Original Article

Access this article online
Quick Response Code:
Website: www.jehp.net
DOI: 10.4103/jehp.jehp_134_18

Mobile phone involvement and dependence among undergraduate medical students in a Medical College of West Bengal, India

Sreemedha Choudhury, Indranil Saha[1], Tapas Kumar Som[1], Gautam Ghose[1], Manas Patra[2], Bobby Paul[3]

Intern, IQ City Medical College, [1]Department of Community Medicine, IQ City Medical College, Durgapur, [2]Department of Community Medicine, Midnapore Medical College, Midnapore, West Bengal, [3]Department of Preventive and Social Medicine, All India Institute of Hygiene and Public Health, Kolkata, West Bengal, India

Address for correspondence:
Prof. Indranil Saha, P-19, Jadavpur University Employees' Housing Co-operative Society Ltd. P.O. – Panchasayar, Kolkata - 700 094, West Bengal, India.
E-mail: drsahaindranil@gmail.com

Received: 16-05-2018
Accepted: 13-07-2018

Abstract:

INTRODUCTION: Mobile phone dependence has become an emerging public health problem. This cross-sectional study was conducted to find out the mobile phone involvement and dependence among undergraduate medical students in a Medical College of West Bengal, India.

MATERIALS AND METHODS: A study was conducted at IQ City Medical College, Durgapur, District Burdwan, West Bengal, India, during July–August 2015 among 252 undergraduate medical students. Involvement and dependence were elicited by mobile phone involvement questionnaire (MPIQ) and mobile phone dependence questionnaire (MPDQ), respectively. Statistical Package for the Social Sciences (SPSS) software (version 19.0) was used for analysis.

RESULTS: About 14.9% of students were being highly involved with their mobile phone. The mean score of MPIQ was greatest in domain 5, i.e. euphoria followed by domain 2, i.e. behavioral salience and then domain 4, i.e. conflict with other activities. About 19.4% of males and 11.1% of females had high dependence. Mean MPDQ score was higher among males, though it was not significant statistically. Sex, total recharge, and total hours spent on mobile phone could explain between 2.2% and 3.8% variance of the presence of dependence in binary logistic regression. Total recharge (adjusted odds ratio 1.144) and total hours spent on mobile (adjusted odds ratio 1.135) were positively associated with the presence of dependence.

CONCLUSION: Many students were highly involved and dependent on mobile phone and they had already been experiencing some health-related problems. There is a need to identify students having high involvement and dependence so as to generate adequate awareness and plan educational or treatment interventions accordingly.

Keywords:

Medical students, mobile phone dependence, mobile phone involvement

Introduction

One of the major bulks of the subscription base of mobile phone users is comprised of college students. They defend their usage by citing various uses of the mobiles; the most common being searching infotainment sites for their curriculum-based works. Mobile phones satisfy the need for individualization and yet also signify being a part of a peer group.[1]

Usage of mobile phones is not intended for negative purposes and influence; however, the attitude and time channeled toward these devices has enslaved the students,

How to cite this article: Choudhury S, Saha I, Som TK, Ghose G, Patra M, Paul B. Mobile phone involvement and dependence among undergraduate medical students in a Medical College of West Bengal, India. J Edu Health Promot 2019;8:1.

making them addicts.[2] Various attitudinal problems, distractions, nomophobia, and ringxiety have been reported along with irritability, stress, etc.[3]

A major proportion of mobile phone users consists of the college-going young adults; thus, a huge chunk of the victims of the adverse impacts of mobile phones consists of them. Research suggests that mobile phone use has become such a significant part of student life that it is almost "invisible" and students do not necessarily realize their level of dependence or addiction to their cell phones.[4] It is, therefore, incumbent to identify the threshold point where cell phone use crosses the line from being a helpful tool to being one that enslaves both users and society alike.

Addiction, attention deficit problems, sleep disturbances, increasing risk to cancers, access to distracting and unwanted information, etc., are just the tip of the iceberg when it comes to listing the harmful effects of cell phones. People, especially today's generation, need to be counseled and made aware of the harmful effects of excessive use of mobile phones and helped to get back on track.[5]

In light of all these hassles and problems and in locating the root cause of the problems posed by the usage of mobile phones and their effects, this cross-sectional study was conducted to find out the mobile phone involvement and dependence among undergraduate medical students in a Medical College of West Bengal, India.

Materials and Methods

This was an institutional-based observational cross-sectional epidemiological study conducted at IQ City Medical College situated in Durgapur, District Burdwan, West Bengal. This is a private medical college established in 2013, which enrolls 150 students every year for undergraduate MBBS course. The college is attached with a multispecialty hospital - Narayana Hrudayalaya Hospital. The study was conducted from July to August 2015, and the study population comprised senior most two batches, i.e. 4th semester and 2nd semester batches of MBBS students both male and female, having mobile phone. There were 146 and 149 students, respectively, in the two batches. Pretesting of the questionnaire was conducted upon ten students: five students from each batch for the pilot study. These ten students were omitted from the final study. Thus, altogether 285 ([146 + 149] – 10) students were approached for the final study. The students who did not submit the questionnaire or submitted almost incomplete questionnaire were excluded from the study. Finally, analysis was done on 252 students with a response rate of 88.4%. Complete enumeration method was followed and no sampling was done. Study tool was predesigned and pretested structured self-administered questionnaire. Students were approached after class hours and were briefed about the purpose of the study. They were requested for informed written consent. The study was approved by the Ethics Review Board of the institute (IQMC/IEC/14/0014).

Mobile phone involvement questionnaire

It assesses participants' cognitive and behavioral association with their mobile phone. Based on Brown's[6] behavioral addiction components and qualitative descriptions of mobile phone behavior[7] (Walsh, White, and Young), the MPIQ includes items measuring withdrawal, cognitive and behavioral salience, euphoria, loss of control, relapse and reinstatement, conflict with other activities, and interpersonal conflict. The participants marked their answers for each domain within a scale of 1–7. Participants who scored 5 or higher out of a possible 7 on the MPIQ were classified as being highly involved with their mobile phone, while participants who scored <3 were not.

Mobile phone dependence questionnaire

Mobile phone dependence was evaluated using the MPDQ, a self-rating questionnaire which consists of twenty items. Each response is scored on a Likert scale (0, 1, 2, and 3). Likert scores for each item are then summed to provide a quantitative overall mobile phone dependence score. Higher scores indicate greater dependence. Students exceeding the mean + 1 standard deviation (SD) were put in the high-dependence category.[8] Both these MPIQ and MPDQ have been found to be reliable and valid in different settings throughout the globe including India by different researchers.[6-12]

Collected data were compiled on Microsoft Excel worksheet. Categorical data were expressed as proportions. Central tendency of the continuous data was expressed in mean and median value, and dispersion of data was expressed in range and SD. Association between categorical data was checked by Pearson's Chi-square statistic, while difference between two mean values was checked by unpaired student's *t*-test. Analysis of variance (ANOVA) was performed to see the differences between more than two mean values. In case of significant ANOVA, Bonferroni's *post hoc* test was employed. Statistical Package for the Social Sciences (SPSS) software (version 19.0) was used for analysis. $P \leq 0.05$ was considered statistically significant.

Results

Out of 252 study students, the majority of the participants were in the age group of 20–21 year, followed by 18–19 years (35.3%) and least number of students were

in the age group of <18 years. About 46.5% of them were in the 2nd semester and 53.5% were in the 4th semester; 53.6% were females and rest 46.4% were males. Majority, i.e. 81.4% of participants were resident of hostel, 85.7% belonged from urban area, and 88.1% were Hindus. The highest number of respondents (92.8%) was in upper class as per modified B.G. Prasad socioeconomic status scale.

Mobile phone involvement questionnaire

Participants who scored 5 or higher out of a possible 7 on the MPIQ were classified as being highly involved with their mobile phone (n = 37, 14.9%), while participants who scored <3 were not (n = 35, 14.1%). The rest (175, 70.8%) were neither too much involved with their mobile phones nor were they too less involved with the mobile phones. They are in a risk of becoming too much involved their cell phones in the near future.

About 97 respondents (39.2%) of 247 scored high on the cognitive salience, while 145 (58.7%) scored high on behavioral salience. Involvement was found to be high among 127 (51.4%) on conflict with other activities, and on 114 (46.1%) regarding interpersonal conflict. About (85.8% (212) and 44.5% (110) scored high on euphoria and loss of control respectively. In the domain of withdrawal and relapse and reinstatement - 128 (51.8%) and 91 (36.8%) subjects were found to be highly involved respectively. The mean score of MPIQ was greatest in domain 5, i.e. euphoria followed by domain 2, i.e. behavioral salience and then domain 4, i.e. conflict with other activities. While the median scores of all of these above mentioned domains were found to be 6, 5 and 5 respectively. Score was minimum in domain 1, i.e. cognitive salience [Table 1].

More number of males had high involvement compared to females in domain 1, 4, 6, and 8, though the association was not significant statistically. While proportion of females were more in the remaining domains, with statistical significance in domain 2 only [Table 2]. The highest proportion of students were seen in domain 5 in all the categories of time spent on mobile phones per day in hours, though no pattern was evident. Domain 5 initially decreased with increase in time spent, but again it decreased in more than 15 h spent [Table 3].

Among those experiencing headache and having high involvement, the domain which was chosen the most is domain 5; while those having low involvement, the domain most commonly chosen was domain 8. The same was the case for ringxiety and nomophobia, where domain mostly chosen by highly involved students is also domain 5 and by lesser involved individuals is again domain 8. A maximum number of the high involvement students fall under the category of recharge of Rs. 201–400 (domain most commonly chosen here is domain 5) followed by the category of Rs. 401–600 (domain most commonly chosen here is also domain 5).

Table 1: Involvement and arithmetic mean, standard deviation, and median of mobile phone involvement score in different domains (n=247*)

Different domains	High involvement	MPIQ score	
		Mean±SD	Median
Domain-1: Cognitive salience	97 (39.2)	3.4±1.8	3
Domain-2: Behavioral salience	145 (58.7)	4.3±1.8	5
Domain-3: Interpersonal conflict	127 (51.4)	3.8±2.0	4
Domain-4: Conflict with other activities	114 (46.1)	4.2±1.8	5
Domain-5: Euphoria	212 (85.8)	5.7±1.3	6
Domain-6: Loss of control	110 (44.5)	3.9±1.9	4
Domain-7: Withdrawal	128 (51.8)	4.1±2.0	5
Domain-8: Relapse and reinstatement	91 (36.8)	3.7±1.9	3

Figures in parenthesis indicate percentages. *5 respondents did not answer in MPIQ. MPIQ=Mobile phone involvement questionnaire, SD=Standard deviation

Table 2: Relationship between sex and mobile phone involvement (n=247#)

Domains	High involvement				Chi-square test, P
	Male		Female		
	Present No. (%)	Absent No. (%)	Present No. (%)	Absent No. (%)	
Domain-1: Cognitive salience	45 (39.8)	68 (60.2)	52 (38.8)	82 (61.2)	0.03, 0.87
Domain-2: Behavioral salience	48 (42.4)	65 (57.6)	87 (64.9)	47 (35.1)	12.46, <0.05*
Domain-3: Interpersonal conflict	50 (44.2)	63 (55.8)	64 (47.7)	70 (52.3)	0.30, 0.58
Domain-4: Conflict with other activities	61 (53.9)	52 (46.1)	67 (50.0)	67 (50.0)	0.39, 0.53
Domain-5: Euphoria	93 (82.3)	20 (17.7)	120 (89.5)	14 (10.5)	2.72, 0.09
Domain-6: Loss of control	54 (47.7)	59 (52.3)	56 (41.7)	78 (58.3)	0.89, 0.34
Domain-7: Withdrawal	51 (45.1)	62 (54.9)	77 (57.4)	57 (42.6)	3.73, 0.05
Domain-8: Relapse and reinstatement	46 (40.7)	67 (59.3)	45 (33.5)	89 (66.5)	1.34, 0.24

#Of the 247 respondents who answered MPIQ, *Statistically significant. MPIQ=Mobile phone involvement questionnaire

Mobile phone dependency questionnaire

Median MPDQ score for the males and females is 36.5 (range 33–51) and 37 (range 33–47), respectively. Mean score for mobile phone dependence was 23.6 ± 9.1 (males: 24.0 ± 10.2 and females: 23.3 ± 7.9). Students exceeding the mean + 1 SD, scoring 32.8 points or more, were put in the high-dependence category. There was a noticeable difference between males and females in the percentage of respondents who scored 32.8 points or more (19.4% vs. 11.1%).

Out of high dependency category students, 59.5% were males while 40.5% were females. Thus, proportion of males were more compared to females on mobile phones high-dependence category but without any significant differences by Chi-square test statistic (χ^2 = 2.97, df = 1, P = 0.08). Although mean MPDQ score was higher among males, it did not differ significantly compared to female score by unpaired Student's t-test (P = 0.513). Most of the highly dependent students recharge their cell phones within the range of 801–1000 rupees followed by those who recharge within the range of 401–600 rupees. The least was in the category of ≤200 rupees. Again with an increase in recharge amount, the proportion of highly dependent students increased in number, though at the end, i.e. more than Rs. 1000, it came down to 15.3%, and this was not statistically significant (χ^2 = 6.512, df = 5, P = 0.26). Mean MPDQ score also varied in different categories and difference was statistically significant between Rs. ≤200 and other categories such as Rs. 201–400, Rs. 401–600, Rs. 601–800, Rs. 801–1000, and Rs. >1000 in Bonferroni's *post hoc* test. Most of the highly dependent students belong in the category of spending 1–5 h per day on mobile phones, then with increase in total hours spent, proportion of highly dependent students decreased though it was not statistically significant (P = 0.25). MPDQ score also varied significantly between the groups. Difference between 1 and 5 h and 10 and 15 h (21.96 vs. 28.29) became statistically significant in Bonferroni's *post hoc* test [Table 4]. About 16.8%, 21.1%, and 14.2% of students of high-dependent category complained of headache, ringxiety, and nomophobia, respectively.

In logistic regression model, dependent variable was the presence of dependence – yes (1)/no (0). Sex, total recharge, and total hours spent on mobile phone were taken as independent variables. All these three independent variables could explain between 2.2% and 3.8% variance of the dependent variable (presence of dependence – yes/no) using Cox and Snell and Nagelkerke R^2. This model was a good fit as evident from the nonsignificant Hosmer-Lemeshow value (P = 0.473). Overall, our model correctly predicted 85.2% of

Table 3: Relation between total hours spent on mobile phones per day and mobile phone involvement

Total hours spent per day on mobiles	Students having high involvement in different domains, *n* (%)							
	Domain 1	Domain 2	Domain 3	Domain 4	Domain 5	Domain 6	Domain 7	Domain 8
<1	1 (50)	1 (50)	1 (50)	0	2 (100)	1 (50)	0	1 (50)
1-5	39 (32.7)	60 (50.4)	55 (46.2)	66 (55.4)	99 (83.19)	44 (36.9)	57 (47.8)	35 (29.4)
5-10	24 (35.8)	31 (46.2)	21 (31.3)	31 (46.2)	45 (67.1)	30 (44.7)	27 (40.2)	32 (47.7)
10-15	19 (67.8)	20 (71.4)	14 (50)	13 (46.4)	26 (92.8)	13 (46.4)	20 (71.4)	10 (35.7)
>15	9 (32.1)	19 (67.8)	14 (50)	13 (46.4)	25 (89.2)	16 (57.1)	16 (57.1)	13 (46.4)

Table 4: Relationship between different parameters and mobile phone dependence

Parameters	Students in high-dependence category, *n* (%)	MPDQ score (mean±SD)	Statistical test (*P*)
Sex (*n*=247)			
Males	22 (59.5)	24.09±10.29	Unpaired *t*=0.656, *P*=0.513
Females	15 (40.5)	23.33±7.95	
Total recharge done at a time (rupees) (*n*=244)[#]			
≤200	1 (2.5)	16.51±9.08	ANOVA (*F*)=9.03, *P*<0.05
201-400	14 (15.7)	24.11±8.99	
401-600	8 (17.1)	26.89±7.88	
601-800	4 (16.0)	27.52±7.06	
801-1000	5 (27.7)	24.06±9.21	
>1000	4 (15.3)	24.85±6.83	
Total hours spent on mobile phones per day (*n*=244)[#]			
<1	0	22.38±11.28	ANOVA (*F*)=4.104, *P*=0.003
1-5	13 (5.3)	21.96±9.52	
5-10	11 (4.5)	23.41±7.94	
10-15	7 (2.8)	28.29±8.89	
>15	4 (1.6)	26.36±7.00	

[#]Three respondents did not respond. MPDQ=Mobile phone dependence questionnaire, SD=Standard deviation, ANOVA=Analysis of variance

outcomes, as shown by the classification table. Although total recharge (adjusted odds ratio 1.144) and total hours spent on mobile (adjusted odds ratio 1.135) were positively associated with dependence, the association was not statistically significant ($P > 0.05$) [Table 5].

Discussion

If the landlines have brought communication links to our homes and workplaces, then mobile phones put them directly into the hands of unprecedented numbers and varieties of people. Mobile phones are really a blessing, considering their versatility; they help to be in constant touch with near and dear ones, checking emails, searching the wide database on the internet, entertainment, etc., Yet, this rapid growth of mobile computing has created a double-edged problem – along with previously unimaginable access to information and in addition to causing unforeseen distractions. Thus, the mobile phone has been dubbed as one of the biggest nondrug addictions of the 21st century.[13]

Mobile phone involvement questionnaire

About 14.9% of students were highly involved with mobile phone comparable with studies done by Dixit *et al*.[14] In contrast, 92% of students were found to be involved by Rupani *et al*. because of different settings. High involvement was found to be more than 50% in domains of behavioral salience (58.7%), interpersonal conflict (51.4%), euphoria (85.8%), and withdrawal (51.8%). Thus, it is implied that engaging in mobile phones gave a sense of euphoria (arising of positive emotions) and hence leads to more mobile phone involvement.

Most of the males scored high in domain 5, i.e. euphoria ("I feel connected to others when I use my mobile phone"), followed by domain 6, i.e. loss of control ("I lose track of how much I am using my mobile phone"), while females also scored high mostly in domain 5, followed by domain 2, i.e. behavioral salience ("I often use my mobile phone for no particular reason"). Similar to the present finding of Chóliz found that girls rely more heavily on mobile phones and had higher levels of tolerance and experienced more interference with other activities (as stated here through domain 4), were more likely to use mobile phones to avoid uncomfortable mood states (as explained here through domain 5), and were more likely to feel bad if they could not use mobile phones (as explained here by domain 7) and that they also have more problems with their parents and others due to their use of the mobile phone (as stated here in domain 3),[15] similar to findings of Rupani *et al*.[10] and Demirci *et al*.[16] Again, males were found to be more involved in some other studies.[9] However, a study by Rupani *et al*. found no such association between mobile phone involvement and gender, per capita income, expenditure on the phone, or type of mobile plan. Association between gender and mobile phone involvement was not conclusively proved by studies.[10]

Table 5: Binary logistic regression of mobile phone dependency questionnaire score

Variables	*B*	SE	*P*	Exp(B)
Sex	−0.579	0.366	0.114	0.561
Total recharge	0.135	0.115	0.241	1.144
Total hours spent	0.127	0.166	0.446	1.135
Constant	−1.662	0.777	0.032	0.190

SE=Standard error

The highest proportion of students were seen in domain 5 in all the categories of time spent on mobile phones per day in hours, though no pattern was evident. Domain 5 initially decreased with increase in time spent, but again it decreased in more than 15 h spent. Highly involved individuals experienced more symptoms than low involved people. Thus, a positive relationship was established between these two factors. With higher cost, the percentage of highly involved individuals also increased, since there is a direct relationship between mobile phone involvement and the frequency of mobile phone usage by them.

Mobile phone dependence questionnaire

Studies in different countries around the world have estimated the prevalence of dependence syndrome between 5.57% and 39.6%.[12,14,17-20] In the present study, there was a noticeable difference between males and females dependent on mobile phone, for example, 19.4% versus 11.1%. This finding is much lower compared to the findings of Nikhita *et al*. (31.3%) among secondary school students,[9] Nehra *et al*. (33.5%),[11] and Aggarwal *et al*. (39.6%).[12]

Of high dependency category students, 59.5% were males while 40.5% were females. Thus, males are more dependent on mobile phones than females. Mean MPDQ score was more among males though difference was not statistically significant. The exact cause for this finding could not be found, but it may be due to males being more technologically inclined or engaging more in mobiles for recreational purposes. Similar finding had also been noted by Nikhita *et al*.[9] and Gupta *et al*.[20] This finding is quite opposite to the finding of Chóliz where girls were found to be more dependent on mobiles.[15] In another study done by Toda *et al*., no significant relation was found between MPD and sex.[8] Thus, dependence is believed to be due to frequency of usage pattern as well as the use of cell phone in different purposes.

Most of the highly dependent students recharge their cell phones within the range of 801–1000 rupees followed by those who recharge within the range of 401–600 rupees.

The least was in the category of ≤200 rupees. MPDQ score varied differently among different categories. Students who recharge more are more dependent on their phones due to purposes ranging from recreation to online shopping.

Most of the highly dependent students were experiencing headache while least was experiencing nomophobia. In this study, it was found that headache, ringxiety, and nomophobia were most commonly experienced symptoms, again majority of the persons experiencing these symptoms were not highly dependent on mobiles, so as such no direct positive relation was found in this study. However, Chóliz[15] and Nehra *et al*.[11] have shown that this has led to behavioral addiction with symptoms such as feelings of loss in the absence of the device, signs of withdrawal, signs of anxiety or craving, signs of tolerance, and the resulting loss of control in managing other activities along with the mobile phone.

Most of the highly dependent students belong in the category of spending 1–5 h per day. MPDQ score was maximum in the category of more than 10 h mobile phone use. Dependence increased with increase in amount of time spent. Similar types of findings were also noted by Toda *et al*.,[8] Chóliz,[15] Aggarwal *et al*.,[12] Nikhita *et al*.,[9] and Zulkefly and Baharudin[21] because most of these studies were conducted upon university students. In logistic regression, total recharge (adjusted odds ratio 1.144) and total hours spent on mobile (adjusted odds ratio 1.135) were positively associated with dependence, but the association was not statistically significant ($P > 0.05$). However, Nikhita *et al*.[9] found a significant association between MPD and amount of time spent on mobile phone per day might be due to the fact of secondary school student adolescents as study participants.

Conclusion

Mobile phone dependence has become an emerging public health problem. In this study too, many students were highly involved and dependent on a mobile phone, and they have already been experiencing some health-related problems. This research, however, has some limitations. It was conducted in one medical college and the sample size was small to be representative. Furthermore, multicentric studies need to be conducted in future so as to elicit multiple determinants. There is a need to identify students having high involvement and dependence so as to generate adequate awareness and plan educational or treatment interventions accordingly.

Acknowledgment

The authors would like to acknowledge the Indian Council of Medical Research, New Delhi, for providing short-term studentship to the first author (SC).

Financial support and sponsorship

This study was supported by the Indian Council of Medical Research.

Conflicts of interest

There are no conflicts of interest.

References

1. Nawaz S, Ahmad Z. Statistical study of importance of mobile on student life. J Humanit Soc Sci 2012;2:43-9.
2. Esemenaka E. Usage and impact of internet enabled phones on academic concentration among students of tertiary institutions: A study at University of Ibadan, Nigeria. International Journal of Education and Development using Information and Communication Technology 2013;9: 162-73.
3. Subba SH, Mandelia C, Pathak V, Reddy D, Goel A, Tayal A, *et al.* Ringxiety and the mobile phone usage pattern among the students of a medical college in South India. J Clin Diagn Res 2013;7:205-9.
4. Roberts JA, Yaya LH, Manolis C. The invisible addiction: Cell-phone activities and addiction among male and female college students. J Behav Addict 2014;3:254-65.
5. Paul B, Saha I, Kumar S, Samim Ferdows SK, Ghose G. Mobile phones: Time to rethink and limit usage. Indian J Public Health 2015;59:37-41.
6. Brown RI. A theoretical model of the behavioural addictions – Applied to offending. In: Hodge JE, McMurran M, Hollin CR, editors. Addicted to Crime. Chichester, UK: John Wiley; 1997.
7. Walsh SP, White KM, Young RM. Over-connected? A qualitative exploration of the relationship between Australian youth and their mobile phones. J Adolesc 2008;31:77-92.
8. Toda M, Monden K, Kubo K, Morimoto K. Mobile phone dependence and health-related lifestyle of university students. Soc Behav Pers 2006;34:1277-84.
9. Nikhita CS, Jadhav PR, Ajinkya SA. Prevalence of mobile phone dependence in secondary school adolescents. J Clin Diagn Res 2015;9:VC06-9.
10. Rupani MP, Parikh KD, Trivedi AV, Singh MP, Patel A, Vadodariya B, *et al*. Cross-sectional study on mobile phone involvement among medical students of a tertiary care teaching hospital of Western India. Natl J Community Med 2016;7:609-13.
11. Nehra R, Kate N, Grover S, Khehra N, Basu D. Does the excessive use of mobile phones in young adults reflect an emerging behavioural addiction? J Postgrad Med Educ Res 2012;46:177-82.
12. Aggarwal M, Grover S, Basu D. Mobile phone use by resident doctors: Tendency to addiction-like behaviour. German J Psychiatry 2012;15:50-5.
13. Am I Addicted to my cell phone? Mobile Addiction – Cell Phone Addict. Addiction and Behaviour Health Assessments. Available from: http://www.behaviorhealth.bizcalcs.com/Calculator.asp?Calc=Cell-Phone-Addict. [Last accessed on 2018 Jul 14].
14. Dixit S, Shukla H, Bhagwat A, Bindal A, Goyal A, Zaidi AK, *et al.* A study to evaluate mobile phone dependence among students of a medical college and associated hospital of central India. Indian J Community Med 2010;35:339-41.
15. Chóliz M. Mobile-phone addiction in adolescence: The Test of Mobile Phone Dependence (TMD). Prog Health Sci 2012;2:2-40.
16. Demirci K, Akgönül M, Akpinar A. Relationship of smartphone use severity with sleep quality, depression, and anxiety in university students. J Behav Addict 2015;4:85-92.
17. Bivin JB, Mathew P, Thulasi PC, Philip J. Nomophobia – Do we really need to worry about? Rev Prog 2013;1:1-5.
18. Szpakow A, Stryzhak A, Prokopowicz W. Evaluation of threat of mobile phone – Addition among Belarusian University students.

Prog Health Sci 2011;1:96-101.
19. Lopez-Fernandez O, Honrubia-Serrano L, Freixa-Blanxart M, Gibson W. Prevalence of problematic mobile phone use in British adolescents. Cyberpsychol Behav Soc Netw 2014;17:91-8.
20. Gupta N, Krishnamurthy V, Gupta J. Gadget dependency among medical college students in Delhi. Indian J Community Health 2013;25:362-6.
21. Zulkefly SN, Baharudin R. Mobile phone use amongst students in a university in Malaysia: Its correlates and relationship to psychological health. Eur J Sci Res 2009;2:206-18.