

# Smartphone addiction among medical students in Bisha, Saudi Arabia

Mohammad S. Al-Shahrani

Department of Family Medicine, College of Medicine, University of Bisha, Bisha, Saudi Arabia

## ABSTRACT

**Context:** Smartphones are quickly becoming the most pervasive technological device on the planet. **Aims:** This study aims to assess smartphone addiction and the factors associated with it among medical students. **Settings and Design:** This study was carried out in Bisha, Saudi Arabia, following a cross-sectional study design. **Methods and Material:** The data collection tool comprised a self-administered questionnaire. The validated Problematic Use of Mobile Phones (PUMP) scale was used. The PUMP score was calculated by summing up the scores for the individual questions such that higher scores indicate higher levels of addiction. **Statistical Analysis Used:** Pearson's correlation coefficient was applied to observe the linear relationship between the PUMP scale total score and the quantitative study variables. **Results:** The mean total PUMP score was 61.55, with a standard deviation of 13.16. The correlation coefficient between daily hours of smartphone usage and total PUMP score was 0.39, with a statistically significant  $P$  value ( $P < 0.0001$ ). The correlation coefficient between smartphone use for games and total PUMP score was 0.19, with a statistically significant  $P$  value ( $P = 0.009$ ). The correlation coefficient between GPA scores and total PUMP scores was -0.21, with a statistically significant  $P$  value ( $P = 0.003$ ). **Conclusions:** There is a high prevalence of smartphone addiction among medical students in Bisha city. There is a significant positive correlation between daily hours of smartphone usage and total PUMP score. Playing games on smartphones is significantly associated with smartphone addiction. There is a significant negative correlation relation between GPA score and total PUMP score.

**Keywords:** Academic performance, addiction medicine, medical students, smartphone

## Introduction

Smartphones are rapidly turning into the most inescapable mechanical gadget on earth. The World Health Organization (WHO) defined addiction as the ceaseless utilization of something for alleviation or incitement, which frequently causes longings when it is missing.<sup>[1]</sup> Unreasonable utilization of cell phones in manners that hinder regular every day activity is considered as smartphone addiction.<sup>[2]</sup>

According to the WHO, uncontrolled use of electronic devices has reached the magnitude of a public health problem in a

growing number of countries.<sup>[3]</sup> In addition, practice of primary care physicians can be adversely affected by the excessive use of mobile phones.<sup>[4]</sup>

For students, numerous studies suggest that smartphone addiction might have a negative impact on academic performance.<sup>[5-7]</sup> Other studies found students' sleeping behavior significantly affected by smartphone addiction.<sup>[8-10]</sup> However, some others found no association between smartphone addiction and academic performance.<sup>[11-13]</sup>

This study aims to assess smartphone addiction and the factors associated with it among medical students. The main study objectives are:

1. Exploring the prevalence of smartphone addiction among medical students.

**Address for correspondence:** Dr. Mohammad S. Al-Shahrani, University of Bisha, Post Box 551, PC 61922 Bisha, Saudi Arabia. E-mail: malshahrani124@hotmail.com

Received: 19-06-2020

Revised: 08-09-2020

Accepted: 08-10-2020

Published: 31-12-2020

### Access this article online

#### Quick Response Code:



Website:  
www.jfmpc.com

DOI:  
10.4103/jfmpc.jfmpc\_1205\_20

This is an open access journal, and articles are distributed under the terms of the Creative Commons Attribution-NonCommercial-ShareAlike 4.0 License, which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.

For reprints contact: WKHLRPMedknow\_reprints@wolterskluwer.com

**How to cite this article:** Al-Shahrani MS. Smartphone addiction among medical students in Bisha, Saudi Arabia. J Family Med Prim Care 2020;9:5916-20.

2. Identifying factors associated with smartphone addiction among medical students.
3. Assessing the implications of smartphone addiction on academic scores of medical students.

## Subjects and Methods

This study followed a cross-sectional study design. The study was conducted on medical students in Bisha, Saudi Arabia. The data collection tool comprised a self-administered questionnaire, designed by the researcher after reviewing relevant literature.

The questionnaire was split into three sections. The first section included the sociodemographic data of participants, along with data about substances usage and academic grade point average (GPA) score. The second section contained details about smartphone usage like duration and purpose of usage. The third section included the validated Problematic Use of Mobile Phones (PUMP) scale.

The PUMP scale is a 20-item questionnaire that assesses mobile phone use based on the Diagnostic and Statistical Manual of Mental Disorders, Fifth-Edition (DSM-5) criteria for substance use disorder.<sup>[14]</sup> It demonstrates a single factor structure, with excellent internal consistency. It also displays convergent validity when compared to existing measures of smartphone dependency and self-reported feelings of addiction to the smartphone.<sup>[5]</sup>

Each PUMP scale question followed a five-point Likert scale quintet. The five ordered response levels ranged from strongly agree to strongly disagree as shown in Table 1.

The PUMP score was calculated by summing up the scores for the individual questions such that higher scores indicated higher levels of addiction, with a minimum of 20 and a maximum of 100.

The GPA variable was used to measure the academic scores of participants.

The target population for this study constituted all male students registered and regularly attending college of medicine in Bisha, Saudi Arabia, for the academic year of 2019–2020. The inclusion criterion for the study was all male medical students from all academic levels agreeing to participate in the study. The questionnaire was disseminated during the week from December 22<sup>nd</sup> to December 26<sup>th</sup>, 2019.

Prior to data collection, an ethical and institutional approval was obtained December 19, 2019.

An informed consent was provided to all participants. The first page of the questionnaire comprised full information on the nature of the study objectives. In addition, participation in the study was completely voluntary. All responses were anonymous, collected data were kept fully confidential and were used only for research purposes.

Data entry and statistical analysis were done using the Statistical Package for the Social Sciences (SPSS, version 21). Frequency and percentage were applied for data description in case of categorical data, while mean and standard deviation were applied for description of quantitative variables. Pearson’s correlation coefficient was applied to observe the linear relationship between the PUMP scale total score and the quantitative study variables. A *P* value of <0.05 was considered statistically significant.

The study was self-funded. Some participations were not complete, with frequent missing responses.

## Results

Table 2 shows sociodemographic characteristics of participants. A total of 188 participated in this study. All participants were males. Sixty-eight participants (36.2%) aged 19 years old and below. Most participants aged 20–24 years old (61.7%, *n* = 116) and only four participants (2.1%) aged 25 years and older. Almost all participants were single (97.9%, *n* = 184), three were married (1.6%), and one was divorced (0.5%). Forty participants were from the first academic year (21.3%), 38 were from the second year (20.2%), 34 participants were from the third year (18.1%), 29 were from the fourth year (15.4%), 30 were from the fifth year (16.0%), and 17 participants were from the sixth year (9.0%).

Table 3 shows health characteristics of participants. Participants BMI data showed 79 in the healthy range (42.0%), 52 were

**Table 1: The five ordered response levels and their scores**

| The statement | Strongly disagree | Disagree | Neutral | Agree | Strongly agree |
|---------------|-------------------|----------|---------|-------|----------------|
| Score         | 1                 | 2        | 3       | 4     | 5              |

**Table 2: Socio-demographic characteristics of participants**

| Socio-demographic characteristics of participants | No  | %     | Correlation with total PUMP score ( <i>P</i> ) |
|---------------------------------------------------|-----|-------|------------------------------------------------|
| Age group                                         |     |       | <i>r</i> = -0.07 ( <i>P</i> =0.3)              |
| > or equal 19                                     | 68  | 36.2  |                                                |
| 20-24 years                                       | 116 | 61.7  |                                                |
| > 25 years                                        | 4   | 2.1   |                                                |
| Total                                             | 188 | 100.0 |                                                |
| Gender                                            |     |       |                                                |
| Males                                             | 188 | 100.0 | -                                              |
| Marital Status                                    |     |       |                                                |
| Single                                            | 184 | 97.9  | -                                              |
| Married                                           | 3   | 1.6   |                                                |
| Divorced                                          | 1   | 0.5   |                                                |
| Academic Year                                     |     |       |                                                |
| First                                             | 40  | 21.3  | -                                              |
| Second                                            | 38  | 20.2  |                                                |
| Third                                             | 34  | 18.1  |                                                |
| Fourth                                            | 29  | 15.4  |                                                |
| Fifth                                             | 30  | 16.0  |                                                |
| Sixth                                             | 17  | 9.0   |                                                |

overweight (27.7%), 42 were obese (22.3%), and 15 were underweight (8.0%). Most participants were not using any substances (80.32%,  $n = 151$ ), 31 (16.49%) were smoking cigarettes and Shisha, and six were using substances like cannabis, Benzo, and others (3.19%).

Table 4 shows participants' duration of smartphone usage. Almost all participants have been using smartphones for more than 3 years (91.0%,  $n = 171$ ). Sixty-one participants use their smartphones more than 5 h a day (32.4%). Eighty-two participants use their smartphones for 4–5 h daily (43.6%). Thirty-four participants use their smartphones for 2–3 h daily (18.1%). Eleven participants spend less than 2 h daily on their smartphones (5.9%). The correlation coefficient between daily hours of smartphone usage and total PUMP score was 0.39, with a statistically significant  $P$  value ( $P < 0.0001$ ).

Table 5 shows the purpose of smartphone usage according to participants. 123 participants use their smartphones for academic purposes (65.4%). Almost all participants use their smartphone to access social media (91.5%,  $n = 172$ ). Seventy-four participants play games on their smartphones (39.4%), and 35 utilize it for athletic purposes (18.6%). The correlation coefficient between smartphone use for games and total PUMP score was 0.19, with a statistically significant  $P$  value ( $P = 0.009$ ).

Table 6 shows participants' distribution according to GPA. The mean total PUMP score was 61.55, with a standard deviation of 13.16. The correlation coefficient between GPA scores and total PUMP scores was -0.21, with a statistically significant  $P$  value ( $P = 0.003$ ).

## Discussion

The current study results revealed a mean total PUMP score of 61.55, with a standard deviation of 13.16, most participants' smartphone usage was at least 4 h and above per day (76%,  $n = 143$ ), and a positive correlation was found between daily hours of smartphone usage and total PUMP score ( $r = 0.39$ ), with a statistically significant  $P$  value ( $P < 0.0001$ ).

It seems that high levels of smartphone addiction are not far from medical students and particularly in Bisha there is prevalence of high levels of smartphone addiction.

Medical students are spending considerable amount of time using their smartphone, which in turn increases their chances of developing overdependence. This overdependence can cause negative psychological, social, physical, and educational effects.<sup>[15]</sup>

These findings are in concordance with findings reported by Alosaimi *et al.* where the mean total PUMP score was 60.8 with a standard deviation of 14.9.<sup>[5]</sup> Another study by Iqbal *et al.* reported a mean total PUMP score of 56.33 and a standard deviation of 15.92.<sup>[16]</sup> Aljomaa *et al.* reported similar findings where using smartphone for more than 4 h a day had resulted in differences in participants' smartphone addiction.<sup>[15]</sup>

**Table 3: Health characteristics of participants**

| Health characteristics       | No. | %     | Correlation with total PUMP score (P) |
|------------------------------|-----|-------|---------------------------------------|
| <b>BMI</b>                   |     |       |                                       |
| Underweight                  | 15  | 8.0   | $r=0.03$ ( $P=0.6$ )                  |
| Healthy                      | 79  | 42.0  |                                       |
| Overweight                   | 52  | 27.7  |                                       |
| Obese                        | 42  | 22.3  |                                       |
| <b>Substances dependence</b> |     |       |                                       |
| None                         | 151 | 80.32 | $r=0.03$ ( $P=0.6$ )                  |
| Cigarettes                   | 26  | 13.83 |                                       |
| Shisha                       | 5   | 2.66  |                                       |
| Cannabis                     | 1   | 0.53  |                                       |
| Benzo                        | 1   | 0.53  |                                       |
| Others                       | 4   | 2.13  |                                       |

**Table 4: Duration of Smartphone usage among participants**

| Smartphone usage among participants          | No. | %    | Correlation with total PUMP score (P) |
|----------------------------------------------|-----|------|---------------------------------------|
| <b>Duration of smartphone usage in years</b> |     |      |                                       |
| <1 year                                      | 5   | 2.7  | $r=-0.009$ ( $P=0.9$ )                |
| 1-3 years                                    | 12  | 6.4  |                                       |
| >3 years                                     | 171 | 91.0 |                                       |
| <b>Daily hours of Smartphone usage</b>       |     |      |                                       |
| <2 h                                         | 11  | 5.9  | $r=0.39$ ( $P<0.0001$ )               |
| 2-3 h                                        | 34  | 18.1 |                                       |
| 4-5 h                                        | 82  | 43.6 |                                       |
| >5 h                                         | 61  | 32.4 |                                       |

**Table 5: Purpose of Smartphone usage**

| Purpose of Smartphone usage | No. | %    | Correlation with total PUMP score (P) |
|-----------------------------|-----|------|---------------------------------------|
| Academic                    | 123 | 65.4 | $r=-0.04$ ( $P=0.5$ )                 |
| Social media                | 172 | 91.5 | $r=0.05$ ( $P=0.4$ )                  |
| Games                       | 74  | 39.4 | $r=0.19$ ( $P=0.009$ )                |
| Athletic                    | 35  | 18.6 | $r=-0.05$ ( $P=0.9$ )                 |
| Other                       | 27  | 14.4 | $r=-0.14$ ( $P=0.8$ )                 |

**Table 6: Participants' distribution according to GPA**

| GPA  | No. | %    | Correlation with total PUMP score (P) | Mean total PUMP score±SD |
|------|-----|------|---------------------------------------|--------------------------|
| <2.7 | 35  | 18.6 | -0.21 (0.003)                         | 61.55±13.16              |
| >2.7 | 153 | 81.4 |                                       |                          |

Similar findings were also reported by Boumosleh and Jaalouk where excessive smartphone use was defined by 5 h or more, 49% ( $n = 331$ ) reported using the smartphone more than 5 h.<sup>[17]</sup> Another study by Alhazmi *et al.* reported an overall prevalence of smartphone addiction of 36.5%, and a statistically significant relationship between daily hours of smartphone usage and smartphone addiction.<sup>[18]</sup>

The present study results showed that 39.4% ( $n = 74$ ) used the smartphone to play games. In addition, a significant positive

correlation between using smartphones for playing games and the total PUMP score was found ( $r = 0.19$ ).

It seems that playing games on the smartphone is associated with smartphone addiction. Additionally, the WHO has raised public health concerns regarding excessive gaming and released Gaming Disorders (GD) and Hazardous gaming (HG) among its International Classification of Diseases 11th Revision (ICD-11) list.<sup>[19,21]</sup>

These findings concur with Alosaimi *et al.*'s findings where 42% ( $n = 997$ ) were reported to use smartphones for playing games.<sup>[5]</sup> A study by Liu *et al.* also revealed that smartphone gaming plays an important role in smartphone addiction.<sup>[22]</sup>

Furthermore, several studies reported that a negative relationship identified between cell phone use and academic performance is moderated by multitasking behavior including playing games.<sup>[23,24]</sup>

In the current study, a negative correlation relationship was found significant between GPA and the total PUMP score ( $r = -0.21$ ,  $P = 0.003$ ). This is in concordance with a number of local studies.

Alosaimi *et al.* report 23.4% ( $n = 555$ ) found their academic achievement adversely affected since they started using their smartphones.<sup>[5]</sup> Jamal *et al.* report similar findings where 13.3% ( $n = 16$ ) of participants considered the use of smartphones as having a bad effect on their grade point average.<sup>[25]</sup>

Different findings were reported by Boumosleh and Jaalouk where smartphone addiction levels were found to be not significantly associated with GPA.<sup>[17]</sup> The same study also found lower GPA significantly associated with older age. However, in the present study no significant correlation was found between age and total PUMP score.

Difference in study setting and population may account for the difference in study results. In addition, several studies suggest that the GPA might not be an accurate representation of academic achievement.<sup>[26,27]</sup> This could be the reason why findings of smartphone addiction and its association with GPA may differ.

Findings of the present study showed that most participants (65.4%,  $n = 123$ ) used smartphones for academic purposes, however no significant correlation was found between using smartphones for academic purposes and total PUMP score.

These findings are in concordance with findings from a study by Haque *et al.* where most participants (66%,  $n = 152$ ) used their smartphones for academic purposes, but no significant relation was found between hours of use and performance.<sup>[28]</sup>

In the current study, almost all participants use their smartphone to access social media (91.5%,  $n = 172$ ).

Similar findings were reported by Alosaimi *et al.* where 94.7% ( $n = 2241$ ) reported using smartphones for social networking.<sup>[5]</sup> Other findings

by Jeong *et al.* report that social network use is a stronger predictor of smartphone addiction than game usage.<sup>[29]</sup>

In the current study, no significant correlation was found between using smartphones for accessing social media and total PUMP score. However, a positive correlation was found between daily hours of smartphone usage and the total PUMP score. Students might spend excess amount of time on social media which might contribute to their smartphone addiction.<sup>[30]</sup>

Therefore, findings of the current study can be concluded in the following conclusion.

## Conclusion

There is a high prevalence of smartphone addiction among medical students in Bisha. There is a significant positive correlation between daily hours of smartphone usage and total PUMP score. Playing games on smartphones was found to be significantly associated with smartphone addiction. There is a significant negative correlation relation between GPA score and total PUMP score. Awareness programs for medical students and primary care physicians on the consequences of excessive use of smartphones are highly recommended. Further research in the field of smartphone addiction is needed for a better understanding to the disorder and its prevention.

## Acknowledgement

None

## Financial support and sponsorship

Nil.

## Conflicts of interest

There are no conflicts of interest.

## References

1. WHO | Dependence syndrome [Internet]. Who.int. 2020. Available from: [https://www.who.int/substance\\_abuse/terminology/definition1/en/](https://www.who.int/substance_abuse/terminology/definition1/en/). [Cited on 2020 Sep24].
2. Kuss DJ, Griffiths MD. Online social networking and addiction-a review of the psychological literature. *Inter J Environ Res Pub Health* 2011;8:3528-52.
3. Public health implications of excessive use of the Internet and other communication and gaming platforms [Internet]. Who.int. 2020. Available from: <https://www.who.int/news-room/detail/13-09-2018-public-health-implications-of-excessive-use-of-the-internet-and-other-communication-and-gaming-platforms>. [Cited on 2020 Sep24].
4. Order Interrupted by Text: Multitasking Mishap [Internet]. Psnet.ahrq.gov. 2020. Available from: <https://psnet.ahrq.gov/web-mm/order-interrupted-text-multitasking-mishap>. [Cited on 2020 Sep24].
5. Alosaimi FD, Alyahya H, Alshahwan H, Al Mahyijari N, Shaik SA. Smartphone addiction among university students in Riyadh, Saudi Arabia. *Saudi Med J* 2016;37:675-83.

6. Nayak J. Relationship among smartphone usage, addiction, academic performance and the moderating role of gender: A study of higher education students in India. *Comput Educ* 2018;123:164-73.
7. Alsalamah AM, Harisi MJ, Alduayji MA, Almutham AA, Mahmood FM. Evaluating the relationship between smartphone addiction/overuse and musculoskeletal pain among medical students at Qassim University. *J Family Med Prim Care* 2019;8:2953-9.
8. Kumar VA, Chandrasekaran V, Brahadeeswari H. Prevalence of smartphone addiction and its effects on sleep quality: A cross-sectional study among medical students. *Ind Psychiatry J* 2019;28:82-5.
9. Ibrahim NK, Baharoon BS, Banjar WF, Jar AA, Ashor RM, Aman AA, *et al*. Mobile phone addiction and its relationship to sleep quality and academic achievement of medical students at king Abdulaziz university, Jeddah, Saudi Arabia. *J Res Health Sci* 2018;18:e00420.
10. Touitou Y, Touitou D, Reinberg A. Disruption of adolescents' circadian clock: The vicious circle of media use, exposure to light at night, sleep loss and risk behaviors. *J Physiol Paris* 2016;110:467-79.
11. Khan A, Khalid A, Iqbal R. Revealing the relationship between smartphone addiction and academic performance of students: Evidences from higher educational institutes of Pakistan. *Pak Admin Rev* 2019;3:74-83.
12. Bun Lee E. Too much information: Heavy smartphone and Facebook utilization by African American young adults. *J Black Stud* 2015;46:44-61.
13. Clayson D, Haley D. An introduction to multitasking and texting: Prevalence and impact on grades and GPA in marketing classes. *J Mark Educ* 2012;35:26-40.
14. Merlo L, Stone A, Bibbey A. Measuring problematic mobile phone use: Development and preliminary psychometric properties of the PUMP scale. *J Addict* 2013;2013:1-7.
15. Aljomaa SS, AlQudah MF, Albursan IS, Bakhiet SF, Abduljabbar AS. Smartphone addiction among university students in the light of some variables. *Comput Human Behav* 2016;61:155-64.
16. Iqbal W, Khan AM, Khan SA. Problematic mobile phone among medical students using PUMP scale. *Pak J Med Health Sci* 2017;11:1127-9.
17. Boumosleh J, Jaalouk D. Smartphone addiction among university students and its relationship with academic performance. *Glob J Health Sci* 2017;10:48.
18. Alhazmi AA, Alzahrani SH, Baig M, Salawati EM, Alkatheri A. Prevalence and factors associated with smartphone addiction among medical students at King Abdulaziz University, Jeddah. *Pak J Med Sci* 2018;34:984-8.
19. Gaming disorder [Internet]. Who.int. 2020. Available from: <https://www.who.int/news-room/q-a-detail/gaming-disorder>. [Cited on 2020 Sep24].
20. ICD-11-Mortality and Morbidity Statistics [Internet]. Icd.who.int. 2020. Available from: <https://icd.who.int/browse11/l-m/en#http%3a%2f%2fid.who.int%2f%2fentity%2f1586542716>. [Cited on 2020 Sep24].
21. ICD-11-Mortality and Morbidity Statistics [Internet]. Icd.who.int. 2020. Available from: <https://icd.who.int/browse11/l-m/en#/http://id.who.int/icd/entity/1448597234>. [Cited on 2020 Sep 24].
22. Liu C, Lin S, Pan Y, Lin Y. Smartphone gaming and frequent use pattern associated with smartphone addiction. *Medicine (Baltimore)* 2016;95:e4068.
23. Becker M, Alzahabi R, Hopwood C. Media multitasking is associated with symptoms of depression and social anxiety. *Cyberpsychology. Behav Soc Networking* 2013;16:132-5.
24. Karpinski A, Kirschner P, Ozer I, Mellott J, Ochwo P. An exploration of social networking site use, multitasking, and academic performance among United States and European university students. *Comput Human Behav* 2013;29:1182-92.
25. Jamal A, Sedie R, Haleem K, Hafiz N. Patterns of use of 'smart phones' among female medical students and self-reported effects. *J Taibah Univ Med Sci* 2012;7:45-9.
26. Dickinson E, Adelson J. Choosing among multiple achievement measures. *J Adv Acad* 2015;27:4-22.
27. Sadler D. Grade integrity and the representation of academic achievement. *Stud Higher Educ* 2009;34:807-26.
28. Haque A, Sugathan S, Ali O, Islam M, Haque M. Use of electronic devices by the medical students of UniKL-RCMP, Malaysia, and its influence on academic performances. *Natl J Physiol Pharm Pharmacol* 2016;6:38.
29. Jeong SH, Kim H, Yum JY, Hwang Y. What type of content are smartphone users addicted to? SNS vs. games. *Comput Human Behav* 2016;54:10-7.
30. Zhang M, Tran B, Le H, Nguyen HD, Nguyen CT, Tran TD, *et al*. Perceptions of health-related information on Facebook: Cross-sectional study among vietnamese youths. *Interact J Med Res* 2017;6:e16.