Yes1 No2 Don't know9	➡ 7 ➡ 7		

EFICOR/Health Bridge
3M project – ENDLINE SURVEY

6	<p>For how many days did you take the tablets or syrup WHEN YOU WERE PREGNANT WITH YOUR LAST CHILD?</p> <p>IF ANSWER IS NOT NUMERIC, PROBE FOR APPROXIMATE NUMBER OF DAYS, AND WRITE THE NUMBER</p>	<p>NUMBER OF DAYS <input style="width: 20px; height: 20px; border: 1px solid black;" type="text"/> <input style="width: 20px; height: 20px; border: 1px solid black;" type="text"/> <input style="width: 20px; height: 20px; border: 1px solid black;" type="text"/></p> <p>DON'T KNOW.....9</p>	
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Now I would like to ask you about the help and support given to you by your husband during the pregnancy

7	<p>Did you receive any help and support during your LAST pregnancy from your family members?</p>	<p>Yes1 No2 Don't know9</p>	
8	<p>Who did you receive help and support from, in your family ?</p> <p><i>Multiple responses possible, record each one</i></p>	<p>Husband.....A Mother in Law.....B Father in Law.....C Mother/ Father.....D Other relative.....E (Specify).....</p>	<p>Option B onwards skips to next section</p>
9	<p>What kind of support did you receive from your HUSBAND, during your LAST pregnancy ?</p>	<p>Ensuring you ate nutritious food.....A Ensuring you took rest.....B Ensuring you went for check ups.....C ENSURING YOU GAVE BIRTH IN A HEALTH FACILITY.....D Other support.....E (Specify).....</p>	
10	<p>How many times did your husband accompany you when you went for check ups during your LAST pregnancy?</p>	<p>Once1 Two Times2 Three times.....3 Four times or more.....4 Did not accompany.....5</p>	

Have you and your husband decided any of the following related to the pregnancy and future delivery of the child ?

11	<p>What kind of preparations DID you and your husband make before the birth of your child? Anything else ?</p> <p><i>Multiple responses possible, record all mentioned</i></p>	<p>Save money.....A Decide upon place of delivery.....B Find blood donor.....C Arrange transport.....D Contact health worker to help with delivery.....E Arrange with mother/ other relations for assistance.....F OtherG (specify)</p> <p>No preparation/don't know.....X</p>	
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Thank the wife for her time. Now, politely request to speak with the husband.

EFICOR/Health Bridge
3M project – ENDLINE SURVEY

Questionnaire
PART 2 – for the HUSBAND

No	Questions and Filters	Coding Categories	Skip
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I will now ask you regarding your wife’s pregnancy

A	<p>In general, how many times should a pregnant woman go for check ups during her pregnancy ?</p>	<p>NUMBER OF TIMES </p> <p>DON'T KNOW.....9</p>	
B	<p>What kind of preparations DID you and your wife make before the birth of your child? Anything else ?</p> <p><i>Multiple responses possible, record all mentioned</i></p>	<p>Save money.....A Decide upon place of delivery.....B Find blood donor.....C Arrange transport.....D Contact health worker to help with delivery.....E Arrange with mother/ other relations for assistance.....F Other _____.....G (specify)</p> <p>No preparation/don't know.....X</p>	
C	<p>In general, what are the symptoms during pregnancy indicating the need to seek health care?</p> <p>RECORD ALL MENTIONED.</p>	<p>FEVER.....A SHORTNESS OF BREATH.....B BLEEDING.....C SWELLING OF THE BODY/HANDS/FACE.....D PAIN IN THE ABDOMEN E CONVIULSIONS/FITS..... F OTHER _____ G (SPECIFY) DON'T KNOW.....X</p>	
D	<p>In general, what are the signs of danger in a mother after giving birth indicating the need for seeking health care?</p> <p>RECORD ALL MENTIONED.</p>	<p>FEVER.....A EXCESSIVE BLEEDING.....B SMELLY VAGINAL DISCHARGE....C PAIN IN THE ABDOMEN.....D</p> <p>OTHER _____ E (SPECIFY)</p> <p>DON'T KNOW.....Z</p>	

EFICOR/Health Bridge
3M project – ENDLINE SURVEY

E	<p>In general, what are the signs to watch for that may indicate that a newborn baby is ill?</p> <p>RECORD ALL MENTIONED.</p>	<p>POOR FEEDING.....A FAST BREATHING.....B NOT ACTIVE.....C REDNESS AROUND THE UMBILICUS.....D REDNESS IN EYE / DISCHARGE IN EYE.....E</p> <p>OTHER_____ F (SPECIFY)</p> <p>DON'T KNOW.....Z</p>	
F	<p>If your wife experienced any of these symptoms either during pregnancy or after delivery, or your child experienced any of these symptoms, what would you do ?</p>	<p>Will take them to a hospital.....A Will take them to a hospital which I have identified previously.....B Will organize a transport to take them to a hospital.....C Will organize a transport which I have identified previously to take them to a hospitalD Other (specify).....E </p>	

Thank the husband for the interview, and tell him that you will be meeting them again, in the future.

Knowledge Exchange Forum: Using m-Health for MNCH

Sharing Knowledge, Inspiring Innovation

An event to share promising practices and lessons learned in using mobile health (m-Health) technology to support maternal, newborn and child health.



Knowledge Exchange Forum: Using m-Health for MNCH

Friday, 11 March 2016

9:00 am – 12:00 pm

Time	Activity
9:00 - 9:15 am	<i>Arrival of Participants – Continental Breakfast & Coffee</i>
9:15 - 9:20 am	Welcoming remarks
9:20- 9:35 am	<p>“Role of Mobile Communications Technology and Social Media in Breastfeeding Support”</p> <p><i>Prof. Daniel Sellen, University of Toronto</i></p>
9:35 - 9:55 am	<p>“Emerging Results from IDRC’s eHealth Portfolio in 7 countries”</p> <p><i>Zoe Boutilier, IDRC</i></p>
9:55–10:15 am	<p>“Opportunities and Challenges in m-Health: Perspectives from the Technology Sector”</p> <p><i>Amelia Sagoff, Dimagi</i> <i>Medic Mobile</i></p>
10:15– 10:30 am	<i>Coffee Break</i>
10:30 – 11:55 am	<p>Interactive Panel: “Promising Practices and Lessons Learned from the Field”</p> <ol style="list-style-type: none"> 1. “Using m-Health to engage men in maternal health in India” <i>Lisa MacDonald, HealthBridge Foundation of Canada</i> 2. “Community health workers using m-Health in rural Tanzania” <i>Dr. Gail Webber, University of Ottawa</i> 3. “Smartphone support for frontline health workers to improve uptake of maternal health services in Tanzania” <i>Kristy Hackett, University of Toronto</i> 4. “Empowering community health workers with HELP in Kenya” <i>Dr. Githinji Gitahi, Amref Health Africa</i> 5. “Recent trials of cell phone based breastfeeding support” <i>Prof. Daniel Sellen, University of Toronto</i>
11:55-12:00 pm	Closing Remarks

Speakers

Amelia Sagoff, Dimagi

Amelia Sagoff is a Product Manager at Dimagi, where she oversees the development of Dimagi's software products. Amelia plays an active role mapping out upcoming software features for Dimagi's products and providing technical support to Dimagi's partners and field staff. In her first role at Dimagi, Amelia worked in Tanzania as one of Dimagi's first Field Managers, where she field-tested the earliest version of CommCare.

Prof. Daniel Sellen, University of Toronto

Prof. Dan Sellen is Professor of Anthropology, Nutritional Sciences and Social and Behavioural Health Sciences at the University of Toronto. He joined the Dalla Lana School of Public Health at the University of Toronto as its first Associate Dean of Research in 2014. He currently leads teams using cluster-randomized trials to assess the usefulness of cell phones to provide vulnerable women with pre- and post-partum counseling to support healthy breastfeeding, infant care and health system access, and smart phones to improve community health worker outreach to pregnant women (principally in urban Kenya and rural Tanzania).

Dr. Gail Webber, University of Ottawa

Dr. Gail Webber is a family physician and researcher, based in Ottawa. Her current research is focussed on access to health services for pregnant women in rural Tanzania, in collaboration with her Tanzanian and NGO colleagues.

Dr. Githinji Gitahi, Amref Health Africa

Dr. Githinji Gitahi is Global Chief Executive Officer at Amref Health Africa. Until his appointment as Group CEO at Amref Health Africa, Dr. Gitahi was the Vice-President and Regional Director for Africa at *Smile Train International*, where he successfully established partnerships for long-term sustainability with various African governments. Prior to that, he worked with the Nation Media Group where he was the Managing Director for Monitor Publications in Uganda as well as General Manager for Marketing and Circulation in East Africa. He also held progressively senior positions at GlaxoSmithKline, Avenue Group and in the insurance industry.

Kristy Hackett, University of Toronto

Kristy is a PhD Candidate in the Health & Behavioural Sciences Program at the Dalla Lana School of Public Health at the University of Toronto. Drawing on her training in medical anthropology and global health, Kristy's research aims to enhance the capacity of health systems to improve maternal, newborn and child health (MNCH) outcomes in hard-to-reach populations. She has led and/or contributed to MNCH research projects based in Tanzania, Ghana, Kenya, Vietnam, Bangladesh and Canada. Her doctoral work investigates the impact of a smart phone application for community health workers on maternal health services uptake in rural Tanzania.

Lisa MacDonald, HealthBridge Foundation of Canada

Lisa is a Project Manager at HealthBridge where she currently leads the development and management of projects in the area of Gender, Reproductive, Maternal, Newborn and Child Health (GRMNCH). She holds a Masters in Health Studies and Gerontology from the University of Waterloo, and has over 7 years of experience working to improve the health of vulnerable populations in Canada and internationally.

Sian FitzGerald, HealthBridge Foundation of Canada

Sian is the Executive Director of HealthBridge, where she oversees health and development programs at HealthBridge, including nutrition and maternal and child health. Her role includes building capacity, and designing, implementing and monitoring programs, as well as governance. Sian has a Master of Science degree in international nutrition for which she conducted research in Guatemala, and a Bachelor of Science degree in Chemistry. She has worked in international development since 1992, when she joined the Food and Agriculture Organization of the UN's program to eliminate vitamin A deficiency. Based in Rome, she worked on programs in francophone Africa, specifically Mali, Burkina Faso, and Niger, and in Vietnam, where she lived from 1993 to 1995. Following her return to Canada in late 1995, she worked as a consultant for CIDA and the Micronutrient Initiative, before joining HealthBridge (then PATH Canada) in 1996.

Zoe Boutilier, International Development Research Centre

Zoe is a Senior Program Officer in the Maternal and Child Health program at IDRC. Zoe has been working with IDRC since 2007 and in that time she has also served as a Program Officer for the Global Health Research Initiative (GHRI), Governance for Equity in Health Systems (GEHS), and Policy and Evaluation. Before coming to IDRC she worked for the Micronutrient Initiative in Ottawa, Oxfam Quebec in Bolivia, Canada World Youth in Costa Rica, and CUSO in Lao PDR. Zoe holds an undergraduate degree in Biology and a Master's degree in International Development. With more than a decade of experience managing health programs in developing countries, her technical expertise lies in North-South partnerships for global health, research for health systems strengthening, and programming to address micronutrient malnutrition.

**3M Project:
Men using Mobile Phones to improve Maternal
Health**

**Notes following endline assessment done in
January 2016
(quantitative)**

**Dr Arvind Kasthuri MD
Professor, Department of Community Health,
St John's Medical College
Bangalore 560 034
March 2016**

This report was completed by a local consultant. The interpretation of findings expressed in the report are based solely on the opinion of the consultant and do not necessarily represent the views or opinions of HealthBridge Foundation of Canada.

CONTENTS

SUMMARY OF RESULTS

1. Introduction

2. The 3M Project

2.1 Objectives

2.2 Project area

2.3 Project design

3. Baseline assessment

4. Description of intervention

5. Endline assessment procedure

6.0 Results

6.1 Table of results

6.2 Notes on results

SUMMARY OF RESULTS

Indicator	Intervention area (%) n=102	Control area (%) n=102	Significance of difference*
A. BACKGROUND CHARACTERISTICS - ASSESSED AT BASELINE ONLY			
Couples whose mother tongue is Hindi	72.6	17.5	Sig, p<0.01
Couples whose mother tongue is Santhali	14.7	49.5	Sig, p<0.01
Mother able to read sentence	64.8	62.5	NS
Father able to read sentence	74.4	78.2	NS
Low socio-economic status (SLI 0-14)	56.7	66.7	NS
First pregnancy	33.3	35.3	NS
Last birth in hospital (for those with children)	64.7	68.2	NS
Approximate current gestation 4 months or less at baseline	62.5	50	NS
Approximate current gestation > 4 months	37.5	50	NS
* Sig – significant, NS – Not significant			

B. KNOWLEDGE of husbands re Maternal health						
Indicator	Intervention area			Control area		
	Baseline n=102	Endline n=104	P value, sig	Baseline n=102	Endline n=103	P value, sig
Percent fathers able to report at least 3 known maternal danger signs during pregnancy	12.6	42.3	<0.001, sig	4.8	26.2	<0.001, sig
Percent fathers able to report at least 3 known maternal danger signs during the postpartum period	5.8	27.9	<0.001, sig	0	14.6	<0.001, sig
Percent fathers able to report at least 3 known newborn danger signs	10.7	34.6	<0.001, sig	2.9	14.5	<0.01, sig
Percent fathers who know that pregnant women need at least four antenatal checks	11.8	49.1	<0.001, sig	7.9	33.9	<0.001, sig

C. SUPPORTIVE ACTIONS by husbands during their wives pregnancy						
Indicator	Intervention area			Control area		
	Baseline n=102	Endline n=104	P value, sig	Baseline n=102	Endline n=103	P value, sig
Percent mothers whose husbands encouraged them or provided practical support to attend ante-natal check-up	35.4	65.2	<0.001, sig	22.6	52.9	<0.001, sig
Percent mothers whose husbands encouraged them or provided practical support to take adequate rest	32.3	60.7	<0.001, sig	25.5	47.1	<0.01, sig
Percent mothers whose husbands encouraged them or provided practical support to eat healthy	53.1	85.4	<0.001, sig	61.8	72.4	>0.05, NOT sig
D. MATERNAL HEALTH INDICATORS – ASSESSED AT ENDLINE ONLY						
Indicator	Intervention area n=104		Control area n=103		P value, sig	
Percent mothers who received 4+ ante-natal check-ups	68.3		58.3		>0.05, NOT sig	
Percent mothers who consumed 100 iron folic acid tablets	33.7		27.2		>0.05, NOT sig	
Percent mothers who gave birth in a health facility.	93.3		62.1		<0.001, sig	

1. Introduction

A basic package of maternal and neonatal health services can save the lives of mothers and newborns during pregnancy, birth, and the post-natal period, including skilled birth attendance, ante-natal care and post-natal care. However, making such services accessible to all women remains a challenge. Improving maternal, newborn and child health (MNCH) requires more than the provision of services; mothers must be motivated and able to seek health care at critical points in time, and use appropriate self-care practices. It is well known that support from family members, particularly husbands is important for enabling women's access to health care.

Men can positively influence MNCH in a number of ways. When educated, men can make informed decisions with their wives about birth preparations and provide assistance when complications arise. When aware of health requirements during pregnancy, men can encourage their wives to seek ante-natal care, provide emotional support, encourage good nutrition and adequate rest and provide practical support with family and household responsibilities to reduce women's workload. However, engaging and educating men is difficult due to time constraints, lack of clinic space and cultural resistance to men's involvement in "women's issues".

The use of mobile technology in MNCH has become increasingly popular and is showing promising results in facilitating emergency medical referrals, point of care support, health counseling and health system monitoring. Preliminary evidence also suggests that mobile health (mHealth) can effectively promote knowledge and care-seeking behaviour amongst pregnant women through timed messages. However, there is a dearth of research on the feasibility and impact of using mHealth to target husbands.

Given that mobile phone ownership is widespread in India, mHealth has tremendous potential to reach those living in remote and isolated areas. Additionally, using mHealth, information can be sent to husbands discreetly, independent of place or time, thus evading challenges of educating men through direct counseling strategies.

EFICOR (The Evangelical Fellowship of India Commission on Relief) is a private voluntary faith-based organization headquartered in New Delhi engaged in implementing programs on Maternal/Child health and holistic development in many needy areas in India including the states of Jharkhand, Madhya Pradesh and Rajasthan. HealthBridge foundation is a Canada-based organization that aims to improve the health of vulnerable populations, including those at risk of malnutrition, infectious disease (particularly malaria and HIV/AIDS) and emerging epidemics, such as non-communicable diseases (NCDs). Recently HealthBridge and EFICOR partnered in a Maternal Child Survival project (MCSP) in the district of Pakur, Jharkhand.

2. The 3M Project

2.1 Objectives

EFICOR and HealthBridge designed a project titled "3M Project: Men using Mobile Phones to improve Maternal Health" based on the learning from the Pakur MCSP, and based on the use of mobile technology in MNCH. It is a collaborative research project with the following objectives:

1. To assess the feasibility and impact of an mHealth intervention targeted to husbands on women's utilization of maternal healthcare in rural India
2. To increase capacity of HealthBridge and EFICOR in using mHealth in MNCH interventions

This project was based in Hiranpur block in the district of Pakur in Jharkhand state.

2.2 Project area

Hiranpur block is predominantly a plain area block with pockets of hilly terrain. The block was once known for its thick and extensive forests, but is now bereft of much of its jungle wealth. The total population of this block is 84062 according to 2011 Census inhabiting 119 Villages. Child population is around 16439, sex ratio among adults is 978, child sex ratio is 965, and the literacy rate is 51.95%. Hiranpur block is mainly inhabited by Santhal and Sauria Paharia tribes. People are mainly engaged in agriculture.

50 villages of Hiranpur block were chosen for study, among which 25 were designated as the "Intervention" villages and 25 as "Control".

2.3 Project design

The project was designed as a quasi-experimental study with a before and after comparison between control and intervention area. It was done in the following steps:

a. A package of educational content on maternal health was developed and converted to messages for dispatch on mobile telephones.

b. In both Intervention and control areas, a target of 115 (the sample size for the project) couples were sought to be identified and recruited, where the wife is 12-20 weeks pregnant, the husband owns a cellphone and was willing to participate in the project. Actual numbers contacted were 102 couples in the baseline in both areas, and 103/104 couples in the control and intervention areas at endline.

c. In both areas, ASHAs (accredited social health activists – village level health functionaries) were recruited, and were given smartphones. These ASHAs received health messages pertaining to MNCH for the duration of the project, which they conveyed to the recruited husbands and wives.

d. Both sets of couples were interviewed at the start of the project to assess their level of knowledge and practice with respect to key indicators of maternal health and the husbands' participation in the promotion and maintenance of the wife's health during her pregnancy – the baseline assessment.

e. In both areas, couples were encouraged to access the government health service by the ASHA based on the messages she received and based on her basic training in MNCH, which is the standard of care.

f. Additionally, in the Intervention area, husbands received messages on their cellphones with respect to good maternal health practices. Messages were customized to the mother's pregnancy stage, and included text as well as voice messaging. Messages were adapted from MAMA (Mobile Alliance for Maternal Health), and were recorded in three local dialects. Husbands registered in the project and residing in the intervention area received voice messages with health information and recommended actions to take at different points along the continuum of their wives' pregnancy. This additional messaging to the husbands did take place in the control area.

f. Endline assessments were conducted 4-5 weeks after women gave birth in both intervention and control villages. The project aimed to assess change between

baseline and endline in each area.

Ethical clearance for the project was obtained from the Institutional Ethics Committee, St Johns National Academy of Health Sciences, Bangalore.

3. Baseline assessments

The following steps were conducted in both intervention and control areas:

a. Literate, active ASHA workers were identified in the 50 project villages in Hiranpur block. They were introduced to the project and cellphones given to them. They were oriented over 2 days as to their role in the project, which includes identification of the study couples and support through the pregnancy based on the messages received on their phones.

b. 230 couples were identified by the ASHA and trained project staff, 115 in each of the intervention and control areas satisfying the inclusion criteria, of whom 102 were actually available for assessment at baseline.

c. Five data collectors were trained on the use of a questionnaire which was designed to capture information pertaining to the key indicators of MNCH based on project objectives. Over a period of 4 weeks in June-July 2015, they visited each of the identified couples in both intervention and control areas, and administered the questionnaire.

d. The data thus collected was entered into EPI INFO version 7.0 and analyzed based on key project indicators.

3. Description of the intervention

Health Bridge and EFICOR has collaboratively designed a pilot intervention called 3M: Men using Mobile Phones to improve Maternal Health. The project has been launched in the Hiranpur block of the Pakur district, Jharkhand. Since it is a pilot program, project has decided to select only 50 villages from entire block. This program is being planned to pilot among 230 husbands whose wife is pregnant with 12 – 20 months. And these 230 husbands are from the selected 50 villages, which is the intervention area of selected 50 ASHA workers, to whom project has provided them 50 smart phones to register the husbands in the smart phone using “CommCare application” and counsel the pregnant women.

From these villages, 25 villages were selected as an Intervention villages, where the husbands will receive the voice messages to enhance health knowledge and to support their wives during pregnancy and rest 25 villages are selected as Control villages, where the pregnant women only will receive the health counseling through ASHA worker using “Dimagi,s CommCare application” in mobile phones.

Project intervention begins with the selection of literate, active ASHA workers who works in 50 revenue villages in the Hiranpur block. After the selection of the ASHA workers, project has ensured through ASHA's/ ANM's register that, required 230 women pregnant with 12 – 20 months can be found within the selected 50 villages.

To deliver the ‘timed voice health messages’, appropriate “MAMA” messages were selected, translated and recorded into three local languages, ‘Hindi’ ‘Santhali’ and ‘Bengali’. So that it can be understood better.

Before intervention of the project, project implementation team has received the 2 days orientation training on ‘Application installation on phones and maintenance’ and

advance trouble shooting. Also 2 days ToT has been conducted to train the ASHA. Later, with the Dimagi project team has installed 'CommCare Application' in all the 50 mobile phones. After selection and before handing over smart phones to the ASHAs, they have gone through 2 days mobile phone orientation training by the 'Dimagi' team. After the orientation they have been sent out to register the pregnant women and their husbands into mobile phones using 'CommCare Application'.

The 25 ASHA of the Intervention areas have registered the 115 husbands in there smart phone, from 25 villages using "CommCare application". After the registration these 115 husbands are receiving the 'timed voice health messages' which is delivered through Dimagi's Commcare software technology every week.

Especially these husbands of Intervention villages along with the women of control villages were monitored by the two cluster supervisor and one project manager along with 25 ASHA workers in a regular basis to insure that, the husbands are receiving the voice massages in a regular basis and there are no issues in the mobile phones.

4. End line assessment procedures

A household survey was conducted to assess men's knowledge and women's utilization of key maternal health services such as; ante-natal care, skilled delivery care, post-natal care, iron-folic acid supplementation and Tetanus Toxoid vaccination and self-care practices in terms of adequate nutrition and rest during pregnancy.

The survey was conducted in 50 selected villages across the Hiranpur block and to carry out the survey five data collectors were given 3 days training on the use of a questionnaire which was designed to capture information pertaining to the key indicators of MNCH based on project objectives including one day field test activities to minimize the error of the final collected data. Over a period of 4 weeks in June-July 2015, they visited each of the identified couples in both intervention and control areas, and administered the questionnaire.

There was suppose to be done the survey with the 230 identified couples but, due to the unavailability of some couples along with few miscarriage happened, the actual number was lesser then targeted.

In both Intervention and control areas, a target of 115 (the sample size for the project) couples were sought to be identified and recruited, where the wife is 12-20 weeks pregnant, the husband owns a cell phone and was willing to participate in the project. Actual numbers contacted were 102 couples in the baseline in both areas, and 103/104 couples in the control and intervention areas at end line.

After completing the survey, the data was entered into "Epi Info 7.0" for the final analysis and to produce a findings report.

RESULTS

Indicator	Intervention area (%) n=102	Control area (%) n=102	Significance of difference*
A. BACKGROUND CHARACTERISTICS - ASSESSED AT BASELINE ONLY			
Couples whose mother tongue is Hindi	72.6	17.5	Sig, p<0.01
Couples whose mother tongue is Santhali	14.7	49.5	Sig, p<0.01
Mother able to read sentence	64.8	62.5	NS
Father able to read sentence	74.4	78.2	NS
Low socio-economic status (SLI 0-14)	56.7	66.7	NS
First pregnancy	33.3	35.3	NS
Last birth in hospital (for those with children)	64.7	68.2	NS
Approximate current gestation 4 months or less at baseline	62.5	50	NS
Approximate current gestation > 4 months	37.5	50	NS
* Sig – significant, NS – Not significant			

B. KNOWLEDGE of husbands re Maternal health						
Indicator	Intervention area			Control area		
	Baseline n=102	Endline n=104	P value, sig	Baseline n=102	Endline n=103	P value, sig
Percent fathers able to report at least 3 known maternal danger signs during pregnancy	12.6	42.3	<0.001, sig	4.8	26.2	<0.001, sig
Percent fathers able to report at least 3 known maternal danger signs during the postpartum period	5.8	27.9	<0.001, sig	0	14.6	<0.001, sig
Percent fathers able to report at least 3 known newborn danger signs	10.7	34.6	<0.001, sig	2.9	14.5	<0.01, sig
Percent fathers who know that pregnant women need at least four antenatal checks	11.8	49.1	<0.001, sig	7.9	33.9	<0.001, sig

C. SUPPORTIVE ACTIONS by husbands during their wives pregnancy						
Indicator	Intervention area			Control area		
	Baseline n=102	Endline n=104	P value, sig	Baseline n=102	Endline n=103	P value, sig
Percent mothers whose husbands encouraged them or provided practical support to attend ante-natal check-up	35.4	65.2	<0.001, sig	22.6	52.9	<0.001, sig
Percent mothers whose husbands encouraged them or provided practical support to take adequate rest	32.3	60.7	<0.001, sig	25.5	47.1	<0.01, sig
Percent mothers whose husbands encouraged them or provided practical support to eat healthy	53.1	85.4	<0.001, sig	61.8	72.4	>0.05, NOT sig
D. MATERNAL HEALTH INDICATORS – at ENDLINE						
Indicator	Intervention area n=104		Control area n=103		P value, sig	
Percent mothers who received 4+ ante-natal check-ups	68.3		58.3		>0.05, NOT sig	
Percent mothers who consumed 100 iron folic acid tablets	33.7		27.2		>0.05, NOT sig	
Percent mothers who gave birth in a health facility.	93.3		62.1		<0.001, sig	

ADDITIONAL QUESTIONS OF INTEREST

Q 21. What kinds of preparations can you/did you and your spouse make before the birth of your child?

Responses	WIFE					
	Intervention			Control		
	Baseline N=101	Endline N=89	P value, sig	Baseline N=102	Endline N=87	P value, sig
Save money	51.5	73.1	<0.05, S	49.0	62.1	>0.05, NS
Decide upon place of delivery	18.8	70.8	<0.001, S	3.0	50.6	<0.001, S
Find blood donor	4.0	5.6	>0.05, NS	0.0	8.0	<0.01, S
Arrange transport	18.0	58.4	<0.001, S	5.9	39.1	<0.001, S
Contact health worker to help with delivery	12.0	65.2	<0.001, S	14.7	46.0	<0.001, S
Arrange with mother/ other relations for assistance	4.0	13.5	<0.05, S	3.0	18.4	<0.001, S
No preparations/ dont know	36.7	1.1	<0.001, S	42.2	5.8	<0.001, S

Q 21. What kinds of preparations can you/did you and your spouse make before the birth of your child?

Responses	HUSBAND					
	Intervention			Control		
	Baseline N=102	Endline N=72	P value, sig	Baseline N=101	Endline N=85	P value, sig
Save money	44.1	70.9	<0.001, S	45.5	62.3	<0.05, S
Decide upon place of delivery	16.7	70.9	<0.001, S	3.0	48.2	<0.001, S
Find blood donor	3.0	7.0	>0.05, NS	1.0	5.9	>0.05, NS
Arrange transport	13.9	60.6	<0.001, S	11.9	43.5	<0.001, S
Contact health worker to help with delivery	15.8	59.7	<0.001, S	10.9	34.1	<0.001, S
Arrange with mother/ other relations for assistance	8.8	19.5	<0.05, S	5.9	16.5	<0.05, S
No preparations/ dont know	41.2	2.8	<0.001, S	44.5	9.4	<0.001, S

Q J. FOR HUSBANDS - If your wife experienced any of these symptoms either during pregnancy or after delivery, or your child experienced any of these symptoms, what would you do ?

Responses	Intervention			Control		
	Baseline N=102	Endline N=72	P value, sig	Baseline N=101	Endline N=85	P value, sig
Will take them to a hospital	99.0	84.7	<0.001, S	96.0	89.4	>0.05, NS
Will take them to a hospital which I have identified previously	5.9	22.2	<0.01,S	10.9	21.2	>0.05, NS
Will organize a transport to take them to a hospital	14.7	31.9	<0.01,S	11.9	9.4	>0.05,NS
Will organize a transport which I have identified previously to take them to a hospital	3.0	19.4	<0.001, S	3.0	16.5	<0.01,S
Other (specify	1.0	0	>0.05, NS	2.0	0	>0.05, NS

6.1 Notes on results

a. The numbers of couples actually interviewed for whom data was available for analysis were 102 in both areas at baseline and 103/104 at endline in the control and intervention areas respectively.

b. The Intervention and control areas differed significantly with respect to mother tongue, with a significantly larger proportion of control couples speaking Santhali as compared to the intervention couples, where a greater proportion spoke Hindi. But the rest of the baseline characteristics such as socio economic status, ability to read, place of last childbirth and period of current gestation were similar. This should ensure comparability of the areas.

c. The baseline levels of indicators which measure KNOWLEDGE of husbands and SUPPORTIVE ACTIONS of husbands were generally higher in the Intervention area compared to control at baseline and levels of knowledge were poor in both areas.

d. Following the endline assessment, the following broad observations are made:

- Levels of KNOWLEDGE among husbands regarding key maternal health issues has significantly raised in both intervention and control areas between baseline and endline assessments. The absolute quantum of increase (in percentage points) is more in the intervention areas.
- SUPPORTIVE ACTIONS by husbands during their wives' pregnancy has also increased significantly in all three domains of support for checkups, for taking rest and for nutrition in the intervention area.

There has been a rise in the control area as well, except in the case of support for nutrition, where there has been no significant change in the control area.

Again, the quantum of change in absolute percentage points is higher in the intervention area as compared with the control area.

- Levels of key MATERNAL HEALTH INDICATORS – adequate antenatal checks, adequate IFA supplementation and institutional delivery are all higher in the intervention area as compared with control of which the difference in institutional delivery rates reaches statistical significance.

The absence of baseline figures for comparison with respect to these indicators makes it difficult to attribute this change to the intervention itself, but the rise in the other indicator levels with respect to baseline values would suggest that it is possible.

- The levels of indicators with respect to birth preparedness are also significantly higher at endline with respect to most aspects of preparedness, in both areas. A certain level of increase would be deemed “expected” since the question at endline referred to actual preparations made, while it probed intent at baseline. Again, the quantum of change at endline is more (in absolute percentage points) in the intervention area than in the control area.

Interestingly, the proportion of mothers/fathers who say they “don’t know” about birth preparedness sharply decreases at endline, in alignment with the earlier suggestion that this referred to actual preparedness more than intent.

- The proportion of husbands who take specific action following recognition of danger signs shows an increase in both areas between baseline and endline assessments. This difference is significantly higher in the intervention area as compared with control with respect to taking the wife to hospital and using transport, previously identified or otherwise.

On the whole, it would appear that the use of mobile telephonic messages with the ASHAs has worked in both areas. Additional intervention with husbands has seen a rise in all levels of indicators, and the difference in the quantum of difference between intervention and control areas probably reflects this added input.

Annex 4

Report

Qualitative Assessment of “Men using Mobile phones to improve maternal health” (3M) Project, Pakur

This report was completed by a local consultant. The interpretation of findings expressed in the report are based solely on the opinion of the consultant and do not necessarily represent the views or opinions of HealthBridge Foundation of Canada.

INDEX

Chapter	Content	Page
1	Introduction	3
2	Methodology	4-5
3	Analysis and Findings	6-22
4	Conclusion	23-25

CHAPTER ONE

INTRODUCTION

This report gives an overview of the qualitative analysis of 6 Focus Group Discussions conducted with husbands and mothers and 7 In-depth Interviews conducted with Sahiyya (ASHA worker), block level government official and project staffs within the framework of the “Men using Mobile phones to improve maternal health” (3M) Project .

The purpose of this evaluation was to conduct a final qualitative assessment of the 3M project, to determine if it successfully reached its objectives, and to gather insight into factors influencing the achievement of results and lessons learned.

Objectives of this qualitative assessment was to assess attitudes and beliefs of men’s involvement towards maternal and child health, as well as perceptions of participating EFICOR staff, men, women and health workers on the feasibility, effectiveness, relevance & design appropriateness and usefulness of the 3M intervention.

CHAPTER TWO

METHODOLOGY

This report presents the findings of the qualitative component of 3M Project that consists of in-depth interviews with ASHA Workers, Project staffs and government health functionaries and focus group discussion with mothers group and husbands who were exposed to and received the 3M messages in the Intervention and control villages within the limitation of the of the project.

They were asked to reflect upon their experience with respect to 3M messages, knowledge and understanding of components and issues associated with of maternal healthcare, the benefits (if any) they draw from the intervention, and more generally on how they see the role of role of men in maternal health care.

Research design

The qualitative component of 3M Project is to be understood in the context of an overall sequential (quantitative followed by qualitative) mixed-methods research design consisting of a house hold survey in the intervention and control villages of the project, and a subsequent qualitative in-depth interviews with selected respondents and focus group discussions of the survey. The rationale behind the qualitative component of the study was to provide more in-depth and more contextualised insights into how people perceive the maternal health care, role of men and use of mobile phone to improve maternal health care.

The qualitative information provides “rich” information about how the 3M messages helped in facilitating the accessibility of pregnant women in to maternal health care, and role husband. In terms of research strategy, the qualitative interviews and FGDs aimed at *complementing* the survey data by rich and unstandardised data and thereby obtaining an overall richer and more accurate picture of the participants in project. Also the interviews and FGDs also allowed grasping *cultural practices with respect to maternal health care in the project area*.

Data collection

The qualitative part of 3M study was carried out in two intervention villages and two control villages. Interview questions and FGD guides were developed and code system for the qualitative analysis of the interviews and FGDs adapted. Purposive sampling has been done for data collection.

Research ethics

The participants in FGDs and all interviewees gave their explicit consent to participate in the FGDs and being interviewed and being audio-recorded. They were informed of the context of the study and the use that would be made of their data.

The interview and FGD data were anonymised in such a way as to make sure neither the respondents nor the people they are referring to in the interview can be identified. The interview transcripts contain no information allowing linking back the interview and FGD data to the survey responses of the interviewee and FGD participants.

To further preserve the anonymity of the interviewees, the list with the full demographic characteristics of FGD participants and interviewees is *not* integrated to the present report.

Data Analysis

The interview data were analysed on the basis of a systematic coding. This consists of a systematic coding (breaking down) of data according to a *code* list, in such a way as to identify (practically and theoretically) relevant patterns. The coded segments are then grouped and synthesised 'up' into (more general) categories, which in turn get linked to more general themes and (theoretical) concepts.

CHAPTER THREE

ANALYSIS AND FINDINGS

In this study 6 focus group discussions (FGDs) have been carried out 3 with husbands and 3 with new mothers. Four FGDs, two with husbands and two with mothers, were conducted in the intervention village where the husbands were exposed to 3M messages. Also Sahiyya (ASHA worker) from two intervention villages and two control villages were interviewed. Two project staffs from the project and one Block Medical Officer was interviewed.

The study was intended to assess attitudes and beliefs of men's involvement towards maternal and child health, as well as perceptions of participating EFICOR staff, men, women and health workers on the feasibility, effectiveness, relevance & design appropriateness and usefulness of the 3M intervention.

Main Category	Sub Category	Codes
Perception on maternal health care	Knowledge & Awareness	Maternal health care services and issues
Importance of discussion on maternal healthcare with Men		Knowledge and understanding on maternal health care among men can improve their concern for care of wife.
		Improved knowledge and understanding of maternal and child healthcare services, precautions, dangers signs help in preparedness for managing emergency situations
Perception on Men's roles in maternal health care	Support in household works	Bringing water
		Cooking
		Washing Cloths
		Care of children
	Accessibility to health services	Health checkups at AWC and hospital
		Immediate medical consultation in case of illness during pregnancy and post delivery
		Arrangement of money and vehicle for delivery at hospital

		follow up with ASHA worker, ANM regarding health of wife
		support in accessing immunisation of the infant
	Care at Home	Arrangement of nutritious food for wife.
		Follow up with wife regarding her health, food-intake, rest.
		support in newborn care practices
3M Messages	Whether listened to the 3M messages	All messages
		Few messages
		None of the messages
	Ability to remember content of the messages	Yes
		No
		Partially
Follow up with wife	Yes	
	No	
Effects of 3M Messages	Attention to care of wife	Yes
		No
	Support from husband in access to maternal healthcare	Yes
		No
	Spouse relationship with regard to maternal health care	Improved
		Not improved
Need of improvement	Content	Message Content
		Message Language
		Duration
	Delivery	Technique
		Process
		Follow-up
Key Drivers of the intervention	Project Design	Sahiyya and Husbands as facilitator
	Scope of Improvement	Content and delivery of messages
		Video Counselling by sahiyya
	Key Barriers	Problem in ComCare software
		Proper handling of phone by sahiyya
		Difficulty in follow up with husband as many of them working outside.
		Reluctance in sharing phone numbers

		Network connectivity
		Changing/Missing the Phone Number of Husbands
	Key Enablers	Training and motivation of Sahiyya
		Use of Mobile Phone in tracking of pregnant women and mothers
		Language and timing of messages as per the audience choice
		Video clippings on different aspects of maternal and child health care.
Increased concern of the husbands as the intervention progressed		
Opportunities for future interventions		Technology
		Trainings
		Video Counselling
		Provisions of financial support for Internet accessibility
		Group meeting with husbands and wife
		Increased Project period.

3.1. Perception on maternal health care

There has been considerable knowledge and understanding maternal health care among the women and men in intervention villages. It has been found that people are quite aware about the components of maternal health care and issues associated with it.

Taking TT injection during pregnancy, blood test, urine test, weighing, taking 100 iron tablets, eating green vegetables, keeping hygiene, avoid excessive movement, avoid heavy work, taking rest and immediate medical consultation in case of illness or weakness during have been identified as issues associated with maternal health care during pregnancy.

“I had swelling in leg during pregnancy. ANM didi advised me to go to Sonajudi hospital (Sadar Hospital, Pakur) for check up. Sahiyya didi had taken me first to Hiranpur hospital and then to Sadar hospital for check up and treatment”.

Also birth preparedness and institutional delivery and postnatal check up visits counselling for breastfeeding to newborn, immunisation of child, supplementary food

intake by the new mother have also been enumerated as part of maternal health care.

“At the time of delivery Sahiyya didi take us to hospital for delivery. Sahiyya didi calls Mamta Vahan to take us hospital. After delivery sahiyya didi visits the new delivered baby and the mother to tell about breastfeeding and checkups of mother and child (weighing). If any mother has difficulty in breastfeeding the infant, support has also been given by sahiyya didi to breastfed the infant. Also at Aanganwadi Centre Sattu (supplementary food) is provided to the mother”.

3.2. Importance of discussion on maternal healthcare with Men

FGDs with mothers and husband had revealed importance of discussing maternal health care with Men.

“Discussions on maternal health with husband are also important. This make husband understand the issues associated with pregnant women and mothers and can help the wife”.

“Husbands can assist in household works, bring water, wash cloths, take care of health, bring nutritious food, take us to doctor/hospital during pregnancy, and ask us to take medicines.

“Men should also been informed because in case of any problem they can take appropriate action, assist in addressing the problem, taking to hospital”.

It is important to discuss so that we can also take care of health of spouse and can avoid mistakes and unwanted circumstances and problems. Mother’s healthcare is important to ensure well being of the mother and the child”.

“If husband know about the aspects related to maternal health care he can take care and help his wife”.

“Discussion on maternal health with men is important. With such discussions men can know and understand issues related to mothers health and can help their spouse. Also there these things can be discussed in community”.

All the sahiyya interviewed were said that it is important to discuss maternal health care with Men. The factors revealed as,

- Knowledge and understanding on maternal health care among men can improve their concern for care of wife.
- Improved knowledge and understanding of maternal and child healthcare services, precautions, dangers signs help in preparedness for managing emergency situations.

“Wife’s problems and sufferings should be known and taken care by the husband. It is responsibility of husband to take care of his wife. If husband has knowledge of maternal health issues he can better care his wife”.

“Men can know about what preparations need to be done for delivery, what checks ups, and immunisations of infant need to be done. In tribal community men do not take much interest. In fact they ask their wives not to go for immunisation if problem happens”.

“If husbands become aware they can support in care of their wife. Earlier husbands were not concerned with wife’s healthcare during pregnancy and delivery and post delivery. Now they are themselves come to us and discuss about their wife’s health. Also they accompany them for delivery”.

“If husband has awareness and understanding of issues and services related to maternal health care they can take decisions and support their wife in accessing the health care and emergency situations”.

3.3. Perception on Men's roles in maternal health care

The focus group discussion with husbands have revealed that men exposed to the 3M messages were having more clarity on role of man or husband in maternal health care and were able explain their roles.

In the FGDs with husbands major number of participants have pointed out role of husband is to support wife in household works and taking care of food intake of wife. The other roles that have been identified support and accompany wife in accessing health checkups, follow up with ASHA worker, ANM regarding health of wife, immediate medical consultation in case of illness during pregnancy and post delivery, arrangement of money and vehicle for delivery at hospital, support in newborn care practices, support in accessing immunisation of the infant.

“Support the spouse and help in household works as heavy work, bring water etc., and support in health checkups, take wife to hospital in case of health problems are responsibilities of husband”.

“Husband should take care of health of wife, not let wife to do outdoor works and heavy work, allowing her to take enough rest, help wife to stay comfortable in home, take care of food intake of wife(arrangement of nutritious food items, fruits); health checkups during pregnancy (condition of mother and child, BP Check up, blood test, VDRL/HIV test, urine test, abdomen checkups, health checkups in if wife fall ill); planning for delivery, arrangement of vehicle (calls Mamta Vahan with the help of Sahiyya/AWW), arrangement of money, accompany wife to hospital. After delivery ensure cleaning, not to give bath and keeping the infant warm wrapped in clean cloth. Keep mother warm. Ensure administration of injection (Immunisation) to infant”.

Husbands in the control village were however aware regarding the care should be given to wife during pregnancy and further and where they can support. But were not able to explain the role of husband and what exactly should be done and taken care by husband.

“What a husband could do is to arrange good food, support in health check-ups and treatment during pregnancy and support in addressal of any problems associated”.

The Interviews with Sahiyya revealed following roles husband/men in maternal healthcare,

- Support in household works
- Supporting wife in accessing healthcare services during pregnancy,
- Birth preparedness
- Accompany wife to the hospital during delivery and other complications.
- Follow up with wife regarding her health, food-intake, rest.

“To help wife in household work, care of wife, take wife to hospital in case of any problem. If husband be with wife, she will feel happy and confidence. Arrangement of money, take care of diet of wife, take wife to hospital for delivery”.

“Accompany their wife for checkups during pregnancy, taking the wife to hospital if there any problem arises during pregnancy, accompany their wife to hospital for delivery, if wife feels weak or having problem take her to hospital for treatment, help in all household work , follow up with wife for if she is accessing the services”.

“Help in immunisation and health checkups, treatment during pregnancy from ANM didi or at hospital. arrangement good food items and take care of food intake of wife, Arrangement of money, follow up with sahiyya regarding delivery, mamta vahan at the time of delivery, child immunisation, interact with spouse regarding her condition, problems, needs”.

“Be with wife in all the stages, arrangement of money, vehicle, blood for delivery, managing emergency situations, and arrangement of nutritious food for wife, household work, care of child and immunisation, breastfeeding of child”.

3.4. Support from husband in maternal health care

Husbands were found supportive during the period of pregnancy, delivery and post delivery. The type of support received from the husbands were day to day household works, cooking, bringing water, care of children, and accompany to go to aanganwadi centre and hospital for pregnancy checkups and delivery, arranging nutritious food items and care of food intake of wife.

“Husbands helped in all house hold works (.....one of the participants shared that her husband helped in cooking food and bringing water in home along with other works), care of children (one of the participant shared the her husband also took

care of children and day to day household work), to go to Aanganwadi Centre and Hiranpur hospitals (CHC) for check up, accompanied to go to hospital for delivery, care for proper food intake”.

“Support in household work, take us to doctor, arrangement of money and vehicle for taking to hospital, care regarding food intake”.

3.5. 3M Messages

3.5.1. Whether listened to the 3M messages

Messages were coming every week with information relevant to that particular week of pregnancy on pre-scheduled day and time. Messages were coming in Santhali, Bengali and Hindi languages. Discussion with the husbands revealed that none of them had heard all the messages. Reasons for not hearing the messages have been attributed to not receiving the call as many of them keeping their phone in silent mode, confusion with voice calls from telecom companies and advertisements, engaged in work at the time of call, interruption by family members or neighbors at the time of call, missing the SIM card or mobile phone.

“I had not heard messages much, as sometime I was at work at the time of call or unable to attend the call due to call from family member or neighbour. Also there were calls from telecom companies regarding offers due to which we used to avoid”.

“I had received message two times in the evening 6 PM. Heard messages both the time. One time voice was not clear. After that I lost the SIM card”.

“I was receiving messages on every Sunday at 6 PM. Since most of the time I used to keep my phone silent (to avoid calls from telecom companies), I missed many messages”.

Interview with one ASHA revealed that several receivers were careless and inattentive to calls they did not attend the calls at all.

“Not all of them were listened to the messages; some were very careless and reluctant to receive the message and saying what we will do by hearing the message”.

3.5.2. Ability to remember content of the messages

It was found that none of the participants were able to remember the content of the message they had heard. However they were summarised the information contained in the messages heard. The key information contained in the messages heard were diet and food intake of the pregnant women, health check up of every month at aanganwadi centre; take iron tablets, taking care of health of wife.

“There was message regarding food intake. What a pregnant woman should eat during pregnancy and benefits of eating”.

“Take pregnant women for check up every month at Aanganwadi Centre and doctor. Take Iron tablets”.

“Messages were related to food intake, give nutritious food to pregnant women, healthcare of wife’

3.5.3. Follow up with wife

In the discussion with mothers It was found that husbands who had received the 3M messages followed up with their wives in respect to health checkups and remind them to go for checkup if their wives forgotten or not willing to go, taking proper rest, not allowed to do heavy works, eat properly and timely. Husbands of several participants were working outside. They had been following up with their wives on phone after receiving the messages.

“Our husbands were used to ask us to take rest, not to do heavy work, take food properly, to go for checkups, immunization”.

“My husband is working outside. He had been following up with me, if I had gone for check up at aanganwadi, taking the pills, having my meal timely, being careful”.

“When the messages started coming in mobile phone, our husbands suddenly started asking us regarding the health checkups and eating nutritious foods as green vegetables, fruits, eggs etc. They had also been discussing regarding the messages”.

3.6. Effects of 3M Messages

3.6.1. Attention to care of wife

Most of the participants in FGDs revealed that prior to receiving the 3M messages they were not much aware and concerned about care of their wife and particularly during pregnancy. The 3M messages helped them to understand the issues and need of care and support to the pregnant women. With the 3M messages they had been informed on maternal healthcare issues and started giving attention to the care of their wife and ensure following the information given.

“Messages were very useful; we were getting information on healthcare of our wives. This was helping us remind us for care of wife and giving attention to wife and her care during pregnancy and after wards”.

“After hearing the messages I had followed the information was given through the message and started taking care of my wife”.

The participants found the messages on food intake and diet during pregnancy, regular health checkups of the pregnant very good.

3.6.2. Support from husband in access to maternal healthcare

The 3 Messages were helpful in awareness generation among husbands on maternal health care and thereby helped in access to maternal healthcare services as health checkups during Pregnancy, taking iron pills; take timely appropriate diet, eating support from husband in household works, birth preparedness, new born immunisation of the newborn.

“Earlier our husbands were not known and aware about the issues related to mother’s health care. They did not believe on the aspects of maternal health care as in old times there women were also working during pregnancy and no checkups were done. The messages helped in creating awareness on maternal health issues among men. After getting message they were started asking us to take proper care and also help in household works”.

“When we forget something or not following the care needed our husbands used to remind us regarding care after hearing messages”.

3.6.3. Spouse relationship with regard to maternal health care

It was found that though the husbands were extending necessary support and care to wife during pregnancy and health complications, they rarely had discussed or followed up with wife on issues of maternal health care prior to receiving the 3M messages. After they started receiving the messages they started following up with their wife and interacted with each other on needs and requirements taken care of for the pregnancy period, delivery and post delivery.

“When we had no exposure to message, we never used to have discussion with our wives regarding care during pregnancy and delivery. After receiving the messages we started following up with wife if there any problem, discuss what to do what not regarding check-ups, health problems, delivery and food intake”.

“We discuss about keeping money for emergency situations and keep precautions and care”.

“Receiving the messages husbands started taking interest in to our healthcare. They used to ask about healthy food intake. Also tells us about the messages. We had also discussed regarding arrangements for delivery. These were not happening earlier”.

3.7. Need of improvement in 3M messages

3.7.1. Content, Language, Duration

Participants were also asked if there changes required in terms of content, language and length of the message they were receiving. Majority of respondents had found the content and language of the messages good and no changes were suggested.

In discussion with mothers some of the participants put up that if Duration of messages could be increased.

“Message comes once in a week. Also the length of the message is less. There should be repeated messages and also the length of the message should be increased”.

Also there in the interview with one ASHA worker revealed that length of the message should be increased.

“When I followed up with the husbands they were asking if the duration of the message and content can be increased. This would be more useful “.

3.7.2. Technique used, Process, Delivery, Follow up

In the discussions with the husbands and mothers it was found that there were issues in timing of message delivery, clarity in voice, fast flow of message that had created difficulty in receiving the messages. Also there messages were coming only once in a week.

It was suggested,

- if there frequency of messages in a week could be increased
- smooth flow in message delivery
- Put in place an interactive system where if someone missed to hear the message, he can request for hearing the message.
- Provide some mechanism to avoid confusion and identify the 3M message from that of telecom company's ads.

“Since the message comes in a week and length of the message is small the flow of message need to be smoothened. As due to fast delivery, message completed by the time we get to understand it”.

“It would be good if an interactive system, where we can ask if we missed or want to hear again the message could be put in place”.

“It would be good if frequency of messages can be increased as many times husbands missed to attend the calls due to different reasons”.

3.8. Key drivers of the Intervention

3.8.1. Project design

In-depth Interviews with the Sahiyya (ASHA Workers) and Project Staffs and Block Medical officer (MOIC) were revealed significant aspects regarding the 3M project.

The project was implemented in 50 villages of the Hiranpur block. 25 villages were intervention village and 25 villages were control villages. In the intervention villages Sahiyya's were provided with android mobile phone which has the software in which

details of pregnant women and their husband recorded. Also there videos related to maternal healthcare as antenatal /postnatal checkups, safe delivery, nutritious diet, immunisation, breastfeeding etc. were loaded. In the intervention villages husbands were receiving messages (through voice call) on their phones. Voice messages had been sent once in every week on required health care of pregnant women, the necessary precautions should be taken in that particular week to the husbands of the pregnant women completed their 3months of pregnancy. Messages were coming once in week on the scheduled day and time in the language (Hindi, Santhali and Bengali) as was selected by husband.

The project implementation team was consists of a Project Manager and Two Cluster Supervisors. Sahiyya and the husbands of the identified pregnant women were the main facilitators of the project. The components of the project were,

- Identification of Pregnant women in 3rd month of pregnancy.
- Training of Project Staffs and Sahiyya on use of Android Mobile Phone and ComCare app in registration of details of pregnant women in 3rd month of pregnancy.
- Development and delivery of voice messages.
- Survey of husbands regarding the suitable day ,time, and language
- Voice messages regarding maternal healthcare to husbands.
- Counselling of pregnant women and mothers through videos.
- Follow ups with pregnant women/mothers, husbands

“Sahiyya’s were given training on use of screen touch mobile phone, how to select target couple (selection criteria was PW who are in 3rd month of pregnancy), how to enter details of pregnant women and their husband (get mobile phone number of husbands and take informant regarding language of message, timing of message)”. Sahiyya were taken the information on time they are comfortable to attend the call and receive the messages. Times as morning 6 AM, noon 12 PM, evening 7PM etc. were given by husbands. Also for language some had chosen Bengali, some had chosen Santhali and some had chosen Hindi. Accordingly they were receiving the messages”

“For selection of suitable language of the messages, opinion of husbands was taken. Messages were sent in the language chosen by them, Santhali, Bengali, and Hindi. Messages were sent to husband’s phone number according to the period of pregnancy of their wife and on the required care needed (health checks ups, immunisation etc.) at the time chosen by husband (during morning or evening)”.

“I had attended training on use of mobile phone, how to registration and enter details of pregnant women in mobile phone. Then details of pregnant women collected through registration of pregnant women in the mobile phone. Also there were videos on all issues related to maternal health care from registration of pregnant women to breastfeeding and immunisation of child. These videos helped me in counselling of pregnant women and mothers”.

3.8.2. Key aspects that brought significant improvement in terms of understanding, communication and utilisation of maternal health care services

Key aspects of the project that has lead to improved understanding, communication and utilisation of maternal health care services among the husbands and end beneficiaries were found to be,

- Registration of pregnant women in mobile phone
- Counselling of pregnant women and mothers through video
- Voice messages related to maternal health care
- Interactions between husband and wife on maternal healthcare issues.

“Use of mobile technology and training, and voice messages helped in change in behaviour of husbands with respect to wife’s health”.

“The pregnant women /mother were counselled through the videos. During the counselling family members including the husband also listened. There is change in attitude of husbands regarding their wife’s care. Now the beneficiaries and their husband are themselves come to me and ask and discuss regarding the care

needed and where to go for delivery and in case of problems arise. Also the video has helped and made counselling easy for me’.

“With these video clippings our knowledge and confidence has increased. Also these videos have made our work easy in counselling and convincing the family members of pregnant women”.

3.8.3. Scope of improvement

Interviews with Sahiyya and Project Staffs has revealed following aspects that could be taken care of when designing the project,

- Increase in frequency of voice messages
- Increase in duration of messages
- Delivery of message as per availability of Network connectivity
- Group discussions with husbands and wives together.

“If group meeting with husbands and wives organized and messages received are discussed. It would have been greater impact”.

3.8.4. Key Barriers

The key barriers in the implementation of the project identified as,

- Problem in ComCare software
- Proper handling of phone by sahiyya
- Difficulty in follow up with husband as many of them working outside.
- Reluctance in sharing phone numbers
- Network connectivity
- Changing/Missing the Phone Number of Husbands

“Connectivity was also an issue. Many times husbands were not able to receive message due to connectivity. (Timing of being them in the network should also be considered when asking them suitable time for receiving the messages.)”.

“We had faced reluctance of wives for sharing phone numbers of their husbands in the early phase of the project”.

“Many times husband change their phone numbers due to low call charge offers telecom companies”.

3.8.5. Key Enablers

The factor that contributed in implementation of the project were found to be,

- Training and motivation of Sahiyya
- Use of Mobile Phone in tracking of pregnant women and mothers.
- Language of messages as per the audience choice.
- Video clippings on different aspects of maternal and child health care.
- Increased concern of the husbands as the intervention progressed.

“There competition among husbands had begun. Husbands who were not receiving the messages were used ask us why they had not receiving the messages. We then tell about the project and the targeted audience of the messages”.

3.9. Opportunities for future interventions

The interviews with sahiyya, Project Staffs and Block Medical Officer had provided with following scope for integration in future interventions.

- Follow up system for tracking effectiveness of the intervention.
- Upgraded software to avoid malfunctioning.
- Training on solution for software malfunctioning.
- Group meeting with husbands should be added.
- Increased Project period.
- Financial assistance for recharge of internet facility in phone to sahiyya.
- Addition of women reproductive and sexual health issues in video counseling.

“Project duration was very small. If the project period increased the impact would be more”.

“Cost of internet pack recharge for in the phone had to be borne by Sahiyya. It would be good if Sahiyya is provided reimbursement for internet pack recharge or support for internet facility in phone provided”.

“There was problem with the ComCare software. Many times software in mobile phone of Sahiyya was found not functioning and we had to engage most of our time in repairing of the software and phone”.

“We repair the malfunctioning app in the phone at our office. Our project manager was used to repair the app in phone”.

“Reporting and feedback mechanism was missing. There no mechanism of follow up was developed from which the effectiveness of the programme can be retrieved in terms of increase in ANC, Institutional delivery, breast feeding etc. We were not updated regularly on progress of the project. ”

“If there any new technique can be added. Video’s on various reproductive and sexual diseases and their precaution and treatment should also be added”.

CHAPTER FOUR

CONCLUSION

The 3M Project (Men using Mobile phones to improve Maternal health), implemented for 18 months from September 2014 to March 2016 in the 50 villages of Hiranpur block of Pakur district has been designed in light of the continued growth in use of mobile phones, combined with the urgency to save the lives of women during pregnancy, childbirth and post delivery involving the husbands.

The purpose of this study was to assess attitudes and beliefs of men's involvement towards maternal and child health, as well as perceptions of other stakeholders on feasibility, effectiveness, relevance & design appropriateness and usefulness of the 3M intervention.

The findings of this study reveal improvement in knowledge, understanding and concerns regarding maternal health care issues among husbands as well as the women. They are able to identify the component of maternal health care, not point to point specifically, but in general.

Importance of discussion on maternal healthcare and with that of men has been acknowledged by widely. All the respondents had the idea that knowledge and understanding on maternal health care among men can improve their concern for care of wife. Also improved knowledge and understanding of maternal and child healthcare services, precautions, dangers signs may help in preparedness for managing emergency situations.

The role of men in maternal health care has been identified in area which is predominantly the responsibility of women in the family that is support in household works. Bringing water has been identified as a major role of husband in household works. Cooking, washing clothes, care of children are the other household works where men can contribute. Also, there support wife during pregnancy, childbirth, post delivery in accessing healthcare services and care at home are responsibility of husband.

Not all the husbands had heard the complete set of 3M messages. Reasons for not hearing the messages have been attributed to not receiving the call as many of them keeping their phone in silent mode, confusion with voice calls from telecom companies and advertisements, engaged in work at the time of call, interruption by family members or neighbors at the time of call, missing the SIM card or mobile phone. The content of the messages husbands able to remember mostly is related to diet and food intake of the pregnant women, health check up of every month at anganwadi centre, take iron tablets, taking care of health of wife.

Husbands who had received the 3M messages followed up with their wives in respect to health checkups and remind them to go for checkup if their wives forgotten or not willing to go, taking proper rest, not allowed to do heavy works, eat properly and timely.

The 3M messages had informed husbands on issues related to maternal healthcare and provoked them in giving attention to the care of their wife and ensure following the information given. Also the 3 Messages were helpful in awareness generation among husbands on maternal health care and thereby helped in access to maternal healthcare services as health checkups during Pregnancy, taking iron pills, take timely appropriate diet, eating support from husband in household works, birth preparedness, immunisation of the newborn. 3M Messages has helped in improving the spouse relationship with respect to maternal health care.

Content and language of the 3M messages are found to be ok. There is concern regarding the duration of the messages. It was suggested to increase the duration of the messages. Also there were issues in timing of message delivery, clarity in voice, fast flow of message that had created difficulty in receiving the messages. Messages were coming only once in a week. It was suggested to improve the delivery of messages in terms of

- Increasing the frequency of messages in a week
- Smooth flow in message delivery
- Interactive system where if someone missed to hear the message, he can request for hearing the message.

- Mechanism to avoid confusion and identify the 3M message from that of telecom company's ads.

Registration of pregnant women in mobile phone, counselling of pregnant women and mothers through video, voice messages related to maternal health care, interactions between husband and wife on maternal healthcare issues are found to be the key aspects of the project that has led to improved understanding, communication and utilisation of maternal health care services among the husbands and end beneficiaries

There has been scope of improvement in 3M messages in terms of frequency of voice messages, increase in duration of messages, delivery of message as per availability of network connectivity, group discussions with husbands and wives together.

The key barriers in the implementation of the project identified as, problem in ComCare software, proper handling of phone by sahiyya, difficulty in follow up with husband as many of them working outside, reluctance in sharing phone numbers, network connectivity, change/missing the phone number by husbands.

Training and motivation of Sahiyya, use of Mobile Phone in tracking of pregnant women and mothers, language and timing of message delivery as per the audience choice, video clippings on different aspects of maternal and child health care, increased concern of the husbands with respect to the 3M messages as the intervention progressed were key factors that has helped in effective implantation of the implementation.

There has been scope for integration in similar future interventions as, follow up system for tracking effectiveness of the intervention, upgraded software to avoid malfunctioning, training on solution for software malfunctioning, group meeting with husbands, increased project period, financial assistance for recharge of internet facility in phone to sahiyya and addition of women reproductive and sexual health issues in video counseling.

Joint Research Collaboration between HealthBridge Foundation and EFICOR

Annex 5

3M Project Document: Men using Mobile Phones to improve Maternal Health, Jharkhand India (October 2014 – March 2016)



Village in Hiranpur Block

This Report captures and documents the background, design, history, activities, process, key learnings, challenges and impact of the 3M Research Project implemented from October 2014 to March 2016 amongst 230 couples in 50 villages of Hiranpur block of Pakur district in Jharkhand, India

Contents

1. Introduction (Problem and Justification).....	2
2. Response: The 3M Project.....	2
2.1 Collaborative Research	3
2.2 Knowledge-Sharing.....	4
2.3 Project Area.....	4
2.4 Research Collaborators	5
3. Project (Research) Design	6
4. Project History and Process	7
5. Key Learnings	13
5.1 Baseline Quantitative (Household) Survey	13
5.2 Baseline Qualitative Survey.....	13
5.3 End-line Quantitative (Household) Survey	14
5.4 End Line Qualitative Survey.....	14
5.5 Overall	15
6. Challenges	17
7. Impact	19
List of Acronyms.....	25
Annexures	26
Annexure 1: Training Schedule for Staff and ASHA	26
Annexure 2: Questionnaire - Interview Guide for Baseline Assessment.....	27
Annexure 3: Baseline and End-line Quantitative Survey (Results Comparison).....	28
Annexure 4: List of ASHA in the Project	31
Annexure 5: Registration details of 115 couples in 25 Intervention Villages.....	33

This report was completed by a local consultant. The interpretation of findings expressed in the report are based solely on the opinion of the consultant and do not necessarily represent the views or opinions of HealthBridge Foundation of Canada.

1. Introduction (Problem and Justification)

A basic package of maternal and neonatal health services can save the lives of mothers and newborns during pregnancy, birth, and the post-natal period, including skilled birth attendance, antenatal care and post-natal care¹. However, making such services accessible to all women remains a challenge. Improving maternal, newborn and child health (MNCH) requires more than the provision of services; mothers must be motivated and able to seek health care at critical points in time, and use appropriate self-care practices.

It is well known that support from family members, particularly husbands is important for enabling women's access to health care. Men can positively influence MNCH in a number of ways. When educated, men can make informed decisions with their wives about birth preparations and provide assistance when complications arise. When aware of health requirements during pregnancy, men can encourage their wives to seek ante-natal care, provide emotional support, encourage good nutrition and adequate rest and provide practical support with family and household responsibilities to reduce women's workload. However, engaging and educating men is difficult due to time constraints, lack of clinic space and cultural resistance to men's involvement in "women's issues".

The use of mobile technology in MNCH has become increasingly popular and is showing promising results in facilitating emergency medical referrals, point of care support, health counseling and health system monitoring². Preliminary evidence also suggests that mobile health (mHealth) can effectively promote knowledge and care-seeking behavior amongst pregnant women through timed messages³. However, there is a dearth of research on the feasibility and impact of using mHealth to target husbands.

Given that mobile phone ownership is widespread in India, mHealth has tremendous potential to reach those living in remote and isolated areas. Additionally, using mHealth, information can be sent to husbands discreetly, independent of place or time, thus evading challenges of educating men through direct counseling strategies.

2. Response: The 3M Project

HealthBridge and EFICOR collaboratively designed a pilot intervention called 3M: Men using Mobile Phones to improve Maternal Health based on the learnings from the Pakur Maternal and Child Survival Project (MCSP) and the use of mobile technology in MNCH Project in Sahibganj district of Jharkhand. The long-term goal of this project was 'to build capacity within Canada and India to effectively use mHealth in MNCH interventions and ultimately, reduce maternal (MMR) and newborn mortality (IMR)⁴. To achieve this goal, the project had two separate but complementary components:

¹ Surviving the first day: State of the world's mothers 2013 (Save the Children: ISBN I-888393-26-2)

² Tamrat T. & Kachnowski S. (2012); Special delivery: An analysis of mHealth in maternal and newborn health programs and their outcomes around the world. *Maternal and Child Health Journal*, 16: 1092-1101

³ Davis J., Luchters S. & Holmes W. (2013): Men and maternal and newborn health: Benefits, harms, challenges and potential strategies for engaging men. Centre for International Health, Burnet Institute, Australia

A collaborative research component would contribute to the global evidence base while building local capacity to use mHealth in MNCH interventions. HealthBridge Foundation worked collaboratively with Evangelical Fellowship of India Commission on Relief (EFICOR) to design, implement and evaluate the impact of using mHealth to engage husbands in their wives' maternal health care. The objectives of the Collaborative Research component were:

1. To assess the feasibility and impact of an mHealth intervention targeted to husbands on women's utilization of maternal healthcare in rural India; and
2. To increase capacity of HealthBridge Foundation and EFICOR in using mHealth in MNCH interventions

A knowledge-sharing component would convene Canadian researchers and practitioners who have used mHealth in an MNCH context to share results, experiences and lessons learned. The Knowledge Sharing Forum would provide a unique opportunity for Canadian organizations to learn how mHealth has been used to improve MNCH both within Canada and in low income group countries such as India. Given the recent popularity of mHealth approaches, the knowledge generated from this event will be valuable to researchers, policy makers and practitioners worldwide. The objectives of the Knowledge Sharing component were:

1. To increase knowledge amongst Canadian organizations of promising approaches for using mHealth to improve MNCH; and
2. To identify best practices for designing, implementing and scaling up mHealth approaches in MNCH interventions.

2.1 Collaborative Research

HealthBridge Foundation has expertise in designing and evaluating interventions which engage men in reproductive health, while EFICOR brings expertise in designing and implementing MNCH interventions in rural India. Using a collaborative learning approach, the two organizations developed timed health messages for husbands of pregnant women with health information, recommended actions to take, and reminders of their important role in supporting their wives. Messages were delivered using Dimagi's CommConnect mobile technology platform which allowed customization of messages to the mothers' pregnancy stage, as well as voice messaging, which was more appropriate than text due to high rates of illiteracy in the district. A collaborative learning approach enabled each partner to learn from and capitalize on each other's skills and knowledge, ultimately enhancing learning and achievement of the final product.

The collaborative research was undertaken over an 18 month period and carried out in one of the six blocks (Hiranpur) in Pakur district of Jharkhand state, India. HealthBridge and EFICOR have been working together to implement an MNCH intervention in the district and thus, have established strong relationships with the local authorities and health workers and have an in-depth understanding of the local culture and barriers to MNCH. This project built on the activities and networks established in the

MNCH project, enabling EFICOR to learn new skills that would ultimately strengthen their MNCH work.

The major activities of the collaborative research were as follows:

1. **Baseline Assessment:** A household survey was conducted to assess men's knowledge and women's utilization of key maternal health services (ante-natal care, skilled delivery care, post-natal care, iron-folic acid supplementation and Tetanus Toxoid vaccination) and self-care practices (adequate nutrition and rest during pregnancy). Qualitative assessments were also conducted to assess attitudes and beliefs towards men's involvement in maternal health;
2. The 3M Intervention was implemented over a 12 month period across 50 villages of Hiranpur block in Pakur district;
3. **End Line Assessment:** The same household survey was conducted to assess changes in men's knowledge and women's utilization of key maternal health services and self-care practices. A qualitative study was also conducted to assess attitudes and beliefs, as well as perceptions of participating EFICOR staff, men, women and health workers on the feasibility and usefulness of the 3M intervention; and
4. Dissemination meetings to share findings with local and national government stakeholders and health experts

2.2 Knowledge-Sharing

The knowledge sharing component was conducted after completion of the collaborative research and took place in Ottawa, Ontario, Canada. This component used the concept of knowledge brokering, which brings people together, helps to build links among groups and individuals and share ideas. A 2-day Knowledge Sharing Forum was co-facilitated by HealthBridge and Dr. Gail Webber of the University of Ottawa, convening Canadian researchers and practitioners in sharing of approaches, results, and lessons learned from using mHealth to improve MNCH. HealthBridge shared findings from the 3M evaluation. Sessions were organized to enable reflection and discussion on the most effective approaches and the scalability of these efforts. Findings from the Forum will be documented and analyzed to identify the most promising practices, key lessons learned and successes and challenges of scaling up. A report will be produced and circulated to all participants for feedback before being finalized. The final document will be shared nationally and internationally to influence and support policy and programming related to the use of mHealth to improve MNCH.

2.3 Project Area

The 3M Project was implemented across in Hiranpur block of Pakur district, Jharkhand, India.

Hiranpur block is predominantly plain with a few pockets of hilly terrain. This block, once known for its thick and extensive forests, is now bereft of much of its jungle wealth. Hot dry summer (March-June), good rainy season and cool winter sums up the climate of this block. The maximum temperature can be as high as 46 degree Celsius. Owing to natural drainage, floods are rare in this area.



Map 1: 25 Intervention Villages coloured in yellow in Hiranpur Block

The total population of this block is 84,062⁴ residing in 14 Gram Panchayats (GP) covering over 119 villages. Male and female population is 42,506 and 41,573 respectively and the literacy rate is 51.95%⁵. This block is mainly inhabited by the Santhal and Sauria Paharia tribes.

The main occupation of the people of Hiranpur block is cultivation. Kharif and Rabi (summer and winter crops) are the main agricultural seasons. Farmers also double up as labourers during lean season. Quality of livestock is very poor though there is scope for enhancing income from animal husbandry initiatives. Paddy thrashing, leaflet making, bamboo basket making are some of the other sources of the income for the villagers. A large number of stone mines and crushers are in operation in the area providing employment to hundreds. In the absence of major

industries and employment opportunities, economic options are limited to above mentioned trades resulting in high scale migration.

2.4 Research Collaborators

HealthBridge Foundation is an international, non-profit, non-government organization that has worked since 1982 with partners world-wide to improve research, policy and action (www.healthbridge.ca). HealthBridge is a leader in recognizing the need to integrate gender into reproductive, maternal, newborn and child health (RMNCH) interventions, and demonstrating the need to engage men in efforts to improve women's health. From 2004-2008 HealthBridge implemented the CIDA-funded project *Promoting Male Responsibility towards Gender Equality* which sought to increase men's involvement in sexual and reproductive health in India, Bangladesh and Vietnam. HealthBridge is currently working with its partner EFICOR to implement three-year *The Pakur Mother and Child Survival Project* in Pakur, India, funded by the Muskoka Initiative.

EFICOR is a non-profit, non-government organization that has worked since 1967 on relief and development issues (www.eficor.org). EFICOR has extensive experience and capacity implementing MNCH interventions in rural India. From 2007-2012, EFICOR implemented the USAID funded *Parivartan Project* which strengthened the health system and increased MNCH service utilization in Sahibganj district of Jharkhand state. EFICOR has established strong relationships with the government at state and district levels, and has a sound understanding of the government health system, local needs and culture. EFICOR has been using mHealth in Sahibganj district to enhance counselling by community health workers.

⁴ Government of India Census Report, 2011

⁵ Government of India Census Report, 2011

3. Project (Research) Design

The project was designed as a quasi-experimental study with a before and after comparison between control and intervention area. It was done in the following steps:

- A package of educational content on maternal health was developed (from MAMA: Mobile Alliance for Maternal Health) and converted to messages for dispatch on mobile telephones.
- 50 villages were selected and were divided into 2 areas of 25 villages each. These were named as Intervention and Control Areas;
- Ethical clearance for the project was obtained from the Institutional Ethics Committee, St Johns National Academy of Health Sciences, Bangalore;
- Approvals and permissions were taken from the Office of the Civil Surgeon cum Chief Medical Officer, Government of Jharkhand;
- In both Intervention and Control areas, a target of 115 (the sample size for the project) couples⁶ were identified and recruited, where the wife was 12-20 weeks pregnant, the husband owned a cellphone and was willing to participate in the project;
- A base line household survey was conducted amongst 102 couples in the baseline in both areas: Both sets of couples were interviewed at the start of the project to assess their level of knowledge and practice with respect to key indicators of maternal health and the husbands' participation in the promotion and maintenance of the wife's health during her pregnancy;
- In both areas, ASHA (accredited social health activists - village level health functionaries who are paid by the government per job⁷ done by them) were recruited and given smartphones. These ASHA received health messages pertaining to MNCH for the duration of the project, which they conveyed to the recruited husbands and wives;
- In both areas, couples were encouraged to access the government health service by the ASHA based on the messages she received and based on her basic training in MNCH, which is the standard of care;
- **Additionally, in the Intervention area, husbands received messages on their mobile phones with respect to good maternal health practices. Messages were customized to the mother's pregnancy stage, and included text as well as voice messaging. Husbands registered in the project and residing in the intervention area received these voice messages with health information and recommended actions to take at different points along the continuum of their wives' pregnancy; and**
- End line assessments (including household survey) were conducted 4-5 weeks after women gave birth in both intervention and control villages amongst 103/104 couples. The project aimed to assess change between baseline and end line in each area.

⁶ Annexure 5: List of 115 couples in Intervention Areas (details of husbands to receive MAMA messages)

⁷ The ASHA keeps record of all pregnant women and new born in her village and supplies relevant services to them such as birth chart, vaccination chart, taking pregnant women for 4 check-ups and delivery to public health centres, and so on

4. Project History and Process

Much thought and planning went into designing the project so that the process thus employed would ensure efficient use of resources and maximum results. Given below are the details of the activities and process of this Research Project **chronologically**:

- The Project was implemented by a Coordinator out of the EFICOR Hiranpur Block Office supported by 2 Cluster Supervisors (CS);
- To deliver the ‘timed voice health messages’, 29 appropriate “MAMA” messages were selected, adapted / developed and recorded initially into Hindi in September 2014 (called 3M messages). These were later also translated and recorded in ‘Santhali’ and ‘Bengali’ in January 2015;
- The first survey was conducted by the 3 Project Staff in 32 HSC (Health Sub Centres) of Maheshpur Block in Pakur District during October 2014 as 2 blocks were being considered for the Research at the time. Data on 532 couples (female was 12-20 weeks pregnant) was collected. Given the size and spread of Maheshpur and Hiranpur blocks (and the difficulty of monitoring both), it was decided that the Project would only be undertaken in Hiranpur Block;
- Ethical clearance for the project was obtained from the Institutional Ethics Committee, St Johns National Academy of Health Sciences, Bangalore;
- Discussions between EFICOR and the Pakur District Civil Surgeon cum Chief Medical Officer (CMO) in October-November 2015 yielded a formal approval for EFICOR to implement the Project. The MOIC (Medical Officer-in-Charge), Hiranpur and District Programme Coordinator (DPC), Pakur - District Head of ASHA were formally informed of the impending research project to be implemented by EFICOR;
- Help was solicited from DPC in identifying villages from Hiranpur block where the ASHA were proactive. It was learnt that there were only 69 ASHA looking after 125 villages (Hiranpur block). The Project team further discussed this list with the Block Trainer Team (BTT), Hiranpur Community Health Centre (CHC) to narrow it down to 50 villages where the ASHA was a resident and proactive in her duties. This narrowed down list was further discussed with 4 Sahiya Sathi (ASHA doubling up as Cluster Head who normally supervises around 15-20 ASHA). They assisted in finalizing the list of 50 ASHA^{*} working in 50 villages in Hiranpur Block;
- The 50 villages were divided into 25 Control area villages and 25 Intervention area villages. The Intervention area villages were selected based on the pro-activeness and literacy (studied up to 10th standard) of the ASHA amongst the 50 selected ASHA;
- Cluster Supervisors were given the responsibility to organize the activities and monitor the progress in 25 villages (a mixture of Control and Intervention area villages) each. Ms. Binita

^{*} Annexure 4: Final list of ASHA

Kisku was given 8 intervention and 17 control area villages based on the proximity of the villages to her house. Mr. Rahul Sah was given 17 intervention and 8 control area villages;

- In both Intervention and Control areas, a target of 230 (115 x 2: the sample size for the project) couples were identified and recruited, where the wife was 12-20 weeks pregnant, the husband owned a cell phone and was willing to participate in the project. Prior to this a survey was conducted in Hiranpur block at the end of 2014 by 3 EFICOR staff and 5 data collectors to identify all such couples. 289 couples had been identified. Owing to a delay in rolling out subsequent activities, a 2nd survey was conducted during March - April 2015 in the same block and this time 286 couples were identified. The Project was able to shortlist 230 couples (115 in each of the 2 areas) with the help of ASHA. Women closer to 20th week pregnancy and whose husbands did not have mobile phones were excluded;
- The Project engaged the services of private software company 'Dimagi' to assist in rolling out the 'mhealth' programme for pregnant women and their husbands. They readied a mobile application based programme: 'CommCare' and trained EFICOR staff and ASHA cluster heads in May 2015. This was done over 4 days and divided into 2 workshops. The first 2-day workshop for EFICOR staff on the overall mobile application programme including:
 1. Installation and maintenance of the app on the phone;
 2. Set up web users;
 3. Report on CommCare HQ;
 4. Data Exports on CommCare HQ;
 5. User Management on CommCare HQ;
 6. Advanced troubleshooting;
 7. App building;
 8. Final check on phones, planning for training; and
 9. Advance app building + deployment.
- The second workshop⁹ was a 2-day Training of Trainers Programme wherein EFICOR staff and ASHA Cluster heads were capacitated to train the 50 ASHA on the various aspects of the Application;
- The 50 ASHA were capacitated on all aspects of the mhealth programme including but not limited to: navigating a touch phone; installing & maintaining CommCare App; using the App to register pregnancy details of 230 selected women, and phone numbers of & preferred time to send messages to 115 men; counselling women; showing videos and so on;

⁹ Annex 1: Training of Trainers Schedule



Pictures 1: Learning to use CommCare App in Dimagi training workshop for ASHA

- The Dimagi team oversaw the installation of CommCare application in the 50 Samsung phones bought for this project. These were handed over to the 50 ASHA by the MOIC and DPC. EFICOR bought the data pack for the first two months for all the ASHA so that they would be able to learn on the job. Subsequently the ASHA were asked to buy their own data and register selected couples in their villages;



Picture 2: Dimagi staff interacting with ASHA

- A baseline household survey¹⁰ was conducted over a period of 4 weeks in June-July 2015 with oversight by an external expert: Dr. Arvind Kasthuri, St. Johns Medical College, Bangalore. 5 data collectors were trained on the use of a questionnaire which was designed to capture information pertaining to the key indicators of MNCH based on project objectives. They visited each of the identified couples in both intervention and control areas, and administered the questionnaire. 102 couples were available for assessment at baseline in each of the 2 areas;
- A qualitative baseline study was also conducted in 6 villages of Hiranpur Block in July 2015 to assess attitudes and beliefs towards men's involvement in MNCH and to assess the feasibility of an mHealth intervention targeted to husbands on women's utilization of maternal healthcare in rural India. The Questionnaire¹¹ was administered through 6 focus group discussion (FGD) sessions by EFICOR staff with 6 groups of 10 husbands each (30 husbands each from control and intervention areas) in the 6 carefully selected villages of:

1. *Govindpur (Muslim)*
2. *Bipatpur (Muslim and Hindu)*

¹⁰ Annex 3: Comparison of results of baseline and end-line survey

¹¹ Annexure 2: Questionnaire - Baseline qualitative study

3. *Khijurdanga (Tribal - Santhal)*

4. *Manidanga (Tribal - Santhal)*

5. *Dulmidanga - OBC*

6. *Dangapara - OBC*

- 25 ASHA of the Intervention area registered 115 pregnant women and their husbands in their smart phones over the period of June-August 2015 using “CommCare application”. 25 ASHA of the Control area registered 115 pregnant women alone during the same period. All this data got automatically uploaded onto the Dimagi server once the ASHA hit the ‘submit’ button at the end of the registration process;



Picture 3: Registration process through CommCare app on smartphone

- After the registration of 115 husbands (with details of their phone numbers, preferred time and language to receive 3M messages) in the Intervention area, they started receiving weekly ‘timed voice health messages’ delivered through Dimagi’s CommCare server;
- ASHA counselled the registered women through the months of June 2015 to February 2016 depending upon their LMP. Hindi IVR messages in the ‘app’ helped in the counselling sessions (when the ASHA could not read instructions) included danger maternal signs during pregnancy, delivery and post-delivery;
- Videos (in Hindi) downloaded in the app enhanced the understanding of both the ASHA and pregnant women on issues surrounding MNCH and prevalent diseases:
 1. Malaria and Pneumonia;
 2. Diarrhoea;
 3. Nutrition and balanced diet during pregnancy;
 4. Hygiene and Sanitation;
 5. Safe Delivery (pre-natal checks, ante-natal checks, post-natal checks, institutional delivery and not at home with help from traditional birth attendants (TBA), etc.);
 6. Saving money;
 7. Information on National Maternity Benefit Scheme(NMBS);
 8. Arranging transportation,

9. Arranging for blood donor;
10. Exclusive breast feeding and benefits of colostrum;
11. Vaccination; and
12. New-born care



Picture 4: Farida Bibi being counselled by ASHA

- Each ASHA had a minimum of 3 couples to register and counsel on a periodic basis. The average number of couples per ASHA in the 115 intervention villages was 4-5. In Hathkati village 15 couples were registered!
- In addition, they followed up with 115 husbands who were receiving messages. They encouraged men to listen to the messages and follow through with their wives. ASHA reported men not receiving messages to EFICOR team who followed up with Dimagi and rectified the same;



Picture 5: Samazul Ansari listening to the 3M message

- The ASHA counselled 230 registered women as per guidelines (Hindi) in the CommCare app;
- Project cluster supervisors had scheduled a visit to every village at least once in 2 months. Their first stop would be the ASHA with whom they would meet with registered women and note the progress. They would check the counselling and teaching skills of the ASHA. They would also meet with the husbands, which was not always possible given their work schedule. If the husband said that they were not getting messages, Project cluster supervisors would inform the Project Coordinator (at Hiranpur Office) who would consult Dimagi. Dimagi would direct him to check with the online monitoring server website: CommCare HQ;

- The Dimagi server allowed EFICOR Project Team to view details of registration, counselling episodes and IVR messages;
- The cluster supervisors spent much of project period time resolving issues around corruption of the ‘app’, re-installation of the ‘app’, clarifying issues of ASHA related to the ‘app’ and men not receiving 3M messages amidst other issues;
- An end line household survey¹² was conducted over a period of 4 weeks in February-March 2016 with oversight by external expert: Dr. Arvind Kasthuri. 7 data collectors were trained on the use of the same questionnaire used during baseline household survey which was designed to capture information pertaining to the key indicators of MNCH based on project objectives. They visited each of the identified couples in both intervention and control areas, and administered the questionnaire. 103/104 couples were actually available for assessment at baseline in the 2 areas respectively;
- A qualitative End-line study was conducted by Mr. Sandip Mitra (external consultant) over 3 days in 6 villages of Hiranpur Block in March 2016 to assess change in the attitudes and beliefs towards men’s involvement in MNCH post the mHealth intervention targeted to husbands on women’s utilization of maternal healthcare in rural India. The Questionnaire¹³ was administered through 6 focus group discussion (FGD) sessions by EFICOR staff with 3 groups of 10 husbands each and 3 groups of 10 wives each in the 6 carefully selected villages of:
 1. *Manidanga (Tribal - Santhal);*
 2. *Mohanpur (Mixed population);*
 3. *Devpur (Hindu);*
 4. *Bada Balrampur (Mixed population);*
 5. *Ranikola (Hindu); and*
 6. *Bipatpur (Hindu and Muslim)*

¹² Annexure 3: End Line Survey Notes

¹³ Annexure 2: Questionnaire - Baseline qualitative study

5. Key Learnings

5.1 Baseline Quantitative (Household) Survey¹⁴

The household survey concluded that:

1. The baseline levels of indicators which measure KNOWLEDGE of husbands and SUPPORTIVE ACTIONS of husbands were generally higher in the Intervention area compared to Control. Levels of knowledge were poor in both areas:
 - Less than 12% men had knowledge regarding maternal health (maternal danger signs during pregnancy & post-partum period, requirement of 4 antenatal checks & newborn danger signs);
 - Less than 62% men encouraged their wives' to eat well during pregnancy;
 - Less than 36% men encouraged their wives or provided practical support to attend ante-natal check-up;
 - Less than 33% men encouraged their wives or provided practical support to take adequate rest during pregnancy;
2. Levels of indicators with respect to maternal health would be measured at end-line only, since they are based on the period of pregnancy, which is completed only after birth.

5.2 Baseline Qualitative Survey

The focus group discussions amongst 60 selected husbands showed that most husbands had a positive attitude towards MNCH although the degree of their actual involvement varied. 40% of the respondents stated that it was their responsibility to take their wives to the hospital for checkup, administer medicines and be in touch with the village ASHA. Similarly, 60% of the respondents stated that women needed special care and food during pregnancy. 90% of the respondents accepted that a hospital was a safe and convenient place for delivery since it would become easier to get a birth certificate. Some stated that their role was to inform the ASHA who would take her to the hospital in government provided emergency transport for pregnant women. 70% of the respondents stated that women & new born needed special care after delivery. 40% of the respondents stated that they would look after their infants while the wife is busy with household chores. Regarding challenges in helping with their wife's pregnancy and delivery, around 30% stated that they had not experienced any challenges. 20% of them said that taking care of the newborn was difficult. The study concluded that since most of the population has year-round and within 5 km access to a health facility they are little aware of dangers surrounding pregnancy and child birth. ASHA present in every revenue villages informs them of serious issues, if any. Government provided emergency transport "*Mamta Vahan*" has lessened the husband's worry regarding transportation. Still, several participants were not knowledgeable about their role during pregnancy and child birth as they are daily laborers and do not have time to stay home during this period.

¹⁴ Annexure 3: Base line survey results

5.3 End-line Quantitative (Household) Survey¹⁵

The household survey concluded that:

- Levels of KNOWLEDGE among husbands regarding key maternal health issues significantly increased in both intervention and control areas. The absolute quantum of increase (in percentage points) was more in the intervention areas;
- SUPPORTIVE ACTIONS by husbands during their wives' pregnancy also increased significantly in all three domains of support for check-up, for taking rest and for nutrition in the intervention area. The absolute quantum of increase (in percentage points) was more in the intervention areas;
- Levels of key MATERNAL HEALTH INDICATORS – adequate antenatal checks, adequate IFA supplementation and institutional delivery were all higher in the intervention area as compared with control of which the difference in institutional delivery rates reaches statistical significance. (The absence of baseline figures for comparison with respect to these indicators made it difficult to attribute this change to the intervention itself, but the rise in the other indicator levels with respect to baseline values would suggest that it was possible);
- The levels of indicators with respect to birth preparedness were also significantly higher at end-line with respect to most aspects of preparedness, in both areas. A certain level of increase would be deemed “expected” since the question at end-line referred to actual preparations made, while it probed intent at baseline. Again, the quantum of change at end-line was more (in absolute percentage points) in the intervention area than in the control area. (Interestingly, the proportion of mothers/fathers who said they “don’t know” about birth preparedness sharply decreased at end-line, in alignment with the earlier suggestion that this referred to actual preparedness more than intent);
- The proportion of husbands who took specific action following recognition of danger signs shows an increase in both areas between baseline and end-line assessments. This difference was significantly higher in the intervention area as compared with control with respect to taking the wife to hospital and using transport, previously identified or otherwise;

On the whole, it would appear that the use of mobile telephonic messages with the ASHA has worked in both areas. Additional intervention with husbands has seen a rise in all levels of indicators, and the difference in the quantum of difference between intervention and control areas probably reflects this added input.

5.4 End Line Qualitative Survey

The Survey concluded that:

- Although messages came every week none of the husbands (survey participants) had heard all the messages. Reasons for not hearing messages include: phone in silent mode at the time of

¹⁵ Annexure 3: End-line survey notes

call, confusion with calls from telecom companies and advertisements, engaged in work at the time of call, interruption by family members or neighbours at the time of call, losing SIM card or mobile phone, carelessness, etc.;

- None of the husbands (survey participants) were able to remember the content of the message but many were able to explain the information contained in the messages. Most people remembered that pregnant women must rest and eat healthy food;
- Several women participants recalled their husbands, who had received 3M messages, asking them to: go for health checks, take proper rest, not carry heavy weight, and eat properly and timely. This was also true of some husbands who were not in-station during pregnancy;
- Most of the FGD participants (prior to 3M messages) had not been much aware and concerned about their wives, particularly during pregnancy. 3M messages has helped them understand the need for care and support to pregnant women in addition to enhancing awareness on MNCH and thereby taking relevant actions;
- Several husbands had followed up with their wives (post 3M messages) and had discussed the needs for and preparations to be taken during pregnancy, delivery and post-delivery; and
- Majority of the respondents found the content and language of the messages useful and no major changes were suggested, although most stated that the messages should have been longer, slower, clearer and more frequent. Many respondents wanted a system in place wherein they could request for repeat of the message they had missed. Additionally they wanted some mechanism in place so as to differentiate 3M messages from tele-marketing calls.

5.5 Overall

The following have been key learnings for the Project Staff whilst implementing the Project:

- Data collectors (surveyors) need to be trained thoroughly and taken through the survey questionnaire step by step. They need to be given extra sets of survey questionnaire (form) in case they make errors while filling them in;
- Couples / Respondents need to be selected appropriately for the study ensuring that husbands will not migrate for the period of the research;
- The ASHA were trained through a training of trainers (TOT) process which proved useful to the Project staff and Sahiya Sathi as they were able to hone their teaching skills and their knowledge of the CommCare app (which would come useful later whilst trouble shooting) got enhanced. It was easier for the ASHA to understand local staff teaching in the local language. However, the training programmes should have been longer and repeated after a period of time so that the Project Staff and ASHA were fully equipped to carry out their tasks more efficiently.
- Rapport building with and involving government health officials in project activities paid off as they were supportive of and cooperative with the Project;

- The ASHA were thrilled with the smartphones and expressed that counselling through mobiles enhanced their status in the village. The target population and general population would listen to her advice assuming that she had relevant and useful information. The first joint visit by HealthBridge, EFICOR and Dimagi to the villages also cemented her standing within her community. This helped immensely in her work;



Picture 6: ASHA thrilled to bits with the touchphone

- Research should not have internet based applications in a village setting as the mobile signal (reception) is poor, mobile phones get corrupted owing to virus attacks and people are not internet savvy;
- Such a Project needs complete and relevant documentation for every stage of the research;
- During village visits, the Project Staff need to work with the ASHA based on her availability and convenience and not as per their schedule. The appropriate times to meet husbands (men) are before 8 am, after 8 pm or during lunch hours. Prior to village visit, the Project Staff need to confirm with the ASHA if the husband is in the village;
- The various videos shown by ASHA to registered pregnant women were a big hit with the other women in the village. Having never seen videos with simple and clear messages related to MNCH, many women flocked to see them and learnt a lot in such a short span of time;
- The capacity of ASHA was built in several ways through this programme especially through use of technology and by teaching others with audio-visual tools. As a result they no longer feel the need to use traditional tools like flip charts to counsel pregnant women and mothers;
- Such has been the impact of smartphones that some ASHA are now using 'Whatsapp' for sending updates & photographs of their programmes to their superiors;
- For a programme heavily dependent upon the IT, the service provider (in this case Dimagi) needs to be able to help trouble shoot over the phone as and when required in addition to a monthly (or a preferred periodic) visit to the Project site till the close of the Project. Contracts need to be drawn accordingly;
- A total of 76 of 115 men heard the 3M messages. On an average they listened to 12 of the total 29 3M messages. The average duration of the messages was 30 seconds;

- The focus of the Project should have been ‘Men’ as stated in the Objectives. A huge amount of energy and resources was used for acquiring smartphones for ASHA, loading them with the CommCare software, ensuring that the phones were working and that the ASHA were doing their job of counselling women and so on with the help of the smartphone. The Project staff spent most of the period from August 2015 to February 2016 trouble shooting and solving mobile phone related problems. Men needed to have been met with every week to ensure that all of them listening to all the messages and clarifying doubts if any.

6. Challenges

The Project faced a considerable number of challenges whilst implementation:

- The Project team had a hard time finding a local expert to translate and record 29 3M messages into Hindi, Bengali and Santhali. A local studio finally arranged an expert from Calcutta for Bengali (who also did the recording in Hindi) and a local college boy for Santhali;
- Training of ASHA kept getting postponed owing to non-availability of training dates from the government. The first training workshop got finalized for April 2015 but had to be cancelled at the last minute delaying the entire process;
- The Project Staff had to conduct 2 surveys to identify 230 couples in the 50 villages. Owing to a several delays, data of the first survey (conducted in December 2014) was rendered useless and another survey had to be conducted during March - April 2015;
- The ASHA were new to smartphones and could not understand the usage. The cluster supervisors had to continuously teach them over weeks before they were able to use the phones confidently. Even then, they would delete the CommCare application by mistake and this would have to be reloaded. By the time the Project Staff learnt of it, several days would go by thus delaying the registration process;
- Family members of several ASHA would use their smartphones to download songs, videos and take photographs. Several times they deleted the CommCare application to make space for the ‘downloads’ and photographs. At times children of ASHA would take the phone for the entire day to the market making it impossible for the ASHA to register and counsel the participants that day;
- Several ASHA would not buy their monthly data pack of Rs. 25 in time and the CommCare app would not allow offline ‘submission’ at the end of registration or counselling session. Family members of several ASHA would consume the data in downloading songs and videos and uploading photographs. The ASHA would expect the Project to recharge for them which the Project did for the first 2 months only. This caused several problems;
- Poor signal, speed and connectivity in the villages proved to be a big headache. The ASHA would have to go to the market place or the local public health centre and upload relevant data;

- Smartphones of 10 ASHA workers stopped working within 3 months of receiving them. They were beyond repair. This meant that all couples in these 10 villages did not receive the relevant phone based counselling sessions;
- Smartphones of 4 ASHA were stolen and which were not replaced by the Project, but which meant no phone based counselling and re-registering in 4 villages;
- Cluster Supervisors did not receive smartphones from the Project so they took time to understand the working of the CommCare App and trouble shoot for the ASHA. In addition they could not help the ASHA whose smartphones had either got stolen or damaged beyond repair;
- Project Cluster Supervisors found out from CommCare HQ website that several men had been sent 3M messages up to 5 times and yet they had not been received by them. The reasons for this lapse include:
 - Men would stay late at work on some days and forget about the time that they had registered for the messages to be received. In their busy-ness they would not hear the ringtone. By the time they would come home it would be dark & with government message restrictions after 9 pm, they would miss that particular week's message;
 - Men would forget or leave their phones at home;
 - Men migrated and took a local SIM at their new residence. Some men simply changed their SIM locally. This new number would then be re-registered and many times the server would just not accept the new number and Dimagi would be roped in to resolve the problem. Several weeks (even months) would pass by from news of SIM change to new number registration. Some new numbers never got registered till the end of the Project which means that around 10-15¹⁶ men never heard 3M messages after they migrated or changed SIM;
 - Men would confuse the incoming call with tele-marketing calls and not pick up the phone; and
 - Men would not recharge their phones or battery;
- Several men found the 3M messages fast and short and before they could realize that the message was from the Project, it would be over. Messages missed or not understood could not be heard again either on the following day or week as the service was designed for just once a week message at pre-determined times;
- The Project staff could never determine if men had heard or missed the messages as they could not meet all 115 men through the 29 weeks and no system had been set-up by the Project for reverse information flow. This proved to be an information black-out for the Project Staff who would otherwise have taken appropriate action; and

¹⁶ Discussions with Project Staff during documentation exercise

- Technical support from Dimagi was not always forthcoming. In the event of a technical error or snag, the Coordinator despite contacting Dimagi over telephone would be asked to file an online complaint on their website. The written response would normally take 24 - 48 hours, which would not always solve the problem leading to another written complaint. This would go on till days, weeks and even months passed in some cases.

7. Impact

The Project has generated a lot of interest in the 50 target villages. People who were not part of this Project have been curious to know details from the target population and ASHA. Women on the whole have benefited immensely through capacity building of the ASHA hoping to be guided more effectively in the future on MNCH issues. The videos in the CommCare application have been seen by scores of unregistered pregnant women and mothers. Smartphones of 25 ASHA were working at close of Project and they intend to use these to spread awareness and enhance health of the village. Village men have seen registered husbands listening to messages and doing things for their wives which they had never done earlier. This has generated curiosity amongst them.

The Project has created an impact amongst the ASHA, Sahiya Sathi, target population of 115 couples in 25 villages and overall in the 50 villages as can be seen in section on Key Learnings. Given below are individual instances of change (Transformation Stories) that have come about owing to this Project:

TS#1

Location: Ranipur village (Hiranpur Khas)

Date of interview: 12th April 2016

Main livelihood/ occupation: Self-employed (27 years old)

Name of Respondent: **Mr. Dharmendra Mondal**



Picture 7: Dharmendra Mondal with his family

Dharmendra Mondal runs a small cosmetics business from his village. His work takes him to other villages and close-by towns where he either supplies cosmetics to shopkeepers or sets up a stall during village fairs and other events. As a result he has hardly any time at home. He is married to Meera Devi (21 years old) and has 2 children. The younger one is a 4 month old girl who was 3.5 kg when she was born. Before his younger daughter was born he knew very little about pregnancy and child birth and even though he cared for his wife and child, he would expect his mother and mother-in-law to look after his wife at those times.

They got selected by the Project in April 2015 and after a few months he started getting 3M messages on his mobile.

He was an avid listener and as he listened he realized the potential there was in his stepping in to ensure his wife's and newborn's wellbeing. Not only did he ensure an increase in his wife's food intake but insisted on going with her for one of her check-up at the Hiranpur CHC. There he learnt about the advantages of fewer children. Not only did they have a healthy baby but his wife is healthy too. They plan on permanent birth control measures so that they do not have more children.

TS#2

Location: Ranipur village

Date of interview: 12th April 2016

Main livelihood/ occupation: Farmer and Daily Labour (25 years old)

Name of Respondent: **Mr. Ajay Kumar Mondal**



Picture 8: Ajoy Mondal in front of the well from where his wife would carry water home

Ajay Kumar Mondal doubles up as a daily labourer during the non-farming (lean) season and earns well doing odd jobs, enough to afford a pucca house. His wife Angoora Devi is 19 years old and they recently had their first child in the Sonajuri District Hospital where she gave birth to a 2.5 kg healthy baby girl. When he got registered with his wife in the Project he did not attach much importance to the 3M messages.

Busy with his work he did not bother to stop her from carrying heavy buckets of water from the well into their house. Till the day he heard (on his phone) about the ill-effects of carrying heavy load on a pregnant woman! He rushed home only to see his wife writhing in pain and made alternative arrangements for water to be made available. He took her to a private nursing home where they prescribed an USG and to his relief saw that the child was okay and with rest, his wife too would be rid of the pain. From then on he listened carefully to the messages and ensured that his wife took adequate rest and ate lots of red coloured fruits and vegetables.

He rushed home only to see his wife writhing in pain and made alternative arrangements for water to be made available.

TS#3

Location: Dulmidanga village

Date of interview: 12th April 2016

Main livelihood/ occupation: Housewife (23 years old)

Name of Respondent: **Ms. Dulali Devi**



Picture 9: Dulali Devi with her child awaiting her husband's return from the farm in the evening

Dulali Devi's husband Nishikanta Ray is a 25 year old farmer and they have 2 children. The younger one is 5 months old. She confesses that her husband had little or no knowledge about MNCH and during her first child; it was her mother-in-law who had accompanied her for health checks. In addition, she had done all household chores right till the 8th month.

Much of this changed after registering with the Project. Nishikanta would come and tell her what he had heard in the message almost every week unless he missed a message. He ensured that she took rest twice a day, ate fish and eggs at least twice a week, bought all groceries and prohibited her from lifting heavy things. In fact, he accompanied her to the public health centre on both occasions and enjoyed watching his child on the USG monitor.

TS#4

Location: Ranipur village (Hiranpur Khas)
 Date of interview: 12th April 2016
 Main livelihood/ occupation: Tailor (34 years old)
 Name of Respondent: **Mr. Vibheeshan Sah**



Picture 10: Vibheeshan busy at work

Vibheeshah enjoys stitching clothes even though it takes up all his time. He is happily married to Bharati Devi (23 years old) and they have 2 children. The younger one was born 3 kg heavy, 2 months earlier at Hiranpur CHC which is close to their home. His first child had been 2.5 kg at birth and he had left the looking after of his wife and newborn to his mother.

After hearing the messages he realized the difference his involvement would have made to his first child and his wife's health. He recalls his wife's inconsistency in consuming iron tablets and going for check-up to the hospital. He took great interest in her well-being, this time by ensuring that she often ate dry fruits, taking her for her

4 check-up, insisting on her lying down for 2 hours every afternoon and eating at least 4 meals through the day. Both have understood the importance of exclusive breast feeding and are enjoying their newborn every day.

TS#5

Location: Ranipur village
 Date of interview: 12th April 2016
 Main livelihood/ occupation: Grocery shop owner (27 years old)
 Name of Respondent: **Mr. Ujjwal Mondal**



Picture 11: Ujjwal just before closing his shop for the day

Ujjwal Mondal is a busy man in his village. Like his buying and selling he likes to do everything perfectly. So he listened carefully to most of the messages on his phone between 2 and 3 pm, when his shop was closed and he was resting at home, and followed through with almost everything. He took his wife, 23 year old Tumpa Devi, for all 4 check-up at the Hiranpur CHC and was amazed to see the foetus on the USG monitor. He made sure his wife took adequate rest and iron tablets. He had planned transportation to the hospital which was just as well because the *Mamta Vahan* did not turn up on D-day. And, he was blessed with a healthy 3 kg baby who is now 3 months old.

But this had not been the case earlier. He had been least bothered with what was happening to his wife and even less so during her pregnancy. But all that changed when the messages started coming every week. He would complain to the visiting Project staff and ASHA when he could not understand some of the messages.

TS#6

Location: Torai village

Date of interview: 12th April 2016

Main livelihood/ occupation: Driver (26 years old)

Name of Respondent: **Mr. Raju Mondal**



Picture 12: Raju at home after dropping his wife to her mother's house

Malda. Towards the middle of the pregnancy he decided to take leave from work and stayed home for a couple of months. He was fearful for his second child and had Avita admitted to a private nursing home where he spent Rs. 28,000 to ensure that nothing adverse happened to mother and child. He is now planning on repaying this loan by working extra hours but *“this hardship is incomparable to the thrill of having a healthy baby girl!”*

Raju Mondal drives a commercial jeep in Malda and sometimes other big towns. He comes home once in 2-3 months. His first child was a caesarean baby owing to several complications during pregnancy of his wife Avita Devi (21 years old). As a result his second child too, was born the same way. However, this time he was armed with the knowledge imparted through 3M messages that he had received over 25 weeks even whilst driving in Malda. Having learnt of the various danger signs associated with pregnancy and child birth, he regrets not having this information earlier.

He ensured that his brother would buy fruits, vegetables, eggs and meat for his wife since he himself was away in

TS#7

Location: Mohanpur village

Date of interview: 12th April 2016

Main livelihood/ occupation: Daily Labour (30 years old)

Name of Respondent: **Mr. Riyaz Momin**



Picture 13: Momin with his wife and 2 kids

and his wife is stronger.

Riyaz is a daily labourer in Calcutta and comes home once in 3 months. His wife Sabira Bibi looks after the house and their 2 children in his absence. Their younger child was born 4 months ago in a nearby government hospital. Riyaz has over the past 15 months learnt the importance of MNCH and stayed put in the village throughout his wife's pregnancy. To make ends meet he works as a van puller in the village. He bought all the food that his wife ate much to the surprise of his parents and delight of his wife. His second child was 3.1 kg at birth and this brought them much satisfaction.

He plans to stay on in the village with his family for a couple of months till his younger child is fully weaned

TS#8

Location: Babupur village

Date of interview: 12th April 2016

Main livelihood/ occupation: Farmer (35 years old)

Name of Respondent: **Mr. Nirmal Ravidas**



Picture 14: Nirmal Ravidas in front of his home

Nirmal and his wife Rekha Devi have 4 children, the youngest being 5 months old. During the previous 3 pregnancies, Rekha did everything: from sweeping to cooking, from filling water to buying groceries, from looking after the home to feeding the children.

Rekha prompted Nirmal to register with this Project and hear the messages carefully which he faithfully did. He would discuss the messages with her and learnt a lot about MNCH care. On one of the visits to the health centre he learnt about the position of the child and was happy to know that his 4th child was well-positioned and growing well. Spurred with the new found knowledge he bought fruits and vegetables for his wife and took time out to talk with the ASHA and even the Project Staff.

TS#9

Location: Babupur village

Date of interview: 12th April 2016

Main livelihood/ occupation: Housewife (25 years old)

Name of Respondent: **Ms. Saira Bibi**



Picture 15: Saira Bibi with 3 of her children

The youngest of the 4 children of Saira Bibi and Rafique Momin is now 7 months old. Tamanna was a healthy 3 kg baby at birth. The last pregnancy was a special one for Saira as her husband was with her throughout and even went to the local health centre with her. She could express herself freely with her husband regarding her hunger pangs, vomiting tendency and back pains. Earlier she would keep her thoughts to herself as her mother-in-law expected her to be a superwoman. Rafique was insistent on her eating well and taking adequate rest, a far cry from her 3 earlier pregnancies.

Rafique works at a local bakery and was not present at home during the interview.

TS#10

Location: Torai village

Date of interview: 12th April 2016

Main livelihood/ occupation: Housewife (20 years old)

Name of Respondent: **Ms. Nirmi Devi**



Picture 16: Nirmi Devi with her loving mother in law

Nirmi Devi is pampered by both her husband and mother-in-law who is also the ICDS worker of her village. Nirmi Devi got information regarding pregnancy and child birth from the ASHA who visits the ICDS centre regularly and her husband (Mukul Ravidas) who received messages throughout her pregnancy. Her mother-in-law was very understanding when she vomited through the 9 months and would not allow her to do any work. Her husband too ensured that she had all the comfort that he could afford including lots of fruits as she could not retain cereals, rice and pulses.

They were both gifted with a 2.5 kg baby 3 months ago in a nearby government health centre.

ASHA: Ms. Malati Handsa



Project wherein she has learnt the use of technology for greater awareness and several couples have become active participants in the betterment of MNCH in the village

One of the few ASHA raring to go is Ms. Malati Hansda, a tribal, in a conservative and predominantly Muslim village: Babupur. Having single handedly, from 2007, crusaded against superstitious beliefs towards vaccination and birth control she is now enjoying the fruits of her labour. Armed with new technology and revamped health messages, she is a much sought after woman in the village post this Project. Men who had earlier threatened her with dire consequences asked her to explain some unclear 3M messages, and women who earlier avoided her flocked to see videos on her smartphone. She expresses great satisfaction at the turn of events post the

Dulmidanga Village



Picture 17: An evening in Dulmidanga Village

This revenue village has a population of 855 of which 8 couples were registered in the Project. The Sahiya, Urmila Devi (40 years old) was chosen because of her pro-activeness. Amazingly all 8 men heard many of the messages and understood them. Even though they missed a few messages, all of them cared for their wives in a way unparalleled elsewhere ensuring timely treatment, proper nutrition (4 times a day), institutional delivery and exclusive breastfeeding. The ASHA would go house to house and talk animatedly without depending too much on the mobile application or her flip chart.

Her smartphone is still working and she is very interested to show the videos to other women in her village.

List of Acronyms

ASHA:	Accredited Social Health Expert(s)
ANM:	Auxiliary Nurse Midwife
BTT:	Block Trainer Team (ASHA Programme)
CIDA:	Canadian International Development Authority
CS:	Cluster Supervisor
CSP:	Child Survival Project
CHC:	Community Health Centre
CMO:	Chief Medical Office(r)
EFICOR:	Evangelical Fellowship of India Commission on Relief
FGD:	Focus Group Discussion (s)
GP:	<i>Gram Panchayat</i>
HH:	Household (s)
HQ:	Headquarter(s)
HSC:	Health Sub Centre(s)
ICDS:	Integrated Child Development Service (<i>Anganwadi</i>)
IMR	Infant Mortality Rate
IVR:	Interactive Voice Response
MAMA:	Mobile Alliance for Maternal Health
MCSP:	Maternal and Child Survival Project
MMR:	Maternal Mortality Rate
MNCH:	Maternal, Newborn and Child Health
MOIC:	Medical Officer-in-Charge (block level)
NGO:	Non-Government Organization(s)
NMBS:	National Maternity Benefit Scheme
NRHM:	National Rural Health Mission (' <i>ASHA</i> ' etc.)
OBC:	Other Backward Caste(s)
PDS:	Public Distribution System (rice, wheat distributed at subsidized rates)
PHC:	Primary Health Centre
RTF:	Right to Food
SC:	Schedule Caste
ST:	Schedule Tribe
TBA:	Traditional Birth Attendant (<i>Dai</i>)
TOT:	Training of Trainers
TS:	Transformation Story
USG:	Ultrasound Sono-Graphy
WCD:	Women and Child Development

Annexures

Annexure 1: Training Schedule for Staff and ASHA

Training of Trainers Schedule for 18 th and 19 th May, 2015	
Day	Time Allotted
Day 1 - 18th May, 2015	
Goals: To understand what is CommCare and get an overview of how it works on a mobile phone along with detailed instructions on installation, running the app and data entry. An overview of all the modules and forms will also be provided.	
PART 1	10:00 - 13:00
Greetings and Introduction of Project/Roles	10:00-10:15
What is CommCare <ul style="list-style-type: none"> • What is CommCare • How is EFICOR using CommCare • Advantages of CommCare 	10:15-10:30
Mobile Phone Orientation <ul style="list-style-type: none"> • On/Off; Navigation • Orientation of home screen and different locations applicable for this project (i.e. Settings, Applications) • Sound • Back/cancel key • Signal • Charging • GPRS connection symbols • Memory card storage • Camera Navigation within CommCare <ul style="list-style-type: none"> • Open CommCare using Shortcut • Forward/selection/confirmation • Backwards/cancel/clear key • Options key 	10:30 - 11:00
Application and Application Structure <ul style="list-style-type: none"> • Start Screen • How to update CommCare • Introduce modules and purpose. • Introduce forms within each module. • Explain concept of case management (creating cases, modifying/updating cases, and closing cases). Case List and Case detail screens <ul style="list-style-type: none"> • Open a module and view the case list • Discuss the indicators displayed for each record. • Discuss how cases are sorted. • Select a record from the list and review data for this record in case detail screen • Describe purpose of case detail screen and when it will be most useful to use. (i.e. to identify a person, to gather basic information, a quick reference) • How do you go back to the case list? (Press back) 	11:00 - 11:45
Phone maintenance <ul style="list-style-type: none"> • Installing the app • Syncing data with server • Basic troubleshooting - date and time, keyboard, language, user friendly settings, camera, accessing memory card, disable auto-update of apps 	12:00 - 13:00
Typing <ul style="list-style-type: none"> • Open a demo form inside CommCare that shows typing, number entry and date entry • Type a name • Type a reason for home visit • Enter numbers with and without decimals • Enter a date 	13:30 - 14:00
Login and logout <ul style="list-style-type: none"> • Provide individual login IDs 	14:00 - 14:15
Registration form	14:15 - 15:00
Pregnancy visit form	15:15 - 16:00

Day 2 – 19th May, 2015

Goals: Go through each module and form in detail and understand case management, case details and listing along with validations, logic and importance of different forms/questions and workflow. End training with demos of all the forms

PART 1	10:00 - 13:00
Mother postpartum visit	10:00 to 11:00
Baby postpartum visit	11:00 - 11:45
Break	11:45 to 12:00
Child immunization + spill over from morning	12:00 - 13:00
Lunch	13:00 - 13:30
PART 2	13:30 - 16:00
Edit mother and child forms	13:30 - 14:00
Due list, videos	14:00 - 15:00
Break	15:00 - 15:15
Demos and closing	15:15 to 16:00
<ul style="list-style-type: none"> Discuss who will take what session 	

Annexure 2: Questionnaire - Interview Guide for Baseline Assessment

Perceptions of husbands on their role in ensuring their wives maternal health care

Identification	
Section 1 – before going to the village	
Area	Intervention () / Control ()
Subject Number I - (001-115) C - (116-230)	
Village name	
Name of Interviewer	
Interview date-(Date/month/year)	
Name of Supervisor	

Interviewer says: I'd like to ask you some questions about men's role in pregnancy and childbirth. There are no right or wrong answers to these questions; we are just looking to get your opinion. All of your answers will be kept confidential.

- What is your opinion on men's involvement in pregnancy and child birth?
 - Probe: Do men have a role to play in pregnancy and child birth? *If husband says yes, ask: What is men's role? [Record husband's response]*
- A) Do you think women need special care during pregnancy? *If husband says yes, ask: What kinds of care? [Record husband's response]*

If husband answered yes to 2A, ask:

B) Do you feel you have a role to play in your wife's care during her pregnancy? *If husband says yes, ask: What is your role? If no, ask: Why not?*

- A) Where do you think is a safe place for your wife to give birth? *After husband responds ask: Can you explain why this is a safe place? [record husband's response].*

B) Do you feel you have a role to play in your wife's child birth? *If husband says yes, ask: What is your role? If no, ask: Why not? [Record husband's response].*

- A) Do you think women need special care in the time period after giving birth? *If husband says yes, ask: What kinds of care? [Record husband's response]*

If husband answered yes to 4A, ask:

B) Do you feel you have a role to play in your wife's care after giving birth? *If husband says yes, ask: What is your role? If no, ask: Why not?* [Record husband's response]

5. A) What is your opinion on men's role in helping with the newborn baby?
Probe: Do you think men have a role to play? *If husband says yes, ask: What is men's role?* [Record husband's responses]
6. Do men experience any challenges in helping with their wife's pregnancy and birth? *If husband says yes, ask: What kind of challenges?* [Record husband's responses]
7. Do men experience any challenges in helping with the newborn baby? *If husband says yes, ask: What kind of challenges?* [Record husband's responses]

Annexure 3: Baseline and End-line Quantitative Survey (Results Comparison)

Including Notes following end-line assessment (Quantitative)

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March 2016

1. The 3M Project

1.1 Objectives

EFICOR and HealthBridge designed a project titled "3M Project: Men using Mobile Phones to improve Maternal Health" based on the learning from the Pakur MCSP, and based on the use of mobile technology in MNCH. It is a collaborative research project with the following objectives:

- To assess the feasibility and impact of an mHealth intervention targeted to husbands on women's utilization of maternal healthcare in rural India
- To increase capacity of HealthBridge and EFICOR in using mHealth in MNCH interventions

This project was based in Hiranpur block in the district of Pakur in Jharkhand state.

2. Baseline assessments

The following steps were conducted in both intervention and control areas:

- Literate, active ASHA workers were identified in the 50 project villages in Hiranpur block. They were introduced to the project and cellphones given to them. They were oriented over 2 days as to their role in the project, which includes identification of the study couples and support through the pregnancy based on the messages received on their phones.
- 230 couples were identified by the ASHA and trained project staff, 115 in each of the intervention and control areas satisfying the inclusion criteria, of whom 102 were actually available for assessment at baseline.
- 5 data collectors were trained on the use of a questionnaire which was designed to capture information pertaining to the key indicators of MNCH based on project objectives. Over a period of 4 weeks in June-July 2015, they visited each of the identified couples in both intervention and control areas, and administered the questionnaire.
- The data thus collected was entered into EPI INFO version 7.0 and analyzed based on key project indicators.

3. Results

Indicator	Intervention area (%) n=102	Control area (%) n=102	Significance of difference*
A. BACKGROUND CHARACTERISTICS - ASSESSED AT BASELINE ONLY			
Couples whose mother tongue is Hindi	72.6	17.5	Sig, p<0.01
Couples whose mother tongue is Santhali	14.7	49.5	Sig, p<0.01
Mother able to read sentence	64.8	62.5	NS
Father able to read sentence	74.4	78.2	NS
Low socio-economic status (SLI 0-14)	56.7	66.7	NS
First pregnancy	33.3	35.3	NS
Last birth in hospital (for those with children)	64.7	68.2	NS
Approximate current gestation 4 months or less at baseline	62.5	50	NS
Approximate current gestation > 4 months	37.5	50	NS

Indicator	Intervention area (%) n=102	Control area (%) n=102	Significance of difference *
* Sig - significant, NS - Not significant			

B. KNOWLEDGE of husbands regarding Maternal health

Indicator	Intervention area			Control area		
	Baseline n=102	End-line n=104	P value, sig	Baseline n=102	End-line n=103	P value, sig
Percent fathers able to report at least 3 known maternal danger signs during pregnancy	12.6	42.3	<0.001, sig	4.8	26.2	<0.001, sig
Percent fathers able to report at least 3 known maternal danger signs during the postpartum period	5.8	27.9	<0.001, sig	0	14.6	<0.001, sig
Percent fathers able to report at least 3 known newborn danger signs	10.7	34.6	<0.001, sig	2.9	14.5	<0.01, sig
Percent fathers who know that pregnant women need at least four antenatal checks	11.8	49.1	<0.001, sig	7.9	33.9	<0.001, sig

C. SUPPORTIVE ACTIONS by husbands during their wives pregnancy

Indicator	Intervention area			Control area		
	Baseline n=102	End-line n=104	P value, sig	Baseline n=102	End-line n=103	P value, sig
Percent mothers whose husbands encouraged them or provided practical support to attend ante-natal check-up	35.4	65.2	<0.001, sig	22.6	52.9	<0.001, sig
Percent mothers whose husbands encouraged them or provided practical support to take adequate rest	32.3	60.7	<0.001, sig	25.5	47.1	<0.01, sig
Percent mothers whose husbands encouraged them or provided practical support to eat healthy	53.1	85.4	<0.001, sig	61.8	72.4	>0.05, NOT sig

D. MATERNAL HEALTH INDICATORS - ASSESSED AT END-LINE ONLY

Indicator	Intervention area n=104	Control area n=103	P value, sig
Percent mothers who received 4+ ante-natal check-ups	68.3	58.3	>0.05, NOT sig
Percent mothers who consumed 100 iron folic acid tablets	33.7	27.2	>0.05, NOT sig
Percent mothers who gave birth in a health facility.	93.3	62.1	<0.001, sig

ADDITIONAL QUESTIONS OF INTEREST

Q What kinds of preparations can you/did you and your spouse make before the birth of your child?						
Responses	WIFE					
	Intervention			Control		
	Baseline N=101	End-line N=89	P value, sig	Baseline N=102	End-line N=87	P value, sig
Save money	51.5	73.1	<0.05, S	49.0	62.1	>0.05, NS
Decide upon place of delivery	18.8	70.8	<0.001, S	3.0	50.6	<0.001, S
Find blood donor	4.0	5.6	>0.05, NS	0.0	8.0	<0.01, S

Arrange transport	18.0	58.4	<0.001, S	5.9	39.1	<0.001,S
Contact health worker to help with delivery	12.0	65.2	<0.001,S	14.7	46.0	<0.001,S
Arrange with mother/ other relations for assistance	4.0	13.5	<0.05,S	3.0	18.4	<0.001,S
No preparations/ dont know	36.7	1.1	<0.001,S	42.2	5.8	<0.001,S

Q 21. What kinds of preparations can you/did you and your spouse make before the birth of your child?

Responses	HUSBAND					
	Intervention			Control		
	Baseline N=102	End-line N=72	P value, sig	Baseline N=101	End-line N=85	P value, sig
Save money	44.1	70.9	<0.001,S	45.5	62.3	<0.05,S
Decide upon place of delivery	16.7	70.9	<0.001,S	3.0	48.2	<0.001,S
Find blood donor	3.0	7.0	>0.05, NS	1.0	5.9	>0.05, NS
Arrange transport	13.9	60.6	<0.001,S	11.9	43.5	<0.001,S
Contact health worker to help with delivery	15.8	59.7	<0.001, S	10.9	34.1	<0.001, S
Arrange with mother/ other relations for assistance	8.8	19.5	<0.05, S	5.9	16.5	<0.05,S
No preparations/ dont know	41.2	2.8	<0.001,S	44.5	9.4	<0.001, S

Q. FOR HUSBANDS - If your wife experienced any of these symptoms either during pregnancy or after delivery, or your child experienced any of these symptoms, what would you do ?

Responses	Intervention			Control		
	Baseline N=102	End-line N=72	P value, sig	Baseline N=101	End-line N=85	P value, sig
Will take them to a hospital	99.0	84.7	<0.001,S	96.0	89.4	>0.05, NS
Will take them to a hospital which I have identified previously	5.9	22.2	<0.01,S	10.9	21.2	>0.05, NS
Will organize a transport to take them to a hospital	14.7	31.9	<0.01,S	11.9	9.4	>0.05,NS
Will organize a transport which I have identified previously to take them to a hospital	3.0	19.4	<0.001,S	3.0	16.5	<0.01,S
Other (specify	1.0	0	>0.05, NS	2.0	0	>0.05, NS

4. Notes on results

- The numbers of couples actually interviewed for whom data was available for analysis were 102 in both areas at baseline and 103/104 at end-line in the control and intervention areas respectively.
- The Intervention and control areas differed significantly with respect to mother tongue, with a significantly larger proportion of control couples speaking Santhali as compared to the intervention couples, where a greater proportion spoke Hindi. But the rest of the baseline characteristics such as socio economic status, ability to read, place of last childbirth and period of current gestation were similar. This should ensure comparability of the areas.
- The baseline levels of indicators which measure KNOWLEDGE of husbands and SUPPORTIVE ACTIONS of husbands were generally higher in the Intervention area compared to control at baseline and levels of knowledge were poor in both areas.
- Following the end-line assessment, the following broad observations are made:
 - Levels of KNOWLEDGE among husbands regarding key maternal health issues has significantly raised in both intervention and control areas between baseline and end-line assessments. The absolute quantum of increase (in

percentage points) is more in the intervention areas.

- **SUPPORTIVE ACTIONS** by husbands during their wives' pregnancy has also increased significantly in all three domains of support for checkups, for taking rest and for nutrition in the intervention area.

There has been a rise in the control area as well, except in the case of support for nutrition, where there has been no significant change in the control area.

Again, the quantum of change in absolute percentage points is higher in the intervention area as compared with the control area.

- Levels of key **MATERNAL HEALTH INDICATORS** - adequate antenatal checks, adequate IFA supplementation and institutional delivery are all higher in the intervention area as compared with control of which the difference in institutional delivery rates reaches statistical significance.

The absence of baseline figures for comparison with respect to these indicators makes it difficult to attribute this change to the intervention itself, but the rise in the other indicator levels with respect to baseline values would suggest that it is possible.

- The levels of indicators with respect to birth preparedness are also significantly higher at end-line with respect to most aspects of preparedness, in both areas. A certain level of increase would be deemed "expected" since the question at end-line referred to actual preparations made, while it probed intent at baseline. Again, the quantum of change at end-line is more (in absolute percentage points) in the intervention area than in the control area.

Interestingly, the proportion of mothers/fathers who say they "don't know" about birth preparedness sharply decreases at end-line, in alignment with the earlier suggestion that this referred to actual preparedness more than intent.

- The proportion of husbands who take specific action following recognition of danger signs shows an increase in both areas between baseline and end-line assessments. This difference is significantly higher in the intervention area as compared with control with respect to taking the wife to hospital and using transport, previously identified or otherwise.

On the whole, it would appear that the use of mobile telephonic messages with the ASHAs has worked in both areas. Additional intervention with husbands has seen a rise in all levels of indicators, and the difference in the quantum of difference between intervention and control areas probably reflects this added input.

Annexure 4: List of ASHA in the Project

Sl.	ASHA	Area
1	ANITA KISKU	Control
2	BABY KISKU	
3	FULKUMARI	
4	BAIJANTI DEVI	
5	BASANTI MURMU	
6	FULMUNI MURMU	
7	JAYANTI DEVI	
8	KANIKA MANDAL	
9	KARMELA TUDU	
10	KARUNA DEVI	
11	MAIDE KISKU	
12	MALOTI MARANDI	
13	MANJU DEVI	
14	MARIAM HANSDA	
15	MARTINA HANSDA	
16	MINA DEVI	
17	PARBATI PAHARIN	
18	PHUL SOREN	
19	REKHA DEVI	
20	SAHIDA BIBI	
21	SALOMI MURMU	
22	SNEHA SHALINI MARANDI	
23	SONAM PAHARIN	
24	SULEKHA DEVI	
25	UMA DEVI	

26	ALPANA DEVI
27	AMITA DEVI
28	ASBUN NISHA
29	BABLI MARANDI
30	BABY DEVI
31	BULBUL DEVI
32	CECILIA SOREN
33	KALPANA DEVI
34	MALTI HANSDA
35	MANJU SOREN
36	MANORAMA DEVI
37	MARSHILA BASKEY
38	MAYNA DEVI
39	MIRA DEVI
40	MUNGLI HANSDA
41	PRATIBHA DEVI
42	PUSHPA HEMBROM
43	PUTUL DEVI
44	RINA DEVI
45	SALOMI HEMBROM
46	SHIKHA SAHA
47	SITARA PRAVIN
48	SOMA CHAR
49	SUSHANTI TUDU
50	URMILA DEVI

Intervention

Annexure 5: Registration details of 115 couples in 25 Intervention Villages

Registration details of 115 couples in Intervention Area (Details of Men for receiving 3M messages)							
Sl.	Village	Wife	LMP	Husband	Mob. No.	Preferred time	Preferred Language
1	Mohanpur	Khusbu Devi	06-04-2015	Siv Ji Bhagat	9546931848	7:30 PM	Hindi
2	Babupur	Ajiban Bibi	08-03-2015	Islam Ansari	9801488652	6:15 PM	Hindi
3	Babupur	Sairun Bibi	02-04-2015	Neshad Momin	9801488652	6:15 PM	Hindi
4	Babupur	Saifun Bibi	08-03-2015	sarif Momin	8674969395	6:15 PM	Hindi
5	Babupur	Saira Bibi	03-03-2015	Rafiq Momin	8674969395	6:15 PM	Hindi
6	Babupur	Rekha Devi		Nirmal Ravidas	7250556384	7:00 PM	Bengali
7	Paderkola	Lilibiti Hembrom	06-03-2015	Jogen Tudu	8294679264	6:00 PM	Santhali
8	Paderkola	Maidi Hembrom	10-03-2015	Jetha Hansda	9135189286	7:00 PM	Santhali
9	Mohanpur	Rejuana Bibi	28-05-2015	Mubarak Ansari	7890392447	10:00 PM	Hindi
10	Mohanpur	Sabera Bibi	12-03-2015	Riyaz Ansari	9523136906	10:00 PM	Hindi
11	Mohanpur	Anjiman Bibi	08-03-2015	Anwar Ansari	9661329405	7:00 PM	Hindi
12	Mohanpur	Chandni Devi	10-05-2015	Ranjit Mahto	8877509336	3:00 PM	Hindi
13	Mohanpur	Remun Bibi	02-04-2015	Kabjur Ansari	8404896571	5:00 PM	Hindi
14	Dhopahari	Guria Devi	04-03-2015	Gopal Yadav	8809948187	7:00 PM	Hindi
15	Dhopahari	Mina Devi	08-03-2015	Naresh Saha	7765067991	7:00 PM	Hindi
16	Dhopahari	Shila Devi	09-04-2015	Mahavir Yadav	9905454732	7:00 PM	Hindi
17	Dhopahari	Nilam Devi	02-03-2015	Manoj Saha	7061051604	8:00 AM	Hindi
18	Dhopahari	Mina Devi	08-03-2015	Ajay Yadav	8434164338	7:00 PM	Hindi
19	Hiranpur Khas	Mira Devi	15-03-2015	Dharmendra Mandal	7870897207	6:00 AM	Bengali
20	Hiranpur Khas	Angoora Devi	30-04-2015	Ajay Kumar Mandal	9931149615	2:30 PM	Bengali
21	Hiranpur Khas	Tumpa Devi	08-04-2015	Ujjwal Mandal	9504141912	2:00 PM	Bengali
22	Hiranpur Khas	Salma Bibi	15-04-2015	Sikander Seikh	9661702097	8:00 PM	Bengali
23	Hiranpur Khas	Hasina Bibi	22-03-2015	Sahjad Seikh	8409810602	8:00 PM	Bengali
24	Hiranpur Khas	Samida Bibi	22-04-2015	Askarul Seikh	7070649990	8:00 PM	Bengali
25	Hathkathi	Chinta Devi	20-03-2015	Pawan Sharma	7050775994	1:30 PM	Hindi
26	Hathkathi	Nashima Bibi	15-03-2015	Md. Chand Ansari	8409269484	2:00 PM	Hindi
27	Hathkathi	Gulesha Bibi	08-03-2015	Mubarak Ansari	7250839023	7:00 PM	Hindi
28	Hathkathi	Laxshmi Devi	23-03-2015	Dinesh Yadav	9122814386	12:30 PM	Hindi
29	Hathkathi	Sefali Devi	02-03-2015	Vibhisan Turi	7793838485	8:00 PM	Hindi
30	Hathkathi	Sushila Devi	25-04-2015	Mantu Pandit	7782066302	1:00 PM	Hindi
31	Hathkathi	Rabia Bibi	25-02-2015	Samsul Ansari	8271927429	7:00 PM	Hindi
32	Hathkathi	Mithu Devi	13-03-2015	Arvind Kumar Mandal	9521779602	7:00 PM	Hindi
33	Hathkathi	Madhwi Devi	15-03-2015	Dilip Bhandari	7654413318	9:00 PM	Hindi
34	Hathkathi	Pallawi Devi	22-05-2015	Nilu Mandal	8540872408	9:00 PM	Hindi
35	Hathkathi	Sushila Hansda	30-03-2015	Yusuf Ansari	8409133095	9:00 PM	Hindi
36	Hathkathi	Rekha Marandi	14-03-2015	Sushil Soren	9661345292	7:00 PM	Santhali
37	Hathkathi	Saraswati Devi	12-03-2015	Bablu Mirdha	8002199135	7:00 PM	Hindi
38	Hathkathi	Taruna Devi	05-05-2015	Chiranjivi Kumar	9572183466	9:00 PM	Hindi
39	Hathkathi	Savitri Devi	14-03-2015	Bhagirath Saha	7070087023	8:00 PM	Hindi
40	Ghagharjani	Baha Tudu	10-05-2015	Sunil Murmu	8294882715	7:00 PM	Santhali
41	Ghagharjani	Budin Kisku	15-04-2015	Choken Hembrom	9955028070	7:00 PM	Santhali

42	Ghagharjani	Hoponmai Soren	07-04-2015	Subhan Hembrom	9771611802	8:00 PM	Santhali
43	Ghagharjani	Bitimai Tudu	15-04-2015	Pradhan Murmu	8434852878	7:30 PM	Santhali
44	Hathkathi	Chramuni Devi	02-05-2015	Suresh Mirdha	8409527584	8:00 PM	Hindi
45	Hathkathi	Farida Bibi	21-03-2015	Abbas Ansari	9776380131	8:00 PM	Hindi
46	Hathkathi	Gulesta Bibi	11-04-2015	Salman Ansari	7546829221	8:00 PM	Hindi
47	Govindpur	Jaweda Bibi	15-05-2015	Ishak Ansari	7766018677	5:00 PM	Hindi
48	Govindpur	Anjana Devi		Kamdev Pandit	7277452521	8:00 PM	Hindi
49	Govindpur	Samiran Bibi	05-04-2015	Samajul Ansari	9135189368	7:00 PM	Hindi
50	Govindpur	Basuran Bibi	04-03-2015	Islam Ansari	9955810443	7:00 PM	Hindi
51	Govindpur	Khateza Bibi	06-04-2015	Tazmul Ansari	8820032035	8:00 PM	Hindi
52	Govindpur	Janani Devi	20-04-2015	Gunju Bakti	7542292715	7:00 PM	Hindi
53	Govindpur	Nuresha Bibi	10-05-2015	Ramjan Momin	8100709532	8:00 PM	Hindi
54	Govindpur	Nurjahan Bibi	12-04-2015	Kabir Ansari	8145930106	7:00 PM	Hindi
55	Govindpur	Tabasun	20-04-2015	Razaul Ansari	7059584601	7:00 PM	Hindi
56	Govindpur	Esha Bibi	16-04-2015	Nashir Ansari	8434852726	7:00 PM	Hindi
57	Govindpur	Sulochana Devi	13-05-2015	Sanjay Thakur	9661334113	7:00 PM	Hindi
58	Lakhanpur	Sukhiya Devi	07-03-2015	Bipin Saha	7759027726	7:00 PM	Hindi
59	Lakhanpur	Kariman Bibi	17-02-2015	Muntaj Ansari	8087413005	8:00 PM	Hindi
60	Lakhanpur	Sita Devi	14-03-2015	Naresh Saha	9572383959	7:00 PM	Hindi
61	Chawkidhab	Jayanti devi	28-04-2015	Ashok Saha	7352344821	8:00 PM	Hindi
62	Jambad Harijan Toli	Lakhimuni Devi	13-02-2015	Dhananjay Rai	9525388451	7:00 PM	Hindi
63	Jambad Harijan	Sarita Devi	04-03-2015	Amal Maraiya	7763981497	8:00 PM	Hindi
64	Jambad Khudu Tola	Saburan Bibi	13-03-2015	Sahjad Ansari	9594300459	10:00 PM	Hindi
65	Gauripur	Sangeeta Devi	19-04-2015	Parkash Raut	8271298422	7:00 PM	Hindi
66	Gauripur	Ramdulari Devi	20-04-2015	Bablu Den	7765035263	5:00 PM	Bengali
67	Nayagram	Sushanti Marandi	14-04-2015	Mantu Soren	7050048509	5:00 PM	Santhali
68	Nayagram	Sushila Hansda	07-04-2015	Pardan Kisku	7070103143	3:00 PM	Santhali
69	Dulmidanga	Lila Mitra	08-04-2015	Prabhakar Mitra	7070697843	8:00 PM	Bengali
70	Dulmidanga	Sarita Kumari	11-03-2015	Sardendu Sekhar	7765041888	8:00 PM	Hindi
71	Bipatpur	Julekha Bibi	10-03-2015	Md. Samsul haq	8935854460	6:00 PM	Hindi
72	Bipatpur	Sahnaj Bibi	10-03-2015	Md. Sabbir	9421356008	6:00 PM	Hindi
73	Bipatpur	Khatiza Bibi	03-03-2015	Md. Wakil	9122780224	6:00 PM	Hindi
74	Bipatpur	Sabiran Bibi	04-03-2015	Md. Samim Akhtar	9631949828	6:15 PM	Hindi
75	Bipatpur	Saba Parvin	15-03-2015	Md. Iqbal	7050922808	6:00 PM	Hindi
76	Manidanga	Elijabed Tudu	30-02-2015	Jetha Murmu	9939482626	6:00 PM	Santhali
77	Manidanga	Sunita Soren	08-03-2015	Kalam Hansda	7250639411	6:00 PM	Santhali
78	Manidanga	Rajmuni Turi	12-03-2015	Kamal Turi	8674896477	6:00 PM	Bengali
79	Torai	Nilmi Devi	20-03-2015	Nakul Ravidas	8757531175	6:00 PM	Hindi
80	Torai	Kajal Devi	10-03-2015	Gour Chand Ravidas	8864097679	6:15 PM	Hindi
81	Torai	Abita Devi	11-04-2015	Raju Mandal	9102498591	6:00 PM	Hindi
82	Dhopahari	Kalpana Devi	20-04-2015	Bablu Yadav	7763518694	7:00 PM	Hindi
83	Deva Para	Mera Devi	07-04-2015	Bholanath Saha	7549098443	6:15 PM	Hindi
84	Deva Para	Yasoda Devi	13-04-2015	Santosh Saha	8298312437	6:15 PM	Hindi
85	Mohanpur	Mensuri Soren	10-03-2015	Kamaldev Hansda	9771987002	6:15 PM	Santhali
86	Dulmidanga	Gayatri Devi	21-04-2015	Prabhas Chandra De	9153048276	10:00 PM	Bengali

87	Dulmidanga	Titu Modak	16-04-2015	Nand Gopal Bhadra	7765035244	9:00 PM	Bengali
88	Dulmidanga	Ramdhan Murmu	03-05-2015	Lal Hembrom	9674579816	8:00 PM	Santhali
89	Dulmidanga	Dulali Devi	05-04-2015	Srikant Rai	7091482026	7:00 PM	Bengali
90	Dulmidanga	Chunki Pandey	11-03-2015	Somen Pandey	8051169534	7:00 PM	Hindi
91	Dulmidanga	Bharti Devi	25-03-2015	Vibhisan Saha	9006553910	8:00 PM	Hindi
92	Bartalla	Samsu Nehar Bibi	20-03-2015	Sam Md. Ansari	8900597329	10:00 PM	Hindi
93	Bartalla	Begampara	20-07-2015	Ebrahim Ansari	9939125158	7:00 PM	Hindi
94	Bartalla	Mehrun Nesha Bibi	26-05-2015	Ekramul Ansari	8676095353	8:00 PM	Hindi
95	Bartalla	Rukhsana Bibi	16-04-2015	Md. Azamtulla Ansari	9572883954	8:00 PM	Hindi
96	Chawkidhab	Gunjo Devi	10-04-2015	Laddu Saha	7563871579	7:00 PM	Hindi
97	Chawkidhab	Dibi Murmu	07-03-2015	Ramcharan Hembrom	7250549958	7:00 PM	Santhali
98	Chawkidhab	Sonamuni Kisku	06-04-2015	Mahesh Marandi	9771979538	7:00 PM	Santhali
99	Chawkidhab	Rekha Devi	04-05-2015	Kamlesh Saha	9135189372	8:00 PM	Hindi
100	Dhowadanga	Arjan Bibi	22-04-2015	Sahjaha Ansari	9093088771	8:00 PM	Hindi
101	Dhowadanga	Rukia Bibi	20-03-2015	Safatul Ansari	8961896814	5:00 PM	Hindi
102	Dhowadanga	Beuty Devi	15-04-2015	Gopal Karmkar	9507133618	7:00 PM	Hindi
103	Dhowadanga	Sahina Bibi	16-02-2015	Rafiq Ansari	8691972259	8:00 PM	Hindi
104	Dhowadanga	Hemanti Devi	13-04-2015	Karigar Karmkar	9661667760	8:00 PM	Hindi
105	Rampur - I	Sarita Devi	26-04-2015	Dhulen Ravidas	9534313750	8:00 PM	Hindi
106	Rampur -I	Chanchala Devi	12-03-2015	Munna Ravidas	8292400420	7:00 PM	Hindi
107	Rampur -I	Hemanti Devi	10-03-2015	Panchanand Pandit	8521679915	8:00 PM	Hindi
108	Jambad (Khudu Tola)	Asera Bibi	12-03-2015	Ali Hussain Ansari	7764034731	6:00 PM	Hindi
109	Jambad (Khudu Tola)	Firoza Bibi	20-03-2015	Razzak Mia	7549206304	7:00 PM	Hindi
110	Jambad	Lalita Devi	04-04-2015	Gangaram Maraiya	7549189292	7:00 PM	Hindi
111	Sunderpur - II	Lili Bakti	18-03-2015	Rajesh Bakti	7766018557	7:00pm	Bengali
112	Sunderpur - II	Ramia Devi	15-05-2015	Pachu Yadav	9122950728	8:00 PM	Hindi
113	Sunderpur - II	Mridulla Devi	22-05-2015	Rajkumar De	7061043045	9:00 PM	Bengali
114	Lakhanpur -II	Najmul Bibi	20-03-2015	Sajaul Ansari	8873660034	7:00 PM	Hindi
115	Lakhanpur -II	Priyanka Devi	18-02-2015	Krishna Bhagat	9661603205	8:00 PM	Hindi