

Perceptions and knowledge toward mobile-health among the college going students in Coastal South India

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Abstract

Background: Among the manifold uses of mobile phones, mobile-health (mHealth) has been an important one, which is the practice of public health initiatives by awareness raising and communication campaigns. Optimum utilization of mHealth is possible only through adequate awareness. Hence, we aimed to study the perceptions and knowledge about mHealth among college going students in Mangalore, India. **Materials and Methods:** A cross-sectional study was conducted in March 2014 among 627 students in selected engineering (302 students) and medical colleges (325 students) in Mangalore, India. Colleges were selected using convenience sampling (nonrandom) method. Data were collected using semi-structured self-administered questionnaire and analyzed. **Results:** Overall, 48.9% were males, 61.4% belonged to 18-20 years age group. The awareness about mobile phone health utilities among medical and engineering students was found to be similar. Among those who were aware of the concept of mHealth (74 [11.2%]), 40 (54.1%) were medical students. Marginally higher proportion of medical students felt mHealth could be helpful in protecting the patients' confidentiality and would help in better communication with the patients. **Conclusion:** There was high level of general awareness about mHealth among the subjects. However, many specific areas had limited knowledge among both the streams of students, hence highlighting the need for increasing awareness and sensitization.

Key words: Knowledge, mHealth, mobile phones, perceptions, South India, students

INTRODUCTION

Mobile phones are an integral part of our modern life. India is the second largest mobile phone user with over 900 million users in the world.^[1] According to

the International Telecommunication Union, there are approximately 5 billion mobile phone subscriptions in the world, over 70% of them reside in low and middle-income countries and over 85% of the world's population is now

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covered by a commercial wireless signal.^[2,3]

Currently, mobile phones serve an important role in public health initiatives through mobile-health (mHealth or eHealth). mHealth helps in overcoming resource limitations on supply side of health care as well as structural barriers and behavioral limitations on the demand side.^[2] Various mHealth projects are carried out in developed, and developing countries focusing mainly on Human Immunodeficiency Virus (HIV), malaria and mother, and child health that includes text messages primarily to run awareness raising and communication campaigns.^[3] Other initiatives include “mHealth for tobacco control” — A World Health Organization (WHO) tobacco-free initiative that works with government, public, and private sectors to help countries advance their tobacco control work,^[3] “mCARE for maternal, neonatal and postpartum care” — A pilot project in Bangladesh aimed at improving maternal and neonatal care utilizing mobile phones and database technologies.^[4]

Despite the emerging threats of health complications such as malignancies of the brain due to long-term usage of mobile phones,^[5-8] their usage and research on their health utilities have been increasing.^[1] This increase can further enhance the prospects of using mobile phones for delivering various health care services.^[2] However, these services and the associated technology can be utilized only if there is an appropriate level of awareness and favorable attitude among the people towards the same. Currently, the younger generation is becoming increasingly involved in usage of mobile phones, which is likely to increase in the foreseeable future.^[1] However, there is a paucity of studies examining the perception as well as awareness towards health utilities of mobile phones including mHealth among the younger people, especially college going students and also documented studies comparing the level of awareness towards mHealth among medical and engineering students are lacking. Hence, this study was conducted to gain an insight into this aspect among the medical and engineering college students in the South Indian coastal city of Mangalore.

MATERIALS AND METHODS

This cross-sectional study was conducted in the select colleges of Mangalore city, in Southern Karnataka state of India, in the month of March 2014. The students of the selected colleges aged 18 years or above were the study subjects. The sample size was calculated with anticipated level of awareness about health effects of mobile phones among professional college students as 50%, 7% relative precision, 95% confidence interval, and 10% nonresponse

error, sample size is 330 each in medical and engineering college students, totaling to 660 students. The colleges were selected using convenience sampling (nonrandom) method. Approval was obtained from the Institutional Ethics Committee (IEC) of Kasturba Medical College (Manipal University, Mangalore). After obtaining the approval of the IEC, the institutional heads of the selected colleges were approached, and their permission was sought. The colleges were visited for data collection after obtaining the necessary permissions on a preinformed date without altering the regular schedule. The students were approached in their classes and explained clearly about the objectives of the study. They were provided with the participant information sheet, and written informed consent was taken from each of them. Those who did not consent to take part in the study and those students who remained absent despite three repeated visits to the college were excluded from the study. During subsequent visits to the same colleges, absentees of the previous visit days based on the attendance records were contacted to avoid the repetition of contacting the same students.

All the eligible students from the selected colleges were included in the study till the required sample size was met from the professional colleges. Data were collected using a semi-structured self-administered questionnaire including sociodemographic variables and sections on perceptions and awareness towards mHealth. The pretested questions were in the form of 5-point Likert scale, with 5 being strongly agree, 4-agree, 3-neutral, 2-disagree, and 1 as strongly disagree. Collected data were analyzed using Statistical Package for Social Sciences (SPSS) version 15.0. The scores were compiled; mean value and standard deviation were calculated. They were compared across medical and engineering students using Independent *t*-test and $P < 0.05$ was considered as statistically significant.

RESULTS

A total of 627 participants (306 [48.9%] were males and 321 [51.1%] were females) completed the questionnaire. Of the 627 participants, the maximum number of students was from ≤ 20 age group 385 (61.4%), followed by 21-24 years age group 233 (37.2%). As shown in Table 1, high proportion of participants were Hindus by religion (406 [64.8%]) followed by Christians (126 [20.1%]). Of the 627 participants, 302 (48.2%) were engineering, and 325 (51.8%) were medical students. The awareness about mobile phone health utilities among medical and engineering students was found to be similar in most of the components [Table 2]. There were some aspects of health utilities of mobile phones where the engineering and

medical students differed in their level of awareness which were found to be statistically significant, as reflected by the scores (ranging from 1 to 5) for mobile phones playing a role in spreading awareness about common diseases (the mean scores of medical and engineering students were 3.89 and 4.13, respectively, $P < 0.0001$), mobile phones playing a role in counseling for cessation of addictions (the mean scores of medical and engineering students were 3.32 and 3.55, respectively, $P = 0.004$), mobile phones playing a role in early diagnosis of diseases (the mean scores of engineering and medical students were 3.12 and 3.45, respectively, $P < 0.0001$) and awareness of smartphone applications for assessing certain disease conditions (mean scores of engineering and medical students were 3.47 and 3.81, respectively, $P < 0.0001$). However, the

overall mHealth utility awareness scores were highest for locating the hospitals in emergencies (4.2), reminding the appointments with doctors (4.16), and spreading awareness about common diseases (4.01).

Overall, 11.2% (74) were aware of the term mHealth, of which 40 (6.3%) were medical, and 34 (4.9%) were engineering students. Of 74 (11.2%) participants who are aware about the concept of mHealth, 29 (72.5%) medical students and 24 (70.6%) engineering students felt that mhealth protects the confidentiality of the patient, wherein many sensitive aspects of the health care delivery could be dealt using mobile phones and patients physical presence is avoided. This drastically reduces the chances of other persons spotting the patient, help conduct surveys, and improve chances of maintaining anonymity. Also, 23 (7.1%) medical students and 24 (7.9%) engineering students agreed that mHealth is a means of effective communication between doctor and patient. Thirty-four (10.5%) medical students and 32 (10.6%) engineering students were of the opinion that mHealth decreases travel time of patient, 19 (5.8%) medical students and 22(7.3%) engineering students were aware about the projects for reminding pregnant and lactating mothers about immunization schedule and health care [Table 3].

Table 1: Sociodemographic profile of the study population (n = 627)

Characteristics	n (%)
Gender	
Male	306 (48.9)
Female	321 (51.1)
Age group	
≤20	385 (61.4)
21-24	233 (37.2)
>24	009 (01.4)
Religion	
Hindu	406 (64.8)
Christian	126 (20.1)
Muslim	067 (10.7)
Others	028 (04.5)
Course	
Medicine	325 (51.8)
Engineering	302 (48.2)

DISCUSSION

A high number of participants had a positive perception on utilities of mobile phones towards health. The majority of the participants were aware that mobile phones can be

Table 2: Comparison of awareness of health utilities of mobile phones among study participants (n = 627)

Statement	Mean (SD)			P
	Medicine	Engineering	Total	
For health education (n=623)	3.87 (0.84)	3.88 (0.82)	3.88 (0.83)	0.84
To spread awareness about common diseases (n=625)	3.89 (0.80)	4.13 (0.79)	4.01 (0.80)	<0.0001*
Reminders for appointment with doctors (n=625)	4.15 (0.80)	4.18 (0.82)	4.16 (0.81)	0.714
Counseling for cessation of addictions (n=621)	3.32 (0.98)	3.55 (0.96)	3.43 (0.98)	0.004*
For self-management of illness (n=623)	3.28 (1.03)	3.47 (0.97)	3.37 (1.00)	0.017*
For adherence to medication (n=620)	3.38 (0.98)	3.47 (0.88)	3.43 (0.93)	0.236
For early diagnosis of diseases (n=618)	3.12 (1.07)	3.45 (1.03)	3.28 (1.06)	<0.0001*
Smartphone apps for assessing certain disease conditions (n=621)	3.47 (1.02)	3.81 (0.90)	3.63 (0.98)	<0.0001*
Navigation apps for locating hospitals in emergencies (n=624)	4.21 (0.85)	4.19 (0.81)	4.20 (0.83)	0.788
For data collection in medical research (n=624)	3.90 (0.92)	4.03 (0.83)	3.97 (0.88)	0.067

*P value significant at 0.05 level. SD: Standard deviation

Table 3: Awareness on specific utilities among study participants aware of mHealth (n = 74)

Statement	Medicine n (%)	Engineering n (%)	Total n (%)
Protecting the confidentiality of patient	29 (08.9)	24 (07.9)	53 (08.5)
Effective communication between doctor and patient through mHealth	23 (07.1)	24 (07.9)	47 (07.5)
Decreases the travel time of patient	34 (10.5)	32 (10.6)	66 (10.5)
Project "mother" for reminding pregnant and lactating mothers about immunization schedule and health care	19 (05.8)	22 (07.3)	22 (03.5)

mHealth: Mobile-health

utilized for health education, to spread awareness about common diseases, counseling for cessation of addictions, adherence to medication. The awareness was similar among medical students in previously reported studies.^[9] In most of the mHealth utility awareness scores, engineering students had higher scores. This could probably be due to the engineering students having increasing access to the mobile phone applications and usage in terms of designing the technology, utility testing, and development. Also, they become acquainted faster and are constantly updated about the most recent developments on various aspects of mobile phones including applicability in health care service delivery. However, studies comparing the knowledge and perceptions of medical students with that of engineering students are lacking. The awareness about mobile health technology among medical students was reported to be 54.4% in a previous study.^[9] However, in our study, overall 11.2% of the students were aware of the concept of mHealth, of which 6.3% were medical students and 4.9% were engineering students. This could be due to the fact that the term mHealth is of recent origin in India and its use has not established much across various scientific disciplines, leading to lower awareness about mHealth concepts despite the awareness about health related applications in the mobile phones. Also, the extent of use of mHealth services in practice among our study subjects is not known. In a previous study, 93.3% medical students were reported to actually use medical apps.^[10] In our study, higher proportion of medical students opined that mHealth and its concepts could be helpful in maintaining the confidentiality of patients. Mobile phone technology will deviate or reduce the need for patient physically visiting the hospital in seeking counseling services or guidance regarding the medications among other utilities. In medical conditions such as HIV and leprosy,^[11] where stigma plays a major role in health seeking behavior of the patients and overall health outcomes, mobile phones will eliminate the chances of patient being seen by others and therefore protecting the privacy. In addition to these, mHealth applications will help in maintaining the anonymity while conducting surveys and opinion collection. Interestingly, in a review by WHO reported that in many areas, maintaining confidentiality of patients while providing mHealth services remains as a challenge.^[12] Indeed in a study conducted on People living with HIV, who were addicted to smoking, cessation counseling program delivered through mobile phones had a better response than the routine casual contact program.^[13] In another study from Cambodia, people aged >18 years receiving vaccination were sent automatically generated text message asking whether any adverse reactions occurred 2 days after being vaccinated. If they had an adverse event, they were advised

to consult the nearest available doctor. This significantly reduced morbidity associated with vaccination adverse effects.^[14] Mobile phone based messaging applications have also proved to be convenient and cost effective option for promoting preventive health care facilities^[15] and initiating timely therapeutic measures.^[16] Recently, a mobile based system was established for providing information related to health to pregnant and lactating mothers. In this program, health devices specific to their health condition like the care to be taken in high-risk pregnancy, immunization reminders, child care, were provided through SMS alerts.^[17] Thus, the integration of mobile phone technology and health care in the form of mHealth in the delivery of both general health care and disease-specific interventions is well evident. Several studies have reported various utilities of mHealth, but not the awareness, perception, and readiness to use the same among young people. This is essential for planning and taking policy decisions about increasing the knowledge about mHealth among younger population and to identify the factors, which facilitate mHealth applicability. In our study, though there was a high level of awareness about mHealth and its various aspects, there were differences across the courses with respect to several components.

CONCLUSION

The awareness towards health utilities of mobile phones among the study subjects were high, despite the low familiarity of the term mHealth and this was similar across the medical and engineering groups. Hence, awareness about the term mHealth among medical and engineering students needs to be improved. Specific utility and applicability training regarding mHealth need to be initiated for students across all the disciplines.

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Conflicts of interest

There are no conflicts of interest.

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