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Study of Knowledge, Attitude and Preferences of Primary Health Care Physicians in Saudi Arabia Regarding the Use of Medical Software Applications on their Smartphones.

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ABSTRACT

Background: The use of medical software applications has changed the clinical practice over the last decade. The usage of smart phone among the population is growing rapidly, including healthcare professionals**,** but the extent of the increase in their knowledge and practice due to the enhanced usage of smart phone is not known. This study aims at determining the knowledge, attitude and preferences of physicians regarding the use of Medical Apps in their professional practice. **Methods:** A cross sectional study was conducted in the governmental primary health care centres in Jeddah, Saudi Arabia, using a sample size of 178, selected through randomized cluster sampling. Self- administered questionnaires were used for collecting the data. **Results:** The study revealed that 92% of the responders were aware of the availability of Medical Apps and most of the doctors had a positive attitude towards the use of Medical Apps. The most prominent use of Medical Apps was to get additional medical information to update their knowledge. The majority of responders had already installed them on their smart phones and most of them used the Apps at least once in a day. Medscape was the most common medical app used by the study population. **Conclusion:** The findings of the study show the existence of good knowledge and a positive attitude towards the use of Medical Apps among the doctors. Most frequently used applications were free Medical Apps.

Keywords: Smart phones, Medical Apps, Primary care Physician.

INTRODUCTION

Use of medical software applications (Medicals Apps) has changed the clinical practice over the last decade.[1] This has encouraged developers of mobile applications to continuously develop new health-care related applications and improve the existing ones.[2] These applications have been shown to be beneficial to primary health-care centre (PHC) physicians as well as consultant physicians in several ways including access to latest information, drug review and other useful functions.

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Nowadays, the smart phones play an important role in medical practice. Smartphone's have improved overall communication effectiveness by promoting better interactions between physicians and paramedical staff as well as between hospitals and the patients. Time taken to contact and share information with the referring physicians and referral hospitals is greatly reduced which is of vital importance, especially during emergencies. A lot of Medical Apps are now available in the smart phones market containing a wide range of medical information such as latest guidelines, clinical consultations, drug guide, drug dose calculation, decision making, laboratory reference range etc.[3-5] Smartphone's allow access to most of these Medical Apps which are useful in clinical practice to help the physicians to improve clinical decision making and to improve patient care.[6] Smartphones have an advantage over desktops and laptops in terms of their accessibility anytime during day and night

There is a study showing the prevalence of mobile devices usage among physicians varying from 45% to 85% and the trend pointing towards an increased rate of usage among younger physicians and in larger hospitals.[7]

Until 2011, more than 13,000 relevant Mobile Apps were in the market.[8] Moreover, in a study that was conducted in the United States, 84% of physicians considered mobile devices as their 1st reference.[9]

In Saudi Arabia, a study that was conducted in Al-Qunfutha city, by Al-Mahdeenet et al. suggested that mobile apps are necessary in healthcare fields. However, he recommended conducting further studies

to better evaluate the impact of smart-phones on health practice in the Kingdom.[10]

A systematic review done by Garritty et al. showed that Personal Digital Assistant (PDA) use among healthcare providers varied from 45% to 85%. The review also showed that residents and those in large hospitals were more likely to use a PDA.[11] Previous studies in the United states and Australia showed that medical applications are frequently installed on doctors's smart phones. A hospital based survey done by Dasari et al. among British anaesthetists reported that eighty percent of them actively used medical apps, with 60% using them for clinical activities and 47% for educational activities.[12]

Recently, a considerable number of clinicians have been using medical apps regularly. Currently, more than thirteen thousand medical apps are available online. Due to the ease of use and availability of medical apps, ordinary non-medical people also tend to use them. It's also claimed that the use of medical apps has improved medical errors rates[13] in addition to better communication between healthcare providers through smartphones.[14]

In 2012, a study conducted in Manhattan found that the use of smart phones among physicians was wide spread. When compared to ninety nine percent who use computers, about eighty five percent use Smartphone in their workplace. It also showed that about eighty percent of the physicians used iPhones and the rest used Android based smartphones.[15] A study done in Korea showed that the usage of smartphones in outpatient guidance system improved health services of those visiting hospitals.[16] A study conducted in Spain on around 3500 apps to common medical conditions such as asthma, diabetes mellitus, depression, anaemia revealed that most of the apps do not require internet connection and these apps are designed for monitoring, assisting or giving latest information about the condition.[17]

Most of the healthcare professionals use smartphones in Saudi Arabia. But many of them use them without fully understanding the advantages and limitations. The topic of using medical apps by physicians has not been previously investigated in Saudi Arabia. With the emergence of this new technology, it is important to establish whether physicians have access to this technology and to study their attitudes towards its use. Therefore we conducted this study to assess the knowledge and attitude of primary care physicians in Ministry of Health regarding the use of medical apps in their practice, to define demographic & educational factors that affect their use and to determine the most common types of medical apps used by the primary care physician.

MATERIALS AND METHODS

The study was a cross sectional study conducted in governmental primary health care centres in Jeddah, Saudi Arabia during 2015-2016. There are 45 PHC centres at the time of the study distributed geographically into 4 sectors with about 328 physicians. Jeddah is the second largest city in Saudi Arabia; and it is the main port of the Kingdom on the Red Sea. It has a population of more than 3.4 millions.

The total number of eligible primary health care physicians was 328. The sample size was calculated by using the single proportion equation in Raosoft software package, and the required sample size was 178 at 95% confidence interval, expected frequency of 50%, with accepted margin of error of 5%. Randomized cluster sampling technique was applied to select the physicians for the study.

An anonymous pre-tested and self administered questionnaire was used to collect information. The researcher distributed the questionnaire during the working hours and they were collected during the same day.

Statistical Package for Social Science (SPSS, version 21) was utilized for data entry and analysis. Categorical Data were presented in the form of frequencies, and percentages. Continuous data were presented as means, and standard deviations. Chi square test was used to compare percentages. P-value of less than 0.05 was considered as a level for significance.

RESULTS

Total responders were 141, representing 79.2% of the target sample size of 178. The mean age of responders was 33.6 SD± 7.4. The majorities of them, 75 (54.7%) were young doctors under 33 years of age. More than 50% of them were female (57.1%), and most of them were Saudi doctors 134 (97.0%). The distribution of the study population according to their academic positions showed that more than 80% were general practitioners (GP) and similarly more than 80% had MBBS qualification only. The mean years of experience was 7.3 (± 6.8), and 82 (59.4%) had an experience of less than 7 years [Table 1].

Table 1: General Characteristics of the studied population.

Variable	No.	%	P value
Age (years) n = 137			
≤ 33	75	54.7	<0.05
> 33	62	45.3	
Gender n = 140			
Male	60	42.9	<0.05
Female	80	57.1	
Nationality n = 138			
Saudi	134	97	<0.0001
Non-Saudi	4	3	
Academic Position n=141			
GP	116	82.3	< 0.001
Resident	5	3.5	
Specialist	15	10.6	
Consultant	5	3.5	

Qualification n=141			
MBBS	121	85.8	<0.001
Diploma	4	2.8	
Master	2	1.4	
PHD	14	9.9	
Experience n=138			
≤ 7	82	59.4	<0.05
> 7	56	40.6	

Regarding the awareness of Medical apps, 131 (92%) were aware of its availability and majority of them (89%) had already installed it on their smart devices. Among those installed Medical apps, 71% used them daily and 88% are willing to recommend the Medical apps to their colleagues [Table 2].

Our finding indicated that doctors had a positive attitude towards the use of Medical Apps in general. [Table 3] shows the details of 15 items regarding doctor's attitudes. Majority of them (62.1%) were looking to obtain more medical apps in the future, 71% felt that medical apps supplement medical textbooks, 69% felt it is safe to use medical apps for patient care and 82% felt medical apps improve the decision making in clinical practice [Table 3].

Table 2: Knowledge and use of medical apps.

Variable	yes	Percentage
Aware of medical apps (n = 141)	131	92.9%
Installed Meddical Apps (n = 131)	117	89.3%
Ddaily use of medical app (n = 117)	83	71%
Willing to recommend the app to colleagues (n = 131)	116	88.5%

Table 3: Attitude of studied population regarding the use of med Apps and smart phones.

No	Variable	Strongly disagree n(%)	Disagree n(%)	Unsure n(%)	Agree n(%)	Strongly agree n(%)
1	**Medical apps on mobile phones are easy to obtain**	4 (3.9)	1 (1)	3 (2.9)	57 (55.3)	38 (36.9)
2	**Medical apps are superior to medical books**	5 (4.9)	30 (29.1)	23 (22.3)	35 (34)	10 (9.7)
3	**Medical apps can replace medical books**	12 (11.7)	20 (19.4)	24 (23.3)	39 (37.9)	8 (7.8)
4	**Medical apps supplement medical books**	3 (2.9)	9 (8.7)	20 (19.4)	57 (55.3)	14 (13.6)
5	**Free medical apps are inferior in quality compared to paid apps**	__	17 (16.5)	32 (31.1)	44 (42.7)	10 (9.7)
6	**It is safe to use medical apps for patient care**	__	4 (3.9)	30 (29.1)	58 (56.3)	11 (10.7)
7	**Medical apps Improve clinical decision making**	__	5 (4.9)	16 (15.5)	67 (65)	15 (14.6)
8	**Medical apps Allow faster access to national clinical practice guidelines**	__	3 (2.1)	13 (12.6)	70 (68)	17 (16.5)
9	**Medical apps Allow faster access to common laboratory reference values**	__	1 (1)	11 (10.7)	75 (72.8)	16 (15.5)
10	**Medical apps Perform useful medical related calculations. (e.g. estimate creatinine)**	__	1 (1)	13 (12.6)	73 (70.9)	16 (15.5)
11	**Medical apps Allow faster access to reliable sources of medical knowledge**	__	4 (3.9)	7 (6.8)	75 (72.8)	17 (16.5)
12	**Medical apps Allow faster access to reliable sources of clinical skills**	__	8 (7.8)	17 (16.5)	66 (64.1)	12 (11.7)
13	**Apps Allow easier medicine dosages calculation**	__	2 (1.9)	16 (15.5)	63 (61.2)	22 (21.4)
14	**Medical apps Allow faster access to evidence-based medical practice**	__	1 (1)	9 (8.7)	75 (72.8)	18 (17.5)
15	**Are you looking to obtain more medical apps in the future**		3 (2.9)	1 (1)	64 (62.1)	28 (27.2)

[Figure 1] shows the main purpose of using medical apps among doctors. The top 5 purposes of use were the following: looking for latest medical information (71%), looking for information about medications and drugs guide (69%), looking for medical news (65%), looking for medical journals (64%) and for revision (64%) [Figure 1].

The majority of doctors reported a high frequency of Med Apps use. Out of 103 who installed Medical App, 73 (70.9%) of them used them least once in a day. Only 2 doctors (2%) reported a frequency of usage of less than once a month [Figure 2].

[Table 4] shows top 5 medical apps used by doctors during their clinical practice. The list comprises of Medscape 81(78.6%), Upto date 68(66.1%), BMJ 57 (55.4%) Pub Med mobile 54 (52.4%), and skyscape 36 (34.9%).

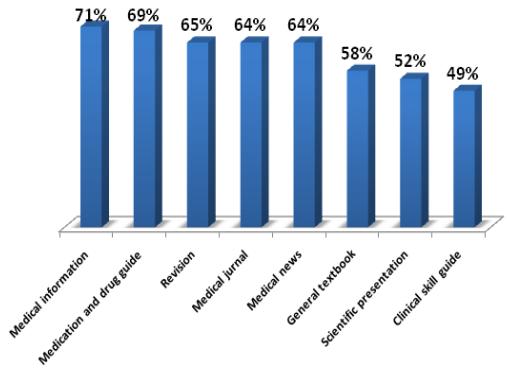

Figure 1: Main purpose of using installed med apps N=103.

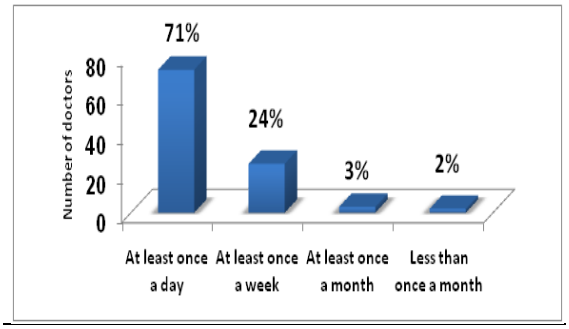

Figure 2: Main purpose of using installed med apps N=103.

Table 4: Top 5 list of Med Apps used by doctors, n = 103.

Variable	No.	%
Medscape	81	78.6%
Uptodate	68	66.1%
Differential Diagnosis BMJ	57	55.4%
PubMed Mobile	54	52.4%
Skyscape	36	34.9%

DISCUSSION

These days, smartphones are a very essential tool for communication between people. Its use is not confined to conversation and text messages any more. Through it, it is possible to access many of the software applications which help the physicians to gather information and to use it productively.

In the present study, it is documented that most of the doctors were aware about presence of Medical Apps. Around two third of them, used smart devices in their daily clinical practice. The high frequency of Medical Apps installation and their use is consistent with Geoffrey et al,[18] which showed that majority of healthcare professionals, had positive attitude towards medical apps.. The prominent motivating factor behind adopting the Medical Apps among our studied population was found to be recommendations from their colleagues. Although we did not find similar results in the literature, there is an unpublished local study in 2015 among medical students which pointed towards the peer effect in promoting the use Medical Apps among the students. Our result also showed that young doctors used the apps more than older doctors . This is consistent with other studies such as Garritty et al, who noted that younger physicians are more likely to use medical apps with range of 55%-85%.[19]

Around half of the participants (55.3%) agreed that medical apps are easy to obtain, also 46.6% revealed that they did most of their medical learning through Medical Apps. Similar findings were obtained in a study carried out in the United Kingdom which showed that the level of Smartphone's ownership and usage among medical students and junior doctors were high.[20]

The main purpose of using Medical Apps was for looking medical information, followed by information about medications and drugs guide. A smaller percentage of participants used them for preparation of presentation, medical news and medical journals. This is probably due to higher need of medical information for patient care in clinical practice.

The study identified Medscape as the most frequently used Medial App among the study population.

The contributing factors behind the wide use of Medscape may be its free availability coupled with its comprehensive nature of incorporating most of tools the physician needs, such as medical information, drug calculation, differential diagnosis, prognosis, and treatment.

We found statistically significant difference in knowledge and attitude towards the use of Medical App in relation to age, academic position, and qualification. We believe that this is due to the fact that younger physicians have a tendency to go for latest technologies. This further explains the higher percentage of their use among the general practitioners who have just MBBS and with experience of less than 7 years.

CONCLUSION

High degree of awareness was noted among our young population regarding the availability of Medical Apps for mobile smartphones. Our findings also indicate that young doctors had positive attitude towards the use of medical apps in general. The majority of young doctors with just MBBS and General practitioners having less than 7 years of experience reported a high frequency of Medical Apps use. Most frequently used Medical Apps were free medical Apps.

Recommendation:

Introduction of smartphones education regarding the use of Medical apps into medical curricula may be beneficial to healthcare providers. Refresher training may be conducted for the benefit of practicing physicians for empowering them towards more effective use of available medical apps. Action is needed to improve access to paid Medical Apps which incorporate more advanced features.

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