

Original Research Article

Smartphone addiction and associated risk factors amongst undergraduate medical students in a medical college of Assam: a cross-sectional study

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ABSTRACT

Background: Use of smartphones is becoming increasingly indispensable in today's world but increased usage creates addiction to it, which is associated with profound social and psychological disturbances. As such, this study was conducted to estimate the prevalence of smartphone addiction amongst undergraduate medical students and to assess their smartphone usage pattern.

Methods: This was a cross-sectional study conducted among 304 medical students. A pre-designed, pre-tested structured questionnaire containing the short-version of the smart phone addiction scale (SAS-SV) was used for data collection. Data is presented in percentages and association was tested using Chi-square and Fischer's exact test.

Results: Prevalence of smartphone addiction was found to be 44.07%. The most personally relevant smart phone function reported was social-media usage followed by watching videos followed by phone calls. Students using smartphones on an average of 3-4 hours/day and >5 hours/day are 3.2 and 5.7 times more likely to be addicted to smartphones compared to the students' using smartphones on an average of 11-60 mins/day [95% CI: 1.13-9.29, p=0.02 (3-4 hours/day) and 95% CI: 1.92-16.92, p=0.00 (>5 hours/day)]. Students using smartphones on a frequency of 21-50 times/day and >50 times/day are 6.7 times and 10.9 times more likely to be addicted to smartphones compared to the students' using smartphones on a frequency of <5 times/day respectively [95% CI: 1.8-24.87, p=0.00 (21-50 times/day) and 95% CI: 2.79-43.1, p=0.00 (>50 times/day)].

Conclusions: Prevalence of smartphone addiction was quite high amongst the medical students compared to previous studies. As such, awareness regarding this upcoming problem amongst students is of utmost importance.

Keywords: Smartphone, Addiction, Social media, Medical students

INTRODUCTION

Smartphones have become an indispensable part in the lives of everyone. Nowadays almost everything, starting from paying our bills, booking tickets, communicating with one another, and watching videos for entertainment are done with these small handheld mobile devices. Smartphones have also become a crucial part in the lives of almost every medical professional like doctors and nurses, both seniors and juniors alike, as they have to keep

updating each other about information regarding patients, recent advances, online meetings, and classes amongst others.

A smartphone, is a term used to distinguish mobile phones with advanced features from basic feature phones. This term was basically introduced in the market for a new class of mobile phones which provides integrated services ranging from communication to computing and mobile sectors such as voice communication, messaging, personal

information management applications and wireless communication capability.¹

As per the World Health Organization (WHO), addiction is considered (WHO expert committee-1964) as dependence, as the continuous use of something for the sake of relief, comfort, or stimulation, which often causes cravings when it is absent.² The two major categories of addiction involve either substance addiction, e.g. “drugs or alcohol addiction” or “behavioural addiction such as mobile phone addiction”.³

Assam Medical College is the oldest medical college in North East India. Every year, about 200 students are enrolled into the undergraduate medical MBBS course of this institution. Just like any other college of the country, regular updates regarding classes, and academic activities are given to the students over the internet for which almost all the students have their own smartphones.

In spite of all the benefits and help provided by the smartphones, it has been shown from several previous studies about the addictive potential of these handheld devices, more so among young adults, leading to impaired interpersonal skills and development of psychological problems like depression and anxiety.²

As such, this study was conducted to know the prevalence of addiction to smartphones amongst the undergraduate medical MBBS students in this college and the pattern and purposes for which they use their devices.

Objectives

Objectives of the study were: to estimate the prevalence of smartphone addiction amongst undergraduate medical students of Assam, and to assess pattern of uses of smartphone amongst the undergraduate medical students.

METHODS

Study design, setting and subjects

The study was a classroom based cross-sectional analytical study carried out from August 2019 to October 2019 among 304 undergraduate MBBS students of Assam Medical College, Dibrugarh. Students who refused to participate in the study, whose questionnaires were incompletely filled or who did not use smart phones were excluded from the study.

Sample size and sampling design

Taking the prevalence(p) of smartphone addiction from previous studies to be 42%, with 6% absolute error(d), with a 95% level of confidence interval.

$$\text{Formula} = z^2 p(1 - p)/d^2$$

The sample size was calculated to be 271. Taking 12% non-response rate, the final sample size obtained was 304.²

Stratified random sampling technique was carried out to select the study participants. The name list of all the students of undergraduate MBBS of 5 years, starting from 1st year to 5th year, was taken from the principal's office. From that list, equal number of students were selected from each of the 5 years randomly, who were then given the questionnaires to fill up after their class hours.

Data was collected using a pre designed pre tested questionnaire containing the short-version of the smart phone addiction scale (SAS-SV).⁴

The SAS-SV is a 6-point Likert scale with 10 items/questions, originally developed by Kwon et al in Korea. It has been used for evaluation of smartphone addiction in communities around the world and has shown good reliability and validity in different studies. The SAS-SV is made to address the following 5 content areas: daily-life disturbance, withdrawal, cyberspace-oriented relationship, overuse, and tolerance. The maximum total score of the scale from the 10 questions with 6 points each is 60 and minimum score is 10. As per the results of the receiver operating characteristic (ROC) analysis conducted by Kwon et al, cut-off values of 31 and 33 for male and female participants respectively was used to determine whether or not they were addicted to their smart phones.⁴

To know the pattern of phone usage by the MBBS students, 4 questions were asked concerning the following: duration of smartphone use on a typical day, to which they could respond by choosing ‘less than 10 minutes’, ‘11–60 minutes’, ‘1–2 hours’, ‘3–4 hours’, or ‘more than 4 hours’; frequency of smartphone use on a typical day, to which they could respond by choosing ‘less than 5 times’, ‘6–10 times’, ‘11–20 times’, ‘21–50 times’, or ‘more than 50 times’; and the most personally relevant smartphone function, to which they could respond by choosing ‘social networking’, ‘phoning’, ‘gaming’, ‘text messaging’, ‘e-mailing’, ‘watching videos’, ‘listening to music’, and ‘reading news’.

The data thus obtained were then entered into statistical package for the social sciences (SPSS) v16.0 and Microsoft excel and analytical statistics such as odds ratio and logistic regression were done.

Inclusion criteria

MBBS students having smartphones were included in the study.

Exclusion criteria

Students whose questionnaires were incompletely filled or who did not give back their questionnaires, and students who refused to participate in the study were excluded.

RESULTS

The prevalence of smartphone addiction among the undergraduate MBBS students of AMCH was found to be 44.07%. A total of 158 boys and 146 girls from the 5 MBBS batches participated in the study and smartphone addiction prevalence was slightly higher amongst boys (44.94%). The mean age and SD of the participating boys was 20.31 and 1.68 and mean age and SD of girls was 20.71 and 1.69 (Table 1).

When asked about the average duration for which they used their smartphones every day, majority students (37.83%) reported it to be for 3-4 hours. On bivariate regression analysis, it was seen that students who reported using their mobile devices for longer duration per day were more likely to be addicted to their smartphones. For example, students reporting to use their smartphones for more than 4 hours per day were 5.7 times more likely to be addicted to their devices compared to the students who were using it for 11-60 minutes per day ($p < 0.5$) (Table 2).

Regarding the frequency of usage i.e. the number of times that they checked on their smartphones per day, majority of students (29.28%) replied it to be around 11-20 times per day. Also, it was observed that students who were using their smartphones more frequently each day were more likely to be addicted to their devices. Students who were using their devices 11-20 times per day were 4 times more likely to be addicted to their phones compared to the students using it for less than 5 times each day and the results showed an increasing trend of addiction prevalence with increasing frequency of usage (Table 3).

Regarding the most personally relevant smartphone function, majority of students (39.14%) reported that they mostly used their smartphones for social networking activities (Facebook and Instagram), followed by watching video (21.71%). Phone calls, which was originally the primary function of our mobile devices, was the third most personally relevant function among the students (16.78%) (Table 4).

Table 1: Distribution of smartphone addiction amongst students by gender.

| Sex | Total sample N (%) | Mean age | Standard deviation | Addiction present (%) | Addiction absent (%) |
|--------|--------------------|----------|--------------------|-----------------------|----------------------|
| Male | 158 (51.97) | 20.31 | 1.68 | 71 (44.94) | 87 (55.06) |
| Female | 146 (48.03) | 20.71 | 1.69 | 63 (43.15) | 83 (56.85) |
| Total | 304 | | | 134 (44.07) | 170 (55.93) |

Table 2: Association of smartphone addiction with duration of smartphone use per day.

| Average duration of use per day | Total sample N (%) | Addiction present (%) | Addiction absent (%) | OR (95% CI) | P value |
|---------------------------------|--------------------|-----------------------|----------------------|------------------|---------|
| 11-60 mins | 24 (7.89) | 5 (21) | 19 (79) | Ref. | |
| 1-2 hours | 90 (29.6) | 31 (34.4) | 59 (65.6) | 1.99 (0.68-5.86) | >0.05 |
| 3-4 hours | 115 (37.83) | 53 (46) | 62 (54) | 3.2 (1.13-9.29) | <0.05 |
| More than 4 hours | 75 (24.67) | 45 (60) | 30 (40) | 5.7 (1.92-16.92) | <0.05 |
| Total | 304 | 134 (44.07) | 170 (55.93) | | |

Table 3: Association of smartphone addiction with frequency of use per day.

| Frequency of use per day | Total sample N (%) | Addiction present (%) | Addiction absent (%) | OR (95% CI) | P value |
|--------------------------|--------------------|-----------------------|----------------------|-------------------|---------|
| Less than 5 times | 20 (6.58) | 3 (15) | 17 (85) | Ref. | |
| 6-10 times | 76 (25) | 23 (30) | 53 (70) | 2.46 (0.66-9.22) | >0.05 |
| 11-20 times | 89 (29.28) | 38 (42.7) | 51 (57.3) | 4.22 (1.15-15.45) | <0.05 |
| 21-50 times | 72 (23.68) | 39 (54.1) | 33 (45.9) | 6.7 (1.8-24.87) | <0.05 |
| More than 50 times | 47 (15.46) | 31 (66) | 16 (34) | 10.9 (2.79-43.1) | <0.05 |
| Total | 304 | 134 (44.07) | 170 (55.93) | | |

Table 4: Smartphone addiction among students and their most personally relevant smartphone function.

| Time | Total sample (N) | Addiction present | Addiction absent |
|--|------------------|-------------------|------------------|
| Phone calls | 51 | 19 | 32 |
| Social networking (Facebook and Instagram) | 119 | 62 | 57 |
| Phone calls | 51 | 19 | 32 |

Continued.

| Time | Total sample (N) | Addiction present | Addiction absent |
|--------------------|------------------|-------------------|------------------|
| Gaming | 21 | 9 | 12 |
| Watching videos | 66 | 29 | 37 |
| Listening to music | 28 | 7 | 21 |
| Study purpose | 7 | 2 | 5 |
| Others | 12 | 4 | 8 |
| Total | 304 | 134 | 170 |

DISCUSSION

The prevalence of smart phone addiction amongst the MBBS students of Assam Medical College of 44% was higher compared to previous studies by Ammati et al in South India and Soni et al in Rajasthan.^{5,6} Our prevalence was also higher than the studies done in China, South Korea and Southern Europe using the same SAS-SV scale.^{4,7-9} But our prevalence was less than a similar study by Sethuraman et al in Andaman.¹⁰ These differences could be due to the different instruments and classification methods used, and also differences among the participants in the different studies. Yet, the high prevalence rate observed in our present study indicates a potential public health concern posed by smartphone use among students at our medical colleges.

In our study, prevalence of smartphone addiction was slightly higher amongst the boys (44.9%) than the girls (43.15%), but it was not statistically significant. Gender difference and smartphone addiction has been a theme of interest for many researchers, but as of now, there has been no concrete agreement as to which group is at higher risk of addiction.¹¹ The study by Jenaro et al among 337 Spanish college students found that high cell-phone use was associated to being female and having high anxiety and insomnia. Similar findings of high addiction in girls were seen by Kawasaki et al in Thailand and by Hakoama and Hakoyama.^{12,13} However, other studies by Takao et al and Perry and Lee have shown no significant association between gender and prevalence of smartphone addiction.^{14,15}

Our study also showed positive association between the average duration of use per day and presence of smartphone addiction. This is in line with the findings of Haug et al in Switzerland and Cha in Korea.^{7,16} Similar findings were observed by Suliman et al in Saudi Arabia where overuse and increased daily hours of smartphone usage was significantly associated with smartphone addiction. This indicates that students were spending considerable time using their smartphone and were dependent on the several technological applications that the smartphones provide. Students have come to depend on a smartphone to do even the simplest of daily tasks. This overdependence can result in negative physical, psychological, social, familial and educational effects as seen in different studies researching smartphone addiction.¹⁷⁻¹⁹ Also the study conducted by Walsh et al

reported a large increase in the number of smartphone users, and increased spending to obtain the latest devices and apps, as well as an inability to do without smartphones, increased hours of use, and preoccupation with smartphones. This indicates that smartphone addiction is expected to grow in the future and to become one of the most prevailing types of addiction.^{17,20}

In our present study, positive association was seen between the frequency of smartphone used per day with prevalence of smartphone addiction which was similar with the findings of Haug et al among students in Switzerland.⁷ Similar findings of increased smartphone usage frequency among smartphone addicts were seen in the studies by Lin et al and Lee et al.^{21,22} Also in the studies by Salehan et al and Lee et al, it was seen that smartphone addicts were more frequently using their smartphones for social networking services.^{22,23}

The most personally relevant/commonly used smartphone function seen amongst the students was social networking (Facebook and Instagram) which was similar to the findings by Ammati et al in South India, Kwon et al (South Korea) and Haug et al. (Switzerland).^{4,5,7} However in the study by Chen in China, phone calls/text message was the most personally relevant function with social networking services coming second.⁸ The higher prevalence of smartphone addiction in persons reporting social networking as their most personally relevant function is in line with previous studies which showed that texting and use of messengers and social media sites were predictors of mobile phone or smartphone addiction.^{4,8}

Limitations

Our study had assessed addiction of smartphones amongst medical students with respect to a few parameters but there are likely other factors on which addiction to smartphones depended upon that needs to be explored. The questionnaire used for data collection was self-reported by the students for which the answers may have been exaggerated or might have been altered due to recall bias. Also, the above study was conducted in one of the tertiary care hospitals cum medical college of Upper Assam and it may not be representative of undergraduate students of other allied science/fields. As such, future studies maybe taken up to increase the study area to estimate smartphone addiction among the students of other varied branches and fields.

CONCLUSION

Our present study found widespread smartphone addiction amongst the medical college students, which suggests that smartphone addiction has become a public health issue in our medical colleges. As smartphone addiction has been shown to cause psychological disorders like anxiety and depression among young adults in different studies, it is imperative for all to raise awareness regarding prevention of this growing menace among students.² Also as smartphone addiction has been found to be associated with increased duration of use and increased frequency of use, advising the students to take note and curtail their daily duration and frequency of smartphone use will help them evade smartphone addiction and its associated mental and behavioural problems.

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Ethical approval: The study was approved by the Institutional Ethics Committee

REFERENCES

1. Sarwar M, Soomro T. Impact of Smartphone's on Society. Eur J Scientific Res. 2013;98(2):216-26.
2. Davey S., Davey A. Assessment of Smartphone Addiction in Indian Adolescents: A Mixed Method Study by Systematic-review and Meta-analysis Approach. Int J Prev Med. 2014;5(12):1500-11.
3. Kim H. Exercise rehabilitation for smartphone addiction. J Exercise Rehabilitation. 2013;9(6):500-5.
4. Kwon M, Lee J, Won W, Park J, Min J, Hahn C, et al. Development and Validation of a Smartphone Addiction Scale (SAS). PLoS One. 2013;8(2):e56936.
5. Ammati R, Kakunje A, Karkal R, Nafisa D, Kini G, Chandrashekar P. Smartphone Addiction among Students of Medical University in South India: A Cross-Sectional Study. Ann Int Med Dent Res. 2018;4(2).
6. Soni R, Upadhyay R, Jain M. Prevalence of smart phone addiction, sleep quality and associated behaviour problems in adolescents. Int J Res Med Sci. 2017;5(2):515.
7. Haug S, Castro R, Kwon M, Filler A, Kowatsch T, Schaub M. Smartphone use and smartphone addiction among young people in Switzerland. J Behavioral Addictions. 2015;4(4):299-307.
8. Chen B, Liu F, Ding S, Ying X, Wang L, Wen Y. Gender differences in factors associated with smartphone addiction: a cross-sectional study among medical college students. BMC Psychiatr. 2017;17(1).
9. Lopez-Fernandez O. Short version of the Smartphone Addiction Scale adapted to Spanish and French: Towards a cross-cultural research in problematic mobile phone use. Addictive Behaviors. 2017;64:275-80.
10. Sethuraman A, Rao S, Charlette L, Thatkar P, Vincent V. Smartphone addiction among medical college students in the Andaman and Nicobar Islands. Int J Comm Med Public Health. 2022;5(10).
11. Al-Barashdi H, Bouazza A, Jabur N. Smartphone Addiction among University Undergraduates: A Literature Review. J Scientific Res Rep. 2015;4(3):210-25.
12. Kawasaki N, Tanei S, Ogata F, Burapadaja S, Loetkham C, Nakamura T, et al. Survey on Cellular Phone Usage on Students in Thailand. J Physiol Anthropol. 2006;25(6):377-82.
13. Hakoama M, Hakoyama S. The impact of cell phone use on social networking and development among college student. Am Assoc Behavioral Social Sci. 2011;15:1-20.
14. Takao M, Takahashi S, Kitamura M. Addictive personality and problematic mobile phone use. Cyber Psychol Behavior. 2009;12(5):501-7.
15. Perry S, Lee K. Mobile phone text messaging overuse among developing world university students. Communication. 2007;33(2):63-79.
16. Cha S, Seo B. Smartphone use and smartphone addiction in middle school students in Korea: Prevalence, social networking service, and game use. Health Psychol Open. 2018;5(1):205510291875504.
17. Aljomaa S, AlQudah M, Albursan I, Bakhiet S, Abduljabbar A. Smartphone addiction among university students in the light of some variables. Comp Human Behavior. 2016;61:155-64.
18. Lepp A, Barkley J, Karpinski A. The relationship between cell phone use, academic performance, anxiety, and Satisfaction with Life in college students. Comp Human Behavior. 2014;31:343-50.
19. Javid M, Malik MA, Gujjar AA. Mobile phone culture and its psychological impacts on students' learning at the university level. Language in India. 2011;11(2):416-22.
20. Walsh S, White K, Young R. Over-connected? A qualitative exploration of the relationship between Australian youth and their mobile phones. J Adolescence. 2008;31(1):77-92.
21. Lin Y, Lin Y, Lee Y, Lin P, Lin S, Chang L, et al. Time distortion associated with smartphone addiction: Identifying smartphone addiction via a mobile application (App). J Psychiatric Res. 2015;65:139-45.
22. Lee H, Ahn H, Choi S, Choi W. The SAMS: Smartphone Addiction Management System and Verification. J Med Systems. 2014;38(1).
23. Salehan M, Negahban A. Social networking on smartphones: When mobile phones become addictive. Comp Human Behavior. 2013;29(6):2632-9.

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