



## Accessing Medical Information on Smart-Phone: Usage and Perception among Post Graduate Students of A Medical College, Central Karnataka - A Cross Sectional Study

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## ABSTRACT

**Introduction:** There is scant reliable evidence on the usage of smart phone by postgraduate students/residents in India. The study conducted to assess the usage of smart phone to access medical information among postgraduate students of a medical college and to explore the perceptions about accessing medical information on smart phone among them.

**Methodology:** A cross sectional study was done among postgraduate students of a medical college in central Karnataka during December 2018 to January 2019. Every postgraduate student of the college available at the campus was approached for the study.

**Results:** Smart-phone use and internet facility in it was almost universal (99.2%). Mean years of smart-phone usage among postgraduates was 7.4 + 2.5 years and they were using internet around 3.4 + 1.5 hours a day. Medical information was accessed by 97.4% of postgraduates over smart-phone and pubmed was the most common site accessed. Information on drug dosages and search for seminar presentations were the most searched reasons. Usefulness of medical information available on internet was graded at 3.62 + 0.85 on a scale of 0-5.

**Conclusions:** Online information aid clinical/academic activity of the subjects significantly. This makes it necessary to train them about the search methodologies and information about validity and reliability of the information provided in the online resources.

**Key words:** Smart-phone, Internet, Medical app, Postgraduates, Medical information

## INTRODUCTION

Over the last 3 decades mobile phones have been evolving rapidly both in technology and accessibility. Advanced functions like highly efficient operating systems coupled with improved processors, large memory space etc has led to the development of applications which are helpful to a greater extent in both personal and work environment<sup>1,2</sup> India has recently experienced exponential growth in its telecommunication industry with mobile phones reaching even the most rural areas<sup>3</sup>. In India it is expected that mobile data traffic will grow 9 fold from 2017-22<sup>4</sup>. Mobile technology is making

huge inroads in the health care space. Mobile health is about leveraging mobile and wireless devices to improve health outcomes<sup>5</sup>. Mobile technologies such as smart phones are increasingly being adopted and used by large number of health care professionals since these technologies have potential to improve health care outcomes. Previous studies suggest that utilization of smart phones in medical centres would improve the efficiency and quality of clinical practice and patient care even in developing countries<sup>6,7</sup>.

Smart phones allow healthcare providers and students to access resources efficiently at the right

time at the point of need. Health care workforce is highly mobile including multiple settings of care such as outpatient care, inpatient care, operating theatres, casualty and intensive care units etc, hence working in healthcare system requires mobility of healthcare providers<sup>2,8</sup>. Increased uptake of internet accessible devices is aiding information retrieval within workplace. Several reviews have highlighted the roles of smart phone technology within the hospital workplace. These include flexible communication, portability, rapid access to online information, usage of medical applications etc.<sup>9,10,11</sup> Resident physicians have reported increasing usage of medical applications in their clinical practice, most commonly drug references, medical calculators and pregnancy wheels.<sup>12</sup> 'Access to information' made possible by the internet accessible devices definitely has the potential to change how medicine is learned and practiced<sup>13,14</sup>. Trelease described the use of smart phone as a potential 'learn anywhere' resource for students.<sup>15</sup> The potential of smart phone as an educational tool is an area which has started to gain recognition<sup>16</sup>. A survey in the UK showed 84% of medical students believed that smart devices were useful addition to their medical education<sup>17</sup>. In addition to clinical work postgraduate work also involves continuous assignments related to their specialty education.<sup>2</sup> There is scarcity of information related to use of smart phone by postgraduates to access the medical information. In view of this, the study was conducted with the following objectives.

## OBJECTIVES

**The study was conducted** to assess the usage of smart phone to access medical information among postgraduate students of a medical college and to explore the perceptions about accessing medical information on smart phone among postgraduate students of a medical college.

## MATERIALS AND METHODS:

A descriptive, cross sectional study was conducted at a medical college (SSIMS & RC) in central Karnataka from December 2018 to January 2019. Study participants were postgraduate students of the institute. It was decided to include all the postgraduate students who satisfy inclusion and exclusion criteria

**Inclusion criteria:** Postgraduates taken admission and studying in the same institution were included in the study.

**Exclusion criteria:** Those who were not willing to give consent or the postgraduates of the institution who will be in their peripheral posting during the study period were excluded from the study.

**Data collection:** The information regarding the usage and perception was collected using a pre-tested and pre designed self administered questionnaire. The questionnaire was having both open and closed ended questions and divided into two sections: first section was focusing on the background characteristics of study population like age, gender, years of postgraduation etc. Second section of the questionnaire focuses on the usage of smart phones to access the medical information, frequency of usage, websites accessed, applications used etc. The questionnaire was given to all the postgraduate students of the institute after taking the informed consent and collected back from them after giving sufficient time to complete the questionnaire.

**Ethical consideration:** The study was approved by the institutional ethical and review board of SSIMS & RC, Davangere. The purpose of the study was explained to study subjects before data collection.

**Statistical analysis:** The data collected was entered into excel sheet and analyzed. Data is presented in percentages and proportions. Responses to open ended questions were assessed qualitatively.

## RESULTS

A total of 121 postgraduates were approached for the study, out of which 117 participated with the response rate of 96.7%. The mean age of the study participants was 27.14 (SD 2.11) years, ranging from 24 to 35 years. Most of the study participants were females; they formed 54.7% (64) of the study group. The majority of the study participants were in the first year of post-graduation (35%) followed by third year post graduate students (33%). (Table 1)

Usage of smart phone was almost universal (99.2%). Only one respondent was not using smart phone. Mean years of smart phone usage was 7.4 (SD 2.5) years, ranging from 3 to 14 years. All the study participants who were having smart phone were using internet facility. Mean years of internet usage in the smart phone was 6.2 (SD 2.1) years, ranging from 2 to 12 years.

**Table 1: Background characteristics of study participants**

Characteristics	PG Students (%) (N = 117)
Age in years	Mean 27.14 (SD 2.11)
Gender	
Male	53 (45.3)
Female	64 (54.7)
Year of post-graduation	
I Year	41 (35)
II Year	37 (31.6)
III Year	39 (33.4)

**Table 2: Distribution of study participants by common sites accessed**

Websites accessed	PG Students (N = 104) (%)
Pubmed	55 (52.9)
Medscape	46 (44.2)
Wikipedia	22 (21.2)
Google scholar	14 (13.4)
Google	11 (10.6)

\*Multiple response

**Table 3: Distribution of subjects by possession of specific app**

Medical application	PG Students (n=74) (%)
Medscape	28 (37.8)
Daily rounds	7 (9.5)
Marrow	7 (9.5)
1 mg	6 (8.1)
Radiology assistant	6 (8.1)
EDD calculator	5 (6.7)

**Table 4: Usage of smart-phone during working hours to aid work**

Usage of Smartphone	PG Students (n=113) (%)
Very often	41 (36.3)
Sometimes	64(56.6)
Rarely	7(6.2)
Never	1 (0.9)

**Table 5: Purpose for which medical information was accessed during previous month**

Purpose	PG Students (n=111) (%)
Seminar preparation	63(56.8)
Drug dosages	57(51.4)
Management of disease	38(34.2)
Diagnosis	34(30.6)
Case presentation	31(27.9)
Lab investigation	24(21.6)
Other	8(7.2)

**Table 6: Advantages and disadvantages of accessing medical information**

Accessing information	Students (%)
<b>Advantages (n=82)</b>	
Easy and fast access	80 (97.5)
Updated information	9(10.7)
Improvement in diagnostic management	6(7.3)
Decreased waiting time	5(6.1)
Portability	3(3.6)
<b>Disadvantages (n=79)</b>	
Network issues	34(43.0)
Irrelevant content/Vast content	23(29.1)
Access to site is limited	21(26.6)
Advertisement	4(5.1)
No WIFI facility in the working areas	3 (3.8)

The mean duration of internet use per day was 3.4 (SD 1.5) hours, ranging from 30 min to 5 hours per day.

Out of 116 study participants who were using internet, 113 (97.4%) were accessing medical information over smart phone. More than 50 websites were accessed to gain medical information. These sites varied from social networking sites to medical websites including specialty specific sites. Most commonly accessed sites were Pubmed (52.9%), Medscape (44.2%), Wikipedia (21.2%), Google scholar (13.4%). (Table 2) The other sites accessed were 1mg, radiology assistant, slide share, webmd, mayoclinic and specialty specific journals etc.

Use of medical applications was found in 74 (63.8%) of the study participants. Most common app in possession was medscape, 28 (37.8%) of the study participants were having this application in their smart phone. Daily rounds (9.5%) and marrow were the other commonly used application by the study participants. (Table 3) Other applications used were 1mg, radiology assistant, EDD calculator apps, CIMS, Curofy etc.

Nearly half of the (56.5%) study participants responded that they use smart phone only sometimes to access medical information during working hours to aid work (Table 4). Usefulness of medical information available on internet was graded at 3.62(SD 0.85) on a scale of 0 – 5.

Most common purpose for accessing medical information during the previous month was preparation for seminars (56.8%) in the department followed by confirmation of drug dosages (51.4%). Assistance for diagnosis, lab investigations, management of disease, case presentation etc. were the other purposes for which smart phone utilized (Table 5).

Study participants listed the advantages and difficulties in accessing medical information in the smart phone. The most common advantage cited by the study participants was easy and fast access (80) followed by updated information (9). Other advantages mentioned were improvement in diagnostic management (6), decreased waiting time (5) and portability (3). (Table 6.) Difficulties were network issues (34), Irrelevant content / vast content (23), Access to site is limited (21), too many advertisements in between (4) and no WIFI facility in the working areas (3). (Table 6.)

## DISCUSSION

In the era of increased utilization of smart phones for personal and professional activities this study was conducted to assess the usage and perception of postgraduate students in accessing medical information through smart phone. In the present study smart phone was used by almost all the study participants (99.2%). This is consistent with

the study by Jamal et al<sup>2</sup> but higher than few older studies<sup>9,18</sup>. This may be due to changes occurring in the telecommunication industry and drop in the prices of smart phones and internet usage charges. The mean duration of internet usage per day was 3.4 hrs. This indicates significant amount of time is spent by study participants in accessing internet.

In our study 97% of the study participants were accessing medical information. The other studies reported wide range of variation regarding accessing medical information<sup>1,11</sup>. This may be due to different settings and heterogeneity of study participants. The most commonly accessed websites were pubmed and medscape in our study. These sites were also featured in top 10 most frequently mentioned sites by a multicentric study done by boruff et al<sup>19</sup> in Canada.

Use of medical applications was found in 64% of the study participants. The other studies it ranged between 47% and 75% in diverse study participants<sup>11,18,20</sup>. The most commonly used app was medscape (38%). The apps used by the study participants and preference in which these apps used varied among different studies<sup>19,20</sup>. The use of mobile applications is less compared to general access to medical information.

In our study, majority (56.5%) of the study participants use smart phone 'only sometimes' to access the medical information during work hours. In other studies majority of the respondents used frequently their devices to access medical resources.<sup>2,19</sup> This shows postgraduates / healthcare professionals adopting smart phone devices to look up for information. Preparation for seminars and confirmation of drug dosages were the two most common purposes for which study participants accessed medical information during previous month. In the earlier studies<sup>2,19</sup> majority findings were related to clinical use and these findings were consistent with our present findings but in our study participants also accessed medical information for academic purposes. The possible explanation may be difference in study protocols and difference in curriculum.

The most common advantage as perceived by our study participants was easy and fast access and major disadvantage cited was network issues. A study by Wallace et al<sup>13</sup> also had similar findings. The information about the advantages and disadvantages will help in improving current situation.

## LIMITATION

The present study was done in single institution, which limits the generalization of the study findings.

## CONCLUSION

Universal usage of smart phone, internet and with more than 95% willing to use smart phone to access medical information would imply that on-line resources contribute significantly in future academic and clinical activities of postgraduates. Recognizing this, policy for using online information should be developed and the difficulties faced during accessing information need to be addressed. The large multi-centric studies will help in confirming the study findings.

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