Original Article

Prevalence of Mobile Phone Dependence in Secondary School Adolescents

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ABSTRACT

Introduction: Mobile phones have become an essential part of modern human life. They have many attributes which makes them very attractive to both young and old. There has been an increasing trend of use of mobile phones among students. Data has now started emerging with respect to the negative physical and psychological consequences of excessive use of mobile phones. New research has shown excessive use of mobile phones leading to development of symptoms suggestive of dependence syndrome.

Aim: To study the prevalence of Mobile Phone Dependence (MPD) in secondary school adolescents.

Setting and Design: Cross-sectional, observational study conducted in secondary section of English-medium schools at Navi Mumbai (India).

Materials and Methods: Four hundred and fifteen students studying in 8th, 9th and 10th standards of schools at Navi Mumbai (India) having personal mobile phone were randomly included in the study. Participant information like age, gender, family type, phone type, duration of use per day and years of mobile phone usage was recorded. They were administered an MPD questionnaire based upon the dependence syndrome criteria as per ICD-10. According to their responses, participants who fulfilled three or more of the diagnostic criteria were rated as having MPD.

Results: Mobile Phone Dependence was found in 31.33% of sample students. It was significantly associated with gender (p=0.003, OR=1.91, CI: 1.23-2.99), family type (p=0.0012), type of mobile phone used (p<0.001, OR=2.6, CI: 1.63-4.35), average time per day spent using mobile phone (p<0.001) and years of mobile phone usage (p =0.004, OR=2.4, CI: 1.31-4.55).

Conclusion: Mobile Phone Dependence has been found to be an emerging public health problem. There is need to recognize and identify early the growing trends and negative consequences of inappropriate mobile phone use in young users so as to generate awareness, and plan educational and treatment interventions, if need be, so as to prevent a major public health concern.

INTRODUCTION

The mobile phone has many attributes and characteristics that make it very attractive to both young and old [1]. Evidences in literature have started emerging regarding the negative physical and psychological consequences of its excessive use [2-11]. In the recent times the concept of behavioural addiction has gained attention of researchers and it has been shown to be equivalent to substance dependence as understood by the current nosological systems [2,12,13]. Behavioural addiction for mobile phones has been variously termed as Mobile phone Dependence, Mobile Phone Problematic Use, Problem cell phone use, Mobile phone abuse and Nomophobia (a portmanteau for "no mobile phone" and phobia) [6,11,14-16]. The symptoms include preoccupation with the device, excessive use with loss of control, use in socially inappropriate/dangerous situations, adverse effects on relationships, symptoms of withdrawal (e.g. feelings of anger, tension, depression when the phone/network inaccessible, ringer anxiety, constant worry that battery will drain, signs of craving), symptoms of tolerance (e.g. need for new better phone, more software or more hours of use), and functional/behavioural impairments (e.g. lying, arguments, poor achievements, social isolation, communifaking i.e. engaging in fake conversations on mobile phone for purpose of avoiding others). These seem to parallel the substance dependence syndrome and thus some researchers deem that it has become important to consider mobile phone dependence (MPD) as a diagnostic entity [1,5,10,11,15,16]. Many diagnostic tools of mobile phone dependence have been developed [2,6,8,10,11,14,15,17] and studies show that there is a significant relationship between test scores and the main parameters of dependence in case of mobile phones [1,3,5,12,18-22].

Research shows that teenagers are far more likely to become dependent on mobile phones as compared to adults [2,5]. Studies show that MPD in adolescents interferes with their school and personal activities, and leads the teenagers to develop social and relationship problems [1,20]. There has been an upward swing in the younger age groups [19,23] with increasing trend of use of mobile phones among students [7,22,24,25].

A few studies from India conducted in adults have identified mobile phone behavioural addiction as ranging from 33.5% to 39.6% using International Classification of Disease, 10th edition (ICD-10) Classification of Mental and Behavioural Disorders criteria for dependence syndrome [12,18].

There exists a paucity of data in the Indian scenario regarding mobile phone use and its dependence syndrome in adolescents. Therefore this study was conducted to evaluate the prevalence of mobile phone dependence in secondary school students of Navi Mumbai, India.

MATERIALS AND METHODS

Permission from Institutional Ethics Committee was obtained. The procedures followed were in accordance with the ethical standards of the committee on human experimentation and with the Declaration of Helsinki, adopted by the 18th World Medical Assembly, revised in October 2008.

This was a cross-sectional, observational survey conducted in the English-medium schools at Navi Mumbai (India) over a period of 2 months (August 2014 to September 2014). The minimum sample size was set to 361 participants (based on previous

study prevalence of MPD 39.6 % [12], at 95% confidence interval, 5% margin of error). After obtaining permission from the respective school principals and class teachers, the students were interviewed during the recess period. Students studying in the secondary class (8th, 9th and 10th) were randomly selected. Students having their own personal mobile phone and willing to participate were included in the study. After obtaining informed consent, they were asked to complete a case record form comprising of a self-designed structured proforma and Mobile Phone Dependence questionnaire. The proforma was used to record participant details and information like type of phone, family type and parental working status. A 23 item questionnaire designed and tested by Aggarwal et al., [12] was used to assess Mobile Phone Dependence. The initial three items enquired about the duration of use in years, average time spent on mobile phones per day and the purpose of use. The other 20 items consisted of questionnaire with binominal (yes/no) response to provide information about pattern of mobile use and whether such usage fulfilled the ICD-10 criteria for dependence syndrome. Out of the 20 items, 14 items covered the six criterion for ICD-10 dependence syndrome (one question for intense desire, four questions for impaired control, three questions for withdrawal, one question for tolerance, four questions for decreased pleasure and one question for harmful use). Participants were considered to fulfill a particular criterion, if they answered positive to question in criteria containing single question or answered positive to at least 50 % questions in case of criteria containing multiple questions [12]. Accordingly, participants who fulfilled three or more of the criteria for dependence (as per ICD-10) were rated as having mobile phone dependence. Students failing to return the questionnaire form, returning incompletely filled forms and not willing to give informed consent/assent were excluded from the study. Four hundred fifty case record forms were distributed. Data from 415 completely filled forms was analysed statistically.

STATISTICAL ANALYSIS

Data was entered in Microsoft 2007 Excel and was statistically analysed by using Statistical Package for the Social Sciences (SPSS) version-17 software. Data was expressed in terms of actual number, mean ± standard deviation, frequency and percentage. Pearson's Chi-Square test was used for categorical data and Odds Ratio (OR) with 95% confidence interval (CI) was calculated. Probability p-value of less than 0.05 was considered as statistically significant.

RESULTS

Out of the total sample of 415 participants, there were 251 males (60.48%) and 164 females (39.51%). The mean age of the participants was 13.99 ± 0.8 years. The average amount of time per day they spent on mobile phone was 131.77 ± 119.9 minutes. [Table/Fig-1] summarizes the characteristics of the sample participants.

Sr. No.	Item		Number (N=415)	%
1.	Gender	Male	251	60.48
		Female	164	39.52
2.	Parental working status	One parent working	301	27.47
		Both parents working	114	72.53
3.	Family type	Single parent	14	3.37
		Nuclear	330	79.52
		Compound	71	17.11
4.	Phone type	Smart	275	66.27
		Non-Smart	140	33.73
5.	Mean Age (years)		13.99 ± 0.8	-
6.	Average time spent on mobile phone per day (in minutes)		131.77 ± 119.9	-
7.	Duration of mobile phone usage (in years)		1.91 ± 1.2	-

[Table/Fig-1]: Characteristics of secondary school adolescents enrolled in the study

Sr. No.	Questions	Positive responses	
		Number (N=415)	%
Q1.	When not using the mobile, are you preoccupied with the mobile phone (Keep constantly thinking about the previous and the future uses)?	93	22.41
Q2.	Do you need to use mobile phone for increased amounts of time in order to achieve satisfaction/ betterment?	110	26.51
Q3.	Have you made unsuccessful efforts to control/ decrease or stop mobile phone use?	211	50.84
Q4.	Do you get upset when attempting to cut down mobile phone use?	180	43.37
Q5.	Has mobile phone use led to decrease in meeting the friends in person	149	35.90
Q6.	Has mobile phone use has made you spend less time with friends/ family	102	24.58
Q7.	Has mobile phone use has led to decrease in socialization? (meeting friends/ hanging out)	82	19.76
Q8.	Do you lose track of time after starting to use mobile phone for SMS, games, music etc?	255	61.45
Q9.	Do you lie to others to conceal the extent of your use of mobile phone?	76	18.31
Q10.	Do you become anxious of missing something if you have to switch off your mobile phone for some reason?	171	41.20
Q11.	Do you compulsively respond to calls/ SMSs at places which don't permit (Class, driving, group participation)?	54	13.01
Q12.	Do you compulsively respond to calls/ SMSs at places where it is dangerous to do so (crossing road, driving/ working at machines)?	54	13.01
Q13.	Do you call back to most of the missed calls?	209	50.36
Q14.	Does using mobile phone help you to overcome the bad moods (e.g. feeling of inferiority, helplessness, guilt, anxiety, depression etc.)?	273	65.78
Q15.	Do you feel guilty about the expenditure on (or excessive use of) mobile phone?	219	52.77
Q16.	Do you get irritated in the morning if you are not able to locate your mobile phone?	172	41.45
Q17.	Do your families/ friends/ colleagues complain that your mobile phone use is excessive?	158	38.07
Q18.	Do you get annoyed or shout if someone asks you to decrease the use of mobile phone?	126	30.36
Q19.	Do you frequently participate in SMSs or phone entry competitions?	51	12.29
Q20.	Do you think you are getting addicted to mobile use?	133	32.05

[Table/Fig-2]: Questionnaire assessing the mobile use pattern in secondary school adolescents

Sr. No.	ICD-10 Criteria for Dependence syndrome	Number (N=415)	%
1.	Intense Desire (Q1)	93	22.41
2.	Impaired control (Q3,8,11,19)	182	43.86
3.	Withdrawal (Q10,13,16)	173	41.69
4.	Tolerance (Q2)	110	26.51
5.	Decreased pleasure (Q5,6,7,17)	142	34.22
6.	Harmful use (Q12)	54	13.01
	Dependence syndrome among Mobile phone users (i.e. Participants fulfilling three or more of the above six criteria)	130	31.33

[Table/Fig-3]: Participants fulfilling ICD-10 diagnostic criteria for dependence syndrome (i.e. presence of Mobile phone dependence)

[Table/Fig-2] summarizes the positive responses to questions evaluating the mobile phone use pattern. In this study, 65.78% participants responded that the mobile phone helps them to overcome bad moods (e.g. feeling of inferiority, helplessness, guilt, anxiety, depression etc.)?" while 61.45% felt that they lose track of time after they start using the mobile phone for SMS, games, music, etc.

Items		MPD Present (N=130)	MPD Absent (N=285)	t-test / chi square value	p value	Odds Ratio (95% CI)
Gender	Male	92	159	8.382	0.0037	1.91 (1.23 - 2.99)
	Female	38	126			
Duration of mobile phone use	< 3 years	107	262	8.387	0.0038	2.44 (1.31 – 4.55)
	≥ 3 years	23	23			
Type of Phone	Smart	104	171	15.975	0.00006	2.66 (1.63 - 4.35)
	Non-Smart	26	114			
Average time spent on mobile phone per day (minutes)		199.8 ± 127.4	100.7± 102.5	8.445	< 0.001	
Parental working status	One parent working	100	201	1.742	0.4185	
	Both parents working	30	84			
Family type	Single parent	5	9	13.303	0.0012	
	Nuclear	90	240			
	Compound	35	36			

[Table/Fig-4]: Comparison of associated factors between participants with mobile phone dependence (MPD) and those without MPD

Prevalence of Mobile Phone Dependence was found to be 31.33% [Table/Fig-3]. The most commonly met ICD-10 diagnostic criteria for dependence syndrome were symptoms of impaired control (43.86%) and withdrawal (41.69%).

The results of the participating students were dichotomized into those having dependence for mobile phone use and those without. [Table/Fig-4] shows their comparisons and analysis. Mobile Phone Dependence was significantly associated with male gender (p =0.003, OR=1.91, CI: 1.23-2.99), participants living in nuclear families (p = 0.0012), use of smart phones (p<0.001; OR=2.6; CI: 1.63-4.35), increasing amount time spent per day using mobile (p <0.001), and increasing number of years of use (p =0.004; OR=2.4; CI: 1.31–4.55).

DISCUSSION

According to the International Classification of Disease, 10th edition (ICD-10) Classification of Mental and Behavioural Disorders Criteria of substance dependence syndrome [26], definite diagnosis of dependence syndrome should be made only if three or more of the following have been present together at some time during the previous year: (a) a strong desire or sense of compulsion to take the substance; (b) difficulties in controlling its use in terms of its onset, termination, or levels of use; (c) a withdrawal state; (d) evidence of tolerance; (e) progressive neglect of alternative pleasures or interests, increased amount of use or increased time taken to recover from effects; (f) persistent use despite clear evidence of overtly harmful consequences [26].

The findings of the present suggest that the prevalence of Mobile Phone Dependence in secondary school adolescents was 31.33% as per ICD-10 diagnostic criteria for dependence syndrome. Several studies have been conducted in many countries around the world such as Thailand, China, Korea, Turkey, Poland, Spain, Italy, Australia and India have estimated the prevalence of dependence syndrome ranges between 5.57% to 39.6% [3,6,8,12,15,22]. In studies conducted in Indian adult population, Nehra et al., found 33.5% participants while Aggarwal et al., found 39.6% participants had mobile phone dependence [12,18].

In present study, male students were found to have almost twice the risk of MPD in comparison to females. This was similar to finding documented by several studies [2,3,8,11,12,27-29]. However, other research have documented that the association between mobile phone use and gender is not conclusive [2,5,7,22,25,30]. Bianchi et al., suggested that the appeal of mobile phones is gender un-biased, and that both genders embrace mobile phone technology equally.

Females more likely to use it for social reasons while males use it more for technology and work purposes [2].

The mobile phone has been dubbed as one of the biggest non-drug addictions of the 21st century. It favours personal autonomy, provides identity and prestige, favours the establishment and maintenance of interpersonal relationships, and is a source of fun and entertainment [1,5,7,31]. These features along with countless perks it offers has consequently led to a tremendous increase in the number of mobile phone users in the world [3,4,7,8]. But studies have shown that this has led to behavioural addiction with symptoms of concern being the feelings of loss in the absence of the device, signs of anxiety/craving, signs of withdrawal/escape, signs of tolerance and the resulting loss of control in managing other activities along with the mobile phone [1,18,20].

Leung et al., reported that there are four types of addiction symptoms of importance in relation to MPD- "losing control and receiving complaints", "anxiety and craving", "withdrawal/escape", and "productivity loss [20]. Bianchi et al., theorized that if problem use of mobile phones has similarities to addictions, then factors linked to other addictions may be present in the problem use of mobile phones [2]. Low self esteem has consistently been linked with addictive behaviours. Bianchi et al., stated that high neuroticism and low self esteem can cause persons to behave in ways that are self defeating [2]. In present study the question "Does using mobile phone help you to overcome the bad moods (e.g. feeling of inferiority, helplessness, guilt, anxiety, depression etc.)?" was the most common positively answered question (answered as 'yes' by 65.78%).

Sahin et al., noted that as frequency of mobile phone use increases, the chances of addiction gets higher [25]. Choliz reported that mobile phone addiction was determined in individuals whose duration of use was approximately two hours or more [31] while Aggarwal et al., in their study found mean duration of mobile phone use per day to be 1.8 ± 1.6 hours [12]. A study by Zulkefly and Baharuddin documented mobile phone use as five hours a day on an average [32]. In our study, in participants with MPD, average time spent on mobile phone was 199.8 ±127.4 minutes per day and mean years of mobile phone use was 2.3 ± 1.5 years. The participants with MPD were significantly associated with increasing amount of time spent on mobile per day and more than 3 years of mobile phone use (p =0.004; OR=2.4; CI: 1.31–4.55). The proportion of participants who were dependent also steadily increased as the number of years of use increased.

In present study, dependence syndrome for mobile phone usage was significantly associated with the use of smart phones. Arif and Aslam in their study suggested that due to factors like the need for social interactions, social influence and convenience young people were becoming dependent on smart phones [33]. They showed that the younger generation especially students tend to adopt electronic devices like smart phones earlier than older people with this is trend being not only seen in developed countries like North America but also in emerging nations like China, Lebanon, Chile, Jordan and Argentina [33].

Thus in our study, MPD was found to be associated with increased frequency and duration of use, and utilization of smart phones by secondary school adolescents. Hence parents could be suggested to supervise/restrict use of mobiles phones to only few hours per day in their children and to make use of non-smart phones in case of young users. Though treating inappropriate mobile phone use may just be addressing a symptom, rather than the underlying problem, but there is still a need to recognize these growing trends and the potential for negative consequences of inappropriate mobile phone use in young users.

LIMITATIONS
The limitations of the study include the fact that it is a cross-sectional study based on self-rated questionnaire with dichotomous yes/no

responses. Socio-economic status, family income and pocket money of the students were not assessed in this study. There is no consensus validity as yet for Behavioural Dependence Model for mobile phone use since there are no defined ICD-10/DSM (Diagnostic and Statistical Manual of Mental Disorders) criteria for mobile phone dependence. However the new DSM-5th edition has expanded the criteria for Addictive Disorders to include certain non-substance behavioural addictions like gambling disorders [34].

CONCLUSION

Mobile phone dependence has been found to be an emerging public health problem. There is need to identify it early so as to generate adequate awareness and plan educational/treatment interventions. Precautionary measures to prevent unnecessary excessive exposure to mobile phones are needed. There is also need to identify vulnerable groups, for example children and adolescents, who can be targeted for any interventional campaigns.

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