Original Research

Prevalence and Purpose of Medical App Usage in Pakistan: A Cross-Sectional Study

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ABSTRACT

Objective: To determine the prevalence and purpose of medical app usage in Pakistan.

Methodology: A cross-sectional study was conducted using a pretested form, distributed via Google Forms. Convenience sampling was used to select a sample of 357 MBBS, BDS, Allied Health, and Nursing students of CMH Lahore Medical College. Data was analyzed using "SPSS version 23.0". Descriptive statistics were calculated as frequencies. A "p-value" of less than 0.05 was deemed statistically significant

Results: Out of all the participants (357), 40.3% were males, and 59.7% were females, with an average age of 20.89 ± 1.61. 95.5% of the participants used intelligent devices, and 86.6% were aware of the medical apps available for use on mobiles. A majority (64.1%) of the students had various medical apps installed on their phones. Almost half of these students (45.1%) were advised by medical educators to use different medical apps for their studies. Most of the students made use of medical apps to search for medical information (49.7%), followed by exam preparations (37.6%), Revision (34.6%), and preparation of presentations (26.4.%). The use of general clinical textbooks and clinical skills guide apps were 22.2% and 23.9%, respectively. 20.5% of the participants did not use Medical Apps for any purpose. A Likert scale showed that students think that Medical Apps are easy to obtain, and many of them frequently use them too. They believe that these apps save time during clinical practice. Medscape was the most common app being used (29.3%), followed by Gray's Anatomy (25%) and Pharmapedia (23.9%).

Conclusion: The common usage of medical apps was recurrent amongst medical students.

KEYWORDS: Medical Apps, Medical Students, Smartphones

INTRODUCTION

Conventionally the primary medium for obtaining education for students was textbooks[1]; however, with passing the time and advancements in technology, there has been an increase in the tools available to acquire information with mobile phones and applications (apps) replacing the traditional settings of acquiring knowledge.[2] The world's earliest smartphone was launched in 1994, and the portion of individuals using smartphones have been steadily increasing since then.[3] Hence, innovative mobile technology has penetrated deeply into society in a relatively short period, attracting a range of subscribers ranging from school going children to senior citizens.[4] Smartphone applications and the internet have introduced a recent wave of approachability and flexibility within academic processes.[5] A similar trend can be seen in Medical education, as it was shown that smartphones are a valuable educational aid for medical students4. Greater than 13,000 mobile applications associating to health under the headings of "medical" and "healthcare and fitness" are available on different App stores.[4]

Medical students are using smartphone applications for many purposes, including guidelines for clinical setup, medical calculators, drug reference tools and other decision-support aids, textbooks, and literature search portals.[6,7,8] Numerous apps cater to

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multiple subfields of medicine, while others are used for mere ease and convenience and to decrease the paper load. For example, some apps can simulate surgical procedures and operations. In contrast, others can be used to assess various sensory functions of the body, such as hearing and visual tests, and other apps are used as an alternative to constantly buying and carrying a load of new edition textbooks as medical applications by way of technology are constantly being updated with apt information.[9,10] These apps can further help healthcare workers to remember their appointments, provide reference ranges for multiple systems of the body, count calories and count the Body Mass Index without applying much manual labor.[11]

Various research on the use of mobile phones and applications in supporting medical students has been undertaken worldwide, and as data suggests, intelligent devices were deemed beneficial to 84% of medical students in the United Kingdom. 8. Another study conducted at Monash University, Melbourne, Australia, stated that 76% of students using smartphones used medical applications. Similar results were obtained at a Canadian university where 65% of students utilized a medical application to access clinical texts and pharmacological references.[12] However, a discrepancy was seen in Pakistan, where one study suggested the frequency of usage of these smartphone apps was 71%, 2while another stated it was 41.46%, so there was a difficulty in understanding the prevalence observed in this region.[13]

There has been very little research focused on this topic in Pakistan to reflect upon the benefit of medical phone applications amongst medical students despite smartphones' fair use and popularity in the medical setup. So the current study was designed to explore the knowledge and perception regarding medical apps among participants, and to determine the prevalence of medical app usage in Pakistan, and the purpose for which they are used.

METHODOLOGY

A cross-sectional analysis was conducted on "CMH Lahore Medical College" students from January to July 2021 after taking informed consent. Students of all years from MBBS, BDS, nursing, and allied health sciences were part of the study. A convenience sampling method was used. A sample size of 306 was calculated using the WHO equation: "n = z2 x p x (1 - p) / e2"
Where:
z = 1.96 for a confidence level (α) of 95%
p = proportion (expressed as a decimal),
e = margin of error.
We got 357 responses just to be on the safer side.
The data were collected utilizing a pretested, self-designed questionnaire. The questionnaire was comprised of three main parts. The first portion of the questionnaire asked questions on demographic data like age, gender, Year, the field of study, whether or not to use a mobile device, having medical apps installed on the smart device, and the intent of installing the applications. The second portion was focused on the students' perceptions of medical apps on smartphones. The third portion aimed to see the importance of medical applications in clinical practice. The fourth portion asked about the students' use of various medical applications and aimed to identify the prevalent applications among them. Five options were given to the students in the second part of the questionnaire, from which they could select only one from the following: strongly agree, agree, neutral, disagree, or strongly disagree.

Statistical analysis The information collected was analyzed using "SPSS version 23.0". Descriptive statistics were calculated as frequencies. A "P-value" of less than 0.05 was deemed statistically significant. The "Ethical Review Committee of CMH Lahore Medical College" provided ethical approval.

RESULTS

Out of all the participants (357), 40.3% were males, and 59.7% were females, with a combined mean age of 20.89 ± 1.61. 95.5% of the participants used intelligent devices, and 86.6% were aware of the medical apps available for use on mobiles. A majority (64.1%) of the students had various medical apps installed on their phones. Almost half of these students (45.1%) were advised by their medical educators to use different medical apps for their studies. (Table `1) Most of the students used medical apps for Looking up Medical Information (49.7%), followed by Exam Preparations (37.6%), Revision (34.6%), and Preparation of Presentation

Table 1: Demographic data and characteristics of participants		
Parameters	**Frequency**	**Percentage**
Total Participants	357	100
Gender		
Male	144	40.3
Female	213	59.7
Using Smart Devices		
Yes	341	95.5
No	16	4.5
Awareness about the availability of Medical Apps on Smart Devices		
Yes	309	86.6
No	48	13.4
Have Medical Apps installed on your smart devices		
Yes	229	64.1
No	128	35.9
Have your medical educators ever recommended that you obtain a specific medical app for your mobile?		
Yes	161	45.1
No	196	54.9

(26.4.%). The use of General Clinical Textbooks and Clinical Skills Guide apps were 22.2% and 23.9%, respectively. 20.5% of the participants did not use apps for any purpose. (Table 2)

Table 2: Purpose of use of Medical Apps		
Parameters	**Frequency**	**Percentage**
Revision	123	34.6
Preparation of Presentations	94	26.4
Lookup Medical Information	177	49.7
Medical Journals	50	14
During Ward Rounds	43	12.1
Medical News	53	14.9
Medications/Drug Guide	64	18
Exam Preparations	134	37.6
General Clinical Textbook	79	22.2
Clinical Skills Guide	85	23.9
I do not have medical apps	73	20.5
Other Purpose	2	0.6
Total	977	100

All of the items in Tables 3 and 4 were scored on a Likert scale, and the average and standard deviations for each response were determined. 1 stood for Strongly Agree, whereas five stood for

Strongly Disagree. Table 5 represents the apps used by the students. Medscape was the most common (29.3%), followed by Gray's Anatomy (25%) and Pharmapedia (23.9%). Table 6 shows the apps most frequently used in each medical year.

Table 3: Students' Perceptions about Medical Apps on Smart Phones		
Parameters	**Mean (total score 5)**	**St. Deviation**
Medical Apps are easy to obtain	2.25	1.10
I am looking to obtain more apps in future	2.37	1.08
I would recommend the use of apps to my fellow medical students	2.27	1.06
I do most of my medical learning using medical apps	3.38	1.24
Medical apps are essential tools for undergrad students	2.62	1.02
Medical apps are superior to medical books	3.61	1.13
Medical Apps are as good as medical books	3.31	1.07
Medical Apps are inferior to medical books	2.81	1.03
Medical Apps can replace medical books	3.66	1.17
Medical Apps can supplement medical books	2.59	1.17
Medical Apps provide helpful medical information at the point of care	2.45	0.95
Free Medical Apps are inferior in quality compared to paid apps	2.52	1.01
No dangers in using medical apps for patient care	2.91	0.94

Table 4: Students' Perceptions of the impact of Medical Apps on Clinical Practice		
Parameters	**Mean (total score 5)**	**St. Deviation**
Improve clinical decision making	2.58	0.19
Save time	2.12	0.88
Allows faster access to national clinical practice guidelines	2.26	0.93
Allows faster access to common laboratory reference values	2.24	0.93
Helps in making differential diagnosis	2.41	0.96
Perform useful medical-related calculations	2.39	0.94
Allows faster access to reliable sources of medical knowledge	2.35	0.99
Allows faster access to reliable sources of clinical skills	2.44	0.95
Allows accurate medicine dosage calculations	2.61	0.94
Allows more straightforward medicine dosage calculations	2.48	0.93
Allows faster access to evidence-based medical practice	2.54	0.92

Table 5: Medical Apps used by students

Parameters	Number	Percentage
Medscape	103	29.3
Pharma Guide	44	12.5
Pharmapedia	84	23.9
Geeky Medicine	65	18.5
Gray's Anatomy	88	25
UpToDate	13	3.7
Oxford Handbooks	37	10.5
MedCalc	20	5.7
Anatomy Atlas	40	11.4
TeachMeAnatomy	21	6
Dr. Najeeb's Lectures	14	4
Sketchy	3	0.9
I do not use any apps	45	12.8
Other Apps	45	12.8

Table 6: Most frequent Medical App used by each Year

Year of Study	Medical App Name	Percentage
1st Year	Gray's Anatomy	34.9
2nd Year	Gray's Anatomy	36.3
3rd Year	Pharmapedia & Medscape	32.7
4th Year	Medscape	44.8
5th Year	Medscape	80

DISCUSSION

The recent advancements in technology have completely shifted the way we view the world today. Smartphones have played a significant role in that. The medical field has also seen change due to the new technology available now. Smart devices have become a significant part of our lives, as can be seen from the findings of our research, which show that about 95.5% of participants own a smart device. These results are similar to another study conducted in Pakistan, which showed that around 95.8% of participants own a smart device 15, and another study conducted at "King Abdulaziz University," Jeddah which had a result of 99%.16.

In recent years, medical applications have increased in popularity among medical students; however, the results show a varying level of interest among students worldwide. In our study, around 86.6% of participants were knowledgeable about medical apps on their phones, and around 64.1% had various medical apps installed on their phones. This result is less than the results obtained from other studies conducted at King Abdulaziz University, Jeddah 16, and Monash University17, where around 76% and 89.1% of participants had one or more medical apps installed on their phones. 45.1% of these pupils had put applications on their phones on the recommendation of their medical educator. This is greater than the result seen in a study conducted at Monash University, which resulted in 32%.17

In our current study, the primary use of medical applications was for looking up medical information (49.7%), followed by exam preparation (37.6%) and Revision (34.6%). The results were similar to those gathered in other studies, with looking up medical information and Revision being the most common use.16,18 20.5% of students were not using any kind of medical applications, and these results were comparable to another study conducted in Pakistan in 2019, which had a percentage of 28% .19

Students who were using medical applications agreed that medical apps were easy to access, and they demonstrated a desire to achieve medical apps in the future; however, most students did not agree that medical applications can take the role of medical textbooks (Table 3). In clinical practice, students believe that using apps saves time and allows in clinical settings, quicker availability of healthcare information (Table 4).

CONCLUSION

In our study, around majority of participants were knowledgeable about medical apps on their phones, and half of participants had various medical apps installed on their phones. Despite the increased level of interest and the shift of the students towards eLearning,

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Author's Contribution

Ibtehaj Munir	Study design, data collection, data analysis and interpretation revise and approve the article
Farhat Ijaz	Study design, data collection, Data analysis and interpretation, revise all intellectual contents and approve the article
Kanza waqar	Study design, data collection, manuscript writing, revised and approve the article
Iman Hussain	Study design, data collection revise and approve the article
Rana Khurram Aftab	Study design, manuscript writing revise and approve the manuscript
Asim Zia	Study design, data collection revise and approve the article
All authors are equally accountable for accuracy, integrity of all aspects of the research work.	