

## Research Article

# Effects of Smartphone Usage on Health of Undergraduate Medical Students at King Edward Medical University, Lahore

Noor-ul-Ain Waheed<sup>1</sup>, Naureen Kanwal Satti<sup>2</sup>, Sumair Anwar<sup>3</sup>

<sup>1</sup>Assistant Professor, Department of Biochemistry, King Edward Medical University, Lahore; <sup>2</sup>Staff Physician, King Abdul Aziz University Hospital, Riyadh, KSA; <sup>3</sup>Professor, Department of Community Medicine, Gujranwala Medical College, Gujranwala

### Abstract

**Background:** Smartphones and hand-held devices have invaded our lives in the 21st century. Excessive use of smartphones has led to the various physical and psychological problems in the society.

**Objective:** To determine the effects of smartphone usage on physical & social health of undergraduate medical students of King Edward Medical University (KEMU), Lahore.

**Methods:** In this cross sectional study conducted at KEMU Lahore, in February 2018, 243 undergraduate medical students, who had been using smartphones for more than a year, were included. Data were collected employing pretested, structured, and self-reported questionnaires by sending survey links through 'WhatsApp'. Responses recorded about health effects (Physical & psychiatric) and social problems faced by the respondents using smartphones. These health effects were compared with the daily time spent on smartphones. Chi-square test was applied to find out the association between different variables of interest.

**Results:** Majority students reported disturbance and loss of concentration during studies due to smartphones usage. Significant difference was observed in both genders regarding year of MBBS course, daily hours spent on desktop/ laptop and smartphone usage while driving ( $p < 0.05$ ). Predominant reported problems were related to eye (in 64%), psychiatric symptoms (in 52.3%) and peer pressure (in 50%), besides other physical & social problems. Daily usage of smartphones for more than 2 hours (n=196), faced these problems in excess as compared to those whose usage was less than 2 hours with significant difference in case of psychiatric symptoms ( $P < 0.05$ ).

**Conclusion:** Smartphone use leads to increased frequency of various physical, psychological & social health problems among medical students especially if daily usage exceeds two hours.

**Received |** 19-04-2018: **Accepted |** 21-05-2019

**Corresponding Author |** Dr. Noor-ul-Ain Waheed, Assistant Professor, Department of Biochemistry, King Edward Medical University, Lahore. **Email:** noorwaheed80@gmail.com

**Keywords |** Smartphone, medical students, physical problems, social problems

### Introduction

Smartphones and hand-held devices have invaded our lives in the 21st century. There was a time when mobiles were used for calling or messaging only. Now a day with tremendous advances in the field of technology, mobiles are being used like

computers with a wide range of accessories and functions. This has gained popularity and people have become dependent on the smartphones.<sup>1</sup>

Excessive use of smartphones has led to the various physical and psychological problems in the society. Internet and social media has further aggravated the problems.<sup>2</sup> There are studies which show that the

people suffer from various physical problems like headache, eye strain ,back and neck pain and complications of sedentary life style.<sup>3</sup> Excessive smartphones usage has been reported to be the cause of various psychological problems like stress ,anxiety and depression. Mobiles emit radiations which are considered a cause of several malignancies.<sup>4</sup> According to a survey there are 4.7 billion mobile phones users worldwide and 3.5 billion internet users.<sup>5</sup>

Smartphones are a source of entertainment as well. They allow us to socialize in different ways and help people communicate across the globe in a blink of an eye. Cell phones have penetrated our lives in such a way that it's difficult to draw lines beyond which they are considered as harmful.<sup>6</sup>

Students and young people consider smart phones a basic necessity and crucial for maintaining communication and socializing. Students and youngsters become victims ofbullying, peer pressure and harassment while using various social media channels .It affects the quality of life and leads to poor performance among college students .The excess use is evolving into addiction among the youngsters. Addiction to technology has been described by Griffiths as behavioral addiction ,which begins with a benign use ofsmartphones and progresses to cause negative effects in one's life. It is claimed that mobiles use is the biggest non-drug addiction in 21st century 21st.<sup>7</sup>

This study determined the problems associated with smartphone usage among medical students of King Edward Medical University (KEMU) Lahore. This is how it can contribute to the research literature on health issues, trends, perception and attitude of medical university students towards smartphone usage. This study was conducted to determine the effects of smartphone usage on physical & social health of undergraduate medical students of King Edward Medical University, Lahore

## Methods

In this cross sectional survey, 243 undergraduate medical students of KEMU Lahore were selected through purposive sampling in January 2018. Both physical symptoms (affecting the functions of one or more systems of human body) and psychological symptoms (affecting human behaviour, distress in life that may affect daily life activities) were asked after permission by the Institutional Review Board. Sample was estimated by using 95% confidence level, 6.2% absolute precision with expected percentage of health effects due to smartphone usage as 84.2%.<sup>8</sup> Only those undergraduate medical students, who had been using smartphone for more than a year, were included in the study except those who already

had some related illness before they started use of smartphone. Data were collected employing pretested, structured, and self-reported questionnaires by sending survey links through 'WhatsApp' to undergraduate medical students of KEMU Lahore. Consent form for participation in the survey was obtained through survey link. Data regarding various variables was collected through these surveys. Data were analysed by SPSS 21. Descriptive statistics was done determining frequency & percentages of age groups, year of the MBBS course (first to four), daily time spent using smartphone and responses recorded when questions were asked. These were about loss of concentration in studies, decline in performance, nomophobia or being addicted to smartphone, knowledge of maximum recommended screen hours for their age and harmfulness for health. Moreover, they were also asked about smartphone usage while driving as a cause of accidents, considering its usage to make life easy and whether they want to reduce its usage? Frequency of different physical & social health problems faced by the respondents using smartphones inquired through multiple response questions. Questions about physical health included eye related problems (strain, blurring, dryness, & refractive errors) and ear related problems (ear-ache, tinnitus, redness). Questions asked about psychiatric symptoms included mood instability, aggressive behaviour, inattention, anxiety, confusion and low self-esteem. The social problems included peer pressure, harassment or bullying. These health effects were compared with the daily time spent and with the different years of MBBS study. Chi-square test was applied to find out the association between different variables of interest. Time in minutes after waking up in the morning, they see their smartphone and before going to sleep they stop using their smartphone, was also recorded.

## Results

Among the study participants (n=243) majority were females (58.4%) and greater no. of students were of age 17-19 years (83%). Amongst students of different years of MBBS course, 2<sup>nd</sup> year students were highest in frequency (44.4%) and majority students of all years (81%) had been using smartphones for more than 2 hours daily. Another finding in this study was that after 1 minute of waking up in the morning majority students (83%) used to see their phones. The study determined that among students, who spent more than 2 hours daily using Smartphones (n=196), mostly were disturbed and experienced loss of concentration during study, reported addiction to smartphones usage and decrease in their academic

performance. The research identified significant difference in both genders regarding class of MBBS, daily usage and its use while driving ( $P<0.05$ ). However, fewer students (34.5%) were having nomophobia. They were also unaware of maximum number of screen hours recommended for their age. Despite knowing hazardous effects of smartphones usage on health and being cause of accidents, majority students (93.4%) believed that its usage made life easy and wanted to reduce the usage. Most of students (66%) didn't face any social problem due to use of social media platforms on smartphones. However, amongst those who faced social problems (34%), peer pressure was recorded to be the maximum followed by harassment and bullying. Among the students participated in our study, majority were spending less than one hour working on desktop or laptop (Table1). The frequency of eye related problems was found to be the highest (64%) among different medical and social problems faced by the students. Figure 1 depicts other problems like pain in neck or hand or back, hearing or ear related problems, fatigue, sleep disturbance or insomnia were recorded in lesser number, however psychiatric symptom, such

as mood instability, aggressive behaviour, inattention, anxiety, confusion, and low self-esteem were also reported by more than half of the students (52.2%). Table 2 shows daily usage of smartphones for more than two hours ( $n=196$ ), faced these problems in excess as compared to those whose usage was less than two hours with significant difference in case of psychiatric symptoms ( $P<0.05$ ). When inquired about use of search engines through multiple response questions, only 6.6% students used 'PubMed'. Percentage of students using smartphones for more than two hours was lesser in 2<sup>nd</sup> year in comparison with other years of MBBS course (Fig. 2). Moreover, there was no difference in responses against rest of the questions, among different years (Table1). Majority students (78%) of our study used smartphones for more than 2 hours along with laptop/desktop/computer daily usage for less than one hour. Large number of female students (84%,  $n=119$ ) spent less than one hour daily on computer and this difference is statistically significant ( $P<0.05$ ) when calculated by  $\chi^2$  test.

**Table 1:** Comparison of different factors or the effects of Smartphone usage in both genders ( $N=243$ )

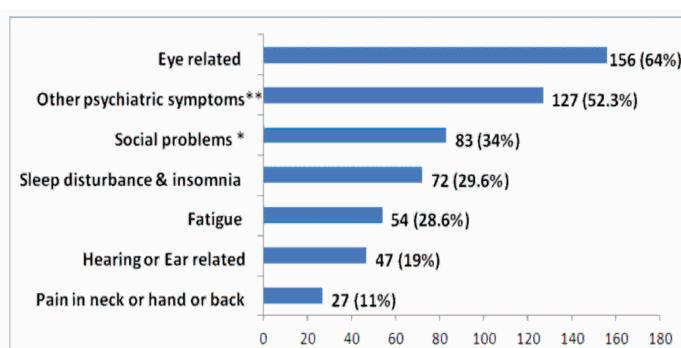
		GENDER		Total	$*p$ - value
		Male	Female		
<b>Year of the MBBS course</b>	First Year	16	11	27	<b>0.001</b>
	Second Year	47	61	108	
	Third Year	32	35	67	
	Fourth Year	6	35	41	
<b>Daily time spent using Smartphone</b>	Less than 2 hours	25	22	47	$>0.05$
	More than 2 hours	76	120	196	
<b>Responses recorded when related questions were asked about Smartphones usage</b>	Disturbance during study	69	109	178	$>0.05$
	Loss of concentration in studies	76	110	186	$>0.05$
	Decrease in performance	57	75	132	$>0.05$
	Nomophobia***	37	47	84	$>0.05$
	Addicted to Smartphones	60	80	140	$>0.05$
	Knowledge of maximum recommended screen hours for their age	8	7	15	$>0.05$
	Smartphones over usage is hazardous for health	94	139	233	$>0.05$
	Smartphones usage while driving is a cause of accidents	99	141	240	$>0.05$
	Smartphones make life easy	93	134	227	$>0.05$
	Want to reduce your Smartphones usage	80	105	185	$>0.05$
<b>Daily hours spent using desktop/ laptop</b>	Uses Smartphones while driving	18	5	23	<b>0.0001</b>
	Peer Pressure	30	32	62	$>0.05$
	Harassment	13	22	35	$>0.05$
	Bullying	12	17	29	$>0.05$
	Less than 1 hour	68	119	187	<b>0.010**</b>
	2 to 5 hours	29	21	50	
	More than 5 hours	4	2	6	
<b>Total</b>		<b>101</b>	<b>142</b>	<b>243</b>	

\*Chi-square test \*\*Fischer Exact Test \*\*\*Irrational fear of being without smartphone

**Table 2:** Comparison of different effects of Smartphone usage with the daily time spent (N=243)

Medical & Social Problems faced by the respondents using Smartphone (multiple response recorded)	Daily usage of Smartphone			***p- value
	< 2 hours n= 47	> 2 hours n=196	Total n=243	
Pain (neck, hand, back)	5(18.5%)	22(81.5%)	27	>0.05
Hearing/ear	7 (14.8%)	40 (85%)	47	>0.05
Fatigue	7(13%)	47(87%)	54	>0.05
Sleep disturbance & insomnia	10 (13.8%)	62(86.2%)	72	>0.05
Social problems*	11(13.2%)	72 (86.7%)	83	>0.05
Other psychiatric symptoms**	15(31.9%)	112(57.1%)	127	<b>0.001</b>
Eye related	30 (19.2%)	126 (80.7%)	156	>0.05

\*Bullying, Harassment & Peer Pressure \*\* Mood instability, Aggressive behaviour, Inattention, Anxiety, Confusion, and Low self-esteem \*\*\* Chi-square test



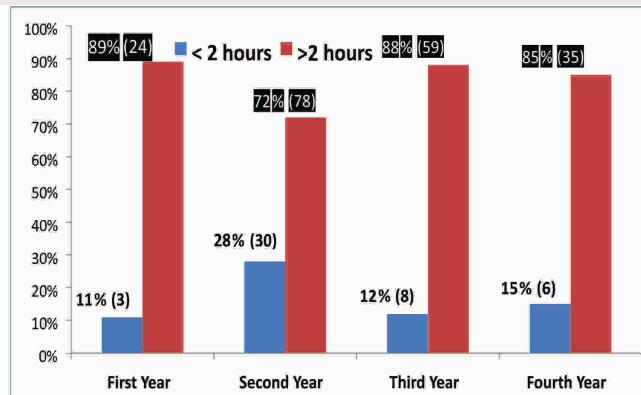
\*Bullying, Harassment & Peer Pressure \*\* Mood instability, Aggressive behaviour, Inattention, Anxiety, Confusion, and Low self-esteem

**Figure 1:** Frequency of Different Medical & Social Problems Faced by the Respondents using Smart-Phones Inquired through Multiple Responses (N=243)

## Discussion

Development in the field of information technology has revolutionised our lives .There are many useful aspects along with the growing concerns over excessive use of smartphones and hand held devices among people especially children and college students .College students use it for study, gaming ,surfing and staying in touch with friends and family on social media .As internet has become an integral part of our lives, there has been an increased research on harmful effects of technology use.<sup>9</sup> Smartphones are among the widely used electronic gadgets. Use of smartphones and their effects on health has gained little attention in Pakistan. This study highlighted the effects of smartphone usage among medical students in King Edward Medical University, Lahore.

In our study, majority of respondents were females and most of students were below 20 years of age.



p- value = 0.03 (Fischer Exact Test)

**Figure 2:** Comparison of Daily time Spent on Smartphone usage by the Students of different Years of MBBS Course (N=243)

There was no significant gender difference for various side effects reported which is consistent with a previous study from Pakistan, Japan and India which stated that males and females are equally affected by the excessive smart phone usage.<sup>10-12</sup>

This was evident in our study that students, who had been using Smartphones for more than 2 hours daily, faced social and medical problems more as compared to those who had been using the phones for less than 2 hours daily .When we compared students of different years of MBBS course, 2nd year students were highest in frequency and majority students of all years had been using smartphones for more than 2 hours daily. Similar results were found in various studies from Pakistan and Saudi Arabia.<sup>12,13</sup>

Our research shows that more than 75% of students experienced disturbance and lack of concentration while studying due to smartphone use. Similar studies from Pakistan and Tanzania showed that academic performance of 53 and 48 % of students was

affected.<sup>14,15</sup> However, our research did not record the drop in grades of students' academic performance but majority of them reported their lack of concentration while studying. Another interesting finding in this study was that after one minute of waking up in the morning majority students used to see their phones. It was found that nomophobia was present in only 34 % of students which contrasts with the study done previously where 79 % of students were facing mobile addiction.<sup>16</sup> This difference might be due to the fact that students studying in this medical university have habit of book learning more than students of other medical colleges/universities.

It was found that in spite of knowing the harmful effects of mobile phone usage, majority thought that smart phones make life easier. This fact has been studied well in other studies available in literature. Innovative use of smartphones in various fields supports this fact that many people find smart phones highly useful in spite of knowing the harmful effects of such devices.

Social media problems were faced by a few students and amongst that most common was peer pressure in our study. The association between smart phone use and psychological disorder has been reported in literature in various studies.<sup>16,17</sup>

The frequency of eye related problems was found to be the highest (64%) among different medical and social problems faced by the students which is consistent with other studies done in Pakistan and Saudi Arabia.<sup>18,19</sup> Other problems like pain in neck or hand or back, hearing or ear related problems, fatigue, sleep disturbance or insomnia were recorded in lesser number. Similar findings were found in a study in Korea and Saudi Arabia.<sup>20,21</sup> We found that psychiatric symptom, such as mood instability, aggressive behaviour, inattention; anxiety, confusion, and low self-esteem were also reported by more than half students (52.2%).

To our knowledge it was the first study in Lahore to see the effects of smartphone use on the health of medical students in a medical university. There were some limitations of our study as being descriptive study it could not assess why physical health issues related to eyes were more prevalent as compared to psychological effects among medical students. The

students were from only one medical university, so the results cannot be generalised.

A further study based on subjects sampled on other medical universities of the region should be carried out to see health hazards of smartphone usage among medical students and how its usage can be reduced to acceptable levels to minimize the health hazards.

## Conclusion

Our study revealed that smartphone use leads to increased frequency of various medical, psychological & social health problems among medical students especially if daily usage exceeds two hours. It is therefore required to have students counselling sessions and awareness campaigns to make them aware of the harmful effects of smartphones and how to reduce its usage and dependence on them.

**Ethical Approval: Given**

**Conflict of Interest: None**

**Funding Source: None**

## References

1. Sapacz M, Rockman G, Clark J. Are we addicted to our cell phones?. Comput Human Behav. 2016; 57:153-9.
2. Sampasa-Kanyinga H, Hamilton HA. Social networking sites and mental health problems in adolescents: The mediating role of cyberbullying victimization. Eur Psychiatry. 2015; 30(8):1021-7..
3. Park J, Kim J, Kim J, Kim K, Kim N, Choi I et al. The effects of heavy smartphone use on the cervical angle, pain threshold of neck muscles and depression. Advanced Science and Technology Letters. 2015; 91(3):12-7.
4. Elhai JD, Dvorak RD, Levine JC, Hall BJ. Problematic smartphone use: A conceptual overview and systematic review of relations with anxiety and depression psychopathology. J Affect Disord. 2017; 207: 251-9.
5. Statista. (2017). Number of mobile phone users worldwide 2013-2019 | Statista. [online] [Accessed 6 Dec. 2017]. Available at: <https://www.statista.com/statistics/274774/forecast-of-mobile-phone-users-worldwide/>
6. Bicen H, Arnavut A. Determining the effects of technological tool use habits on social lives. Comput Human Behav. 2015; 48:457-62.
7. Parasuraman S, Sam AT, Yee SW, Chuon BL, Ren LY. Smartphone usage and increased risk of mobile

- phone addiction: A concurrent study. *Int J Pharm Investig.* 2017; 7(3):125-31.
8. Pas.org.pk. (2017). Mobile Phone Users in Pakistan Cross 139.2 Million Mark | Pakistan Advertisers Society. [online] [Accessed 6 Dec. 2017] Available at: <http://www.pas.org.pk/mobile-phone-users-in-pakistan-cross-139-2-million-mark/>.
  9. Mok JY, Choi SW, Kim DJ, Choi JS, Lee J, Ahn H et al. Latent class analysis on internet and smartphone addiction in college students. *Neuropsychiatr Dis Treat.* 2014; 10:817.
  10. Kojima R, Sato M, Akiyama Y, Shinohara R, Mizorogi S, Suzuki K, Yokomichi H, Yamagata Z. Problematic Internet use and its associations with health-related symptoms and lifestyle habits among rural Japanese adolescents. *Psychiatry Clin Neurosci.* 2019;73(1):20-6.
  11. Sekhon A. Gender differences in mobile phone addiction and its association with stress among medical students. *Indian Journal of Health & Wellbeing.* 2018; 9(2).
  12. Khan D, Wajid A, Safdar G, Ashraf M. Effects Of Mobile Phone Usage On Social Behaviours Of University Students: A Case Study of Islamia University of Bahawalpur, Pakistan. *Global Media Journal: Pakistan Edition.* 2018; 11(1).
  13. Jamal A, Temsah MH, Khan SA, Al-Eyadhy A, Koppel C, Chiang MF. Mobile phone use among medical residents: a cross-sectional multicenter survey in Saudi Arabia. *JMIR mHealth and uHealth.* 2016; 4(2):e61.
  14. Kibona L, Mgaya G. Smartphones' effects on academic performance of higher learning students. *Journal of Multidisciplinary Engineering Science and Technology.* 2015; 2(4):777-84.
  15. Aman T, Shah N, Hussain A, Khan A, Asif S, Qazi A. Effects of mobile phone use on the social and academic performance of students of a public sector medical college in khyber pakhtunkhwa Pakistan. *KJMS.* 2015; 8(1):99-103.
  16. Pavithra MB, Madhukumar S, Mahadeva M. A study on nomophobia-mobile phone dependence, among students of a medical college in Bangalore. *Ntl J of Community Med.* 2015; 6(3):340-4.
  17. Augner C, Hacker GW. Associations between problematic mobile phone use and psychological parameters in young adults. *Int J Public Health.* 2012; 57(2):437-41.
  18. Noreen K, Batool Z, Fatima T, Zamir T. Prevalence of computer vision syndrome and its associated risk factors among undergraduate medical students. *Pak J Ophthalmol.* 2016 Jul; 32:140-6.
  19. Sirajudeen MS, Muthusamy H, Alqahtani M, Waly M, Jilani AK. Computer-related health problems among university students in Majmaah region, Saudi Arabia. *Biomed Res.* 2018; 29(11):2405-15.
  20. Eom SH, Choi SY, Park DH. An empirical study on relationship between symptoms of musculoskeletal disorders and amount of smartphone usage. *J Korea Saf Manag Sci.* 2013; 15(2):113-20.
  21. AlZarea BK, Patil SR. Mobile phone head and neck pain syndrome: proposal of a new entity. *Headache.* 2015; 251:63-3.

Copyright of Annals of King Edward Medical University is the property of King Edward Medical University and its content may not be copied or emailed to multiple sites or posted to a listserv without the copyright holder's express written permission. However, users may print, download, or email articles for individual use.