

Implementation of CycleTel Family Advice: an SMS-based service to provide family planning and fertility awareness information in India

Nicki Ashcroft¹, Victoria Shelus¹, Himanshu Garg², Courtney McLarnon-Silk¹, Victoria H. Jennings¹

¹Institute for Reproductive Health, Georgetown University, Washington, DC, USA; ²Institute for Reproductive Health, New Delhi, India

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Correspondence to: Victoria H. Jennings. Institute for Reproductive Health, Georgetown University, 1825 Connecticut Avenue NW, Suite 699, Washington, DC 20009, USA. Email: jenningsv@georgetown.edu.

Background: CycleTel Family Advice (CFA), an SMS-based service designed to improve knowledge of fertility and family planning (FP), was delivered to over 100,000 people in India from April to August 2015. The goal of CFA was to increase knowledge on a range of reproductive health topics, e.g., the menstrual cycle, fertility, and FP, and to increase positive perceptions and use of FP. This paper focuses on the best practices and operational challenges for providing an SMS service based on the implementation experience of CFA.

Methods: The implementation process for CFA was well documented, specifically program design, commercial partnerships, formative research, design of messages, and recruitment of users. The impact of CFA on knowledge, attitudes, and behaviors was assessed through phone surveys before and after message delivery.

Results: Programmatic data and phone surveys resulted in several operational findings, particularly in the areas of user behavior, partnership management, and mHealth research. While there were improvements in knowledge, there were not significant changes in FP use and couple communication.

Conclusions: The intervention yielded insights into designing an mHealth intervention as well as the opportunities and challenges of implementing a stand-alone SMS-based service with a broad audience. Lessons learned were that (I) SMS-based interventions, without other supporting systems, may not lead to high user engagement or behavior change; (II) partnerships with private sector technical platforms can help overcome the difficult problem of marketing and outreach, but they bring limitations to user interface and dependencies on a commercial structure; (III) collecting demographic data required to provide tailored content may be a barrier to user acquisition; and (IV) while phone surveys are useful for evaluation of mHealth interventions, reaching users is challenging and response rates are low.

Keywords: Family planning (FP); fertility; India; telemedicine; text messaging

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Introduction

CycleTel Family Advice (CFA) was an SMS-based (short messaging system-based) intervention designed to increase knowledge of fertility and family planning (FP), positive attitudes about FP, and use of FP in India. It was developed by the Institute for Reproductive Health at Georgetown University (IRH) with support from the United States Agency for International Development (USAID) through the Fertility Awareness for Community Transformation (FACT) project and from the United Nations Foundation through the Innovation Working Group Catalytic mHealth grants program.

A total of 222 million women in the developing world want to avoid pregnancy but are not currently using FP including nearly 36 million women in India (1,2). The main reasons cited for not using contraception by women in northern India are inadequate knowledge of methods and fear of side-effects (3). Improving knowledge of fertility and FP methods may increase positive perceptions and use of FP.

In India, FP and fertility are taboo topics in many communities, and men and women have few trusted and accessible sources of information (4,5). Previous research conducted by IRH in India on mHealth solutions indicated that people wanted information about fertility, pregnancy risk, healthy timing and spacing of pregnancies, and FP options, and were interested in receiving this information through their mobile phones (6).

Mobile phone use is growing rapidly across India, with over 1 billion connections and a mobile penetration rate of 76%, suggesting that mobile phones are in wide use and could provide a new pathway for information sharing (7). SMS is a discreet channel, where people can receive information privately and directly.

This paper focuses on the best practices and operational challenges for providing an SMS service based on the implementation experience of CFA. Programmatic data and surveys resulted in several operational findings, particularly in the areas of user behavior, partnership management, and mHealth research.

Methods

CFA program design

IRH created CFA in 2013 to increase knowledge of fertility and FP related topics via a proprietary SMS-based platform. CFA was available in four languages (Hindi, Punjabi, Oriya, and English) to subscribers from seven states in India (Uttar

Pradesh East and West, Haryana, Delhi, Himachal Pradesh, Punjab, and Orissa). The free service provided information on a range of sexual and reproductive health-related topics such as the menstrual cycle, female and male fertility, FP options, and couple communication through a series of 65 text messages. Users were segmented into seven groups to receive messages targeted by age, sex, and marital status:

- ❖ Unmarried women, ages 18–34;
- ❖ Married women, ages 18–24;
- ❖ Married women, ages 25–34;
- ❖ Women, ages 35+;
- ❖ Unmarried men, ages 18–34;
- ❖ Married men, ages 18–34;
- ❖ Men, ages 35+.

CFA was designed to take advantage of the rapid growth of mobile phone use in India and the popularity of value-add services for education and entertainment. The text message format, supported by a toll-free number for additional information, maintained users' privacy by allowing them to access information on their phone. They could read the messages at their convenience, store them for later use, and show them to friends or family (6). The CFA design adhered to principles of behavior change communication for mHealth interventions: we pretested messaging, segmented the audience by demographics, used a narrative format with relatable characters to increase user engagement, and sent multiple messages over time which contained a logical topical progression (8).

Commercial partnership

Because reaching potential users via mobile phones can be difficult and time-consuming as a standalone intervention, IRH identified and established a partnership with HCL Services Ltd. (HCL), the firm that oversaw, managed, and implemented the Nokia Life information platform application in India. The Nokia Life platform, re-branded as the Life Tools application in 2015, was available on selected Nokia handsets and provided information on agriculture, health, and education to over 50 million users across India. Through the HCL partnership, CFA was hosted as an opt-in app on the Life Tools platform. Although the Life Tools platform is based on standard SMS, messages are sent in a proprietary format and were thus found in a separate inbox on user's phones.

This partnership brought several benefits. By integrating the service into a well-known, trusted brand, CFA was able to gain a legitimacy not available to a new, independent service. In addition, Life Tools provided access to an

extensive database of potential users who had previously accessed health information through a mobile phone. The Life Tools platform also had capabilities in twelve different languages. Since many Indian languages use different character sets, this capability was markedly valuable.

While previous services on the Life Tools platform have required only a simple registration process, to segment CFA users by age, sex, and marital status, the Life Tools platform for CFA was extended to include three registration questions. No other personal information was collected.

Formative research

The CFA service and messages were piloted with 25,000 Life Tools users from January to April 2014, to test the messages, understand their effectiveness for creating demand for FP, and pilot the operations of the call centers, technology servers, and delivery reporting. After the pilot, messages were further validated through several focus groups. This process allowed the team to gather user feedback on the service to help refine fertility awareness messages, and begin to assess opportunities and constraints in engaging users.

During the pilot, users received four messages a week for five weeks in English, Hindi, Tamil, and Marathi. A short, six-question survey instrument captured general customer feedback on the fertility awareness messages and the CFA service from 502 users. Ninety-seven percent of survey respondents recalled reading the messages, and 94% indicated that they learned something. Learning was uniformly high among both men and women, and users in urban and rural areas.

While respondents said they learned something from CFA, only 68% found the messages helpful. The survey did not investigate how users were defining helpful; but for many, it appears to mean relevant to their lives regarding taking action on the fertility awareness knowledge. The top reasons cited for the service being unhelpful were related to relevance: users said that they were unmarried (reflecting a strong social norm in India against girls' having sex before marriage), using another method, too old or too young, or pregnant. This suggests the importance of segmenting the target audience and providing information appropriate to each segment. This finding was taken into consideration when developing the intervention further.

Design of messages

Messages were written in SMS format and were thus limited

to 160 characters. Within those limitations, each message was written to either impart knowledge, change attitudes towards FP or couple communication, or encourage healthy behaviors.

Key lessons from the pilot led to the redesign of messages. Initial messages were purely factual, with no narrative structure or content. Even though the messaging was designed in a sequential manner, many respondents reported reading the messages out of order, or only reading a few messages rather than the whole set. As a result, a narrative arc including characters was added to increase user engagement and interest, and encourage sequential reading, but each message was still written so that it would be comprehensible if read independently.

The pilot test also indicated that targeting the fertility awareness and FP messages was important. Generic, non-targeted messages, and messages that seemed targeted to a different age or sex were not well received. Additionally, users' most frequent suggestion was for more advanced, detailed, or specific content. As a result of the feedback, the service was expanded to additional messages (65 instead of 20) over a longer time frame (16 weeks instead of five) and targeted by age, sex, and marital status.

A socio-ecological approach was used to design messages to address the variety of barriers to FP use and healthy timing and spacing of pregnancies. Messages emphasized individual, family, and peer networks. Both primary and influencing audiences were considered and targeted (4). Messages were developed to address individual knowledge, skills, and self-efficacy, and every segmented sequence included messages on peer influence, partner and family influence, and spousal communication. Each segment's messages emphasized different aspects of behavior change. For example, while messages sent to women contained information on personal fertility signs such as the presence of secretions, messages directed at men placed more emphasis on the importance of seeking out reliable information, partner communication, and counteracting taboos. Messages to older age groups emphasized their importance as positive role models.

Examples of targeted messages are shown in *Table 1*, which contains the first four weeks of messages for young married men and women. *Table 2* demonstrates how selected messages can be categorized by purpose; messages were designed to address knowledge, attitudes, or behavior. These messages were designed for unmarried women, encouraging them to speak to their future husbands about FP and the importance of child spacing.

Table 1 Example CFA messages for young married men and women for weeks 1–4

Week	#	18–24 married women	18–35 married men
Week 1	1	You are reading Puja's story. She recently got married and lives with her in-laws. She is trying to understand her new family. Puja wants to finish school, but is afraid to say so.	Alok and his wife have moved to the city. Ajit, his childhood friend, got him a job in the factory where he works. Alok hopes that like Ajit, he will be able to have a good life.
	2	Indu is Puja's elder sister-in-law. One day, Indu talks of her education. Indu: I had just started college when I got married. But I was happy to complete my course from the house.	Alok: In such a short time, how have you and your wife been able to settle so well in the city? Ajit: I have 5 simple rules. Keep reading to know the 5 rules of success.
	3	Puja: That is nice you finished your education. I also want to complete my course but there is so much talk that I should have a child. I am unsure whether I can complete it.	Ajit: Rule 1. "Plan your life together". My wife and I discuss all matters, especially ones related to the future of our family. We make decisions together.
	4	Indu: You are so young, Puja! You are only 19. You should wait before you have a child. Puja: Wait? How can I wait before having child? Indu: Haven't you heard of family planning?	Ajit: When we got married, there was pressure to have a child immediately. When my wife and I discussed, we realized we both wanted to wait. I helped her tackle family pressure.
Week 2	5	Puja looks unsure. Indu: Family planning means having children at the right time. You can plan when you want to have children by using one of many family planning methods.	Ajit: Since we delayed our first child, my wife was older when she gave birth. She and baby were healthy. If a woman has a child before 18 years old, it is bad for both of them.
	6	Indu: Women can get pregnant only on a few days every month. These days are called unsafe days. There is no change in a man's ability to get a woman pregnant over a month.	Ajit: Alok, you and your wife should discuss when you want to have children and plan accordingly. There are several effective family planning methods available.
	7	Puja: How can I find out which days I can get pregnant? Indu: It depends on your menstrual cycle. Puja: You mean the monthly bleeding? Indu: No, monthly bleeding is called a period.	Alok: Did you use a family planning method? Ajit: Yes. There are many safe and effective methods that either a man or woman can adopt. Speak to a doctor to know more.
	8	Puja: What is the difference between a period and a menstrual cycle? Indu: Periods are the days a girl has blood flowing. Menstrual cycle is the time between 2 periods.	Ajit: Rule 2. "Always seek the right information". You must speak with a doctor to ensure your knowledge of family planning is right. I will tell Rules 3–5 after your doctor's visit.
Week 3	9	CycleTel Humsafar, a family planning method on your phone, presents Puja's story. You will receive SMS of her story for 4 months. Call us at 180018008000 toll-free for questions.	CycleTel Humsafar, a family planning method on your phone, presents Ajit's story. You will receive SMS of his story for 4 months. Call 180018008000 toll-free for any questions.
	10	Indu: When did your last period start? Puja: On the 22nd. Indu: So when will you have your next period? Puja: Maybe around the same time next month, or maybe a day or two earlier.	Alok asks his wife: When do you want to have children? Alok's wife: I want to wait, I am only 17 years old. Alok: I agree. We will visit a doctor to get advice.
	11	Indu: To calculate the menstrual cycle, count from the first day of your period to the day before your next period starts. It is called a cycle because periods repeat every month.	Alok and his wife visit the doctor the next day. Doctor: It is a wise decision to delay birth. Having children before a woman is 18 is bad for both mother and child.
	12	Puja: Menstrual cycle is calculated from the first day of period. Indu: It does not matter how many days your period lasts. Your cycle is always calculated from the first day.	Doctor: To delay pregnancy, you can use temporary methods such as condoms, family planning pills or injections, an IUD called Copper T, or CycleTel Humsafar.

Table 1 (continued)

Table 1 (*continued*)

Week	#	18–24 married women	18–35 married men
Week 4	13	Puja: So if blood started flowing on the 5th this month, then the first day of my menstrual cycle this month is 5th. Indu: That is correct. Puja: I did not know this!	Doctor: Temporary methods mean a couple can have children when they stop the method. Permanent methods like sterilization mean they can never have more children.
	14	Indu: What is the last day of your menstrual cycle? Puja: The day before my periods start next. Indu: That is correct. The gap between 2 periods is the menstrual cycle.	Alok: What is CycleTel Humsafar? Doctor: CycleTel Humsafar identifies days women can get pregnant based on her menstrual cycle. Alok, do you know about the menstrual cycle?
	15	Puja: If my period starts on 5th Jan, and my next period starts on 2nd Feb, the first day of my cycle is 5th Jan and last day is 1st Feb. Length of my menstrual cycle is 28 days.	Doctor: The menstrual cycle is the time between two periods. Alok's wife: Periods are days on which bleeding happens? Doctor: Yes, they are also called MC, date, or monthly.
	16	Puja: What is the right cycle length? Indu: There is no right cycle length, but for most women the cycle is about one month long, between 26–32 days. It can be shorter or longer.	Doctor: Day 1 of the menstrual cycle is the first day of a period. The last day of the cycle is the day before periods start again. For most women, this is 26–32 days long.

CFA, CycleTel Family Advice.

Table 2 Example CFA messages for unmarried women ages 18–35 categorized by purpose

Knowledge messages

Abha: Periods are the days a girl has blood flowing. Neha: Ah yes I call that my MC. Abha: Yes, other names for periods are menstruation, monthly bleeding and MC.

Abha: The time between two periods is called a menstrual cycle. It is called a cycle because periods repeat after a fixed time.

Doctor: Temporary methods mean a couple can have children when they stop the method. Permanent methods like sterilization mean they can never have more children.

Doctor: To delay pregnancy, one can use temporary methods such as condoms, family planning pills, injections, IUD which is also called Copper T, or CycleTel Humsafar.

Amit and his wife visit the doctor the next day. Doctor: It is a wise decision to delay pregnancy. Having a child before a woman is 18 is not good for both mother and child.

Attitude messages

Ajit: Rule 1. “Plan your life together”. My wife and I discuss all matters, especially ones related to the future of our family. We make decisions together.

Abha: With the right planning, you can have a happy family and fulfill all your dreams. You can decide when starting a family is right for you and your husband.

Abha: The doctor suggested various methods of family planning. My husband and I chose the one that best suited us. There are many options so couples can make a personal choice.

Abha asks: When does a couple need to use family planning methods? Neha: If they want to delay a pregnancy, space births and plan their families. Abha: Very good, you have learned!

Behavior messages

Abha: Family planning is about having children at the right time for you and your husband. To plan, you must seek information now even before marriage.

Neha giggles, but Abha asserts: You must reach out and ask questions. It is very important to have timely information. How will you use this information to help you?

Neha: I will tell my friends. So many of them have had children even before one year of marriage. I will tell my future husband so that we can plan our family together.

Next month, Neha calls Abha. Neha: I marked my periods on a calendar. I know my cycle is 31 days, from the first day of my last period to the day before this period started.

CFA, CycleTel Family Advice.

Recruitment of users

Over a six-week period from April to May 2015 an initial opt-in message was sent to over three million users who had accessed another Life Tools health service in the 30 days prior, thus targeting people who had shown interest in receiving health information via the Life Tools platform. By targeting this population, the intervention could be directed at people who might be contemplating FP use or preparing to make changes in their sexual and reproductive health behavior (9).

Full registration was a multi-step process. Users first responded to the opt-in message to express interest. They were then sent three demographic questions. When all answers were received, they were registered in the system and immediately began receiving messages tailored to their demographic segment. Users received all messages in the language that was set in their Life Tools preferences. Recruitment took place on a rolling basis, so each user received messages on an individual schedule.

Data collection

Survey data was obtained from telephone surveys with CFA users. The study was approved by the Georgetown University Institutional Review Board and the Ethics Committee of the Centre for Operations Research and Training in India. Phone numbers of CFA users were released to interviewers only with explicit consent and in accordance with Indian telecommunications regulations. Informed consent was obtained from all study participants prior to data collection.

A random sample of 305 users were interviewed via phone within a week of service initiation (pre-test), and an independent sample of 117 users were interviewed within two weeks after service completion (post-test). Users were asked questions to assess their knowledge of key fertility awareness concepts, specifically with regard to information about the menstrual cycle, fertile days, male and female fertility, healthy timing and spacing of pregnancy, and post-partum fertility. Other themes included attitudes about FP use, self-efficacy, partner communication, and FP use history.

Fisher's exact test was used to determine whether there was a nonrandom association between CFA use and fertility awareness knowledge and attitudes, as well as behaviors such as couple communication and FP uptake.

Results

User demographics

CFA launched in mid-March 2015, and by April 22, 100,880 users had registered. Users ranged in age from 19 to 86 with a mean age of 32.8 years, and the majority were male (72%). This reflects women's lower access to mobile phones in India, the demographics of the Life Tools service, and the fact that even phones used by women are frequently registered by male relatives. Most users enrolled in the service in English (69.3%) and Hindi (30.3%), although the service was also available in Oriya and Punjabi. The top segmented groups were married men ages 25 to 34 (44.9%), men ages 35 and up (26.6%), married women ages 25 to 34 (16.2%), and married women ages 35 and up (11.7%).

Readership

While most post-test participants (81%) indicated they were satisfied with the service, readership of the messages was low. Nearly half of participants surveyed ($n=117$) read only one to five messages, 9% read none of the messages, and only 14% read more than half of the messages.

Fertility awareness knowledge

There was a significant improvement between the two time points for fertility awareness knowledge for several concepts, however, knowledge still generally remains low (*Table 3*). Knowledge was significantly higher during the post-test (Fisher's exact test P value <0.05) for understanding the menstrual cycle, including knowing the typical cycle length is 26 to 32 days or about a month (62% for the post-test *vs.* 45% for the pre-test), that the first day of the menstrual cycle is the day when a woman's period or bleeding starts (52% *vs.* 35%), and that the last day of the menstrual cycle is the day before the next period starts (8% *vs.* 2%).

While a fairly high and consistent percentage of users knew there are days during the menstrual cycle when a woman can get pregnant (62%), understanding exactly when these fertile days occur was more challenging. However, there was a statistically significant increase in the percentage of users who knew that fertile days are several days halfway between two periods (15% *vs.* 7%).

There were not significant differences in knowledge of male fertility or the return of fertility post-partum. Users

Table 3 Summary of fertility awareness knowledge, behavior, and self-efficacy pre and post-test results for CFA users

Variable	Pre-test (N=305) (%)	Post-test (N=117) (%)	Fisher's exact P value
Fertility awareness knowledge			
Typical length of the menstrual cycle is about a month	45	62	0.001
The first day of the menstrual cycle is the first day of bleeding	35	52	0.002
The last day of the menstrual cycle is the day before the next period begins	2	8	0.019
There are days during the menstrual cycle when a woman can get pregnant	62	62	1.000
The days during the menstrual cycle when a woman can get pregnant occur for several days halfway between two periods	7	15	0.025
A man is able to get a woman pregnant everyday	19	26	0.182
A woman can get pregnant again after she has a baby, even before her period returns	42	39	0.581
Behavior			
Ever used a family planning method	45	50	0.447
Currently using a family planning method	36	32	0.425
Discussed family planning with their partner	82	86	0.471
Self-efficacy and attitudes			
If I want to plan or prevent pregnancy, I should use family planning	86	94	0.027
I am confident I can access a family planning method if I want to plan or prevent a pregnancy.	91	97	0.061
CFA, CycleTel Family Advice.			

with a higher education (*vs.* a primary education) and users who read more than 50 of the messages (*vs.* none) had higher fertility awareness scores in the post-test survey. Sex, age, and participation in both the pre and the post-test survey were not associated with greater knowledge.

Behavior

CFA users were asked about their previous and current FP use and communication with their partner about FP. Reported FP use was low among surveyed users (*Table 3*). Approximately half of the study population had used FP (50% for the post-test *vs.* 45% for the pre-test) previously, with the most commonly-used methods being the pill (13%) and condoms (29–31%). Approximately one-third of survey participants were currently using FP (32% for the post-test *vs.* 36% for the pre-test), with the majority using male condoms (20–21%). Pre and post-test survey results showed that 82% and 86% of users

respectively had initiated discussion with their partner about using FP together to plan or prevent pregnancy. No significant differences were observed in behavior from the pre to the post-test, or by sex or number of messages read.

Self-efficacy and FP attitudes

Users were asked to respond to two statements related to self-efficacy and their attitudes about FP (*Table 3*). Ninety-one percent and 97% of users during the pre and post-test respectively agreed “I am confident that I can access a FP method if I want to plan or prevent a pregnancy”, a difference that was not significant. However, there was a statistically significant difference from the pre to the post-test for users who agreed that “If I want to plan or prevent pregnancy, I should use FP” (86% for the pre-test, and 94% for the post-test). No significant differences were observed by sex or number of messages read.

Discussion

Overall, the CFA intervention resulted in positive changes in fertility awareness knowledge and FP attitudes, but within the time frame of the study, had no significant impact on behaviors such as FP use and couple communication.

mHealth interventions pose unique challenges. Some we were able to overcome. For example, user acquisition can be difficult with stand-alone mobile projects. In response to that difficulty, we partnered with HCL and the Life Tools platform to reach a wide user base. However, partnering with the commercial sector and using an existing platform also impacted the success of the intervention. The primary challenges we faced were usability issues with targeting by demographic, low readership of the messages, difficulties reaching users for evaluation of the service, and the unexpected cessation of the Life Tools platform.

Usability issues with targeting by demographic

Our experience suggests that, while users want targeted information, collecting the information required to provide it may be a barrier to access. To target messages by life stage as requested during formative research, users were asked their birth date, sex, and marital status to register for CFA. This process proved to be a significant barrier to registration. Of the 3 million users who were sent an opt-in message, 17% (500,000 people) initiated registration. Of those 500,000, less than 20% answered all three demographic questions. People who did not answer all three questions were not registered for the service and did not receive CFA messages. Discussion with call center representatives and analysis of data suggest several possible explanations.

Potential registrants may have been unable to enter their birth date because they did not know it. Call center counselors instructed them to put in January 1 and an approximate year, but many dropped out at that question without contacting the call center. It would have been preferable to ask for a birth year or age, but the Life Tools interface did not support that question. It is also possible that people with only a mild interest in the topic may not have been motivated enough to complete the registration process. Each registration question and answer appeared on a different screen and required several steps, an aspect of the Life Tools platform that could not be modified. In addition, while demographic questions appeared on the Life Tools platform in the users' preferred language, the answers to

those questions could only be shown in English. Although messaging was designed to clarify the answer choices, users may have found the English answers a barrier.

Low readership

The low readership of the CFA messages demonstrates that user engagement with the content was low, and may help explain why this service led to increased knowledge but not to behavior change. While we were not able to ask users direct questions about why they did not read the messages, there are several potential explanations. They may not have seen the messages because they were not sent to the recipient's standard SMS inbox; instead, they went to a dedicated, less visible inbox within the Life Tools platform. It is also possible that the person who was primarily in possession of the phone was not the person who had signed up, as it is common for phones in India to be shared among family members.

Challenges of a commercial partnership

The partnership with HCL allowed CFA to reach a wide audience efficiently as the Life Tools platform had an existing base audience of ~50 million people, and over 100,000 users completed registration within a short recruitment period. However, despite those advantages, working with HCL was challenging in several ways.

Lack of monitoring capability

The use of an external partner's platform creates dependencies on their monitoring capabilities. In this case, the HCL system had no way to verify that users were receiving messages. Delivery reports could be requested from a third-party vendor but were difficult to access and only confirmed initial transmission. IRH conducted monitoring with test phones and reviewed the expected versus actual calls to the call center. This process caught numerous instances of technical difficulties, but the ad hoc, hands-on nature of the process, and lack of message verification made it difficult to assess the reliability of the system.

Rigid platform with usability problems

The platform was created for push services with a simple one-step registration, and it was difficult to modify the original form of the platform. That led to substantial usability issues for a more complex service such as CFA.

For example, while demographic questions appeared in the language the user had selected, answers to those questions could only be sent in English. Additionally, Life Tools was set up in a series of folders, one for each service, but a new top level folder could not be created for CFA. The messages appeared in a subfolder which was difficult for users to find. These and other similar issues were discovered during the development process as we tried to adapt an existing platform for a new purpose.

Unexpected platform shutdown and service discontinuation

In June 2015, HCL discontinued their support of the Life Tools platform, which was then shut-down across India. Continuing CFA users were able to receive the full set of 65 messages, but the planned scale-up efforts were not implemented. This shutdown had a devastating impact on the project and was caused by factors outside the control of the project team.

Contacting users for evaluation

Contacting CFA users for the pre and post-test surveys to evaluate the service was challenging. To comply with Indian telecom regulations, each survey participant had to be called twice, once by the Life Tools call center to receive permission to release the phone number to the research team and then again, at a later time, by a separate, IRH-managed call center operator to conduct the survey.

Phones were shared by several people within the household, so it was not always possible to reach the person who had registered for the service. Many users could not be reached at all, suggesting they had either changed their SIM or screened their calls from unknown numbers.

After the correct person had been identified and agreed to speak to an interviewer, the informed consent process took several minutes. Each step in the process had significant attrition; while the surveys were short, users had little motivation to complete 10–15 questions for a service that many had not interacted with frequently.

An additional challenge was the available Life Tools call center representatives. Though trained by IRH on FP topics and user interactions, their prior work was primarily in telecom and sales, so their capacity in sexual and reproductive health was limited. In addition, they were uncomfortable speaking to male callers about reproductive health topics.

Lessons learned and implications for future mHealth projects

Lessons learned from the implementation of CFA in India are relevant for other mHealth interventions.

- (I) SMS-based interventions without other supporting systems may not lead to high user engagement or behavior change.
- (II) Partnerships with technical platforms can help overcome the difficult problem of marketing and outreach, but bring limits to user interface and dependencies on a commercial company.
- (III) Collecting the demographic data required to provide tailored content may be a barrier to user acquisition.
- (IV) While phone surveys are useful for program assessment, reaching users is challenging, and response rates are low.

Conclusions

Operationally, this intervention encountered a variety of challenges in the areas of user experience, conducting telephone research, and partnership management. Creating an engaging user experience using an existing commercial platform for the general public is inherently difficult, particularly when working with technical and call center partners.

IRH's experience demonstrated that partnerships are useful in enabling outreach but can be challenging to navigate and sustain. HCL's user base of over 50 million people provided a low-cost path to user acquisition, allowing the recruitment of 100,000 users in a six week period. However, by working with an existing platform, IRH had to adapt to the constraints of technical systems and user interface associated with the Life Tools platform, even when focus groups and testing uncovered challenges. In addition, IRH had committed heavily to this partnership and designed a research program around the continuation of the platform. When HCL shut down the Life Tools platform after only a few months of implementation, the risks of technical 'lock-in' became apparent.

The results of this intervention support similar work that suggests that informational interventions through low-touch digital means, such as SMS, are not sufficient to change behavior and should be reinforced through supporting interventions, such as multi-channel informational

campaigns or community-wide interventions. While an extended SMS campaign may change knowledge on some topics, user engagement with the content and ultimate impact may be low.

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Footnote

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