



# Assessing awareness and use of mobile phone technology for health and wellness: Insights from India

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## ABSTRACT

**Purpose:** The purpose of this study is to determine the awareness and use of mobile phones and applications for health service delivery among technical students, working staff, medical students, and health professionals of India.

**Design/methodology/approach:** A cross-sectional study was conducted with a sample size of 386 students, working staff, and health professionals of engineering and medicine using structured questionnaires and the data were analyzed.

**Findings:** Most of the responses are female (50.25%) of age 18–25 (48.44%). However, respondents have used mobile phones for managing menstrual cycles and chronic/lifestyle diseases. Moreover, the degree of awareness and familiarity about the term “mobile health” was found to be more among technical students and working staff (55.17%) than medical students and health professionals (44.82%). Statistical results also revealed that awareness about the use of mobile phone for health-related components was found to be significant except for health awareness and education, and medication adherence and refilling. Further, about mobile health applications use, there exists a significant association between the study groups for the self-management applications of cancer, cholesterol, heart diseases, and stroke.

**Conclusion:** The study recommends to improve peoples’ awareness and familiarity about the use of mobile phone for managing health and service delivery. This can be achieved with the help of health professionals as most of the people prefer personal visits than through mobile interventions. Moreover, peoples’ socio-demographic factors, perception about the device, and health information also play an important role in using mobile health applications for health service delivery.

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## Introduction

Over the past several decades, in the developing countries, the pattern of disease burden had created a significant challenge for the global health policy to address the issues relating to lack of focus about infectious diseases and awareness [1]. As a result, the use of information and communication technologies (ICT) in healthcare helps people and healthcare professionals in improving the focus by reducing effort and increasing response rate thereby monitoring their opinions [2,3]. This practice of using ICT, particularly the mobile devices in medicine and health systems are termed as mobile health (mHealth) [4]. It is defined as “emerging mobile communications and network technologies for healthcare systems” [5]. These mobile technology/wireless devices are connected between people and healthcare professionals through multiple interphases with/without the use of mobile applications

(apps). Due to its features like device mobility, advanced computational capacity, and access speeds [6] it is used in receiving health information, improving social influence and accessibility, and utilizing entertainment based on various features, supporting health goals and generating evidence for patient’s diagnosis, disease control, and monitoring preventable and chronic illness condition [7–10].

Further, during implementation, the healthcare solution providers should also plan for targeted social change by providing necessary training and awareness for the health and administrative staff about the system adoption which motivates them to use and support front-end and back-end activities [11–13]. In Africa, mHealth innovations have practically found to be successful in delivering services for HIV/AIDS, maternal care and child health, and management of Ebola and malaria epidemics through patient tracking and reporting [14–16]. Therefore, this adds to the challenge of healthcare solution providers and/or the healthcare professional in familiarizing software solutions for the people as they will be the participants for managing health and diseases using mHealth apps and systems [17].

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Despite such positive associations, prior studies in the developing countries have indicated that individual characteristics, health conditions [18], knowledge, and familiarity of mobile health are required for encouraging people towards its adoption and acceptance [19,20]. For example, questionnaire survey conducted among medical and engineering students in India identified lack of awareness about its use for specific health-related components and suggested to incorporate sensitization programs to improve them [21]. Similarly, the rate of awareness was also seen to be less and unfavorable among the people of Iran due to literacy and recommended to provide electronic informative-communicative resources to support and improve health conditions [22]. Likewise, the knowledge about mHealth appeared to be low in the regions of Bangladesh and the authors when compared with mHealth interventions and personal visits, found that its compliance to prescription was similar [23]. Hence, proper awareness, knowledge, and familiarity of various health applications are also required for encouraging mHealth adoption and acceptance among people.

Thus, the study was aimed to determine the awareness and use of mobile phones and applications for health service delivery among technical students and working staff, and medical students and health professionals of India. It was also indicated that, India ranked 2nd among developing countries in its maturity for mHealth adoption [24] and 8th among the most attractive countries for implementing digital health solution [25]. In India, the wireless telephone subscribers across rural (499.00 million) and urban (668.44 million) regions are increasing at an unprecedented rate with an overall teledensity of 90.11% [26]. Among the group of twenty (G20), India was recognized as the largest mobile internet usage nation [27] and is currently having the second largest online market with more than 460 million internet users [28]. According to a healthcare solution provider, to become an economic powerhouse, India should focus on building a healthy population by improving healthcare expenditure and facilities which are currently lagging from the WHO set standards [29,30]. With the disparity in the level of the population of 1.3 billion [31] and improper healthcare expenditure and facilities [32] for the people during preventive and chronic/lifestyle health conditions, it is desirable to use mobile phone technology and applications for managing health services. Thus the process of telemedicine, electronic health records, mobile health applications, etc. have been introduced in the healthcare system for providing continuous and evidence-based health monitoring and control practices.

The government has initiated various mHealth services and apps from a national health portal which is single point access for health-related information. These apps are used for improving awareness about health and disease conditions, maternal and child health, etc. To contribute, many private companies and startups have also developed apps for providing health tips, consultations, medicine reminders through SMS, telemedicine, voice and web service. In rural regions, various mHealth projects are connected through health workers to monitor and to improve maternal and child health, patients with Tuberculosis, etc. These systems use different tools which are synchronized with mobile phones and/or apps of a health worker which is used for informing vaccination dates, scheduling visits, and treatments. This system not only improves the health of the people and patients in the last mile but also improves data recording and reporting system of health workers thereby saving time and data entry errors [33]. However, the use of mobile phone in health service delivery is advantageous for the rural and urban populations, as lack of awareness and its access will keep them away from using it efficiently [34]. Hence, there is a need to study the awareness and use of such cost-effective technologies and preventative interventions which will improve the health status of the people.

To date, we can identify that there exist various literature which explains the importance of mobile phone technology and apps for improving the health and service delivery across different countries. However, not many studies have been available specifically addressing the components of awareness and use among Indian populations. Thus, this study attempts to fill the gap by determining the awareness and use of mobile phones and apps for health service delivery among technical students, working staff, medical students, and health professionals of India. In addition, the study also contributes to identifying the significance and magnitude of the association of mHealth app awareness and use among these groups.

## Methodology

A cross-sectional study was conducted to measure peoples' awareness and use of mobile phone technology and applications for receiving health information from March 2018 to May 2018. Participants were selected based on convenience and simple random sampling, wherein the former is used for collecting responses from the students of engineering and medical colleges and the later among respondents working in engineering and medicine. A pre-tested questionnaire was designed using existing literature [16,21–23,35] and offline focus group interviews. The focus groups consisting of two working-class individuals, three engineering college students, and two medical college students contributed to the study by suggesting questions related to familiarity or awareness about the term “mobile health”, health conditions, and mobile phones used for communicating or receiving health information. Based on these suggestions, the questionnaire was modified and pre-tested offline with one doctor and two management professors of operations discipline for identifying unclear wordings, components, and structure. These questions are measured using Likert scales and includes open answer type.

A sample size of 386 was estimated from the Survey Monkey website [36–40], and the data collection was processed through online and offline modes through personal contacts and in turn asking them to send it to their contacts. Offline responses have been collected from the students of technical (193 students) and medical colleges (83 students) located in the regions of Telangana and Maharashtra (India). To achieve national representation from other states of India, online survey questionnaire was sent randomly through email requests, Facebook and LinkedIn messengers, and as WhatsApp messages to 397 health professionals and 398 technical experts working across various domains. Additionally, multiple reminders have been sent to those respondents for participating and indicating their importance in the survey.

A total of 213 responses were received online, indicating a response rate of 26.69%. Overall, a total of 489 responses have been received including offline questionnaires. After discarding incomplete questionnaires, a sample size of 409 was considered valid for this study. As the survey was conducted among students and professionals, depending upon their educational background and field of work such as software developer, production manager, healthcare consultant, nursing, para-medicine, etc., the valid responses 386 (out of 409 responses) have been grouped as “technical students and working staff” (224 respondents) and “medical students and health professionals (practitioners) including doctors and physicists” (162 respondents). The remaining 23 responses have not been included in this study as they are still pursuing their 12th or Pre-University Course (PUC).

Statistical analysis was performed on the data in descriptive and analytical levels using Statistical Package for Social Sciences (SPSS) software. Descriptive statistics such as frequency distributions and means were used to evaluate demographic variables and sections on awareness and use of mobile phones towards health.

**Table 1**  
Respondents demographic characteristics.

Characteristics	Frequency	Percentage
<i>Gender distribution</i>		
Male	192	49.74%
Female	194	50.25%
<i>Age distribution</i>		
18–25	187	48.44%
26–35	145	37.56%
36–45	44	11.39%
46–55	06	1.55%
> 55	04	1.03%
<i>Marital status</i>		
Single	302	78.23%
Married	84	21.76%
<i>Education distribution</i>		
12th or PUC	03	0.77%
Bachelor degree	216	55.95%
Master degree	149	38.60%
Doctoral degree	18	4.66%
<i>Occupation distribution</i>		
Technical students and working staff	224	58.03%
Medical students and health professionals	162	41.96%
<i>Living arrangements</i>		
Family	195	50.51%
Hostel	109	28.23%
Paying Guest	58	15.02%
Others	24	6.21%
<i>State or territory</i>		
Andhra Pradesh	31	8.03%
Assam	8	2.07%
Karnataka	54	13.98%
Telangana	92	23.83%
Maharashtra	85	22.02%
Madhya Pradesh	13	3.36%
Nepal	18	4.66%
Tamil Nadu	34	8.80%
Uttar Pradesh	17	4.40%
West Bengal	6	1.55%
Kerala	28	7.25%
<i>Location</i>		
Rural	90	23.31%
Semi-urban	84	21.76%
Urban/town	212	54.92%
<i>Smartphone availability</i>		
iPhone	48	12.43%
iPad	12	3.10%
Android smartphone	325	84.19%
Android tablet	03	0.77%
Blackberry	03	0.77%
Windows tablet	03	0.77%
Windows smartphone	06	1.55%
Basic mobile phones	07	1.81%

The compiled scores were compared across technical students and working staff, and medical students and health professionals using *p*-value, Chi-square value, and effect sizes (Phi values) were calculated.

## Results

The study results present descriptive statistics and tables for participants' demographic characteristics, indicating the awareness level and use of mobile phones and apps for health service delivery.

### Demographic characteristics of the respondents

The demographic characteristics of the respondents have been represented in Table 1. From a total of 386 valid responses, 49.7% male respondents and 50.25% female respondents completed the questionnaire, indicating that the sample was balanced with respect to the gender distribution. Of these samples, 48.44% of respondents are of age 18–25 which is maximum, followed by 37.56%

**Table 2**  
Mobile phone use for health conditions.

Health Conditions	Frequency	Percentage
Asthma	28	7.25%
Blood pressure	41	10.62%
Cancer	54	13.98%
Cold and fever	101	26.16%
Diabetes	36	9.32%
Epilepsy	7	1.81%
Hypertension	35	9.06%
Itching	14	3.62%
Kidney disease	33	8.54%
Menstruation	34	8.80%
Mental health	36	9.32%
Obesity	45	11.65%
Pregnancy	18	4.66%
Skin disease	22	5.69%
Stress	89	23.05%

respondents of age 26–35. This indicates that the age distribution of the responses is also relatively balanced relating to mobile internet usage rate among G20 nations [41] and the distribution of the total population [42]. The other demographic information of the respondents is outlined in Table 1.

### Awareness about the use of mobile phone for health communication and delivery

From Table 1, we can identify that all the 386 respondents owned a mobile phone. Of these, 347 (89.89%) respondents have used mobile phones for searching health information online. This means that respondents have used mobile phones with/without internet access to receive health materials, but when asked about the awareness and familiarity about the term “mobile health”, only 174 (45.07%) respondents have indicated that they are extremely aware and familiar. Table 2 shows the list of health conditions for which respondents have used mobile phones.

However, when indicated about the awareness level about the use of mobile phones for health-related components, the score values differ between technical students and working staff, and medical students and health professionals (Table 3). For example, the mean scores for measuring awareness level in the use of mobile phones for assessing and diagnosing disease conditions and medication reminders for technical students and working staff, and medical students and health professionals were 3.70 and 3.21 having a *p*-value < 0.001. Similarly, the *p*-value differed when analyzed for awareness of mobile phone use in locating hospital and scheduling appointments, storing patient records, doctor-stakeholders communication, and immunization programs for pregnant and lactating mothers. Table 3 compares the awareness about mobile phone use for health-related components among technical students and working staff, and medical students and health professionals.

From Table 3, since *p*-value was less than 0.05 except for health awareness and education, and medication adherence and refilling, indicating the rejection of the null hypothesis at a significance level of 5%. Therefore it can be concluded that there exists a significant difference between the awareness level among technical students and working staff, and medical students and health professionals. Based on the mean value, we can conclude that technical students and working respondents are more aware of the use of mobile phones for health utilities than medical students and health professionals.

Additionally, the impact of dependency between the responses, when calculated, revealed that the magnitude of the effect between the groups is almost medium for assessing and diagnosing disease conditions and medication reminders (0.27), storing pa-

**Table 3**  
Comparison of the awareness about mobile phone use for health-related components among technical students and working staff, and medical students and health professionals ( $n = 386$ ).

Indicators of awareness about mobile phone use for health-related components	Mean (SD)		<i>p</i> -value (2-tailed)	Phi value	Measure of association
	Technical students and working staff	Medical students and health professionals			
Creating health awareness and education like cessations etc.	3.79 (0.95)	3.65 (0.75)	0.123	0.22	Small effect
Assessing and diagnosing certain disease conditions and medication reminders.	3.70 (0.86)	3.21 (0.95)	0.000*	0.27	Medium effect
Locating hospitals and for scheduling appointments	4.13 (0.87)	3.80 (0.76)	0.000*	0.34	Medium effect
Medication adherence and refilling	3.66 (0.91)	3.48 (0.99)	0.078	0.21	Small effect
Storing patient records	3.73 (0.96)	3.22 (1.03)	0.000*	0.25	Small effect
Doctor-stakeholders communication informing health status of the region	3.70 (0.95)	3.16 (0.95)	0.000*	0.37	Medium effect
Immunization reminders for pregnant and lactating mothers	3.66 (0.94)	3.41 (1.18)	0.021*	0.22	Small effect

\* *p*-value significant at 0.05 level.

**Table 4**  
Comparison of the use of self-managing apps among technical students and working staff, and medical students and health professionals based on Chi-square test results ( $n = 386$ ).

Components of mHealth apps use	Scale	Technical students and working staff Percent (Count)	Medical students and health professionals Percent (Count)	<i>p</i> -value(2-tailed)	Phi value	Measure of association
Self-managing of cancer	Yes	29.53% (114)	9.33% (36)	0.000*	0.29	Medium effect
	Maybe	8.81% (34)	7.77 (30)			
	No	19.69% (76)	24.87% (96)			
Self-managing of cholesterol, heart diseases, and stroke	Yes	23.58% (91)	11.40% (44)	0.019*	0.14	Small effect
	Maybe	12.69% (49)	12.44% (48)			
	No	21.76% (84)	18.13% (70)			
Self-managing of chronic obstructive pulmonary disease like bronchitis, asthma	Yes	26.68% (103)	17.88% (69)	0.575	0.05	Small effect
	Maybe	9.33% (36)	5.96% (23)			
	No	22.02% (85)	18.13% (70)			
Self-managing of fitness, yoga, diet, and nutrition for obesity	Yes	30.31% (117)	21.76% (84)	0.933	0.01	Relatively smaller effect
	Maybe	9.59% (37)	7.51% (29)			
	No	18.13% (70)	12.69% (49)			

\* *p*-value significant at 0.05 level.

tient records (0.25), and immunization programs for pregnant and lactating mothers (0.22) whereas its magnitude is large for locating hospitals and for scheduling appointments (0.34) and doctor-stakeholders communication informing health status of the region (0.37).

#### Use of mobile health applications in health service delivery

The use of mHealth applications in technical students and working staff, and medical students and health professionals are found to be 135 and 111 numbers respectively; thus, exploring the various other areas wherein respondents have used mHealth apps were self-managing of a chronic health condition such as cholesterol, heart diseases, stroke, fitness, yoga, etc. (Table 4).

From the Table 4, the interpretation of Chi-square test results, *p*-value, and effect sizes between technical students and working staff, and medical students and health professionals are explained below relating to the components of mHealth apps use.

#### Self-managing of cancer

The chi-square test results for self-managing of cancer is found to be significant as *p*-value is 0.000. Hence the null hypothesis is rejected indicating that the technical students and working staff, and medical students and health professionals are independent to one another. In other words, the use of apps for the self-managing cancer app is dependent upon technical and medical related courses and practices. Moreover, to measure the impact of dependency between the responses, measures of association

or effect sizes has been calculated with a “Phi” value, and in this study, this value is found to be 0.29. Thus, indicating that there is a medium magnitude of effect in the use of cancer health app, the difference between technical students and working staff, and medical students and health professionals.

#### Self-managing apps of cholesterol, heart diseases, and stroke

For self-managing apps of cholesterol, heart diseases, and stroke, the chi-square test results between the groups was found to be significant as *p*-value is 0.019. Hence the null hypothesis is rejected indicating that the two groups are independent to one another. In other words, the use of apps for self-managing of cholesterol, heart diseases, and stroke is dependent upon technical and medical related courses and practices. Moreover, the “Phi” value was found to be 0.14 indicating that there is a small magnitude of effect in the difference of health app use between technical students and working staff, and medical students and health professionals.

#### Self-managing of chronic obstructive pulmonary disease (COPD)

In this case, the chi-square test results for self-managing of COPD was found to be 0.575, indicating the failure of rejecting the null hypothesis at a significance level of 5%. Therefore, we can conclude that there is no significant association between the use of self-managing of COPD like bronchitis, asthma, etc. among technical students and working staff, and medical students and health

professionals. Additionally, when the impact of dependency between the responses using effect sizes has been calculated, a “Phi” value is 0.05. Thus indicating that there exists a small magnitude of effect in the use of self-managing of COPD app difference between technical students and working staff, and medical students and health professionals.

#### *Self-managing of fitness, yoga, diet, and nutrition*

From the Table 4, we can indicate that the technical students and working staff, and medical students and health professionals were using/used self-managing apps for fitness, yoga, diet, and nutrition. When calculated statistically, the result was found to be 0.933 which is insignificant at 5% level. Hence, the null hypothesis is failed to reject indicating that the two groups are independent of one another. Therefore, we can infer that there is no significant association between the use of self-managing apps for self-managing of fitness, yoga, diet, and nutrition for obesity among technical students and working staff, and medical students and health professionals. Moreover, the “Phi” value was found to be 0.01 indicating that there is relatively smaller magnitude of effect (smaller than COPD app) in the difference of fitness, yoga, diet, and nutrition app use between technical students and working staff, and medical students and health professionals. Thus, the use of these apps is not dependent on technical and medical related courses and practices (or work).

### **Discussion and study implication**

#### *Discussion*

The study findings indicate that the awareness and use of mobile phones and application among the groups of technical and medical courses were moderate. However, the respondents have largely used mobile phones for assessing chronic/lifestyle illness/diseases (Asthma (7.25%), Cancer (13.98%), Diabetes (9.32%), etc.) rather than other illnesses/health conditions. This indicates that respondents are health conscious and tried finding information sources for managing menstrual cycles, preventive and chronic/lifestyle health conditions.

Regarding the awareness and familiarity about the term “mobile health” among technical students and working staff, and medical students and health professionals, only 174 respondents have indicated that they are extremely aware and familiar, out of which are 96 (55.17%) respondents are from technical courses and 78 (44.82%) respondents from medical courses. Statistically, the survey on awareness about mobile phone use for health-related components among the groups revealed that, except for health awareness and education, and medication adherence and refilling, the null hypothesis is rejected at 5% significance level. Overall, among the groups, considering the mean values, awareness rate about mobile phone use is highest among technical students and working staff, and medical students and health professionals.

Moreover, regarding the use of mHealth apps, there exists a medium effect in the use of cancer app, small effect for apps of cholesterol, heart diseases, and stroke, relatively small effect for COPD and fitness, yoga, diet, & nutrition app difference between technical students and working staff, and medical students and health professionals. This can be due to the internet accessibility and structure of technical course curriculum equipped with industrial practices, seminars, and other technical projects making them drive towards health application awareness and use.

Similarly, the technical people working in the manufacturing and service sectors are basically health conscious as they will be continuously working from one or multiple workstation to meet the company’s targets, making them susceptible to various health

conditions. Therefore, technical people usually refer to various mHealth apps to stay fit, free from mental stress and other related health behaviors like blood pressure, hypertension, etc. which was identified in this study.

Due to work pressure, I hardly find time to go to the gym. Therefore, I walk every day using this ... applications and also follow diet plans by asking friends and doctors. (Professional working in a technical field)

In the case of medical practitioners, the use of mobile phones for health activities is less, as they will be continuously working with real-time health cases of different patients on a daily basis and may use it to send patient health records to their peers informing health status. The doctor cited it as:

I am aware about the use of mobile phones for maternal and child care when I was working in a healthcare center. There as a front-end support, we used to call and remind maternal women and new mothers regularly to take vaccinations and diet plans for staying healthy. At its back-end, we used to record and consolidate all the vaccination details given on that particular day so as to send it to higher authorities or peers of that districts for projecting and allocating health treatment plans, etc. (Doctor)

Moreover, they may use mHealth apps for personal use than their professional lives due to users’ socio-demographic factors.

I use ... health application for tracking fitness and also I suggest the same to my patients during visits, but sometimes, people used to tell me that, they have problems in reading (language) and often face difficulties in using mobile phones (other than calling) if their son/daughter is not there at home. Therefore, I suggest them to meet once three to six months for a routine health checkup. (Doctor)

In addition to this, most people in India even though having access to internet prefer to visit doctor personally, and in some cases follow Ayurveda and traditional home remedies as it brings relaxation to their mind and rather than the following information through digital and/or online communities.

The prospects are intriguing, but reliability and accuracy are severely lacking presently in health applications. Therefore, I would prefer visiting him personally rather than mobile phones. (Engineering Student)

*I prefer first aids or home remedies if something comes up sudden (Professional working in a technical field).*

Furthermore, respondents have also expressed a positive feeling about the initiative of using mobile health and health applications for healthcare service delivery but are also waiting for evidence about behavioral outcomes and reliability.

*I am aware about mobile health services, but currently, it is still in an initial stage of managing appointments, and in later stages, if evidence gets generated, I am sure that majority of the people will go for it. I feels it's a great initiative towards the digital campaign. (Engineering Student).*

In this way, the study not only considered prior literatures in designing the questionnaires but also included questions from the focus groups interviews. Thus, the survey instrument so developed are relevant for explaining the mobile phone technology and apps awareness and use components but found to be comprehensive as per the present context. Furthermore, the study finding contributes to the body of knowledge as previous literature involving technical and medical course groups especially in the Indian context are less reported.

## Study implication

The usefulness of mobile phone technology and applications can be improved only when people are aware of different health applications available in their mobile play stores. The present study was conducted to measure the awareness and use of mobile health applications among technical and medical groups working in India. However previous literature which was published had also addressed mHealth awareness among college going students of engineering and medicine, and the results were similar [21,22].

In most of the results relating to awareness and the use of mobile phone technologies in healthcare, among the groups, technical students and working staff have the highest awareness about the usage than medical students and health professionals. This can be due to mobile phone and internet access which drives technical personnel towards innovativeness, trying out new technologies resulting in positive belief about such technologies. In addition, most of these technical students try to keep themselves up-to-date about the latest technologies, helping them in designing and developing architecture or applications relating to mobile phones.

The use of mobile phone technology and applications in our study corresponds to a total of 63.7% of the study population. Of these, 135 (34.9%) respondents were from technical students and working staff, and 111 (28.7%) respondents belong to medical students and health professionals. This means that, medical students and health professionals were using less of mHealth apps even though they are aware of it. The reason could be inefficient and inaccurate online health information, data privacy issues, problems in identifying the right health apps, lack of trust and technology infrastructure for facilitating patients' data, and resistance to use because of socio-demographic characteristics of the respondents (such as problems of literacy, language, income, etc.). This result was found to be consistent with another study finding that healthcare providers are reluctant to use medical device and apps for clinical practices due to the fundamental level of quality and safety in using the apps [43].

Similarly, medical students and junior doctors specified the importance of user-friendly smartphones in education, professional practices, and hospital management system and indicated about the management concern (such as return on investment, patient safety, and data privacy factors) in implementing it in their projects [44]. Also, about 68.84% of the Indians live in the rural region [45], the hospitals and software developers should also consider affordability factors and people lifestyles in implementing technology, such that both will be benefitted. For example, it was found in a randomized controlled study that the smartphone application is negatively associated with the number of alcohol intakes and is not effective in reducing alcohol consumption among university students [46]. At this instance, the mHealth application standards and interoperability should also be considered to get the accurate patient data and efficient data processing units which assists people in managing their health.

Thus, in India, the improvement in mHealth awareness and use can be improved either by building evidence base, trust, and improving the misconceptions about mobile phone use or through doctors' recommendations. As people tend to use mobile health application until an authoritative and governance policy recommends it. Therefore, in our study, even-though private and government bodies are promoting mHealth platforms, the differences in the level of awareness and use can be observed across students, practitioners, and workers of technical and medical courses. In such cases, these results can equip healthcare providers and application developers to device necessary promotions strategies and support for creating awareness and making them use mobile phones and applications for day-to-day activities.

## Conclusion

India is one of the G20 nations with the largest internet subscribers and the majority of its populations is young (age below 25 years and two-thirds less than 35 years). The study findings indicate that the rate of awareness and use of mHealth applications is highest among technical students and working staff, than medical students and health professionals. Moreover, people prefer to use mobile phone technology and applications for improving health and wellness conditions. However, due to connectivity problems, socio-demographic factors, trust, and information credibility lead to lower acceptance and adoption among people and make them prefer personal visits than through mobile interventions. Therefore, recommendations from healthcare professionals, healthcare solution providers, and the government play an important role in improving their awareness, perceptions, and for creating value among individuals, organizations, and society.

### Study limitation and future research dimensions

The current study has several important limitations. Firstly, most of the data responses have been received from the participants living in the regions of the south of India. This can be a limit to generalize the total population's awareness about mHealth apps as most of the health application by Government of India under National Rural Health Mission was initiated in Northern states of India as phase 1. Secondly, offline respondents have been initially instructed about the importance of using mobile phones for health service delivery, and later provided questionnaires for their response. Thirdly, this study has not considered the observed changes in the peoples' health outcome in using a mobile phone for chronic/lifestyle illness and other disease conditions. This might have an influence on the data results being more reliable for awareness level than they actually have. Finally, the use of semi-structured interviews among the study respondents will provide further evidence about any specific reason and experience of using mHealth and applications. Therefore, in the future, research can be conducted by considering the factors of demography, culture, and individual health needs and consciousness influencing the awareness and use of mobile phone for health service delivery.

### Author statements

#### Funding

None.

#### Competing interests

None declared.

#### Ethical approval

The study includes survey data and the participation was voluntary. It doesn't seek any intimate questions nor clinical test results and does not require ethical committee approval. The consent was provided along with the questionnaire survey and no personal information was collected and ensured anonymity and confidentiality. The respondents have agreed future use of the data for academic purpose and provided their responses.

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