

## SMARTPHONE USAGE AND ATTITUDE AMONG MEDICAL STUDENTS AS A NEW LEARNING AID IN MEDICAL EDUCATION IN NORTHWEST INDIA: A QUESTIONNAIRE BASED STUDY

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### ABSTRACT

**Introduction:** Smartphones are becoming popular in medical field, with evolving priority on evidence-based medicine and e-learning, it becomes increasingly important to have baseline data on country's next generation of physicians. The present study was conducted to assess attitude of medical students towards the usage of mobile phones as a learning aid and its perceived advantages and disadvantages.

**Methods:** The present study was a questionnaire-based descriptive cross-sectional study conducted in November 2017 and comprised 500 Medical students of three Government Medical Colleges of Rajasthan, India. A Prevalidated 18 point, structured, questionnaire were

distributed in the classrooms after lecture and were filled by the students anonymously. SPSS was used for statistical analysis. **Results:** Of the 500 students enrolled in the study 376 completed the questionnaire with a response rate of 75 %. 99.2 % owned smartphones mostly Android Phones. Popular medical applications amongst students were Google/Wikipedia 87.8 %, Medical Dictionary and Medscape. 58 % students, reported to have technological skills to use smartphones. Major advantages perceived by students were access current information 69 % and anytime /anywhere access 23%. Major barriers to learning were slow speed and cost. **Conclusion:** Present Net generation of Medical students have positive attitude towards use of Smart phones in Medical curriculum and needs training to improve effectiveness of using medical apps as supplement to learning.

**KEYWORDS:** Smart phones, medical education, learning, student, medical.

## INTRODUCTION

“New technology is not good or evil in and of itself, it is all about how people choose to use it “David Wong.

Various forms of Informational technology, such as Smart phones, laptops, tablets, e- books, and, have occupied the classroom which can have both positive and negative impact on student’s learning and concentration depending upon how they use them.<sup>[1]</sup>

The popularity of smartphones is due to its versatility of functions, which can assist in medical decision making, information gathering and medical education. The present “ Net generation” of Medical students uses various mobile applications for blended learning.<sup>[2]</sup> With evolving priority on evidence-based medicine and technology, it becomes increasingly important to have baseline data on medical app use in the country’s next generation of physicians.

Learning is now possible everywhere anytime. Access to resources is a fundamental phase in learning, and mobile learning empowers this access. Software applications (Apps) now enable users to access content even when they are off-line. There is also a risk of distraction from learning as the device serves multiple function.<sup>[3]</sup>

Multiple past studies have demonstrated that there is a strong interest in, and use of, smartphone apps among medical trainees<sup>[4,5,6]</sup>, with further research exploring the use of podcasts on smartphones as a way of delivering education and ‘teleradiology’, have been a popular area of research.<sup>[7]</sup> There was significant improvements in performance amongst students using smartphone applications.<sup>[8]</sup> Studies have indicated frequent use of apps as reference and information management tools in clinical practice, with a trend toward increasing app use amongst medical practitioners with little training.<sup>[9,10]</sup>

However wastage of time by medical students is a negative aspect of Smart phone use and “Smartphone Addiction” is a relatively new concept and research studies and social interventions have been conducted to address the adverse impact of smartphone addiction.<sup>[11,12]</sup>

There are more than 1000 free and paid applications available on Android Play store and on Apple store about 360 applications labelled under the "Medical" categories. This number is significantly increasing annually. These Medical Applications are mostly used for reading

textbooks and articles, clinical guidelines, medical calculators, drug indexes continuing medical education (CME), other decision-support aids and quiz apps.<sup>[13,14]</sup>

A smartphone-based application based study of formative testing was found to be an effective and attractive intervention to stimulate study behavior and improve study performance in (bio) medical students.<sup>[15]</sup> One study done found improved test scores in participants who utilized mobile apps versus the traditional structure of teaching.<sup>[16]</sup> Another similar study on the use of digital versus nondigital learning resources amongst medical students found high prevalence of digital learning resources such as online lecture slides, e-learning cases, and mobile app use that are preferred over textbooks.<sup>[17]</sup>

The aim of this study was to investigate whether and up to what extent medical students academically use their smartphones to enhance their medical knowledge, their subjective attitudes toward smartphones as learning tools and how often they use apps for education and clinical professional development.

## **MATERIAL AND METHODS**

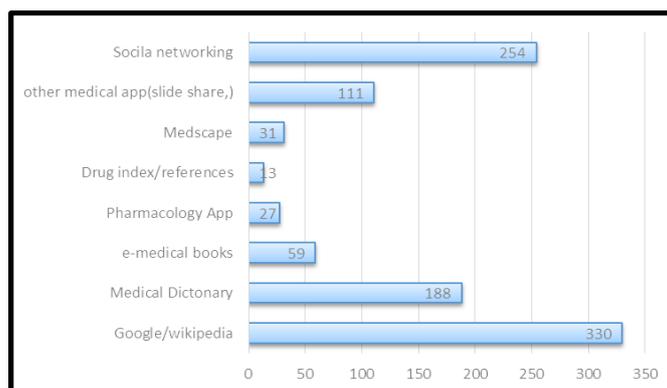
This was an Observational Cross-sectional Questionnaire based study conducted in the month of November, 2017. The Study population included students affiliated with three Medical colleges of Rajasthan (J.L.N. Medical College Ajmer and Jhalawar Medical College Jhalawar and S.M.S. Medical College Jaipur). An ethical approval was taken from respective Institutional Ethics Committee to conduct the study. A Prevalidated 18-item questionnaire was developed by the researchers for content reliability and validity. The questionnaires were distributed in classrooms after lecture and were filled up by the students keeping their names Incognito. Participants were informed that completion of the survey was voluntary and no inducements were offered for participating in the study. Questions were multiple choice, and there were no exclusion criteria. For simplicity, phones with camera, internet connectivity, and downloadable apps were considered as smartphones.

All data was collected during a 1-month time period. The questionnaire elicited information about the participant's gender, MBBS year, College, Mobile application used, and their perceived benefits and barriers for using these devices in medical education setting. Data were analyzed using IBM SPSS Statistics for Windows, Version 20.0. With Excel sheet and represented as simple mean and proportions.

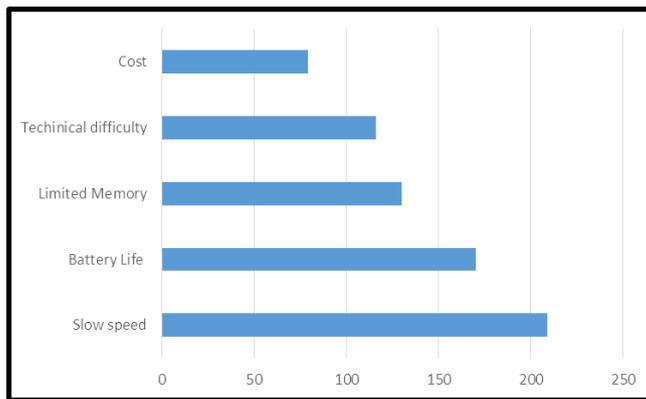
## RESULTS

Of the 500 students contacted, total of 376 medical students participated in the survey with a response rate of 75.2% (376/ 500) out of which majority were Males (53.7%) and 46.3% were Females (Table 1). With mean age 21 for Males and 20 for Females. Majority of students owned a Smart Phone (99.2 %) while 0.8% were using simple Non Android phones. 355 (94.4 %) were using Android based phones and 18(4.8%) were using iPhones. 97 % of participants agreed that smart phone was a useful means to enhance their medical knowledge. When inquired about the name of the medical apps students were using (Chart 1). most popular applications for study purpose were Google / Wikipedia (87.8%), Medical dictionary (50 %), e-books (15.7%) and few were using Medscape(8.2%), Pharmacology app (7.7%), drug index and slide share and perceived them to be trustworthy. Along with medical apps student also use social networking application (66.7%) for amusement. 88 % of medical students who responded said medical apps were very helpful in latest information gathering, bed side teaching (27%), self-assessment and time saving (22%), While other major uses included communication along with entertainment.

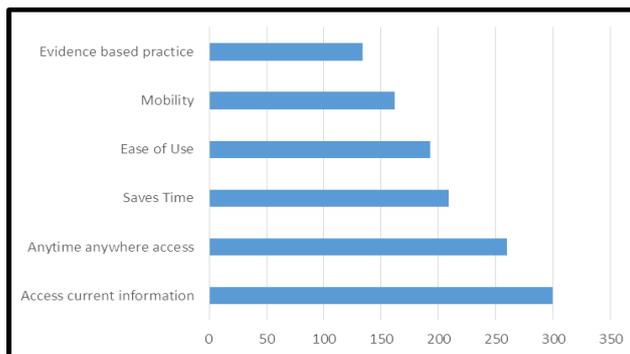
About 79% of Medical students thought smart phone should be included in their MBBS curriculum. 51% describe smart phones as Innovative and brilliant while only 7.4 % student describe it as a distraction. 82.2% Students use phones both for recreational and study purpose. 88 % keep their mobile all the time and don't think having access to smartphone in wards would mean I spent less time with patients. 58 % student think they have all technical skills to use smart phones. Major disadvantage (Chart -2) perceived in its use was slow speed (57 %), battery life and cost. While major advantage (chart-3) perceived by students of using smart phone was access latest information, anytime and anywhere saving time and its ease of use.



**Chart -1 Common applications used amongst medical students.**



**Chart -2 Disadvantage of using Smart phones perceived amongst medical students.**



**Chart -3 Advantage of using Smart phones perceived amongst medical students.**

**Table 1: Academic Use of Smartphones by the students.**

	Using Smart phone n (%)	Not Using Smart phone n (%)	Total
Male	199(53.2%)	03(0.8 %)	202
Female	174(46%)	0	174
Total	373(99.2%)	03(0.8% )	376

**Table 2: Attitude towards use of smartphones use among study subjects.**

Attitude of participants	No of participants (%)
Usage of smart phones more for	Study Recreation Both 42 (11%) 22 (6%) 309(81%)
Impact do you think a smartphone would have on your learning	Useful aid distraction 341(91%) 35(9 %)
Do you have all technical skills to use a smartphone?	Yes No 217 (58 %) 156(42 %)
Prefer Textbooks to smartphone reading?	Yes No 336 (90%) 37 (10 %)
Carry Smart phones regularly to college	Yes No 328 (88%) 45 (12 %)
How often do you use a medical apps?	Once daily 47(18%) multiple times a day 80(31%) occasionally 126(49%)
Including smartphones in medical curriculum	Yes No 297 (79%) 79 (21 %)

## DISCUSSION

Modern Medical education system must adapt to this ever-changing social setting of Information and communication technology (ICT) where cell phones have overnight turned from communicating devices to multi-tasking hand-held computers. Medical Student are increasingly using medical apps, this fact is revealed in our study in which 99 % participants were using smartphones, which comes out to be similar when compared with a Indian study done on medical students which reported 96 % usage<sup>[18]</sup> and in a Saudi Arabia based study (99%)<sup>[19]</sup> One Pakistan based study also showed similar results where 95.8% respondents owned a smartphone indicating a global trend of owning a Smartphone and Medical students are not an exclusion.

Medical students using medical apps were of the opinion that Smart phones are useful aid in learning, this reflected their positive attitudes towards the utilization of apps in medical education. Internationally, one study shows that a number of medical schools are now using medical apps as part of their Medical Education Program and advise students to use selected websites and apps during training.<sup>[7]</sup> In terms of technical skills of using medical applications, only 58 % thought they have all skills of using smart phones while a similar Indian study showed 90 % medical students owned all skills, so more attention is needed by the faculty of medical colleges to guide and educate the students on appropriate use of smartphones and medical apps.

Use of smartphones for recreation was also studied and it was observed that 82 % of students reported to use it for both study and recreational purposes. Apparently smart phone can be a source of disturbance because of notifications and social networking apps use especially during study hours impairing use of their brains for cognition, perception and attention.<sup>[20]</sup>

Despite the fact that medical students showed interest in the medical apps and considered the medical apps as a reliable alternative yet the majority of the students preferred the text books for study at home. A UK based study on Medical students also the gave the same impression.<sup>[21]</sup>

According to studies excessive smartphone use can interfere with concentration and can cause physical problems, such as neck stiffness, blurred vision, wrist or back pain, and sleep disturbances.<sup>[22]</sup> So they can be used to supplement learning.

## CONCLUSION

Medical students who grew as “Net Generation” still mobile technology has not been fully incorporated into the culture of medicine, training is needed to improve effectiveness of using medical apps as supplement to learning. Specifically, this data will allow us to develop and recommend appropriate learning materials and activities for delivery on smartphone applications and improve the underuse of available technology.

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## CONFLICTS OF INTEREST

There are no conflicts of interest.

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