JMTM
WWW.JOURNALMTM.COM

ORIGINAL ARTICLE

HEALTH CARE APPS- WILL THEY BE A FACELIFT FOR TODAY'S MEDICAL/DENTAL PRACTICE?

Deepika **Jasti**[1], KVNR **Pratap**, MDS[2], Madhavi **Padma.T**, MDS[3], V. Siva **Kalyan**, MDS[4], M. Pavana **Sandhya**, MDS[5], ASK. **Bhargava**, MDS[6]

[1]Final year Post graduate student, Department Of Public Health Dentistry, Mamata Dental College, Khammam-507002, Andhra Pradesh, India; [2]Professor and Head, Department Of Public Health Dentistry, Mamata Dental College, Khammam-507002, Andhra Pradesh, India; [3]Professor, Department Of Public Health Dentistry, Mamata Dental College, Khammam-507002, Andhra Pradesh, India; [4]Reader, Department Of Public Health Dentistry, Mamata Dental College, Khammam- 507002, Andhra Pradesh, India; [5]Senior Lecturer, Department Of Public Health Dentistry, St. Joseph Dental College, Eluru-534003, Andhra Pradesh, India; [6]Senior Lecturer, Department Of Public Health Dentistry, Mamata Dental College, Khammam-507002, Andhra Pradesh, India

Corresponding Author: deepikajastii@gmail.com

Background: With the recent advent of smart phones, usage of medical apps is on rise. Smart phones are powerful devices that combine the conventional functions of a mobile phone with advanced computing capabilities enabling users to access software applications commonly termed as "apps". Health care applications (apps) that are downloadable on to smart phones are increasingly becoming popular among clinicians.

Aim: The aim of the present study was to assess the usage of health care apps among Medical and Dental doctors.

Methodology: A descriptive cross sectional questionnaire based study was conducted on medical and dental doctors of Mamata hospitals, Khammam, Andhra Pradesh. A pretested, self administered questionnaire was used and it consists of questions regarding demographic data followed by usage of health care apps. Descriptive statistics were computed to demonstrate the frequency of responses and the comparisons were made using chi-square test. A p-value less than or equal to 0.05 was considered to be significant.

Results: A total of eighty doctors (48 Medical and 32 dental) completed the questionnaire. More males (n = 63) than females (n = 17) participated in the study. Participants had a mean age of 32.5 years. It was found that 68% of dental doctors and 70.45% of medical doctors are using health care apps on their smart phone. Most of the participants (58.8% of dental and 77.4% medical doctors) use the health care apps for knowledge purposes, while no dental doctors used the apps for diagnosis or treatment purposes. The majority of the dental doctors (41.17%) are using these apps for patient education purpose when compared to the medical doctors (3.22%).

Conclusion: There is a high usage rate of health care apps among both medical and dental doctors, with medical doctors using the apps for informational purposes, whereas dental doctors used the apps for patient education.

Journal MTM 4:1:8–14, 2015 doi:10.7309/jmtm.4.1.3 www.journalmtm.com

INTRODUCTION

Smart phones have become ubiquitous among general public. Advanced mobile communications and portable computations are now combined in a handheld device called as "smart phone". These phones are capable of running third party software "applications" commonly termed as "apps"[1,2]

Of late there is an exponential growth of Smart-phone users in India. A survey conducted by Eriksson reported that smart phone penetration will grow from 10% in 2013 to 45% by 2020 i.e. from 90 million subscribers to 520 million subscribers[3].

It is no surprise, therefore that such devices have become a part of health care system. Health care applications that are downloadable on to smart phones are increasingly becoming popular among clinicians. Smart phone technology is changing the way that the healthcare is being practiced, with professionals becoming likely to access regularly updated, more convenient, web based literature than refer to hard copies of text books or journals. Around 500 million smart phone users worldwide will be using some kind of health care app by 2015[4].

There are many health care apps both medical[5–7] and dental[8] that focused on patient education, demonstration, provision of library which include drug information, drug dosage and effect. Although the number of health related apps has skyrocketed, it is unknown how many of these are evidence based or developed by reliable health organizations. Other concerns include confidentiality of patient information and usage of apps in front of patients[9]. Thus a few studies[10–12] have evaluated the efficacy of some apps and revealed wide adaptation of these apps by health care professionals during recent years.

According to survey by Epocrates, more than 40% of medical students indicated that they turn to smart phone medical apps as their first choice of reference[13]. Robinson et al conducted a study on medical students and found that 84% students believed that smart devices were a useful addition to their education[14]. Research by Vigmen and Williamson indicate that the use of smart phone leads to improve patient care and diagnosis, and choice of therapy[15].

Most of these international studies were conducted on usage of health care apps among medical students. To the best of our knowledge, little is known in regard to the usage of health care apps among Medical and Dental professionals. Adding to these, India stood one among the top countries in smart phone subscription[16], but still there are no studies conducted in Indian context till date on usage of smart phone among medical and dental professionals. Thus a study was planned to assess the usage of health care apps among Medical and Dental doctors of a tertiary care dental college and hospital, Khammam, A.P, India.

Aim of the study

To assess the usage of health care apps among Medical and Dental doctors of Mamata hospitals, Khammam, A.P. We hypothesized there is similar frequency, and usage pattern of use of health care apps amongst medical and dental doctors.

Objectives

1. To assess the frequency of usage of health care apps among Medical and Dental doctors
2. To compare the usage of health care apps among Medical and Dental doctors

Methodology

A descriptive cross sectional questionnaire based study was conducted. Ethical clearance was obtained from the Institutional Research Ethics Committee, Mamata dental college, Khammam, India. Study participants include medical and dental doctors from all the specialties including post graduates of Mamata hospitals. Informed consent was taken from all the participants before the start of the study.

All the Medical and Dental doctors who owned smart phone were included in the study. Those doctors who were not willing to participate and were busy or out of station during the period of the survey were excluded.

Study instrument

A pre tested self administered 9-item questionnaire was used. Questionnaire consists of two parts. First part consists of three questions which collected data on the demographic details like age, gender and profession followed by second part of six questions related to awareness, usage and usefulness of health care apps, how often the apps were used etc.

The content of the questionnaire was derived from the previous literature and was modified according to Indian nativity. Pretest was done to ensure the content validity of a questionnaire with the help of a panel of experts of size six. Certain questions which were found to be irrelevant were deleted and those questions which were found to be incomprehensive were modified. Reliability of the questionnaire was checked with the help of a test- retest method using kappa statistic and it was found that 90% agreement for responses. Test-retest was done with a time interval of 2 weeks. Pilot study was conducted on a sample of 40 subjects who were not included in the main study and the results were analyzed to ensure that the aim and objectives of the study were obtained.

Study procedure

The duration of survey was one month conducted in October on all the medical and dental doctors of Mamata hospitals, Khammam. Participants were explained about the purpose of the study before the questionnaire was distributed to them. The questionnaire was designed to take maximum of five minutes to complete and these questionnaires were collected back after providing the required time to fill the form. The doctors who were not available at the time of the study were noted and tried to meet again for two times. Those who are not available even at the third visit were not included in the study. As this was an exploratory study, a convenience based sampling method was adopted for determining sample size.

Data analysis

The data collected was analyzed using statistical package for social sciences (SPSS version 18). Chi square test is used to test the significance. P-value less than 0.05 was considered as significant.

RESULTS

Demographics

A total of eighty health care professionals completed the questionnaire. More males (n = 63) than females (n = 17) participated in the study. Participants had a mean age of 32.5 years. Out of eighty health care professionals, 48 are Medical professionals and 32 are dental professionals. (Table 1)

	MALE	FEMALE	TOTAL
DENTAL	24	8	32
MEDICAL	39	9	48
TOTAL	63	17	80

Table 1: Demographic Details

Health care apps awareness and usage

Among all the smart phone holders, 86% (78% dental and 91.6% medical) doctors are aware of the health care apps and 69.56% (68% of dental doctors 70.45% of medical doctors) are using health care apps on their smart phone.

Of the 30.43% doctors who are not using health care apps on their smart phone, 7.69% of medical and no dental doctors said that they don't know how to obtain the apps on their smart phone, 30.7% medical and 12.5% dental doctors felt that they don't need the health care apps and 61.5% medical and 87.5% dental doctors felt that they prefer the computer instead of smart phone.

Majority of the dental doctors (58.8%) and only a few medical doctors (22.58%) felt that the health care apps are very useful to them in their clinical practice. But majority of the medical doctors (64.50%) and only a few dental doctors (41.17%) felt that the health care apps are moderately useful for their clinical practice. This difference is found to be statistically significant with $p < 0.05$ (Figure 1).

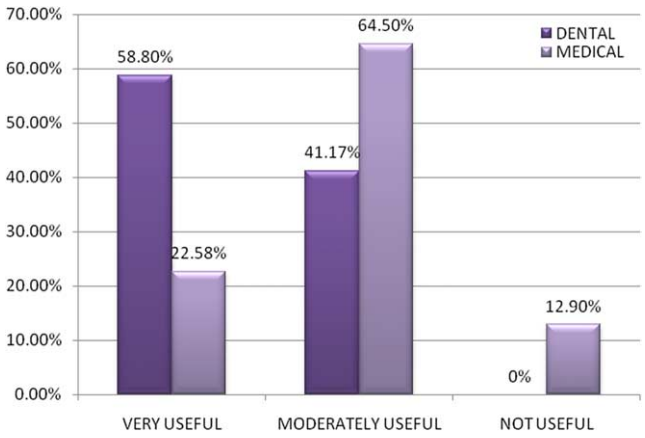

Figure 1: Usefulness of Health Care Apps Among Medical and Dental Doctors

Note: The above graph depicts usefulness of health care apps among medical and dental doctors. The chi-square value of this data is 7.3278, degree of freedom is 2 and p-value is 0.025 which is found to be statistically significant.

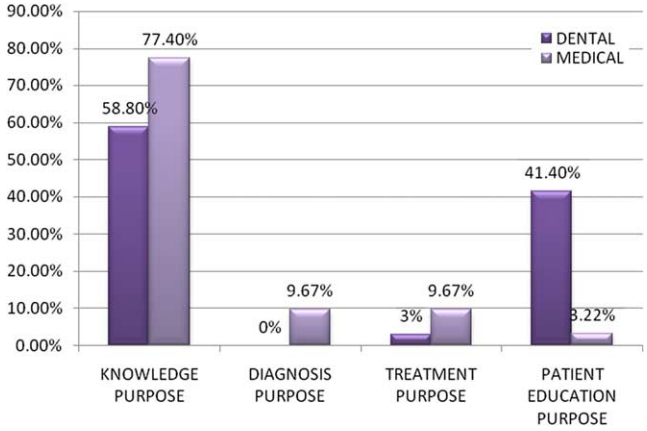

Figure 2: Purpose of Healthcare Apps Usage Among Medical and Dental Doctors

Note: The above graph depicts the purpose of usage of health care apps among medical and dental doctors. The chi-square value for the above data is 13.3394, degree of freedom is 3 and the p-value is 0.0039 which is statistically significant.

Most of the participants (58.8% of dental and 77.4% medical doctors) use the health care apps for knowledge purpose, while no dental doctors use the apps for diagnosis or treatment purpose. High proportion of the dental doctors (41.17%) are using these apps for patient education purpose when compared to the medical doctors (3.22%). This difference is found to be statistically significant with $p < 0.05$ (Figure 2)

Participants most commonly used medical apps when ever required (33%) followed by few times per month (31%), few times per week (23%) and once in a day (13%).

DISCUSSION

Smart phones have rapidly become part of everyday life. The worldwide number of mobile device users who have downloaded mobile health care applications nearly doubled from 127 million in 2011 to 247 million in 2012[17]. The widespread adoption and use of mobile technologies is opening new and innovative ways to improve health and health care delivery. They are playing a key role in transforming the efficiency, delivery and access to the health care system.

The present study findings reveal that 78% of dental and 91.6% of medical doctors were aware of health care apps. These results were in accordance with the previous study, where 83% of health care professionals were aware of the medical apps prior to the study[18]. Various resources aid to promote the awareness regarding health care apps among doctors like fellow medical students, app stores, clinicians etc.

Also many medical universities have embraced this mobile application technology as part of training or for the usage of their students and staff[19,20]. Present study findings showed that 68% of dental and 70.45% of medical doctors are using health care apps on their smart phone. These results are in accordance with the previous studies[21,22]. This suggests that it is a global trend and practice for health care professionals to own a smart device and use medical apps to support their study and clinical sessions.

Choy koh et al found in their study[22], that majority of their study participants have positive perceptions on health care apps usage believing that, these apps were essential tools for their studies, allowing for faster and reliable access to clinical guidelines, knowledge and skill as well as helping in decision making. Several studies performed in UK and Australia among medical faculty staff and students showed similar positive attitude towards health care apps usage[18 23,24].

A Study found that smart mobiles improved physician's response time, accuracy, data management and record keeping practices[25]. Other potential benefits of mobile technology include tools to overcome language barriers and increase patient attendance rates by providing virtual reminders[17].

Majority of the medical and dental doctors, who are not using health care apps on smart phone, felt that they prefer computer instead of smart phone apps for accessing medical information. This might be due to dislike towards relatively small mobile phone screens. Participants of previous studies felt that, medical apps cannot replace the use of traditional textbooks. They felt that, unlike textbooks and journals, there is no official peer review process for apps and thus doctors may be skeptical of the content[26]. In a study conducted by Laucher et al, 82% of their participants expressed concerns about confidentiality and correctness of the information[16].

In present study, 58.8% of dental doctors and 22.58% of medical doctors felt that the health care apps as very useful while 64.5% of medical doctors

and 41.17% of dental doctors felt that the apps are moderately useful for their clinical practice. Emergencies due to long waiting in the dental clinics can be reduced due to appropriate use of patient appointment apps. Also dental doctors are using the health care apps more than medical doctors for patient education purpose, finding these apps very useful. We recognize that an arbitrary likert scale was used in the questionnaire, and as such it is difficult to further define the "usefulness" to each practitioner

More medical doctors are using the health care apps for diagnosis purpose when compared to dental doctors. This might be due to availability of more number of multiple medical applications than dental applications[21].

Most of the medical and dental doctors use the health care apps for knowledge purpose. This is because apps allow easy access to information within seconds, which would take longer in searching a text book. Smart phones are handy, very convenient and portable to access information while on public transport or on clinical sessions compared to relatively bulky textbooks[22].

Conclusion

Both medical and dental doctors are using health care apps at an equal level. Majority of the dentists felt health care apps as very useful while majority of the medical doctors felt these apps as moderately useful. Dentists are using health care apps for knowledge and patient education purpose while majority of the medical doctors are using apps mainly for knowledge purpose.

Limitations

The results from this study cannot be generalized, as the sample size of the present study was small and confined to one particular area. Multi centric studies of this kind with large sample size are needed for the results to be generalized.

Future prospects

Further studies can be done to evaluate the usage of health care apps among patients. Also frequency and type of medical and dental apps can be compared on a same smart phone platform or in different platforms.

References

1. Md Mosa A, Yoo I, Sheets L. A Systematic Review of Healthcare Applications for Smartphones. *BMC Medical Informatics and Decision Making* 2012; **12**(67):1–31.

2. Telecom: Enabling growth and serving the masses. Accessed at: http://www.deloitte.com/assets/Dcom-India/Local%20Assets/Documents/Thoughtware/ 2014/Telecom_Enabling_growth_and_serving_the_masses.pdf. Last accessed on 09.05.2014.

3. Tech Desk. Smartphone penetration to reach 45% in India by 2020: Ericsson. May 9, 2014. Accessed at: http://indianexpress.com/article/technology/technology-others/ericsson-identifies-key-elements-of-mobile-broadband-growth-in-india. Last accessed on may27th.

4. U.S. Food and Drug Administration. Mobile medical applications. Accessed at: http://www.fda.gov/MedicalDevices/ProductsandMedicalProcedures/ConnectedHealth/MobileMedicalApplications/ucm255978.htm. Last accessed on 09.05.2014.

5. Havelka S. Mobile resources for nursing students and nursing faculty. *Journal of Electronic Resources in Medical Libraries.* 2011;**8**:194–9.

6. Dasari KB, White SM, Pateman J. Survey of iPhone usage among anaesthetists in England. *Anaesthesia.* 2011;**66**:620–31.

7. Franko OI, Tirrell TF. (2011). Smartphone app use among medical providers in ACGME training programs. *Journal of Medical Systems [Online].* Available: http://www.springerlink.com/content/p6t82ph541835u75.

8. Top 15 Mobile Applications for Dental & Oral Health. http://www.medscape.com/features/slideshow/dentalapps. last accessed on 10.05.2014.

9. Public Health Smartphone Apps: Disadvantages. http://www.medscape.com/viewarticle/776278_3. Last accessed on 10.05.2014.

10. Josephson CB, Salman R. Smartphones: Can an iPhone App help stroke physicians? *The Lancet.* 2010;**9**:765.

11. Low D, Clark N, Soar J, Padkin A, Stoneham A, Perkins GD, Nolan J. A randomised control trial to determine if use of the iResus application on a smart phone improves the performance of an advanced life support provider in a simulated medical emergency. *Anaesthesia*. 2011;**66**:255–62.

12. Zanner R, Wilhelm D, Feussner H, Schneider G. Evaluation of M-AID, a first aid application for mobile phones. *Resuscitation.* 2007;**74**:487–94.

13. Epocrates invests in future physicians. http://www.epocrates.com/who/media/news/press-releases/epocrates-invests-future-physicians. Last accessed on 10.05.2014.

14. Robinson T, Cronin T, Ibrahim H, et al. Smartphone use and acceptability among clinical medical students: a questionnaire based study. *J Med Syst.* 2013;**37**:9936.

15. Safdari R, Jebraeily MD, Rahimi B, Doulani A. Smartphone medical applications use in the clinical training of medical students of UMSU and its influencing factors. *European Journal of Experimental Biology*, 2014;**4**(1):633–7.

16. Subscriber base- Indian Brand Equity Foundation. August 2013. Accessed at: http://www.ibef.org/download/telecommunication-august-2013.pdf. Last accessed on May 27th.

17. Advancements in mobile health technology. Health capital topics. 2013: **6**(2); 11–2. Accessed at: http://www.healthcapital.com/hcc/newsletter/2_13/MOBILE.pdf. Last accessed on 10.05.2014.

18. Koehler N, Vujovic O, McMenamin C. Healthcare professionals' use of mobile phones and the internet in clinical practice. *Journal Mob Technol Med.* 2013; **2**(1):3–12.

19. Stanford School of Medicine. http://med.stanford.edu/estudent/ipads/app-recommendations.html (last accessed on 10 may 2014).

20. Top five medical apps at Harvard Medical School. http://mobihealthnews.com/10745/top-five-medical-apps-at-harvard-medical-school/ (last accessed on 10 may 2014).

21. Rung A, Warnke F, Matteos N. Investigating the use of Smart phones for learning purposes by Australian Dental Students. *JMIR mHealth.* 2014;**2**(2):1–8.

22. Koh KC, Wan JK, Selvanathan S, Vivekananda C, Lee G, Tau Ng C. Medical Students' Perceptions Regarding The Impact Of Mobile Medical Applications On Their Clinical Practice. *Journal Mob Technol Med.* 2014;**3**(1):46–53.

23. Payne K, Wharrad H, Watts K. Smartphone and medical related App use among medical students and junior doctors in the United Kingdom (UK): a regional survey. *BMC Medical Informatics and Decision Making* 2012;**12**(121):2–11.

24. Aungst T. Survey results show how medical student use of medical apps differs from resident physicians. *iMedicalapps* April 25, 2013. http://www.imedicalapps.com/2013/04/survey-medical-student-medicalapp-resident-physician/ (last accessed on 10 may 2014).

25. "The Impact of Mobile Handheld Technology on Hospital Physicians' Work Practices and Patient Care," By Mirela Prgomet, Andrew Georgiou and Johanna Westbrook, *Journal of the American Medical Informatics Association*, Volume **16**, No. 6, November/December 2009, p. 799.

26. Koehler N, Yao K Dr , Vujovic O Dr, McMenamin. Medical student's use of and Attitudes towards Medical Applications. *Journal of Mobile Technology in Medicine.* 2012;**1**(4);16–21.

ANNEXURE- QUESTIONNAIRE

HEALTH CARE APPS- WILL THEY BE A FACELIFT FOR TODAY'S MEDICAL/DENTAL PRACTICE?

QUESTIONNAIRE:

PRINCIPAL INVESTIGATOR: Dr. Deepika Jasti

DEMOGRAPHIC DETAILS

1. Age :
2. Gender:
3. Profession :

AWARENESS & USAGE OF HEALTH CARE APPS

4. Are you aware of health care apps?

   a. Yes b. no

5. If yes, do you use health care apps on your smart phone?

   a. Yes b. no

6. If no, what is the reason?

   a. Don't know how to obtain them?

   b. Health care apps are too expensive

   c. No need to use health care apps

   d. I prefer to use computer

7. Are these applications useful for your clinical practice?

   a. Very useful b. Moderately useful c. Not useful

8. For what purpose, do you use the health care apps?

   a. For knowledge purpose

   b. For diagnosis purpose

   c. For treatment purpose

   d. For patient education purpose

9. How often do you use these health care apps?

   a. Few times per month

   b. Few times per week

   c. Once in a day

   d. whenever required