

mSakhi: An Interactive Mobile Phone-Based Job Aid for Accredited Social Health Activists (ASHAs)

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Background

With 56,000¹ maternal and 876,000² newborn deaths each year, India accounts for 19% of all maternal and 29% of newborn deaths globally. Accredited social health activists (ASHAs), a new cadre of community health workers (CHWs) instituted as part of India's National Rural Health Mission (NRHM),³ can prevent many of these deaths by helping women and their families recognize maternal and neonatal danger signs and promptly seek care. However, a majority of ASHAs are low-literate village women, and they face significant operational challenges in conducting routine maternal, newborn, and child health (MNCH) activities and in keeping their skills updated. In particular, ASHAs' lack of access to health care information, refresher training, supportive supervision, and user-friendly job aids compromise their ability to contribute to improved maternal and newborn health outcomes.^{4,5}

Existing paper-based job aids include text-heavy reference materials, bulky counseling flipbooks, complex newborn care checklists, and reporting formats that are not suitable for low-literate ASHAs. However, the near ubiquity of mobile phones throughout the developing world, including India, has led to the emergence of mHealth applications that are potentially effective tools for supporting CHWs across a range of activities. In this context, the Manthan Project, funded by the Bill & Melinda Gates Foundation and led by IntraHealth International, developed and tested *mSakhi*, a mobile phone-based multimedia job aid for ASHAs, through two operations research (OR) studies carried out between April 2012 and June 2013 in Bahraich and Jhansi districts. The two studies, which were conducted in collaboration with the Government of Uttar Pradesh (GOUP), compared the feasibility and effectiveness of *mSakhi* against existing paper-based tools using a pre-test/post-test quasi-experimental design and involved a total of 143 ASHAs. (For more details on study design, see Box 1, next page.)

What is mSakhi?

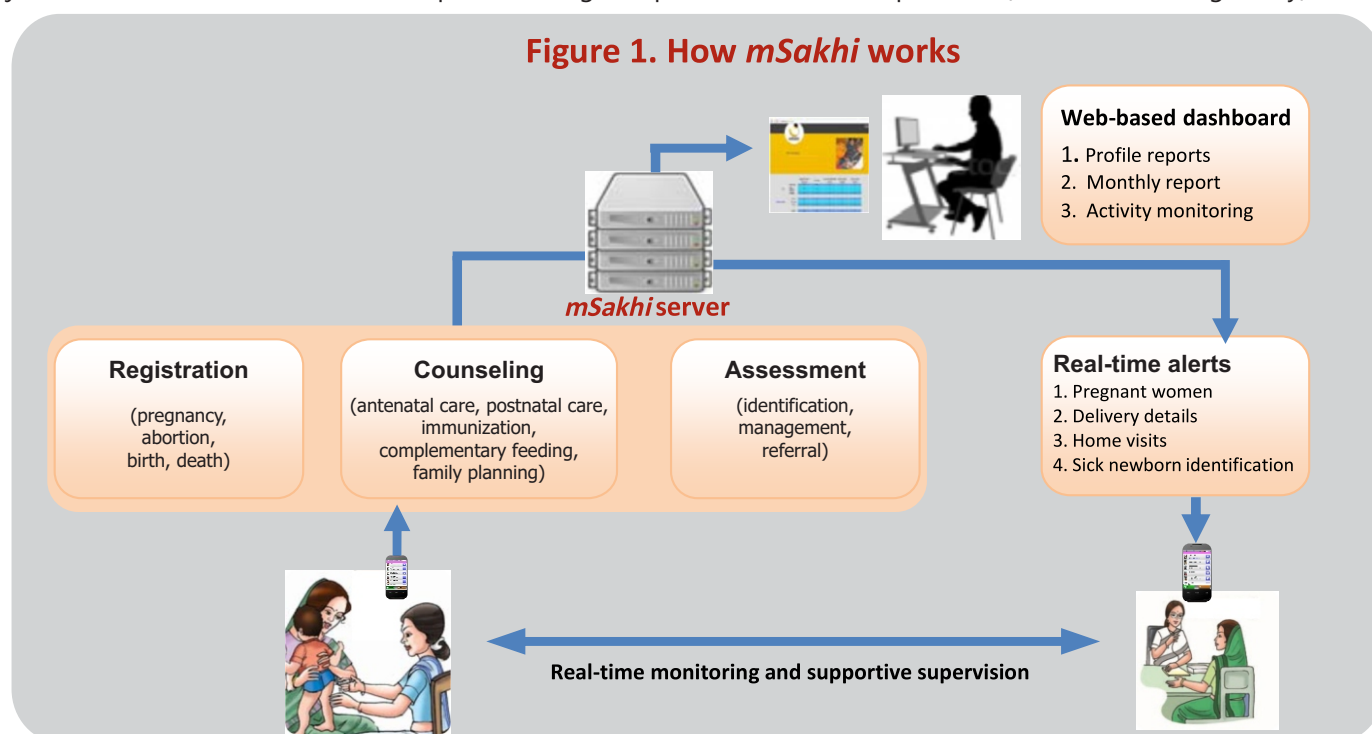
mSakhi (where *Sakhi* means "a friend" in Hindi) is an interactive vernacular audio/video-guided mobile application that provides support to ASHAs in conducting routine activities across the continuum of MNCH care. *mSakhi* uniquely combines the functions of existing paper-based tools, thereby eliminating the need for difficult-to-use-and-carry flipbooks, manuals, registers, and other job aids (Table 1). *mSakhi* content is based on the NRHM ASHA manuals and home-based newborn care (HBNC) guidelines and formats.



Table 1. mSakhi Functionalities and Features

Functionalities	Features
<ul style="list-style-type: none"> Self-learning Beneficiary registration Automated home visit schedulers & reminders Beneficiary counseling across MNCH Step-by-step guide and decision-support for identification, management, and referral of sick newborns 	<ul style="list-style-type: none"> Voice-guided vernacular messages, illustrations, videos Easily accessible on-the-go content Auto-categorization of sick newborns with automated alerts to supervisors Web-based dashboard and reports

The Manthan Project initially developed *mSakhi* on the open-source CommCare platform using java-enabled, keypad-based mobile phones. Based on ASHA and beneficiary feedback for more intuitive and multimedia-enabled applications, the Project then modified *mSakhi* for touch phones using an open-source Android platform (available on Google Play).



ASHAs register beneficiaries (pregnant women and/or newborns) by entering basic information such as name and village into *mSakhi* during home visits (Figure 1). Upon registration, *mSakhi* generates a home visit schedule for each beneficiary and provides a set of audio-video guided instructions for counselling, assessment, and referral specific to each visit. The ASHAs' *de-facto* supervisors (auxiliary nurse midwives or ANMs) receive the data entered by ASHAs into *mSakhi*, and the data are stored in the *mSakhi* central database, allowing for real-time tracking of both ASHAs and beneficiaries. The database is designed for seamless integration with existing government information and communication technology (ICT) systems such as the Mother-Child Tracking System (MCTS) and the Health Management Information System (HMIS). This integration has the potential to save time and reduce delays.

Box 1. *mSakhi* Operations Research Studies

OR Study #1 (April-December 2012): The first OR study, which took place in Bahraich District, tested the feasibility and effectiveness of *mSakhi* as a self-learning and counseling tool. A total of 86 ASHAs (46 experimental, 40 comparison) covering a population of 46,000 participated in the study.

OR Study #2 (November 2012-June 2013): The second OR study took place in Jhansi District and evaluated the effectiveness of *mSakhi* as an integrated tool (self-learning, beneficiary registration, counseling, decision-support, and real-time monitoring) specifically for the postnatal period. Fifty-seven ASHAs (29 experimental, 28 comparison) covering a population of 39,000 participated.

ASHAs in the experimental arms used mobile phones pre-installed with *mSakhi* and received usage training, while those in the comparison arms received training on NRHM paper-based tools. An ICT resource person provided on-call technical support to ASHAs in the experimental arms on phone-related issues. In both study arms, ASHAs received ongoing monitoring and feedback through existing monthly meetings.

The Project conducted baseline and endline ASHA knowledge assessments on key MNCH topics as well as counseling and newborn assessment skills observations. The Project also interviewed 450 beneficiaries to assess changes in community practices around maternal and newborn health. Finally, the Project estimated the cost of *mSakhi* implementation at a district level to inform future scale-up.

Key Findings

mSakhi Usage

Web-based usage monitoring data showed that during the nine months of the first OR study, ASHAs accessed the MNCH counseling and self-learning messages in *mSakhi* 57,222 times, totaling 1,048 hours. Average monthly usage per ASHA increased from 52 minutes at start-up to 121 minutes at endline as ASHAs gained confidence in using the application as a counseling tool. While more than half of the beneficiaries (55%) surveyed in the experimental arm reported that ASHAs used *mSakhi* during counseling, less than a quarter (22%) of surveyed comparison arm beneficiaries reported that ASHAs used the paper-based flipbooks. Beneficiaries found *mSakhi* to be engaging and also reported other family members' interest in the counseling messages because of the multimedia mobile content.

ASHAs reported that *mSakhi* enabled them to articulate correct and complete counseling messages thanks to the voice-enabled and video-supported guided instructions. Several ASHAs appreciated that having a mobile phone at their fingertips allowed them quick and convenient access to counseling messages without having to carry manuals and flipbooks during home visits.

"mSakhi is easy to use..., a lot easier than paper-based postnatal visit checklists and booklet."

ASHA, Jhansi District

"We have always been loaded with information but no one taught us how to counsel, this does...."

ASHA, Bahraich District

Knowledge

In the first OR study, ASHAs in both the experimental and comparison arms showed knowledge improvements for critical MNCH topics, although the increase in knowledge was significant only for the experimental arm. ASHAs' knowledge of HBNC topics also increased in both the experimental and comparison arms in the second OR study. Although the increase in mean knowledge scores was similar in both arms, 76% of ASHAs in the experimental arm demonstrated greater recall of at least six critical newborn conditions warranting referral compared with 58% in the comparison arm.

Skills

Counseling skills: During the first OR study, ASHAs in the experimental arm delivered complete messages significantly better than those in the comparison arm for a number of MNCH topics (Table 2). A message was considered complete when the ASHA covered all three critical counseling steps: she gave the message, explained its importance, and used a counseling tool during her interaction with the beneficiary.

Table 2. Completeness of messages delivered by ASHAs

MNCH topics	Experimental (endline)	Comparison (endline)	Net effect
4 antenatal care (ANC) checkups	84	39	28**
Anemia	68	15	33*
Birth preparedness	90	42	46***
Danger signs in pregnancy	69	28	38***
Danger signs in newborn	10	8	6
Skin-to-skin care	19	4	7
Early breastfeeding	16	0	17
Postpartum checkup	37	0	27*
Child immunization	61	12	33*

N=100 observations in each arm

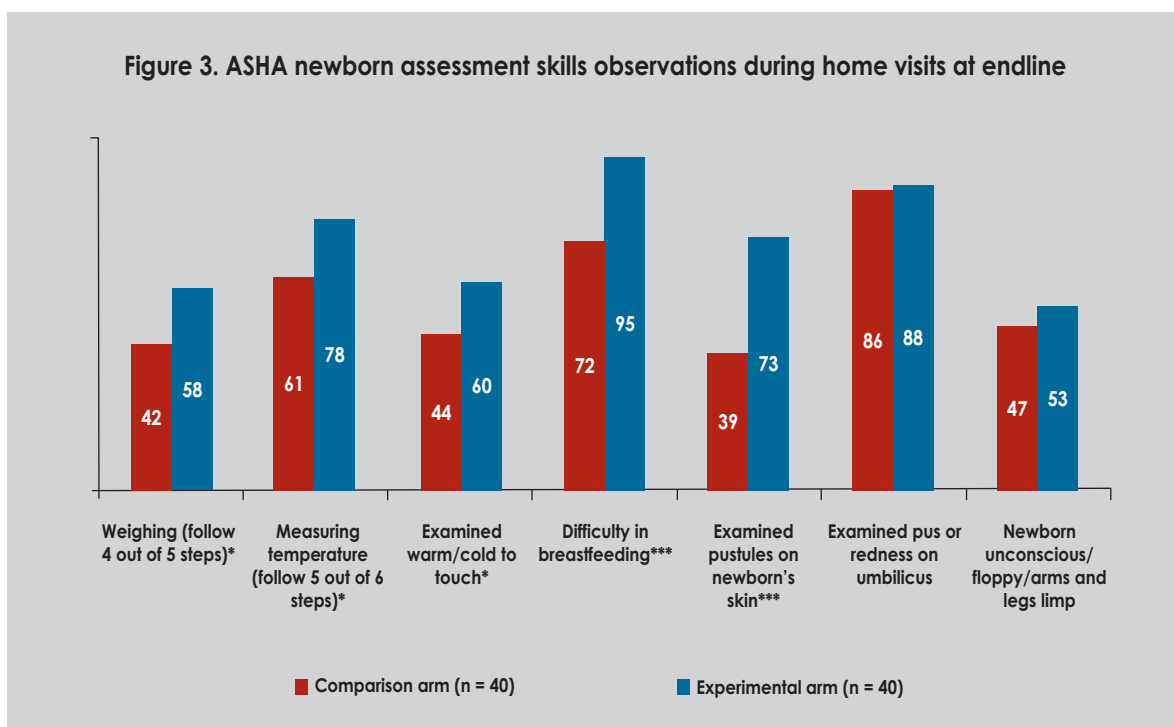
Net effect = Difference of differences between baseline and endline in experimental and comparison arms in percentage; *p<0.05, **p<0.01, ***p<0.001

Source: Baseline and endline ASHA counseling skills observations during home visit, OR Study #1

“...Now mothers and her family members listen to me more seriously.”



Sick newborn assessment skills: In the second OR study, ASHAs used *mSakhi* to register 494 births (100% of estimated births expected in their villages over the time period) and identified 53 sick newborns needing referral (10% of births). In comparison, ASHAs in the comparison arm registered 380 births (78% of the expected estimate) and identified only nine (2.4%) sick newborns for referral. Observations of ASHAs who used *mSakhi* showed them to have significantly better newborn assessment skills than those in the comparison arm (Figure 3). Net effect (i.e. the difference-of-differences in baseline and endline data between experimental and comparison arms) showed ASHAs in the experimental arm were more likely to correctly assess sick newborns than those in the comparison arm. Further, ASHAs in the experimental arm correctly classified sick newborns needing immediate referral and those needing home-based treatment more often than ASHAs in the comparison arm.



All figures in percentage; Level of significance: *p<0.05, **p<0.01, ***p<0.001

Source: Endline ASHA newborn assessment skills observations during home visits, OR study #2.

Costing

The Project enumerated the *mSakhi* software, hardware, and other activity costs incurred in the experimental arm to calculate the average cost per ASHA (Table 3). The main cost components were hardware (smartphones), training, ongoing technical support by an ICT resource person, application development, and server management. The Project estimated the average cost per ASHA to be INR 10,280 for the first year, with a yearly recurring cost of INR 4,680 per ASHA.

Table 3. *mSakhi* implementation costs (INR)

Smartphones (hardware)	4,000 per ASHA
Training (5 days)	1,600 per ASHA
Ongoing technical support (ICT resource person)	2,280 per ASHA per year
Application development, server management, and data usage	2,400 per ASHA per year

Lessons Learned and Recommendations

1. *mSakhi* can help ASHAs identify and correctly refer sick newborns.

Mobile applications such as *mSakhi* have the potential to significantly improve the identification and referral of sick newborns. While the sample size and duration of this intervention limit drawing firm conclusions, ASHAs using *mSakhi* were much more likely to identify sick newborns. The Project's baseline and other studies have shown that CHWs often underdiagnose newborn illness. The built-in decision-support and algorithms in *mSakhi* appear to help ASHAs reach correct diagnoses and guide families to seek help when needed. However, community-based interviews suggest that *mSakhi*'s effect on improving coverage of ASHA postnatal home-visits is limited (similar to paper-based tools).

2. mHealth applications can improve CHW knowledge and skills.

mSakhi also improved ASHAs' knowledge and counseling skills in important MNCH areas. However, evidence from other CHW interventions suggests that ASHAs are likely to require periodic refresher trainings and functional supervision to support acquisition and retention of MNCH skills and sustain *mSakhi*'s effectiveness as a job aid.

3. User-friendliness is important for mHealth applications.

The Project revised the *mSakhi* design over the course of the two studies in response to ASHA and beneficiary feedback. Ease of operating a mobile application can be greatly enhanced by choosing a simple, intuitive, and voice-navigated user interface. User interface should be an important criterion when choosing an application platform (proprietary or open source) for CHWs.

4. ICT support is critical for sustained support to CHWs.

The two OR studies demonstrated that it is feasible to train ASHAs and other CHWs to use applications such as *mSakhi*. However, an ICT resource person is critical to provide continuous support on mobile maintenance, application updates, and handholding. To ensure high and effective use of the application, ASHAs also need regular supervisory feedback (such as through monthly ASHA meetings).

5. mHealth interventions require initial and recurring costs.

The OR studies provided information on required investments to scale up the *mSakhi* program. Equipping an ASHA with a smartphone, application development, training, and technical support required an initial outlay of INR 10,280 and recurring costs of INR 4,680 each year. This outlay needs to be compared with the benefit of potentially improved newborn health outcomes.





IntraHealth International's mission is to empower health workers to better serve communities in need around the world. IntraHealth fosters local solutions to health care challenges by improving health worker performance, strengthening health systems, harnessing technology, and leveraging partnerships.



The Purpose of the Manthan Project (2009-2013) is to support the Government of Uttar Pradesh to improve maternal and newborn health outcomes in the state through the development and adoption of effective operational strategies to increase coverage of evidence-based interventions within the National Rural Health Mission.

Conclusion

The two OR studies demonstrated that, compared with existing paper-based job aids, *mSakhi* is a more user-friendly and effective ASHA job aid for a range of activities, including self-learning, counseling, and newborn assessment. Although the two studies' limited sample size and short duration do not permit measurement of *mSakhi*'s effect on community-level health outcomes, these promising data suggest that mobile applications may be an important tool to support ASHAs in improving maternal and newborn health outcomes. The positive findings make a case for implementing and evaluating *mSakhi* at scale.

References

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The Manthan Project is led by IntraHealth International and funded by the Bill & Melinda Gates Foundation. For more information on the Manthan Project, visit www.intrahealth.org/manthan

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