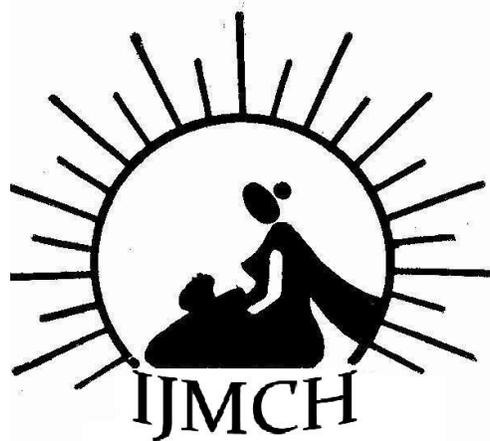


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“Can and how far mobile phone technology based preventive information service on maternal health knowledge, behaviour change be effective? Are the service users satisfied?”

Impact of mHealth Initiative on Utilization of Ante natal Care Services in Rural Maharashtra, India

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Abstract

Research questions: “Can and how far mobile phone technology based preventive information service on maternal health knowledge, behaviour change be effective? Are the service users satisfied?”

Setting and Participants: 1750 women from 250 villages in Maharashtra, were equally distributed into two groups as follows: 581 women in Control Group A; 1162 women receiving mHealth intervention in Group B.

Study Design: A randomized control trial.

Methodology: Mobile phone based delivery of voice messages and animation films display and discussion with project *Arogya Sakhis*. Information content of mobile tools was vetted by Mumbai Obstetrics and Gynaecology Society.

Results: Out of seven impact indicators, achievement in five indicators in the intervention group exceeded the target. Qualitative feedback from participants amply corroborates quantitative findings.

Key words: *Ante natal care, Maternal health, Maternal mortality, mHealth, Utilization of health services*

Introduction

In recent years, mobile phone technology has been acknowledged for its creative applications in health care sector, especially in the developing world. Two fundamental reasons for this being extensive reach as well as a range of health care functions supported through mobile phone applications. As for penetration of mobile phones technology in India, of the six billion mobile phone users across the globe, 860 million users are Indians.¹

ARMMAN [Advancing Reduction in Mortality and Morbidity in Mothers Children and Neonates] is a not-for-profit organization in India which has undertaken an innovative mHealth project focused for improving maternal health in three districts of Maharashtra, India. The project '*mMitra Arogya Sakhi Ante natal Home Based Care*' is fully funded by Department for International Development (DFID), U.K. The project aims to conduct a randomized controlled trial (RCT) to test and document the effectiveness of two mHealth interventions provided to target women. The two health interventions are: one - a mobile phone voice messaging and animation film service to improve maternal and child health (MCH) information access for rural pregnant women; and two - provide home-based after

work-hours diagnostic investigations and appropriate referral service for enrolled pregnant women and their new-born until the latter reaches age one. The current paper seeks to present impact of the first intervention regarding ante natal mobile phone voice messaging and animation film service.

Project Rationale

As reported in the latest official statistics², the country is likely to fall short on a majority of targets and indicators with respect to millennium development goal (MDG) 1, 3, 4, 5 and 7. In order to achieve MDG 5 on improving maternal health, India needs to reduce its maternal mortality ratio (MMR) to 109 by end of 2015. At the historical pace of decline, the country is likely to reach a level of 140 deaths per 100,000 live births, falling short of the target by 31 points. This implies that India's performance on maternal health indicators is depressingly low. The good news however, is that a significant proportion of maternal deaths in the country can be prevented provided that rural women get access to appropriate and adequate counselling during their critical antenatal and postnatal stage. Government of India has created a cadre of rural community health workers designated as Accredited Social Health Activists (ASHAs) to improve information access for pregnant women *inter alia*. However, ante natal counselling by ASHAs unwittingly gets marginalized due to a variety of reasons. The most notable reason being that her attention is largely directed towards job role that give her performance based incentives and not so much towards non - incentivized activities like counselling. Secondly, for any behaviour change communication to be effective, it must be *timed* and *targeted* to reach the right people at the right time, be culturally specific and reinforced by repetition over a period of time. Invariably, ASHAs have neither the time, nor an incentive to undertake counselling to improve health care seeking practices of rural women. In the ongoing context, ARMMAN launched a twice-a-week mobile phone voice messaging service in local dialect that disseminates targeted, timely, and culturally sensitive preventive information directly to the pregnant women to ensure that messages reach their target audience and generate a demand for ante natal care services. The voice messaging service is supported by short educational animation film clips displayed on mobile phones for reinforcement of preventive health information.

Study Site and Sample

Maharashtra state ranks second and third respectively (amongst bigger states in India) for her achievement in reducing maternal and infant mortality in India³. However, there are marked inter-district variations in health indicator achievement and three such low performing (on health indicators) districts Osmanabad, Solapur and Washim were selected for project intervention.

As the first step in sampling, a master list of all villages in Osmanabad, Solapur and Washim districts was sent to bio statisticians to randomly select 100 villages each from Osmanabad and Solapur (being larger districts) and 50 villages from Washim district. In the next step, 1743 pregnant women from 250 villages enrolled in RCT were divided into two groups as per below:

Group A – 581 women represented Control group which received no service

Group B – 1162 women received preventive health information via voice messages and animation films.

Materials and Methods

In order to assess project feasibility and selection of mobile tools, a baseline survey of prospective project beneficiaries' mobile phone ownership and use related skills-set was undertaken. It was revealed that 67.1% women had access to family mobile phone; 45% of respondents did not know how to access an 'SMS'; 58.4% did not know how to read an 'SMS'; but 92.4% of the respondents knew how to receive a mobile phone call. These findings validate the use of mobile voice messages over the use of text messaging for providing preventive care information. Secondly, voice calls have a comparative advantage over text messages in so far as the former can make an emotional connect with the beneficiary which text messages invariably lack. 96.4% of respondents knew how to make a phone call. Thus a vast majority of respondents were capable of receiving the voice calls and were capable of giving a 'missed call' to project call centre in case they had missed the calls of the week or desired to contact project staff for any other reason.

In each of the 166 intervention villages a community health worker called as *Arogya Sakhi* [AS] was appointed and provided with a smart phone for providing information access to beneficiaries who did not have a family mobile phone. Android phones given to ASs in the intervention group had a full set of 59 ante natal care voice messages as well as 5 animation film clips encoded into them. Duration of voice messages and animation film clips lay between 60 to 120 seconds. 67 per cent women who had access to a family mobile phone were sent two voice messages per week directly in her preferred time slot and preferred language. The automated platform for voice messages carried particulars required for message delivery such as beneficiary personal information including phone number, preferred time slot for voice messages, preferred language, last menstrual period date, birth location plan and so on. All ASs were trained to pick out specific voice messages as per beneficiary's gestational age and provide access to beneficiaries without mobile phones. ASs were also trained to show animation film clips to all beneficiaries from their project phones.

Enrolment and Informed consent of RCT participants

Women in project area were enrolled as RCT participants from the third or fourth month of pregnancy. Only women who furnished us their written informed consent to voluntary participation in the project were enrolled.

Unique Features of mHealth Service and Functions

Content of voice messages as well as animation films were culturally appropriate; timed and targeted as per beneficiary's gestational age; sent in a user specified language and time slot twice a week from 11th to 39th week of pregnancy. The range of functions served by mHealth tools included: client education and counselling; diagnostic alerts; information giving; actionable tips to pregnant women for self-care and foetal health; and encouragement to clients for behaviour change.

Observations

The RCT design used seven impact indicators to measure project performance which can be classified into three categories: knowledge of selected maternal health matters; health seeking behaviour; user satisfaction with mHealth services. Table 1 below presents indicator specific targets and performance on each of the indicators. Out of the three knowledge gain indicators, two met the project target and one fell slightly lower. In the latter case, regarding 'proportion of women who know that consistent condom use can reduce the chance of HIV/AIDS infection', a chi square test was applied to the control and intervention group observations. It was found that the impact of project intervention was highly significant at ninety nine per cent levels. The two knowledge gain indicators where the project impact exceeded the target were 'importance of taking 100 iron and folic acid tablets (IFA) during pregnancy' and 'knowledge of at least three family methods other than sterilization'. In context of behaviour change, one indicator on 'proportion of pregnant women who took IFA tablets for 100 days', achievement in the intervention group was 13% below the set target at 65%. Observation in the control group was 30.44% which was much lower than the intervention group. Again the chi square test established that the achievement in the intervention group was significantly higher than control group. Regarding beneficiaries' satisfaction it was found that beneficiaries' satisfaction with voice messages as well as animation film service was 89.32 and 97.41 per cent respectively exceeding the project target.

Qualitative feedback from beneficiaries strongly corroborates the quantitative findings. For example, one beneficiary impressed with the new information she gained from the project said *"this was my third pregnancy but I learnt many new things from voice messages which I didn't learn from my personal experience"*. To express similar sentiment, another beneficiary said *"even doctor doesn't tell us all these things"*. More specific to knowledge building, one woman said *"now I learnt what I should be eating for health of baby and myself"*.

TABLE 1: Knowledge gain, Behaviour change and User satisfaction

Indicators with Target figure in parenthesis	Control Group (%)	Intervention Group (%)
Knowledge gain		
Proportion of women who know the importance of taking IFA tablets for 100 days during pregnancy (65%)	59.20	95.2
Proportion of women who know of at least 3 methods of family planning other than permanent sterilization (65%)	18.58	65.53
Proportion of women who know that consistent condom use can reduce the chance of getting HIV/AIDS (65%)	34.76	64.71*
*Chi square test vis-à-vis control group data was significant at 99% level		
Behavior change		
Proportion of pregnant women who took IFA tablets for 100 days (65%)	30.44	52.10**
* **Performance in intervention group fell short by 13%. Yet Chi square test vis-à-vis control group data was significant at 99% level		
Proportion of births attended by skilled birth assistant/ skilled health personnel (92%)	98.96	98.88
User satisfaction		
Proportion of enrolled women (1162 women) who receive 70% of the voice messages and are satisfied with the content (80%)	N.A.	89.32
Proportion of enrolled women (1162 women) who have been shown 3 animations during pregnancy and are satisfied with the content (80%)	N.A.	97.41

Regarding client satisfaction with project services and family support to her participation one beneficiary said *“my husband gave me his phone when I went to my mother’s home for delivery so that I could continue to hear voice messages uninterrupted.... ”*.

The project staff observed that many beneficiaries who initially did not have a mobile phone started buying them and asked their respective ASs to update their information on the voice platform so that they too would receive voice calls directly and not depend on husband’s or AS’s phone. This was a clear pointer to growing client demand for project services and women’s empowerment.

Conclusion

In overall terms, both quantitative and qualitative data analyses clearly show that mHealth initiative for promoting higher uptake of ante natal care services is highly impactful. However, the fact that 95.2 per cent women had acquired adequate knowledge regarding ‘importance of taking 100 IFA tablets during pregnancy’ but only 52.1 per cent women actually consumed the recommended supplement shows that information alone does not always result in behaviour change. Family and environment support are equally vital to adapt improved health practices. To that extent it is gratifying that beneficiaries’ children

liked the animations so much that they had learnt the dialogues by heart and we draw satisfaction that we succeeded in 'catching them young'.

References

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