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European Journal of Experimental Biology, 2014, 4(1):633-637

ISSN: 2248 –9215
CODEN (USA): EJEBAU

Smartphone medical applications use in the clinical training of medical students of UMSU and its influencing factors

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ABSTRACT

Medical students have required timely access to information, such as algorithms and clinical guidelines, drug reference, clinical calculations, demographic information and also the latest scientific evidences at the point of care from anywhere at anytime. Therefore, to meet such needs in the areas of clinical training, utilization of smartphone appears to be essential. This study aimed to investigate the rate of using smartphone applications in the clinical training of students at the Urmia University of Medical Sciences and its influencing factors. We therefore distributed a questionnaire to clinical medical students. Data were obtained from 185 participants. 61.6% of students had Smartphone that 47% of them using apps in their clinical training. The highest rate of using medical applications among residents counseling and clinical communication (50%), among interns drug reference (56%) and among externs resources and e-books (65%). Prioritizing the medical applications in the view of respondents indicated that Up-to-date application is the first priority (37%). Factors such as accreditation of medical applications by health institutions, donation of financial facilities and ease of the use of applications are the most important factors in increasing the use of these applications. Given that the use of medical applications in medical students was relatively low. It seems essential that the training courses required for familiarity and way of using applications be held. The accreditation of smartphone medical app by health institutions, donation of financial facilities and ease of the use of applications can have a significant impact on increasing the use of such applications.

Keywords: Medical applications, Smartphone, Clinical training, Medical students, Urmia University of Medical Sciences.

INTRODUCTION

Clinical training plays an important role in developing medical skills and in training efficient individuals. In this course, in an interaction with the instructor and environment, students apply the learned concepts in practice [1-3]. Research results show that failures such as lack of coordination between theoretical learning and clinical services, lack of proper training facilities and equipment, diversity in the role of trainers and the deficiency of time dedicated to train and provide responsibility for patient care to the student have made the quality of clinical training not be desirable and also the ensuring safety and satisfaction of patients face with challenges [3-5].On the other hand, medical students depend highly on medical books and resources and require timely access to information such as

algorithms and clinical guidelines, drug reference, clinical calculations, demographic information and also the latest scientific evidences at the point of care from anywhere at any time [4-8]. Therefore, to meet such information needs in the field of clinical training, utilization of Information technology appears to be essential. Smartphone is one of such tools that has recently had an increasing growth and has been accepted by health professionals and medical students. It is a new technology which has an operating system, the capability of installing various applications and also the ability of doing complex calculations and establishing related communications at the point of care [9-11]. Studies show wide adoption of smartphone by healthcare professionals during recent years. Smartphone are becoming popular for clinical use among clinicians and medical students [12-15]. Enjoying its potential capabilities such as portability, ease of use, instant access to the internet, low cost and public acceptance, smartphone will bring tremendous opportunities to facilitate the communications of students, access to a wide range of resources and tools of learning, provide proportional training program with the needs of learners and also for the possibility of lifelong training of a lot of learners with lower cost and independence of time and place [14-17]. Given such invaluable potentials, all students in Stanford University of Medical sciences were given smartphones in order for the students to use as an educational tool [18]. Davis believes that medical applications on smartphones provide professionals of health care with evidence-based proceedings within care procedure [8].

In a study put forward by Wallis et al, 85% of medical students in Canada had smartphones used for medical objectives at least once a day and 77% of them regularly used at least one medical application on their smartphones [19]. A recent study in the UK reveals that 79% of medical students have smartphone that a majority of them use medical applications for self-learning in clinical environments [20]. Research by Vigmen and Williamson indicate that the use of smartphone leads to improve patient care and diagnosis, choice of therapy and tests and also reduce patient hospital stay [14].

The increased popularity of apps among health care providers resulted in a dedicated medical app category created in the manufacturers of smartphone [21].these applications were grouped into various categories based on functional similarity: disease diagnosis, drug reference, medical calculators, literature search, clinical communication and medical training that have been created for use by different groups of professionals, students and patients [14].
Given the public acceptance and the interest of the youth in smartphone technology and also the advantages of applications in clinical training, the present study aimed to investigate the rate of using smartphone applications in the clinical training of students in Urmia University of Medical Sciences and its related factors.

MATERIALS AND METHODS

This cross-sectional descriptive study was conducted in 2013. The study population consists of medical students studying clinical training course (including 167 externs, 97 interns and 186 residents) in Education and Treatment centers of Urmia University of Medical Sciences which were 450 individuals in total. Data were collected through a self-designed questionnaire.The first part of the questionnaire was demographic information of the respondents including sex, age and clinical training course; the second part was designated for the properties of smartphone and the way of familiarity and supply of medical applications. The third part determined the rate of the use of medical applications by medical students based on their function and original groups. In the final part, factors affecting the rate of the use of medical applications by the students were specified by 5 criteria Likert scale. The validity of this tool was determined based on concepts in valid scientific texts and receiving comments of experts (including professionals of health information management, medical informatics and medical education). The reliability of the questionnaire was assessed via calculating the internal correlation. In so doing, the designed questionnaire was given to 25 individuals among from the population and after collecting data, Cronbach's alpha was obtained as 0.82. Analysis was performed using statistical SPSS software. In order to determine the significant relationship between sex and course, chi-square test was conducted.

RESULTS AND DISCUSSION

Out of 450 distributed questionnaires, 185 cases (41.1%) were collected that it may be resulted from their ignorance or lack of awareness of smartphone medical applications. 57.3% of respondents were female, while 42.7% were male. The mean age was 24.3 years. In terms of various training courses, the frequency of respondents included 28.6% residents, 33.5% intern and 37.8% extern. According to the obtained results, 61.6% of students (114/185) had smartphones that in terms of operating system, the most one (43%) was related to Android (Figure 1). 47% of the respondents reported using apps in their clinical training. 24% of students believed that sue of such applications

satisfies their learning needs. In terms of technical skills of using medical applications, 22%, 47% and 31% were at advanced, intermediate and elementary levels, respectively.

The familiarity of students with smartphone applications was by friends (38.3%), Internet (24.8%), professors (16.8%), advertisements (12.6%) and other cases (7.5%) and the preparation of these applications was as free download (41.5%), receiving via Bluetooth (20.6%), experimental download (14.3%), purchasing software (8.8%), details of the initial smartphone applications (6.6%) and other (9.2%).

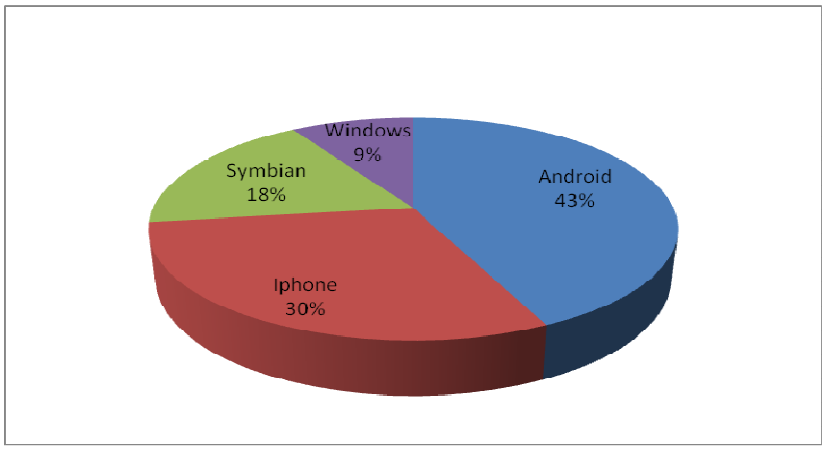

Figure 1: Smartphone operating system of choice across survey population

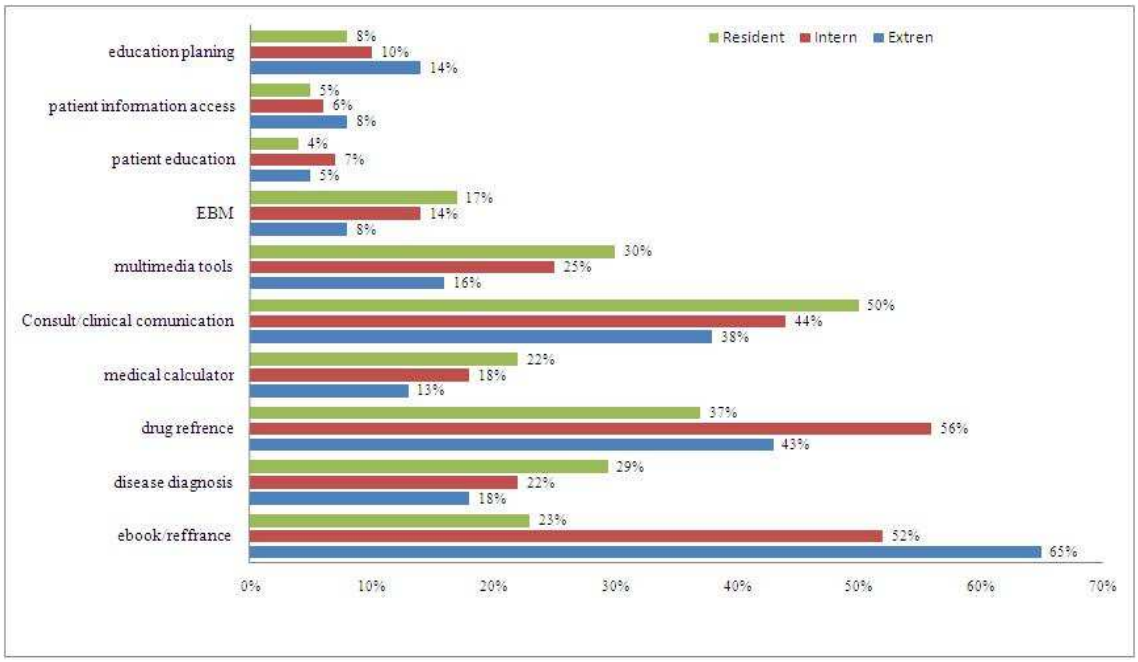

Figure 2 Percentage frequency of use of different categories of medical apps (n=114).

According to the diagram, the highest rate of using medical applications among residents counseling and clinical communication (50%), among interns drug reference (56%) and among externs resources and e-books (65%), also the lowest rate of the use in all three groups is related to patient training and accessing to patient information. The Chi Square test results showed that among from three clinical training courses, given the very low rate of use by students in the residency course, there is a significant difference in using the rates of applications based on their function (P = 0.02).

Table 1 most commonly used smartphone apps

Ranking	App Name	% of respondents reporting use
1	Up to date	37
2	Skyscape	16
3	PubSearch	13
4	Medscape	11
5	Epocrates	10
6	Med Calc	8
7	5-Minute Clinical Consult	5

Prioritizing the medical applications in the view of respondents indicated that Up-to-date application is the first priority (37%) and 5-Minute Clinical Consult is the final priority (5%) based on the rate of use. Factors such as accreditation of medical applications by valid health institutions, donation of financial facilities for purchasing smartphone and applications and ease of the use of applications are the most important factors in increasing the use of these applications (Table 2).

Table 2: factors affecting the rate of the use of medical applications by the studen

Factors	High	Medium	Low
Technical skills in the use of smartphone medical apps	67	33	0
Perceive the advantages of Smartphone medical app	54	38	8
Accreditation of Smartphone medical app by health institutions	75	25	0
Encourage students through professors	34	56	10
Have the necessary infrastructure at the University	37	58	5
Provide the necessary training to use smartphone medical apps	42	55	3
Appropriate information about smartphone medical apps	37	43	23
Financial donations to buy a smart phone and applications	72	25	13
Culture-making fit	57	36	7
Ease of use of smartphone medical apps	68	32	0

The results of researches conducted by Farrell and Rose (2008) indicates that using mobile for training nursing in clinical environment leads to increase students' skills in critical thinking and decision-making based on the best up-to-date practices [22].

Robinson et al (2012) In their cross-sectional study conducted on students of 3, 4, 5 years in UK University of Birmingham, accomplished the following results: 59% of students have a smartphone that 38%, 31% and 21% had iphone, BlackBerry and Android operating systems, respectively. More than 34% of respondents use medical applications to learn, while 39% of them described it as an innovation. 90% of students believed that they had the technical skill for using medical applications of smartphones [18]. Another study done by Franco et al (2012) shows that over 85% of respondents used smartphones in which most common operating system were iphone (48%) and Android (19%) [15]. in this study, the widely used operating system was Android allocated 43% to itself. Also, in terms of the technical use, unlike the results of the above studies, only 22% of the users had the ability of technical and advanced use of their smartphones.

According to the research by Chatterley, among medical students, the application of these programs based on the rate of use also included calendar, medical information, e-mail, medical reference, medical dictionaries, doing clinical calculations of differential diagnosis of diseases and storing logbooks, respectively [23]. On the other hand, in the study by Franco, the most used programs also include drug guidelines (79%), medical calculations (18%), coding and auditing applications (4%) and pregnancy cycle (4%) [15]. the results of the present study, eBooks, drug reference, consult and clinical communication have the highest rate of use among students. The study results by Franco showed that in terms of prioritizing, the varieties of medical applications are Epocrates (75%), Medscape (17%) and Med Calc (12%), respectively [15]. The prioritizing results of this study also show Up to date (37%), Skyscape (16%) and PubSearch (13%) are the first three priorities that differs with Franco research.

In a study, Lacher et al (2000) concluded that 82% of internal physicians used medical applications for professional reasons while they expressed concerns about Internet security, confidentiality, correctness of the information contained therein and low time for searching in Internet [24]. In the present study, only 53% of students have used a medical application that shows the difference between our results and the above study results.

In a study in India on learners' attitude to learning through mobile, 69.2% of individuals considered mobile as an emergency tool associated with their learning and 72.2% also believed that learning with mobile is a new opportunity for them. 73.4% of students considered the advantages of this type are interaction, enthusiasm; communication and cooperation are [25]. Our study results indicated that 47% of respondents consider medical applications as useful. 24% of students believed that using these applications satisfies their learning needs.

CONCLUSION

Meeting the information needs of busy physicians at the point of care and finding the best evidences for answering the clinical questions are the most important challenges in providing health services. The Smartphone medical apps can be used from monitoring patients and diagnosis to effective medical training and related clinical communications [14-19]. The results this study shows that using medical applications of smartphone is at a relatively low level.

Given the lack of students' understanding and also technical skills of using medical applications, it is recommended that the training courses required for familiarity and way of using programs be held. It also seems necessary that the role of using these applications in professional progress of students to be sensible so that it leads to the feel of need and motivation for the efficient use of these applications. One of these cases can be using evidence-based medicine. On the other hand, the accreditation of smartphone medical app by health institutions, donation of financial facilities for purchase of smartphone and applications and ease of the use of applications can have a significant impact on increasing the use of such applications.

Acknowledgments
This study was a part of a research project supported by Urmia University of Medical Sciences (Grant No: 1349). We sincerely thank all the individuals who contributed to the development of this study.

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