



The feasibility of using mobile-phone based SMS reminders and conditional cash transfers to improve timely immunization in rural Kenya[☆]

Hotenzia Wakadha^a, Subhash Chandir^b, Elijah Victor Were^a, Alan Rubin^a, David Obor^a,
Orin S. Levine^b, Dustin G. Gibson^b, Frank Odhiambo^a, Kayla F. Laserson^a, Daniel R. Feikin^{b,c,*}

^a Kenya Medical Research Institute/Centers for Disease Control and Prevention Public Health and Research Collaboration, Kisumu, Kenya

^b International Vaccine Access Center, Department of International Health, Johns Hopkins Bloomberg School of Public Health, Baltimore, MD, United States

^c Division of Preparedness and Emerging Infections, National Center for Emerging and Zoonotic Infectious Diseases, Centers for Disease Control and Prevention, Atlanta, GA, United States

ARTICLE INFO

Article history:

Received 10 October 2012

Received in revised form

29 November 2012

Accepted 30 November 2012

Available online 13 December 2012

Keywords:

Conditional cash transfers

Short message service

DTP-HepB-Hib

Mobile money services

RapidSMS

Reimbursement

ABSTRACT

Background: Demand-side strategies could contribute to achieving high and timely vaccine coverage in rural Africa, but require platforms to deliver either messages or conditional cash transfers (CCTs). We studied the feasibility of using short message services (SMS) reminders and mobile phone-based conditional cash transfers (CCTs) to reach parents in rural Western Kenya.

Methods: In a Health and Demographic Surveillance System (HDSS), mothers with children aged 0–3 weeks old were approached to determine who had access to a mobile phone. SMS reminders were sent three days prior to and on the scheduled day of immunization for 1st (age 6 weeks) and 2nd doses (age 10 weeks) of DTP-HepB-Hib (Pentavalent) vaccine, using open-source Rapid SMS software. Approximately \$2.00 USD was sent as cash using mPESA, a mobile money transfer platform (2/3 of mothers), or airtime (1/3 of mothers) via phone if the child was vaccinated within 4 weeks of the scheduled date. Follow-up surveys were done when children reached 14 weeks of age.

Results: We approached 77 mothers; 72 were enrolled into the study (26% owned a phone and 74% used someone else's). Of the 63 children with known vaccination status at 14 weeks of age, 57 (90%) received pentavalent1 and 54 (86%) received pentavalent2 within 4 weeks of their scheduled date. Of the 61 mothers with follow-up surveys administered at 14 weeks of age, 55 (90%) reported having received SMS reminders. Of the 54 women who reported having received SMS reminders and answered the CCT questions on the survey, 45 (83%) reported receiving their CCT. Most (89%) of mothers in the mPESA group obtained their cash within 3 days of being sent their credit via mobile phone. All mothers stated they preferred CCTs as cash via mobile phone rather than airtime. Of the 9 participants who did not vaccinate their children at the designated clinic 2(22%) cited refusals by husbands to participate in the study.

Conclusion: The data show that in rural Western Kenya mobile phone-based strategies are a potentially useful platform to deliver reminders and cash transfers. Follow-up studies are needed that provide evidence for the effectiveness of these strategies in improving vaccine coverage and timeliness.

Published by Elsevier Ltd.

Abbreviations: CCT, conditional cash transfer; KEMRI/CDC, Kenya Medical Research Institute/Centers for Disease Control and Prevention's Health; HDSS, health and demographic surveillance system; DTP-HepB-Hib, diphtheria, hepatitis B, haemophilus influenzae type B; SMS, short message service; M-money, mobile money services; VR, village reporters; M-Health, mobile-health; Ksh, Kenya shillings.

[☆] The findings and conclusions are those of the authors and do not necessarily represent the views of the Centers for Disease Control and Prevention.

* Corresponding author at: 855N. Wolfe St., Suite 600, Baltimore, MD 21205, United States.

E-mail address: dfeikin@jhsph.edu (D.R. Feikin).

1. Introduction

Despite clear evidence that immunization is an efficient and cost-effective intervention for improving child survival [1], children in many parts of the world, including much of sub-Saharan Africa, are either unvaccinated or vaccinated late [2]. Much of the efforts to augment immunization over the past decade have improved vaccine supply-side issues (e.g., cold chain, transportation, procurement, and staff training). As coverage improves, lingering deficits and barriers remain to achieving optimal immunization status, many of which cannot be overcome with more supply-side interventions. In particular, demand-side barriers, such as lack of knowledge, forgetfulness, prohibitive transport cost, and competing priorities come to play a more prominent

role in impoverished populations with persistently low vaccine uptake.

The access and ownership of mobile phones in Africa is rapidly rising [3]. Mobile phones are increasingly being used for health applications (mHealth) and mobile money services (mMoney) [4–8]. We believe some of these new applications, could potentially be harnessed to administer interventions to achieve high, timely and sustainable immunization coverage. Short message services (SMSs) have been successfully employed for various health applications, such as promoting adherence to drug treatments for chronic diseases [9–11], uptake of screening tests [12–15], immunization coverage [16–18], clinical appointment attendance [19,20], and training health workers in malaria treatment [21].

mMoney refers to the technology that facilitates cash transfers through mobile phones. In many developing countries, mMoney provides an opportunity to reach rural and/or low-income population with limited access to formal financial institutions. In Kenya, the mPESA system is a leader in offering mobile financial services, currently claiming 14 million users [22], approximately 30–35% of the total population (43 million) [23].

Economic incentives targeting both health care providers [24] and the general population have been used to improve health outcomes by encouraging use of various health services, including immunizations [25–27]. A specific type of incentive is conditional cash transfers (CCTs), which are the provision of money (or other valuable goods) upon completion of a particular health behavior [26–29].

Evidence is needed before scaling up mobile-phone based strategies for immunization. We undertook a feasibility study of using automated SMS reminders and mobile-phone based CCTs for timely immunization among mothers in rural Western Kenya.

2. Methods

2.1. Study site

The study was conducted in the Kenya Medical Research Institute/Centers for Disease Control and Prevention's Health (KEMRI/CDC) and Demographic surveillance system (HDSS) in rural Siaya district, Western Kenya [30]. Within the HDSS, this pilot study was conducted in 30 villages located within 5 km radius of the government operated Ting'Wan'i health center. In the HDSS area, malaria is holoendemic [31,32] and HIV prevalence is high (17% in adults ≥ 18 years in 2008) [33]. The under-5 mortality rate was 212 per 1000 live births in 2008 [31]. Immunization coverage with the third dose of pentavalent vaccine was 54% by 24 weeks of age (scheduled to be given at 14 weeks) and 83% by ages 12–23 months in 2010. As part of the HDSS, births and deaths are identified by village reporters (VRs), who are residents of each village [30]. Immunization status of children, collected by field workers during home visits done three times per year, is determined primarily by vaccination card, and if not available, by verbal report. Vaccinations are also documented in Ting'Wan'i health center by HDSS-employed health facility recorders. The Kenyan Expanded Program on Immunization (EPI) guidelines call for vaccination with the primary series at 6, 10 and 14 weeks of age and measles at 9 months of age [34].

2.2. Enrolment into the pilot study

We enrolled mothers of children 0–3 weeks of age, randomly distributed in a 2:1 mMoney:airtime ratio. This number was chosen, without statistical considerations, to enroll enough mothers in each group to encounter most of the main contingencies and problems that might occur with the process. For enrolment, VRs

approached mothers of newborns at the time of the birth notification visit, as well as children up to 4 weeks of age in their villages. Mothers were informed that they would receive 150 Ksh. (~US\$2.00 in 2011) in mMoney or equivalent in airtime if they brought their child in on time, defined as within 4 weeks, for their first and second pentavalent vaccines. The CCT amount was chosen as it was the standard transport reimbursement given for all studies conducted in the HDSS, representing the average cost of round-trip transportation to the clinic for HDSS residents. After consenting to participate, mothers were asked to provide a phone number of a mobile phone from which they could receive SMS messages related to this study. We defined mobile phone access as owning a phone or readily being able to receive messages from a phone owned by someone living in their compound, a neighbor or a friend.

2.3. SMS reminders

We customized RapidSMS, a free and open source system designed to leverage SMS mobile phone technologies [35]. At the time of enrollment, VRs sent a message to the RapidSMS server at KEMRI/CDC offices, located approximately 50 km from Ting'Wan'i, using the following syntax: name, date of birth, phone number (Fig. 1). At this point, the phone was automatically registered by the server, which was programmed to send the first SMS immunization reminder three days before the child reached six weeks of age based on the indicated date of birth in the enrollment SMS. The first reminder SMS read "[Baby's name] is due for Pentavalent1 vaccination in three days (e.g., Wednesday) 13/7/2011 at Ting'Wan'i. You will get Ksh. 150 by mPESA(or airtime) if baby is vaccinated on time." On the day the baby was exactly six weeks old, the mother was sent a second SMS with a similar message that emphasized that vaccination was due on that day. If the child had come for vaccination at Ting'Wan'i for the first dose, SMS reminders were next sent three days prior to and on the day that the second pentavalent dose was due. If the child did not get vaccinated at Ting'Wan'i exactly at six weeks for the first vaccination, then the SMS reminders were reprogrammed to occur four weeks after first dose. Of note, if the first dose was not given at the designated vaccination clinic, Ting'Wan'i, then the system was not aware that the first dose was given and no SMS reminders were sent for the second dose. All the SMS reminders were sent in the local language (Dholuo).

2.4. Immunizations and CCTs

A study-employed health facility recorder was based at Ting'Wan'i to record immunization visits of enrolled children (Fig. 1). Every Monday, the recorder was provided with a list of expected immunization visits by enrolled children for that week. When a child was brought in for immunization, the health facility recorder verified from the list that the child was a study participant and then notified the server via an SMS of the child's visit. The server sent simultaneous SMSs to the participant's phone, congratulating her on vaccinating her child on time, and to the study coordinator, notifying her that child was vaccinated on time. For children who were brought in for vaccination after 4 weeks, a SMS was sent by the server to the mother congratulating her on vaccinating her child, but indicated that it was not done within a timeframe that entitled her to receive the CCT.

Mothers were randomized to one of the two CCT groups, either mMoney or airtime. Any of the four mMoney systems registered in Kenya could be used for CCTs, based on the mother's preference. For mothers who vaccinated their child on time, CCTs were sent to the mother's registered mobile phone. For those randomized to get the CCT via mMoney, we sent a credit worth Ksh.150 to each participant's registered mobile phone. For those participants

Download English Version:

<https://daneshyari.com/en/article/10966802>

Download Persian Version:

<https://daneshyari.com/article/10966802>

[Daneshyari.com](https://daneshyari.com)