

# Does mobile phone affect academic progress among medical students?

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## Abstract

**Background:** Medical students need to learn considerable new information during their studies and they must develop skills for lifelong learning, keeping their knowledge updated. Lifelong learning, particularly in medicine, requires motivation and problem identification and solving skills relevant to the clinical situation.

**Aim of the work:** The aim of the current study was to determine the effect of mobile phone use on academic progress among female medical students at college of medicine, King Faisal University, KSA.

**Methods:** A cross-sectional study design was conducted in the present study at College of Medicine, King Faisal University in Saudi Arabia among female medical students. Participants are female medical students of pre clinical and clinical phases of medical study. All participants were provided a self administered questionnaire.

**Results:** The total number of participants was 174 female medical students, College of Medicine, King Faisal University. The mean age of the students was  $20.7 \pm 1.9$  years old with a range of 7 (18-25) years. Among the female medical students 53% were using smart phones, compared with 47% using other types of mobiles such as old versions of mobiles and other brands of mobiles. The academic progress due to mobile phone use was reported among 43% of the users of smart phones. Using mobiles for long hours during learning showed highly statistical significant difference regarding academic progress among medical students, with a p value of 0.008.

**Conclusion:** The usage of mobile phones and IPADs showed an impact on academic progress and overall performance of the medical students.

**Index terms:** usage of mobile phones, academic progress , performance of the medical students, Saudi Arabia.

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## Introduction

Medical students need to learn considerable new information during their studies and they must develop skills for lifelong learning, keeping their knowledge updated. Lifelong learning, particularly in medicine, requires motivation and problem identification and solving skills relevant to the clinical situation(1). Given their utility after qualification, undergraduate medical students may benefit from earlier exposure, both to improve their skills and work habits with a mobile device, and by enhanced learning opportunities(2). Davies and his colleagues (2012) found out that smart phones are mostly used by students to answer a question right on the spot and that students would use smart phones to repeat learned topics(1). Boeder (2013) and Kron et al; (2010) reported that learners appreciate that new media could enhance their medical education. The smart phone has also proved useful within medical student populations(3,4). Trelease (2008) described the use of the smart phone as a potential "learn anywhere" resource for students, with further research exploring the use of pod casts on smart phones as a way of delivering education. Within medical schools the requirement of gaining competency sign offs during clinical attachments is very applicable to handheld technology, with evidence for improved case logbook use(5-8). Within the student group, educational use of applications starts in pre-clinical years and appears to follow into clinical years, with both year groups using applications more for educational than clinical purposes. However there appears to be no pattern relating to frequency and time spent using applications specific to clinical and educational environments(9). Use of smart phones by students in resource-poor countries is essential. Medical schools in the United States are also beginning to use technology more in their curriculum. For example, at Stanford University's medical school all students are given an iPad to use in place of text books. Online resources are easily accessed. As the role of the smart phone continues to grow, we can only expect that its role in medical education will expand with more institutions incorporating it into their curriculums. However, we need to have better evidence to support both its use and methods of how best to use it(10). The use of electronic devices such as laptop computers, smart phones, and tablets in daily activities is common, and the use of these devices by pharmacy students during class appears to be increasing(11). Some pharmacy colleges and schools are mandating that students use mobile computing devices in class to keep up with advances in education technology and to augment lecture content(12). Computer-assisted learning can increase knowledge and comprehension, but one of the biggest disadvantages of using e-devices in class is students engaging in non-course-related activities such as sending and checking e-mail and accessing material on the Internet(13). The aim of the current study was to determine the effect of mobile phone usage on academic progress

among female medical students at college of medicine, King Faisal University, KSA.

## Subjects and Methods

A cross-sectional study design was conducted at College of Medicine, King Faisal University, Kingdom of Saudi Arabia. Participants were female medical students of pre clinical and clinical phases of undergraduate medical study. The total number of students was 347. The effect of mobiles on academic progress was estimated to be around 40%(13) with a power of 80% and an alpha set at 0.05, a minimum sample size of 165 subjects was estimated Sample size estimation is done using Epi Info Statistics program version 7. Sampling technique: Simple random sampling technique was used to choose the medical students. Sampling will continue until fulfilling the total number. A total number of 174 female students was selected to participate in our study. All participants were provided a self administered questionnaire. Written consent was taken before distribution of questionnaires. Consent of the College authorities was provided before delivery of the questionnaires. Our questionnaire was adopted from a previous questionnaires used to study mobile phone usage and/or symptoms and side effects of mobile phone usage(1,9). The questionnaire was formulated according to our objectives guided by other questionnaires from previous studies(14-16). The questionnaire comprised of four domains. The first domain of the questionnaire was the socio-demographics such as (age, year of study, residency and marital status). The second domain of the questionnaire included questions that were designed to elicit information about mobile phone usage (e.g. duration of usage, number of hours) and mobile phone impacts on student academic progress. The third domain of the questionnaire was designed to determine the symptoms that might occur due to mobile usage. The fourth domain included items were related to academic progress due to mobile phone usage (e.g. grades of students using mobiles in learning). All questions of the fourth domain were collected into a score of academic progress. The score was calculated as above 60% to those who have academic progress and less than 60% for those who have no academic progress. A likert scale of yes and no was used in all items of the questionnaire. Items of the used data collection tool were translated into Arabic by a panel of qualified professionals followed by back translation into English by other independent experts. Pilot testing of the questionnaire was performed. The tool was tested by applying to 10 female medical students to clarify terms and assess any potential difficulty in questionnaire before administration of the tool to participants. Statistical Analysis: Data collected, coded and data cleaning was done before entry into computer. Description of the data was done in the form of frequency, percent, mean, standard deviation, tables and graphs. Initial comparisons between using mobile phone and academic progress were done using the Student t-test for continuous variables and Pearson's chi-square test for

categorical variables. Level of significance was set at  $p < 0.05$ . All data variables were encoded and statistical analysis were performed using the Statistical Package for Social Science (SPSS) version 19.

## Results

The total number of participants was 174 female medical students, College of Medicine, KFUPM. The mean age of the students was  $20.7 \pm 1.9$  years old with a range of 7 (18-25) years. Mean age among medical students using smart phones was a  $20.5 \pm 1.9$  years compared with mean age of  $20.9 \pm 1.9$  years among medical students using other types of mobiles, no statistical significance was reported. Table (1) showed the demographic characteristics of the studied population at the current study. Distribution of the studied population according to their mobile type was described in figure (1). Seventy-two (57.6%) of the female medical students in preclinical phase were using smart phones compared to 21 (42.9%) among clinical phase medical students, while 53 (42.4%) in preclinical phase were using other types of mobiles compared with 28 (57.1%) in clinical phase medical students, no statistical significance was found. Figure (2) showed the distribution of medical students according to their academic progress due to mobile phone usage at College of Medicine, King Faisal University. Using smart phones in learning 40 (53.3%) among medical students, showed no statistical significant difference regarding academic progress compared with those who were using other types of mobiles in learning 35 (46.7%) with a  $p$  value of 0.97. Also, using IPAD 69 (92%) among medical students in learning showed no statistical significant difference regarding academic progress compared with those who were not using IPADS in learning 6 (8%),  $p$  value=0.11. Learning through using mobiles for long duration everyday showed that 28 (38.4%) of medical students reported positive effect on academic progress compared to 29 (29.6%) of medical students who said it has no effect on academic progress with a  $p$  value of 0.229. Effect of mobile phone use in learning on academic progress among the medical students at Faculty of Medicine has been shown in table (2). One of the factors that showed no statistical significance among the participants regarding academic progress was closing mobiles during lectures to avoid distraction, those who mentioned that closing mobiles during lectures has a positive effect on academic progress were 58 (77.3%) compared with 79 (79.8%) who said it has no effect on academic progress with a  $p$  value=0.694. Table (3) reported the prevalence of symptoms occurring due to mobile phone use among female medical students at college of medicine. Using another technology with mobiles showed no statistical significant difference among medical students regarding effect on academic progress, as those who mentioned that it has effect on academic progress were 48 (64%) compared with 73 (73.7%), who said it has no effect on academic progress with a  $p$  value of 0.17. Using mobile phones attracts medical students to learn more and feel

interested and never get bored during lectures, was reported among 95 (54.6%) compared with 79 (45.4%) with a  $p$  value of 0.031

## Discussion

In parallel with the growth of mobile health, mobile learning has emerged as a tool that leverages mobile technology to increase healthcare providers' access to medical information and resources. Smart phones are widely spread devices with plenty of possible applications due to their connection to the internet (1,17-21). In our study, 71.8% of the female medical students were from the pre clinical years while 28.2% were from clinical years of study at the college of medicine. Comparing with other studies, when examining pre-clinical and clinical medical students there were approximately equal numbers returned (48.2% and 52.9% respectively)(9). In the current study 93 (53.4%) of the medical students owned smart phones compared with 81 (46.6%) of the students who owned other types of mobiles. In Payne et al; (2012) of the medical students surveyed 79% ( $n=203/257$ ) owned a smart phone, with the most popular model being an iPhone, 56.6% ( $n=115/203$ ) and a further 18.7% ( $n=38/203$ ) owning a Google android platform smart phone(9). Mobile phones were the best method to learn as a fast method in our study was agreed by 48 (64%) of the female medical students that it has effect on the academic progress compared with 34 (34.3%) who mentioned that it has no effect on academic progress. It was found that the use of e-devices during class for both course-related and non-course-related purposes had no overall impact on academic performance in a population of pharmacy students enrolled in a pharmacotherapeutics sequence(13). Similarly, Payne et al; 2012 found that overall, application usage for educational purposes was most popular (78.3%), with 39.9% using applications for clinical purposes. Within the educational section, revision and learning equated to 73.2% ( $n=123/168$ ) and 83.3% ( $n=140/168$ ) respectively. Within the clinical section, ward and clinic environment equated to 42.9% ( $n=72/168$ ) and 36.9% ( $n=62/168$ ) respectively. Very few pre-clinical students used applications to support their limited clinical activities in contrast to those in their clinical years, but both groups used apps for education. In our study we reported that using mobile attracts me more to learn also feel interesting and never get boring in lecture, was 95 (54.6%) compared with 79 (45.4%) among the studied population with a statistical significance difference in comparison with academic progress. Student perceptions regarding the impact of e-device use on academic performance were unknown. Most students believe that e-device use during class may be beneficial if used appropriately(9,22-23). It was reported that course-related use of e-devices is perceived by students to enhance their ability to learn the course material, although using an e-device to carry out activities that are unrelated to the course may be a distraction(24-26). Symptoms that occurred in the current study due to mobile phone usage showed that 83

(47.7%) had headache compared with 91 (52.3%) had no symptoms. Bad mood was detected among 125 (71.8%) of female medical students due to mobile phone use, while dizziness was reported among 62 (35.6%) of the medical students. Absent mind was presented among 102 (58.6%) of the medical students due to mobile phone usage. Nervousness was detected among 66 (37.9%), while exhaustion was detected among 90 (51.7%). In previous studies, it was reported that most of the subjects (83.57%) reported some symptoms of ill health such as 16.08% complained of headache, 24.48% of fatigue, and 34.27% of impaired concentration. The most prevalent symptoms related to mobile phone use were memory disturbances (40.56%), sleeplessness (38.8%) and hearing problems (23.07%) (27-29). In one of the studies, the authors have denied any adverse effects of mobile phone emissions on the body functions, at least for a short-term mobile phone usage. However, they could not exclude a possibility of long-term effects(30). Some statistical evidence points out that the use of mobiles may cause headache, extreme irritation, increased carelessness and forgetfulness, as well as decreased reflex and a clicking sound in the ears(31). As far as the medical students are concerned, the electromagnetic waves emitted by mobiles may interfere with various electronic medical devices in the hospital where they have their clinical practice(32). In conclusion: The data obtained through this investigation supports the development of new media teaching methods in medicine; and its role in academic progress and achievement of the students. The use of mobile phones and IPADs are common during lecture for course related reasons and applications among the KFU medical students and it showed an impact on academic progress and overall performance of the medical students. Studies that look at larger groups of students in wider varieties of medical courses should be performed to confirm these data.

### Limitations of the study

The sample size was one of the limitations of the current study as well as the application of the study on females only without comparison with male students. The other possible limitation was the tool of data collection, the self administered questionnaire used due to time constraints of the students, the students have a tight schedules of the medical curriculum, which did not allow the possibility of administration of other techniques such as interview questionnaire.

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**Table (1): Demographic characteristics of female medical students at College of Medicine, KFU**

	Number (n=174)	Percent
<b>Age of students:</b> Mean±SD Range	20.7±1.9 7 (18-25)	
<b>Marital status:</b> Single Married Divorced	128 45 1	73.5 25.9 0.6
<b>Educational status</b> Pre clinical phase	125 49	71.8 28.2

Clinical phase		
<b>Residence</b>	152	87.4
Al Hassa	22	12.6
Dammam		

**Table (2): Effect of using mobiles in learning on academic progress among female medical students at College of Medicine, KFU**

	Academic progress		P value
	Yes (n=75)	No (n=99)	
<b>Using mobiles for many hours during learning</b>			0.008
Yes	57 (76%)	56 (56.6%)	
no	18 (24%)	43 (43.4%)	
<b>Mobile use is beneficial during studying exams</b>			0.04
Yes	73(97.3%)	88 (88.9%)	
No	2 (2.7%)	11 (11.1%)	
<b>Mobile is the best way to learn</b>			0.00
Yes	48 (64%)	34 (34.3%)	
No	27 (36%)	65 (65.7%)	
<b>Mobile helps in getting knowledge in short time</b>			0.013
Yes	60 (80%)	62 (62.6%)	
No	15 (20%)	37 (37.4%)	

**Table (3): Prevalence of symptoms occurring due to mobile phone use among female medical students at college of medicine, KFU**

	Number (n=174)	Percent

<b>Headache</b>		
Yes	83	47.7
No	91	52.3
<b>Having bad mood</b>		
Yes	125	71.8
No	49	28.2
<b>Dizziness</b>		
Yes	62	35.6
No	112	64.4
<b>Feeling of loosing concentration</b>		
Yes	102	58.6
No	72	41.4
<b>Nervousness</b>		
Yes	66	37.9
No	108	62.1
<b>Exhaustion</b>		
Yes	90	51.7
No	84	48.3

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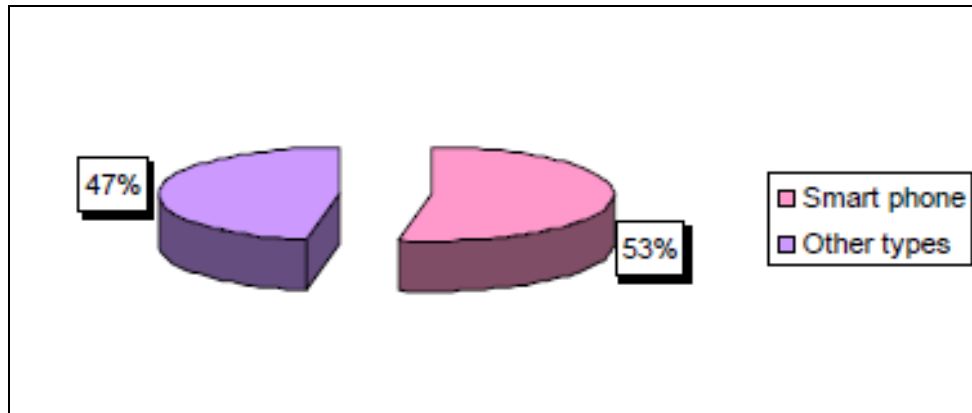


Figure (1): Distribution of medical students according to their mobile type at College of Medicine, King Faisal University

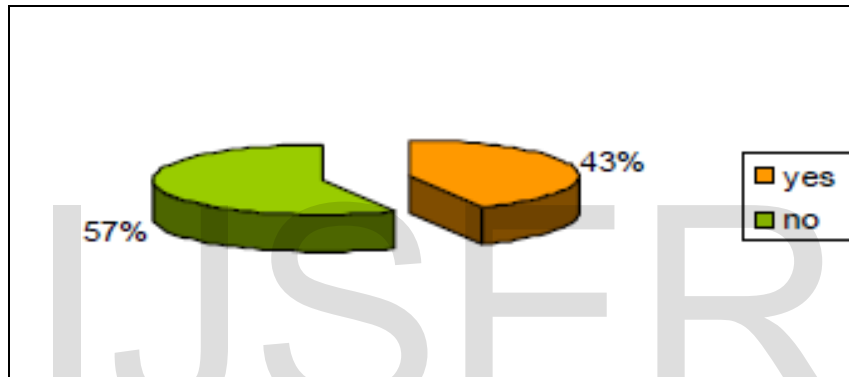


Figure (2): Distribution of medical students according to their academic progress due to mobile phone usage at College of Medicine, King Faisal University