

**Original Article**

# Frequency of smart phone usage in medical students and its association with academic performance

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## Abstract

**Background:** Smart phone use is becoming a severe mental health problem as it is becoming dominant with the passage of time leading to dependency and diverting individual's concentration. The addiction is not only confined to youth, it can be observed among individual of all ages. Through this study our aim was to observe the smart phone usage frequency and its association with academic performance among university students.

**Methodology:** A cross sectional study was conducted on a total of 400 students of Dow university of health sciences between January 2016 – January 2017. The problematic mobile phone usage scale (PUMP) was used to evaluate the smart phone addiction level and grade point average (GPA) of previously attended semester was analyzed to evaluate its association with academic performance.

**Results:** It was observed that 134 out of 400 participants were spending 1-2 hrs. daily on mobile phone usage. A strong association was observed between frequency of smart phone usage and academic performance. Moreover, control loss and dependence were also affecting the academics among the study participants. In this study we observed that female students with frequent smart phone use had greater chances of having poor academic performance as compared to males.

**Conclusion:** It can be concluded from the study results that excessive smart phone usage affects academic performance and hence results in increased dependence leading to lack of concentration, decreased confidence, reduced public dealings and face-to-face interactions. Furthermore, the use must be restricted as in long term it is leading to several health issues especially among youth.

## Keywords

Smartphone Addiction, Dependence, Academic performances



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## Introduction

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In this era of technology and innovations, manufactures of smart phone and hand held devices have exhibit amazing growth and expansion. Smart phone devices are now considered as the prime necessity for everyday life, it can be distinguished from mobile phones which have basic features with the one with advanced features<sup>1</sup>. Globally this new technology is growing at the fastest pace in comparison to any other technology. According to a recent study, in past 20 years the estimated increase in smart phone users has raised from 1 billion to 3.5 billion<sup>2</sup>. The smart phone has been labelled as one of the biggest non-drug addictions of the 21st century<sup>3</sup>. It favors personal autonomy, provides identity and prestige, favors the establishment and provides maintenance of interpersonal relationships.

Increased sociocultural problems such as technological dependence, unsocial and unhealthy lifestyle has been associated with smart phone addiction<sup>4</sup>. Access to internet enabled applications such as WhatsApp, Facebook and messenger is increasing with a phenomenal rate as the technology is advancing<sup>5</sup>. The growing market of smart phone users and increased usage of hand held devices due to cheaper calling and internet rates and other facilities have created debilitating effects on the young population in general<sup>5</sup>. An increased rate of mental health disorders associated with this dependency is reported around the globe<sup>6</sup>. According to recent research youngsters indulging in excessive smart phone usage are becoming predisposed to Smart phone dependence syndrome; a new syndrome discovered in relation to smart phone use<sup>2</sup>. Individuals with low self-esteem, social anxiety, and eccentric behaviour patterns are likely to become diagnosed with this syndrome<sup>2</sup>.

Smart phone dependence is associated with active addiction as it involves inducing and

reinforcing<sup>5</sup>. Griffiths postulated the six series of common symptoms related to behavioural dimensions of active addiction that includes mood modification, tolerance, withdrawal and symptoms of relapse<sup>7</sup>. Problematic smart phone usage demonstrate that smart phone addiction is more or less similar to many other behavioural addictions caused by technology<sup>8</sup>. Similar to the drug or alcohol addiction, behavioural addiction creates mood instability, sleep disturbance, fatigue, tension and more commonly headaches<sup>8</sup>. Moreover, academic performance and sleep quality of a smart phone addict deteriorates as the usage increases<sup>9&10</sup>.

Similarly, relationship problems are more common among individuals with high smart phone usage<sup>5</sup>. Individual's spending greater time on social media and mobile phone are becoming depressed as they lose connection with the real world and consequently, they are no longer able to express their feelings and thoughts. A study conducted in UK stated that most of the young adults are suffering from 'Nomophobia' describing fear of losing connection with the smart phone. Nomophobia is the modern fear of being unable to communicate through a mobile phone<sup>10&11</sup>.

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## Methodology

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A cross-sectional study was conducted between January 2016 to January 2017 on a sample of 400 students enrolled in allied health science departments of Dow University of health sciences. Students in 1st year to 4th year were included on the basis of voluntary participation. Deaf and mentally challenged students were excluded from the study sample. Written informed consent were taken prior the study initiation and the data confidentiality was maintained. Data was collected through a questionnaire inquiring socio-demographic characteristics including age, gender, academic year and time spent on smart phone. Academic performance which was taken in Grade point

average (GPA) was recorded as good academic performance and satisfactory academic performance on the basis of GPA scores. Students with GPA greater than or equal to 3.4 were placed in good academic performance, whereas those with GPA greater than 2.4 and equal to 3.3 were placed in satisfactory academic performance.

The frequency of smart phone usage was analyzed by estimating the response generated on Likert's scale. The responses were categorized as 'High' and 'Low' according to the responses obtained i.e. score 0-strongly disagree, score 1-disagree indicating low usage whereas score 3- agree and score 4-strongly agree indicating high usage.

Impulsive usage, control loss, mounting tension and dependence were identified as behavioural dimensions, PUMP scale items were used for evaluation. On the basis of which the behavioural dimensions were categorized into high and low on the basis of scores

obtained for each of them. For impulsive usage, the score ranged between 3-9 and was denoted as low whereas, score of 10 - 16 was denoted as high. Similarly, for both mounting tension and control loss 0-10 was denoted as low while 11-20 as high. Moreover, for dependence the scores between 0-12 indicated low, and 13-24 as high. Data was analyzed through SPSS version 20. The association of academic performance with frequency of smart phone usage and other variables were evaluated using binary logistics regression and  $p < 0.05$  was considered statistically significant.

## Results

Out of the total 400 students there were 331 females and 69 males. 324 study participants reported frequent mobile phone usage while only 76 indicated low frequency of mobile usage. 148 participants spent 20-60 minutes per day on smart phone use while 134 participants were spending 1-2 hrs daily due to this addiction.

**Table I: Socio-demographic characteristics of study participants**

Variables	Sub-categories	n=400
Gender	Male	69(17.3)
	Female	331(82.7)
Age (Years)	18 –20	191(47.7)
	21–23	177(44.3)
	24 and above	32(8)
Academic year	1st year	99(24.7)
	2nd year	116(29)
	3rd year	85(21.3)
	4th year	100(25)
Academic performance	Good	263(65.8)
	Satisfactory	137(34.2)
Frequency of Smart phone Usage	High	324(81)
	Low	76(19)
Time spent on smart phone (per day)	20 min or less	73(18.3)
	20 – 60 min	148(37)
	1 – 2 hour(s)	134(33.5)
	More than 2 hours	45(11.2)
Smart phone utilization (Duration)	7 years or less	208(52)
	8 – 9 years	89(22.3)

10 years or more	103(25.7)
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\*Values are given as n(%).

The academic performance among females was 0.43 times more affected with the smart phone use as compared to males. Whereas, students with high smart phone usage frequency were 2.19 times more likely to be having declined academic performance. Nevertheless, years of smart phone usage also showed that students who were using smart phone from 8-9 years had 2.34 times more affected academic performance. Moreover, those who have more than 10 years of usage the risk ratio increased to 2.42 times. Furthermore, those students who had high smartphone dependence were having 2.38 times more affected academic performance due to their addiction (ANOVA). Moreover, high control loss and high dependence were 2.16 and 2.47 times more likely affecting academic performance among smart phone users (MANOVA).

**Table 2: Association of smart phone usage with academic performance**

Variables	Sub-categories	Univariate Analysis of Variance COR(95% CI)	Multivariate Analysis of Variance COR(95% CI)
Gender	Male	Ref	Ref
	Female	0.43(0.25-0.73)	0.45(0.22-0.90)
Age (Year)	18-20	Ref	0.42(0.15-1.19)
	21 - 23	0.37(0.17-0.80)	0.45(0.16-1.28)
	24 or above	0.48(0.22-1.04)	Ref
Academic year	1 <sup>st</sup>	1.01(0.55-1.87)	
	2 <sup>nd</sup>	1.61(0.91-2.84)	
	3 <sup>rd</sup>	1.55(0.84-2.87)	
	4 <sup>th</sup>	Ref	
Frequency of smart phone usage	High	2.19(0.86-5.58)	Ref.
	Low	Ref	1.19(0.36-3.95)
Time Spent on smart phone	≥ 20 min	Ref	Ref
	20 – 60 min	1.06(0.59-1.89)	1.00(0.46-2.20)
	1 – 2 hour(s)	0.61(0.33-1.12)	0.65(0.29-1.46)
	≤ 2 hours	0.65(0.29-1.45)	0.89(0.32-2.47)
Smart phone utilization (Duration)	7 years or less	Ref	
	8 – 9 years	<b>2.38</b> (1.39-4.06)	
	≤10 years	<b>2.87</b> (1.70-4.84)	
Impulsive usage	Low	Ref	Ref
	High	0.99(0.62-1.59)	1.12(0.53-2.37)
Mounting Tension	Low	Ref	Ref.
	High	1.09(0.71-1.66)	0.61(0.31-1.19)
Control Loss	Low	Ref	Ref.
	High	<b>1.44</b> (0.93-2.21)	<b>2.16</b> (1.15-4.07)
Dependence	Low	Ref	Ref.
	High	<b>2.38</b> (1.51-3.74)	<b>2.47</b> (1.26-4.84)

\*COR=Crude Odd Ratio; Ref= Reference \*Numbers in bold are statistically significant.

## Discussion

As this rapidly increasing public health problem and the adverse events associated with its addiction, smart phone use is affecting individuals directly and indirectly. The study results revealed that those students who had high dependence and control loss were having significant decline in the academic performances with increasing smart phone usage. Gender was also found to be an important predictor in smart phone overuse, in our study it was observed that academic performance of the females was more affected as compared to males (Table 2). Also supported by a similar study, 57% females reported smart phone addiction greater in comparison to males<sup>12</sup>. Although on the basis of results females are more influenced problematic smart phone consumers but a few studies contradictory to our results reported that no significant differences between either genders<sup>13</sup>. Moreover, Bianchi et al., claimed that the appeal of smartphones was gender-independent and equal connectivity to smartphone technology was observed in both genders<sup>14</sup>.

Studies mostly focused on age differences and the mobile phone addiction, Langer et al., found out that men mostly find it convenient to stay connected through cell phone calls in public and during intimate relationship as compared to women<sup>15</sup>. They also observed that men too find it comfortable to text in public. Young women were found to be involved with their parents on phone call and texting as compared to male as far the gender differences were noticed. According to Langer's theory, women socialize to feel more in control for keeping social ties and being sensitive to needs and expectations of other people<sup>15</sup>. Therefore, women would be more attentive to the potentially disruptive impact of cell phone use on the social environment.

In a Swedish study, increased usage of smart phone was strongly associated with sleep disturbances, stress and symptoms of depression as compared to low usage<sup>16</sup>. In another study conducted on Indian teens it was found that smartphone addiction not only effect interpersonal skills, but also caused significant psychological and harmful health effects on the study population<sup>15</sup>. In another study uncertain smart phone usage was associated with psychopathological symptoms and accidental injuries<sup>15</sup>.

Locally Niaz et al., highlighted the impact of this public health concern in Pakistani population, he also indicated that common users of smart phones should be educated about the addictive behaviours of prolonged usage and the associated health hazards<sup>18</sup>. Another local study revealed that smart phone addiction also affects relationship amongst the families causing negative outcomes in the form of loss of interest in studies and other surrounding activities<sup>19</sup>. Peer pressure is the prime influencer that engages young population into addictive behaviours such as gambling, drinking, smoking, and technological addiction<sup>20</sup>.

Our study revealed that there was no significant relation between GPA and scores obtained from the Problematic Smart phone Use scale ( $p=0.784$ ). The average GPA was  $2.55 \pm 0.56$  (min: 1.00, max: 4.00). An estimated number of text messages sent per day by each of the study population were recorded, it was observed that individuals in the two mid-age groups sent 11–30 text messages a day. However, since the high use of messages continues in the 25–34 age group, this may reflect an emerging form of social interaction more common among adults. Age group is observed as an independent predictor of high smart phone usage<sup>21</sup>. The smart phone addiction level in the students whose age for first smart phone was 13 or less was determined to be higher than the students

whose age for first smart phone was 16 or above ( $p < 0.05$ ). Similarly, in a study, the age for first smart phone ever used was 13-16 among majority of the students<sup>21</sup>.

In a study conducted at university of Osaka Japan, statistically significant relationship between smart phone dependence and health related lifestyle was observed<sup>4</sup>. In our study, it was observed that dependence was positively associated with academic performance (multivariate analysis) after adjusting all four variables with frequency of smart phone usage at 95% confidence interval (Table 2). The addiction level among the students whose smart phone usage duration was more than five hours daily was higher as compared to those who were involved in less usage ( $p < 0.05$ ). Choliz (2010) stated that smart phone addiction can be determined as the usage duration extending up to two hours<sup>22</sup>.

In this study variable mounting tension showed negative correlation with academic performance same as in the case of control loss. In a previous study conducted by Diana James mounting tension was described as a negative mood reduction motive which indicates the extent to which an individual use's his mobile or smart phone in order to improve their mood<sup>13</sup>. Academic year of the students showed no significant correlation with academic performance, highest frequency of students of second year were observed to be using smart phone (Table 1). Years of smart phone usage showed strong association with academic performance in univariate analysis (Table 2), COR for smart phone usage for 8-9 years was OR=2.34 at 95% Confidence Interval (1.38-3.94) and for 10 years or more it was OR=2.42 (1.46-3.98). On the contrary, time duration spent on smart phone showed no significant correlation at all.

In this study after adjusting variables in multivariate analysis (Table 2), it was observed that the adjusted odds ratio OR=1.15 (1.07-

1.24) with 95% confidence interval, showing one-time increased risk of poor academic performance among students with high frequency of smart phone usage as compared to those with low frequency of usage. Whereas, other behavioural dimension such as impulsive usage, mounting tension or control loss showed no significant correlation with academic performance in this study.

Further cohort and experimental studies should be conducted which can provide advance knowledge on the recommended daily usage of smart phone related addiction. Graphical plot such as receiver operating characteristic (ROC) curve must be utilized in order to identify the safe or optimal duration of usage of smart phone. There should be guidance seminars and workshops for young students and parents for increasing awareness regarding harmful effects of smart phone usage. Data should be made available to the masses which can create sense of responsibility and restrain usage of smart phone beyond certain limit.

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## Conclusion

On conclusion the major findings of this study showed that smart phone usage can lead to decreased academic accomplishments, if the frequency of usage extends significantly beyond threshold limits. Moreover, excessive usage of technology can cause dependence which may lead to adverse health outcomes such as mental health disorders, eye disorders, mood fluctuations, and depression. The adjusted effects of smart phone usage such as age, gender, time duration and years of usage indicate significant correlation and can further lead to symptoms of technological addiction.

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## Conflicts of Interest

None.

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