

A Mobile Tool for Health Workers: Promising Results in Bihar, India

The Information Communication Technology Continuum of Care Services (ICT-CCS) tool, created and implemented in a pilot program by CARE, uses mobile technology to improve health care services provided to mothers and children in Bihar, one of India's poorest and most populous states.

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Since 2011, the Bill & Melinda Gates Foundation has worked in partnership with the state of Bihar on an initiative called Ananya, which aims to improve the quality and coverage of interventions related to maternal, newborn, and child health; child nutrition; immunizations; and family planning. A key priority is improving the skills, knowledge, and performance of village-level frontline health workers (FLWs) deployed by the Indian Government, namely Anganwadi workers (AWWs) and accredited social health activists (ASHAs).

In 2012, CARE implemented a pilot that provides FLWs with a smartphone-based tool to facilitate their interactions with households, consistent with the Ananya program's hypothesis that improved interactions would increase uptake of key health behaviors. The Information Communication Technology Continuum of Care Services (ICT-CCS) tool allows FLWs to electronically schedule and coordinate home visits, track beneficiaries, and record health information. Other features include interactive checklists and informative videos. A year into the pilot, FLW supervisors—including the subcenter auxiliary nurse midwife (ANM)—received a version of the tool designed to improve their oversight of FLWs.

This issue brief explores the effect of adding the ICT-CCS tool to the Ananya program. Mathematica Policy Research conducted a

clustered randomized controlled trial of the pilot program in 70 health subcenters in Saharsa district, Bihar, India. Results are based on data from surveys of beneficiaries (mothers of infants), FLWs, and ANMs about two years after implementation began. The study found that the introduction of the ICT-CCS intervention significantly improved coordination among FLWs and increased the share of women visited by an FLW at key points in time. The intervention also significantly affected several important beneficiary health behaviors, with effects concentrated in measures of antenatal care, nutrition, and reproductive health.

KEY FINDINGS

The ICT-CCS intervention improved FLWs' coordination of home visits and increased their confidence.



Photo courtesy of CARE India.

COMPONENTS OF THE ICT-CCS TOOL

- Applications to register beneficiaries, track service receipt, and automatically schedule home visits, designed to improve the regularity and timeliness of beneficiaries' interactions with FLWs
- Beneficiary records and home visit schedules synchronized among FLWs to improve coordination
- Interactive checklists providing health messages to beneficiaries and helping FLWs accurately record health information
- Animated videos to improve FLWs' credibility and communication with beneficiaries
- Automatically generates a list of children due for immunizations
- Supervisor version of the tool, designed to improve monitoring and oversight of FLWs



The ICT-CCS tool aimed to synchronize the home visit schedules of FLWs serving a given catchment area, helping them coordinate home visits. The study found that ASHAs and AWWs in treatment areas were more likely than those in control areas to report that they coordinated home visits with the opposite-cadre FLW serving the same beneficiaries. For example, an ASHA or AWW was significantly more likely to have been asked by her opposite-cadre FLW to conduct a home visit when the other FLW was unable to do so (60 percent in treatment areas compared to 46 percent in control areas, not shown).

FLWs' reports also suggest that the ICT-CCS tool increased their confidence in their ability to perform their jobs. Specifically, ASHAs and AWWs were significantly less likely to report that they needed more skills for their jobs (62 percent in treatment areas, compared to 72 percent in control areas, not shown) and ANMs were significantly more likely to run subcenter meetings by themselves (89 percent in treatment areas, compared to 69 percent in control areas, not shown).

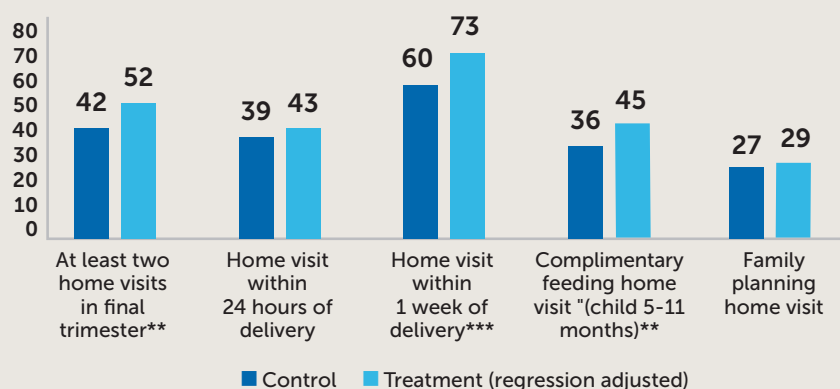
There was no evidence of significant changes in FLW supervision after the introduction of the ICT-CCS tool.

FLWs' reports do not suggest any statistically significant improvements in supervision of ASHAs and AWWs by ANMs outside of subcenter meetings, which was one aim of providing the mobile supervisory tool to ANMs. At endline, the frequency of interactions between ANMs and ASHAs and AWWs was very similar in the treatment and control areas.

Beneficiaries in treatment areas were more likely to receive FLW home visits than those in control areas.

Figure 1 depicts the percentages of beneficiaries who reported that they received home visits from an FLW at critical times during pregnancy and after delivery. Relative to beneficiaries living in control areas, those in treatment areas were significantly more likely to report receiving at least two FLW home visits in their last trimester of pregnancy, any FLW home visit within one week of giving birth, and any home visit related to complementary feeding.

Impacts on FLW home visits reported by beneficiaries



Notes: Treatment means are adjusted using ordinary least squares regressions that control for study design effects, demographic characteristics, and subcenter-level baseline means of the outcome (when available).

//** Significantly different from zero at the .10/.05/.01 level, two-tailed test, adjusting for clustering at the subcenter level.

Figure 1

Home visits by FLWs in the treatment group appear to be of higher quality.

In addition to receiving more home visits, the treatment group received higher quality visits than the control group by some measures (not shown). On average, treatment area beneficiaries were significantly more likely than those in control areas to receive advice from FLWs on topics related to breastfeeding and nutrition, although differences were not significant for other antenatal and newborn care topics. The average treatment area beneficiary was also between 4 and 18 percentage points more likely to be exposed to non-ICT-CCS informational and demonstration tools (introduced by the core Ananya program) than beneficiaries in the control areas (not shown). Availability of the ICT-CCS tool, therefore, seems to have complemented rather than substituted for other Ananya tools, although the increase in home visits in the treatment

areas may have mechanically led to the increase in beneficiaries' exposure to other tools. Despite these changes, there were no significant differences between beneficiaries in treatment and control areas in other crude proxies for visit quality, such as visit duration or whether the most recent visit involved the beneficiary's husband or mother-in-law.

The ICT-CCS intervention had significant impacts on health behaviors, especially those related to antenatal care, child nutrition, and reproductive health.

Table 1 presents differences between treatment and control beneficiaries in key maternal and child health behaviors at endline. The significant impacts of the ICT-CCS intervention on FLW-beneficiary interactions were accompanied by statistically significant impacts on health behaviors in some, but not all, health domains.

Impacts on key health behaviors (percentages)

	Endline control mean	Adjusted endline treatment mean	Impact
Antenatal Care			
At least 3 antenatal care visits	28.8	49.8	21.1***
At least 2 tetanus toxoid injections	89.3	94.0	4.7**
At least 90 IFA tablets consumed	10.9	17.2	6.3***
Obtained telephone number of ambulance, private vehicle, or FLW for delivery	40.2	49.3	9.1**
Delivery and Newborn Care			
Facility delivery	83.9	85.1	1.2
Nothing applied to cord and umbilicus	32.5	32.4	-0.1
Bath delayed by at least 2 days	47.6	45.7	-1.9
Immediate breastfeeding	62.2	75.9	13.7***
Skin-to-skin care	57.8	65.2	7.4*
Exclusive breastfeeding in past 24 hours (child 0–5 months)	70.0	64.8	-5.3
Child Nutrition (child 6–11 months)			
Child eats solid or semisolid food	54.7	63.6	8.8*
Child began eating solid food by age 6 months	31.8	41.0	9.1**
Immunization (child 6–11 months)			
Received DPT3 vaccines	76.7	77.7	0.9
Fully immunized (except measles)	55.3	59.1	3.8
Reproductive Health			
Use of permanent methods of contraception	17.8	24.3	6.4**
Use of temporary methods of contraception (ever)	22.0	29.0	7.1**
Use of any modern method of contraception (ever)	32.4	43.3	10.9***
Use of temporary methods of contraception (current)	10.6	11.5	0.8
Use of any modern method of contraception (current)	28.5	35.8	7.3**

Notes: Treatment means and treatment-control differences are adjusted using ordinary least squares regressions that control for study design effects, demographic characteristics, and subcenter-level baseline means of the outcome (when available).

*/**/*** Significantly different from zero at the .10/.05/.01 level, two-tailed test, adjusting for clustering at the subcenter level.

Table 1

Screen shots from the ICT-CCS tool used to communicate health messages



Birth preparedness



Complementary feeding



Family planning



An FLW using the ICT-CCS tool.

IMPLEMENTING A MOBILE HEALTH INTERVENTION IN BIHAR

Mathematica also conducted a process study to learn about ICT-CCS implementation. Key findings included:

- FLWs’ understanding of the ICT-CCS tool increased over time. Intensive training by CARE was required to achieve this result.
- FLWs used some features of the ICT-CCS tool more often than others. Tools to register beneficiaries and manage visits were commonly used; videos, checklists, and supervisory tools were less commonly used.
- Some FLWs reported that using the ICT-CCS tool increased their job burden, possibly because FLWs were still required to maintain manual records during the pilot.
- FLWs experienced some technical and logistical challenges in using the ICT-CCS tool, in particular due to limited internet connectivity, which limited synchronization of records.
- Despite limited initial familiarity with technology, FLWs were able to learn to use many of the ICT-CCS features effectively.

There were significant impacts on all key outcomes in the antenatal care domain, including receipt of at least three antenatal care visits, receipt of at least two tetanus toxoid injections, consumption of at least 90 IFA tablets, and measures of birth preparedness.

The ICT-CCS intervention further led to significant improvements in the child nutrition and reproductive health domains. The study found that children 6–11 months old in treatment areas were 9 percentage points more likely to eat solid or semisolid food compared to those in control areas, a statistically significant difference. There was also a significant impact on the timely introduction of complementary feeding (at six months). In the reproductive health domain, current use of modern contraceptive methods was 7 percentage points higher in the treatment group than the control group. The share of women who ever used a modern contraceptive method was also 11 percentage points higher in the treatment group than in the control group. These large and significant differences are driven by impacts on the use of permanent methods and past (but not current) use of temporary methods.

The study did not find significant impacts of the ICT-CCS intervention on most recommended behaviors in the delivery and newborn care domain, including facility delivery, applying nothing to the cord or umbilicus, and delayed bathing. The study also found no significant impacts of the intervention on outcomes in the immunization domain. This is despite the finding that FLWs in treatment areas reported using the immunization due list component of the ICT-CCS tool relatively often.

LOOKING FORWARD

This evaluation found that, after two years of implementation, beneficiaries in ICT-CCS treatment areas experienced substantial improvements in interactions with FLWs and several key health behaviors relative to those in control areas. The findings suggest that the ICT-CCS intervention has the potential to add significant value to the core Ananya package of interventions that was in place across Saharsa during the evaluation period.

These strong impacts were observed despite the fact that some features of the ICT-CCS tool were not utilized to the extent envisaged and that FLWs experienced technical and logistical challenges in using the tool (see box above). The fact that significant impacts were observed despite these limitations suggests that there may be potential for even greater impacts if all the features of the tool, including the checklists, videos, and supervisory applications, are used fully (although one cannot be certain of this based on the results of the study alone). The findings suggest that during the scale-up phase it will be important to: (1) focus on strengthening the use of these other features of the tool, (2) try to resolve the technical issues that limit the use of the tool (particularly with regard to synchronization of beneficiary records), and (3) ensure that sufficient training is provided.

This issue brief is based on a report prepared by Evan Borkum, Anitha Sivasankaran, Swetha Sridharan, Dana Rotz, Sukhmani Sethi, Mercy Manoranjini, Lakshmi Ramakrishnan, and Anu Rangarajan of Mathematica Policy Research.

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