

SHORT ARTICLE

The willingness for using mobile phone for health education among women caregivers of under 5 children in an urban resettlement colony in Delhi, India

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Abstract	Introduction	Methodology	Results	Conclusion	References	Citation	Tables / Figures
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Abstract

Background: The delivery of health education through mobile phones either through voice calls or text messages (mHealth) provide valuable opportunities for bridging gaps in maternal and child healthcare in resource constrained settings. **Aims & Objectives:** The objective of the present study was to assess willingness to receive m-Health services among women caregivers of under-5 children. **Material & Methods:** We conducted a cross sectional study in an urban resettlement colony of North East District of Delhi during the period from September' 2016 to Feb' 2017. We enrolled 201 adult women up to 35 years of age who were active caregiver of at-least one under 5 child in their familial household. **Results:** The mean age of the women was 26.4 and mean years of schooling was 10.1 years. Nearly three-fourth (73.2%) could read text messages (SMS) while more than a third (36.8%) were using mobile internet services. The willingness to receive mHealth services for health promotion was affirmed by 157 (78.2%) subjects but it was significantly lower in women with low educational attainment. **Conclusion:** There exists a strong unmet need for mHealth services among young women caregivers of under 5 children. However, bridging the digital divide is a key challenge towards advancing mHealth for all.

Keywords

mHealth; maternal health; India

Introduction

Mobile health (mHealth) is the use of mobile phone technology for improving the health of populations (1-2). The delivery of health education through mobile phones either through voice calls or text messages provide valuable opportunities for bridging gaps in healthcare and reaching out to socioeconomically disadvantaged populations.

Furthermore, patients living in rural and remote areas lacking adequate health and transportation facilities can benefit from mHealth (2). Hence, MHealth interventions could be particularly useful in resource constrained settings with limited healthcare providers where much of the opportunity for effective health communication is lost due to the heavy patient load. Developing countries like India with their high per capita mobile phone connectivity

and their widespread and enthusiastic adoption across diverse sociodemographic categories provides enormous potential for acceptance and benefit from mHealth (3).

Health communication through mHealth either unidirectionally for one-way delivery of health education through voice calls and/or short message service (SMS) text messages or even via two-way communication can be used to promote maternal and child health (4). Text messaging is unsuitable in those lacking literacy skills and poses the challenge of comprehension. However, it also has several advantages over telephonic mHealth communication as it permits optimization of the frequency of text messages allowing for repeated reinforcement at desired frequency. Furthermore, the messages can be stored and read at any time of the day or saved for later and messages can also be delivered to phones which are switched off as soon as they are turned on (5).

Some of the major health challenges in young mothers and their under-5 children like lack of exclusive breast feeding, early or delayed weaning, lack of spacing, incomplete immunization, nutritional deficiencies especially anemia and protein energy malnutrition require sensitization and awareness of mothers which can be enhanced through regular high quality mHealth services. The government of India has initiated the Kilkari scheme in this regard which employs out-bound dialing through IVR technology to deliver health education through 2-minute audio messages to women registered in the Maternal and Child Tracking System (MCTS) from the second trimester of pregnancy onwards till the child is 1 year of age with the messages linked to the stage of pregnancy (6). Nevertheless, the willingness, acceptability, readiness and preferences of mHealth service users towards mHealth services requires adequate evaluation to ensure their optimal utilization (2). Furthermore, the scope and limitations in scaling mHealth services in these vulnerable populations has also not been adequately explored particularly in the Indian context.

Aim & Objective

To assess willingness to receive m-Health services among women caregivers of under 5 children in an urban resettlement colony of Delhi, India.

Material & Methods

Study site: We conducted a cross sectional study in an urban resettlement colony of North East District of Delhi which constitutes the field practice area of a medical college in Delhi during the period from September' 2016 to Feb' 2017. The urban health center staff from the medical college provides comprehensive maternal and child health services to more than 60,000 population of the area. The data was collected during a demographic survey in the area for assessment of health needs of the residents. Inclusion criteria: We enrolled adult women up to 35 years of age who were active caregiver of at-least one under 5 child in their familial household.

Sample Size: The primary outcome of the study was the proportion of adult women up-to 35 years of age who were willing to receive mHealth services on mobile phones. For calculation of sample size, we expected 50% of the women to be willing to receive mHealth service from a previous study (7). At 8% absolute error, 95% confidence interval and a design effect of 1.5, the minimum sample size was calculated using Statcalc in Epi info 7.2 as equal to 225 subjects.

Sampling: The study area includes 4 blocks out of which 2 were selected randomly through lottery method. We enrolled subjects from 113 and 112 households of the 1st and 2nd selected blocks respectively which had at-least 1 woman fulfilling the inclusion criteria. In case of multiple eligible subjects in a household, only the youngest adult woman was selected. The survey was done through a door to door visit in a consecutive manner. In case of locked houses or when the eligible subject was not present, we attempted to interview the eligible subject on a subsequent visit.

Ethics: The subjects were interviewed after verbal consent. No personally identifiable information was collected from the study subjects.

Study tools: We interviewed the subjects using a pretested questionnaire. The original questionnaire was prepared in English and translated into Hindi through a back and forth translation process. The questions included details of the sociodemographic status, mobile phone access and ownership, mobile phone usage skills, present status on mHealth service delivery and preferences relating to mHealth services. The willingness of the subject for receiving mHealth services was assessed using a question 'How interested will you be to receive health education for maternal and child-care through mobile phones' on a 5 item Likert type scale ranging

from 1 (not at all interested) to 5 (very interested). The socioeconomic status of the participants was assessed using the modified Kuppaswamy scale updated for income criterion (8).

Data analysis: The data was entered and analyzed using SPSS Version 17. Categorical variables were expressed in frequency and percentages and quantitative variables through mean and standard deviation. Bivariate associations were tested using chi-square test. A binary logistic regression analysis was conducted by including the sociodemographic factors associated with ownership of mobile phone and the willingness to adopt mHealth technology for receiving health information. A P value ≤ 0.05 was considered significant.

Results

A total of 225 eligible women in as many households were located. Twenty-four women who were eligible could not be contacted even after a subsequent visit to their house. We were ultimately able to enroll 201 women in the study (Figure 1).

The mean age of the subject was 26.4 ± 3.8 (Mean \pm S.D) years, (25.91-26.98, 95% C.I). More than two thirds (70.1%) of the subjects had completed more than 8 years of schooling while the mean years of completed schooling was 10.1 ± 4.4 years. A majority (58.7%) of the subjects were classified as belonging to either the lower middle (44.3%) or the upper lower (13.4%) socioeconomic classes as per the modified Kuppaswamy classification (Table 1).

Almost all (96.5%) participants had access to a mobile phone at home. A personal mobile phone was available with 164 (81.6%) subjects. Higher educational attainment considered as 10 years of completed schooling was the strongest predictor of mobile phone ownership among the subjects (Table 2).

A majority (61.2%) of the participants were using smartphones. Mobile phone skills possessed by the subjects included the ability to receive calls (96%), reading a SMS text message (73.1%), sending a SMS text message (69.7%) and using mobile internet services (36.8%). Only 17 (8.2%) subjects reported receiving any mHealth related communication on their mobile phones in the previous 3 months from the day of interview (Figure 1).

The willingness to receive mHealth communication among the subjects was assessed using a question on a 5 item Likert type scale (Table 1). One hundred fifty-seven (78%) of the subjects expressed interest

in receiving health information (mHealth services) on their mobile phones. On multivariable analysis, the availability of a personal mobile phone and educational attainments of at-least 10 years of completed schooling were significantly associated with presence of willingness to adopt mHealth for health communication (Table 3).

As for the medium of mHealth communication, voice calls were preferred by 91 (45.3%), SMS text messages by 37 (18.4%) while both voice calls and text messages were equally preferred by 30 (14.9%) subjects (Figure 1).

Discussion

We conducted a cross sectional study among women caregivers of under 5 children up to 35 years of age in an urban resettlement colony in Delhi, India. More than four-fifths of the subjects had a personal mobile phone. A study on readiness for mHealth by Reddy et al conducted in urban areas of Puducherry, India among the general population found nearly three fourths of their participants owning personal mobile phones (7). Another study in a rural area in Bangalore, India reported found nearly 87% households owning mobile phones. (8) India has over 1 billion mobile subscriber base. (9) Our results corroborate the findings of other studies which indicates that mobile phone availability is ubiquitous in Indian populations across diverse sociodemographic groups (3,7). We also observed in the present study that mobile phone accessibility was almost universal while personal mobile phone ownership was also quite high despite the mean education level of the women in the study population to be only 10 years of completed schooling. Nevertheless, our findings may not be generalizable across India especially in regions where socio-cultural resistance and dominant patriarchy may prevent young women from independently accessing mobile phones. (10) Educational status was found to be the strongest predictor of mobile phone ownership in our study which suggests that there is a risk that the most socioeconomically disadvantaged populations may be unable to avail and benefit from the government sponsored mHealth services. Hence, the reduction of the digital divide remains a key challenge in universalizing mHealth services and bridging the gap in healthcare through this medium.

A majority of the subjects in our study were using smartphones. Smartphones provide users with the

ability to run dedicated mHealth applications which provide greater interactivity, volume of content and on demand access compared to conventional mHealth methods. However, a global research survey shows that only 15% of Indians are smartphone users. (11) The higher prevalence of smartphone use in our study is probably due to the urban setting in which the study was conducted, the relatively higher socioeconomic status of the population compared to the national average and the rapidly increasing affordability of smartphones. The present study found 69.7% of the subjects had the ability to both, read and send SMS text messages through mobile phones. In contrast, the study in Puducherry found a majority of the participants were unable to send and receive text messages (7) while the study in Bangalore reported only 14% of their participants using SMS text messaging function on their mobile phones (3). A study on evaluation of MCTS services in Bihar by Nagendra et al found that only one fifth of the participants reported receiving SMS text messages sent to them and the inability to satisfactorily operate the mobile phone was a major reason for their inability to read the text messages. (12)

Mobile phone internet facilities were being accessed by nearly a third of the subjects. However, the study in Bangalore, India by DeSouza et al found just 1% subjects using mobile health facilities (3). Mobile internet can deliver real-time health information and can enhance mHealth service quality and our results such that the trend of its growing proliferation might provide another valuable avenue for mHealth service delivery in the near future.

More than three-fourths (78%) of our study subjects were interested in receiving mHealth services for health promotion although a stronger expression of interest was seen in a lower proportion (60%) of subjects. Only 8% reported having received any form of health communication on their mobile phones in the previous 3 months which suggests that there is a significant unmet need for high quality mHealth services in the study population. The willingness towards receiving mHealth services on mobile phones reported in the present study is higher compared to the study in Puducherry (7) in which only half of the participants were willing but much lower compared to the study in Bangalore in which nearly all the participants were willing to receive information on mobile phones for their health promotion (3). Higher educational status equivalent

to 10 or more years of completed schooling and availability of a personal mobile phone were the factors which were highly associated with the willingness to receive mHealth services. Our findings suggest that the digital divide can preclude socioeconomically disadvantaged populations from accessing and benefiting from mHealth services, thereby greatly reducing the power and the potential of mHealth in bridging the gap in healthcare for these vulnerable populations. Hence, the expansion of government sponsored mHealth services must necessarily be accompanied with efforts to both, increase access to mobile phone technology and enhance digital literacy in the most socioeconomically deprived segments of the target populations.

Although in our study, the preferred medium of mHealth service delivery in maximum subjects were exclusively voice calls (45.1%) but SMS text messages was also the preferred medium in a sizable proportion (18.4%). The study in Puducherry reported exclusive voice call preference to be even lower (35%) (7). These results suggest that IVR and voice messages for improving maternal health through initiatives like the Kilkari should be complemented with SMS text messages considering the additional advantages of the latter medium.

The strength of the present study is that it is one of the first studies relating to readiness and willingness for mHealth services in India conducted exclusively in young women of the reproductive age group who were active caregivers of any under 5 child in their families.

Our study has the limitation that it relied upon self-reported assessments of mobile phone operational skills in the study subjects and did not evaluate their readiness for mHealth through direct observation of the enquired skills. Also, the likely interrelationship between educational status and the socioeconomic status could have influenced the results of the multivariable analysis. Finally, we did not evaluate for concerns regarding breach of privacy in the study population. The possibility of reluctance in disclosure of telephonic contact data by the beneficiaries due to concerns regarding violation of privacy when actually enabling the mHealth services cannot be ruled out.

Conclusion

In conclusion, mHealth programs targeting women of the reproductive age group requires further

acceleration and scaling up in Indian healthcare settings. Future researchers should ascertain the readiness for mHealth in socioeconomically deprived groups and areas with suspected sociocultural resistance and gender deprivation and envisage means to overcome such barriers and challenges in order to truly advance an inclusive mHealth platform for all Indians.

Authors Contribution

All authors have contributed equally in this study.

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Tables

TABLE 1 WILLINGNESS TO RECEIVE MHEALTH SERVICES ON MOBILE PHONES AMONG STUDY SUBJECTS, DELHI, 2016-17 (N = 201)

Socio-demographic variable	Total	Interested to receive health education through mobile phones				
		Not at all interested	Unlikely to be interested	Somewhat interested	Interested	Very much interested
Age (years)						
< 25	65	8 (12.4)	3 (4.6)	15 (23)	15 (23)	24 (37)
≥ 25	136	16 (11.7)	17 (12.5)	24 (17.6)	42 (30.9)	37 (27.2)
Personal Mobile phone						
Available	164	11 (6.7)	9 (5.4)	35 (21.3)	53 (32.3)	56 (34.1)
Unavailable	37	13 (35.1)	11 (29.8)	4 (10.8)	4 (10.8)	5 (13.5)
SES						
Upper	11	0	0	2 (18.2)	5 (45.5)	4 (36.3)
Upper middle	89	5 (5.6)	5 (5.6)	18 (20.3)	17 (19.1)	27 (30.4)
Lower middle	72	14 (19.6)	7 (9.7)	13 (18.1)	30 (41.8)	25 (34.8)
Upper lower	29	5 (17.2)	8 (27.6)	6 (20.6)	5 (17.3)	5 (17.3)
Education						
< 10	71	16 (22.6)	15 (21.2)	7 (9.8)	18 (25.3)	15 (21.1)
≥ 10	130	8 (6.2)	5 (3.8)	32 (24.6)	39 (30)	46 (35.4)

TABLE 2 ASSOCIATION OF FACTORS ASSOCIATED WITH PERSONAL MOBILE PHONE ACCESS IN WOMEN UP TO 35 YEARS OF AGE, DELHI, 2016-17 (N = 201).

Sociodemographic variable	Total (N)	Personal mobile phone present, n (%)	Adjusted oddsa (95% C.I.)	P value
Age (years)				
< 25	65	53 (81.5)	0.8 (0.35-1.9)	0.65
≥ 25	136	111 (81.6)		
SES*			3.2 (0.98 – 10.7)	0.05
Upper	83	79 (95.1)		
Lower	118	85 (72)		
Education (years)**			5.5 (2.2 – 13.9)	< 0.01
< 10	71	43 (60.5)		
≥ 10	130	121 (93)		

a: Adjusted odds with other predictor variables controlled. Goodness of fit was assessed using Hosmer Lemeshow test.

* Upper SES combined Upper and Upper Middle categories while Lower SES combined Lower middle and Lower socioeconomic categories

** : Years of completed schooling

TABLE 3 ASSOCIATION OF SOCIODEMOGRAPHIC FACTORS WITH WILLINGNESS TO RECEIVE HEALTH EDUCATION THROUGH MOBILE PHONES AMONG ADULT WOMEN CAREGIVERS OF UNDER-5 CHILDREN IN SELECTED POPULATION OF AN URBAN RESETTLEMENT COLONY IN DELHI, 2016-17 (N = 201).

Sociodemographic variable	Total (N)	Interested to receive mHealth service, n (%)	Adjusted odds (95% C.I.)	P value
Age (years)				
< 25	65	54 (83)	1.6 (0.67-4.1)	0.26
≥ 25	136	103 (75.7)		
SES*			0.76 (0.26-2.1)	0.003
Upper	83	73 (87.8)		
Lower	118	84 (71.8)		
Education (years)**			4.2 (1.6-11.2)	0.61
< 10	71	40 (56.3)		
≥ 10	130	117 (80)		
Personal mobile phone			8.8 (3.5-22)	< 0.001
Available	164	144 (87.8)		
Unavailable	37	13 (35.1)		

a: Adjusted odds with other predictor variables controlled. Goodness of fit was assessed using Hosmer Lemeshow test.

* Upper SES combined Upper and Upper Middle categories while Lower SES combined Lower middle and Lower socioeconomic categories

** : Years of completed schooling

Figures

FIGURE 1 FEASIBILITY AND WILLINGNESS FOR MHEALTH SERVICES AMONG ADULT FEMALE CAREGIVERS OF UNDER-5 CHILDREN UP TO 35 YEARS IN SELECTED POPULATION OF AN URBAN RESETTLEMENT COLONY IN DELHI, 2016-17

