

Evaluation of the Levels of Nomophobia and Academic Stress among Medical Students

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ABSTRACT

Background: Technology has been intruding into human's daily life so much that most of us would develop dependence on it and so, smartphone is not exclusion. There has been increase in the usage of smartphone especially among student population for various reasons, which could foster addictive behaviors. Medical students are vulnerable population for such addictive behaviors probably due to tremendous academic pressure, where they find smartphone usage as way of escape & ease to relieve from ongoing stressful situations and so on. **Objective:** To determine the smartphone usage pattern, nomophobia and correlation of nomophobia with academic stress among medical students. **Material and Methods:** Second year & third year medical students were considered as subjects. Nomophobia Questionnaire (NMP-Q) and Academic Stress Inventory (ASI) were administered. **Results:** Almost all the students in the study group had nomophobia but at different levels which includes Mild (24.7%), Moderate (65.8%) and Severe (9.3%) and slightly higher among female students. All the domains of the academic stress inventory showed statistically significant association with nomophobia i.e. there is a positive correlation between nomophobia and academic stress among medical students. **Conclusion:** Apart from various stresses which a medical student undergo, academic stress seems to be an important factor which could have great influence on Nomophobia [No-Mobile-Phobia] and can influence smartphone addiction. This study emphasizes the need for early interventions required to address the medical students in effectively managing their stress and reduce the chances of mobile phone addiction.

Keywords: *Nomophobia/Smartphone addiction, Academic Stress, Gender*

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In the current digital world, our smartphone feels like extension of a body organ and permanently attached to our hand like an extra appendage. Use of smartphone has become an integral part of our daily living, so much so that the fear of not being with one's own phone has been recorded, termed as “**Nomophobia**” and was proposed to include as diagnostic criteria in DSM 5 manual (Bragazzi & Del Puente, 2014). There has been increase in utilization and penetration of newer technological devices and virtual communication, which has significant impact on individuals' daily habits and behaviors (Davey & Davey, 2014). As per the recent report from Internet And Mobile Association of India [IAMAI] 2017 & KANTAR IMRB, there have been 456 million mobile internet users in India, of which mobile internet is predominantly used by youngsters with 46% of urban users and 57% of rural users being under the age of 25 (Internet-in-India 2017). While short-term usage of a new technology seems to be beneficial, in long term the same may increase addictive and impulsive behaviors, outnumbering positive attributes. Smartphones also face similar challenges, as an addictive usage pattern is being increasingly noticed (Bragazzi & Del Puente, 2014). These behaviors are more commonly found in individuals who perceive more stressful conditions in their daily life. Indian studies have shown similar trends of increasing usage of smartphone. Around 900 million Indians use smartphone, more so in younger generation, in whom addictive patterns have emerged and an estimated range is between 39-45% (Davey & Davey, 2014) (Goswami & Singh, 2016). There has been increasing proportion of mobile phone users among college students without much knowledge about the threshold on healthy usage and possibility of developing addictive pattern (Roberts, Yaya, & Manolis, 2014).

Academic stress is defined as apprehension, frequent worries and anxiety about one's performance in the academic activities (Prabu, 2015). Academic stress among students is well researched entity and common reasons for stress are noted as follows: too many assignments, competition and comparison with other students, fear of failures and poor relationship with others students and teachers (Fairbrother & Warn, 2003). Eustress leads to better performance, whereas perceived distress can lead to poor academic performance (Hojat et al., 1993) (Yamada, Klugar, Ivanova, & Oborna, 2014). Many studies have reported common sources of stress among medical students like excessive workload, poor time management, work-life balance & relationships, general health & financial concerns, most importantly concern about career planning & performance pressures like constant assessments, Examinations etc (Hill, Goicochea, & Merlo, 2018) (Slavin, Schindler, & Chibnall, 2014) (Chang, Eddins-Folensbee, & Coverdale, 2012). This study aims to find out the levels of Nomophobia and its correlation with perceived academic stress among medical students in our institution.

METHODOLOGY

Sample and procedure

The study sample consists of second year (2017-18) & third year (2016-17) medical students studying at Akash Institute of Medical Sciences and Research Centre, Bangalore. A written informed consent was taken from the students who were willing to participate in the study. Anonymity was maintained about student's individual identity. A semi-structured proforma consisting of smartphone usage pattern, Nomophobia questionnaire and Academic stress inventory were administered among the study group. Approximately 20-30 minutes were required to fill the details of the given study questionnaires. Students were briefly informed about the questionnaires and queries were addressed as and when required. Institutional ethical committee clearance was obtained prior to the study.

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Instruments

Nomophobia Questionnaire: This instrument was developed and validated by Yildirim C & Correia A in 2015 (Yildirim & Correia, 2015). The NMP-Q is a self-reported questionnaire with 20 questions and each item is scored on a 7-point Likert scale wherein 1= Strongly disagree, 2= Disagree, 3=Somewhat Disagree 4=Neutral, 5= Somewhat Agree, 6= Agree, 7=Strongly Agree, with total score ranging from 20 to 140 which defines the severity of Nomophobia. Score of 20 indicates Absence of Nomophobia, 21-59 indicates mild Nomophobia, 60-99 indicates Moderate Nomophobia and 100-140 indicating severe Nomophobia.

Academic Stress Inventory: This instrument was developed by Ying Ming Lin & Farn Shing Chen in 2009 (Lin & Chen, 2009). This self-reported scale has 34 questions wherein each item is rated on a five point Likert scale with 1= Completely disagree, 2= Disagree, 3= Neutral, 4= Agree, 5= Completely Agree. ASI assesses students stress levels from 7 possible domains as follows **1. Stress from teachers:** including teaching materials, teaching & exercise items. **2. Stress from results:** stress from parents, including conflicts between expectations, opinions & drop in grades.**3. Stress from tests:** Worry about how to prepare for a test and redo the compulsory courses.**4. Studying in group stress:** Including exercise reports, grouping etc. **5. Peer stress:** included academic competition, peer interference etc. **6. Time management stress:** stress from social activities, student association, time management and different choices.**7. Self-inflicted stress:** such as self-expectation, interest of the course selection etc. The Cronbach's reliability test of Academic stress inventory shows α value of 0.90. Higher the scores indicate higher levels of stress in all the domains.

Statistical Analysis

The Statistical software namely SPSS 18.0, and R environment ver.3.2.2 were used for the analysis of the data and Microsoft word and Excel have been used to generate graphs, tables etc.

Descriptive and inferential statistical analysis has been carried out in the present study. Results on continuous measurements are presented on Mean \pm SD (Min-Max) and results on categorical measurements are presented in Number (%). Significance is assessed at 5 % level of significance. The following assumptions on data is made, **Assumptions:** 1. Dependent variables should be normally distributed, 2. Samples drawn from the population should be random, Cases of the samples should be independent

Analysis of variance (ANOVA) has been used to find the significance of study parameters between three or more groups of patients, Student t test (two tailed, independent) has been used to find the significance of study parameters on continuous scale between two groups (Inter group analysis) on metric parameters.

Chi-square/ Fisher Exact test has been used to find the significance of study parameters on categorical scale between two or more groups, Non-parametric setting for Qualitative data analysis. Fisher Exact test used when cell samples are very small.

RESULTS

Majority of the students had variable levels of Nomophobia, but predominantly moderate levels (65.8%), which are quite alarming that they may progress to severe levels over a period of time especially among female students [Table 1].

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Table 1: Prevalence of nomophobia among medical students

Nomophobia	Gender		Total
	Male	Female	
<20	0	0	0
21-59	27	34	61 (24.7%)
60-99	61	101	162(65.8%)
100-140	11	12	23(9.3%)
Total	99	147	246(100%)

In this current digital world, the rate at which the people are becoming dependent/addicted to gadgets especially smartphone is determined by their usage pattern. The present study has evidenced that majority of the students were residing in hostel/paying guest (61.8%), recent exposure to smartphones i.e. between 1-3yrs (56.9%). Large number of students was using smartphone upto 5hours per day for academic and non-academic purposes (82.1%). All the students in this study were using smartphone and majority of students has spent less than thirty thousand on their mobile phones (74.8%). Most of the study population had been using smartphones for more than 2 years (66.3%), with internet packages (68.7%), intermittent Log-in status (61.8%) and spending 100-500 rupees a month on smartphone recharges [Table 2].

Table 2: Pattern of smartphone usage among medical students

	Gender		Total (n=246)
	Male (n=99)	Female (n=147)	
Current place of stay			
• Home	41(41.4%)	53(36.1%)	94(38.2%)
• Hostel/paying guest	58(58.6%)	94(63.9%)	152(61.8%)
Years of smartphone usage			
• <1yr	1(1%)	1(0.7%)	2(0.8%)
• 1-3yrs	50(50.5%)	90(61.2%)	140(56.9%)
• >3 to 5yrs	27(27.3%)	42(28.6%)	69(28%)
• >5yrs	20(20.2%)	14(9.5%)	34(13.8%)
Hours of smartphone usage per day			
• <3hr	17(17.2%)	40(27.2%)	57(23.2%)
• 3-5hr	59(59.6%)	86(58.5%)	145(58.9%)
• >5to10hrs	23(23.2%)	18(12.2%)	41(16.7%)
• >10hr	0(0%)	3(2%)	3(1.2%)
Cost of smartphone in rupees			
• <10k	17(17.2%)	16(10.9%)	33(13.4%)
• ≥10k-20k	45(45.5%)	73(49.7%)	118(48%)
• ≥20k-30k	13(13.1%)	20(13.6%)	33(13.4%)
• ≥30k-40k	13(13.1%)	10(6.8%)	23(9.3%)
• ≥40k	11(11.1%)	27(18.4%)	38(15.4%)
Mode			
• Wi-Fi/ broadband	5(5.1%)	4(2.7%)	9(3.7%)
• Internet package	67(67.7%)	102(69.4%)	169(68.7%)
• Both	27(27.3%)	41(27.9%)	68(27.6%)
Log-in status			
• Intermittent	54(54.5%)	98(66.7%)	152(61.8%)
• Continuous (always online)	44(44.4%)	48(32.7%)	92(37.4%)
Years of smartphone usage			
• <1yr	9(9.1%)	5(3.4%)	14(5.7%)

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	Gender		Total (n=246)
	Male (n=99)	Female (n=147)	
• 1-2yrs	29(29.3%)	40(27.2%)	69(28%)
• >2-4yrs	36(36.4%)	52(35.4%)	88(35.8%)
• >4yrs	25(25.3%)	50(34%)	75(30.5%)
Time spent on phone for academics in a day			
• <30mins	52(52.5%)	64(43.5%)	116(47.2%)
• 30mins-2hrs	37(37.4%)	75(51%)	112(45.5%)
• >2hrs-4hrs	9(9.1%)	7(4.8%)	16(6.5%)
• >4hrs	1(1%)	1(0.7%)	2(0.8%)
Money spent in Rupees per month			
• <100	20(20.2%)	21(14.3%)	41(16.7%)
• 100-500	69(69.7%)	119(81%)	188(76.4%)
• 501-1000	6(6.1%)	5(3.4%)	11(4.5%)
• >1000	4(4%)	1(0.7%)	5(2%)

There was a strongly significant and direct correlation between nomophobia and each domain of academic stress inventory which means academic stress and nomophobia are directly proportional to one another [Table 3].

Table 3: Pearson Correlation between Nomophobia and Academic Stress Inventory

variables	Nomophobia			Total	r value	P value
	Mild	Moderate	Severe			
ASI Teachers Stress	25.13±6.37	29.78±5.04	32.17±6.26	28.85±5.93	0.380	<0.001**
ASI Results Stress	15.67±4.79	16.90±4.17	18.04±5.46	16.70±4.49	0.389	0.062+
ASI Tests Stress	11.75±3.84	13.57±4.32	13.57±3.27	13.12±4.18	0.189	0.012*
ASI Studying in Group	12.84±3.95	15.57±4.00	15.91±4.28	14.93±4.18	0.168	<0.001**
ASI Peer Stress	10.64±2.96	12.27±3.03	12.52±3.76	11.89±3.16	0.280	0.001**
ASI Time-management Stress	8.03±3.03	9.96±2.80	10.52±3.17	9.54±3.01	0.259	<0.001**
ASI Self Inflicted	10.97±3.41	12.81±3.19	12.87±3.49	12.36±3.36	0.309	0.001**

+ Suggestive significance (P value: $0.05 < P < 0.10$)

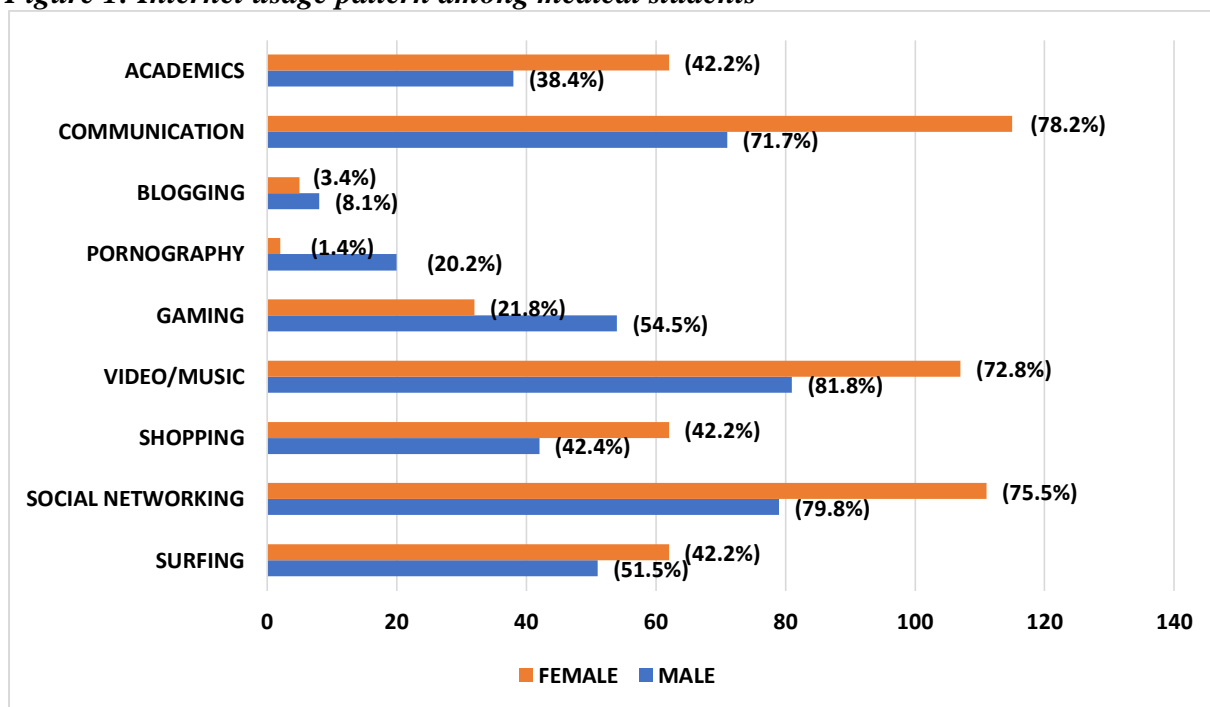
* Moderately significant (P value: $0.01 < P \leq 0.05$)

** Strongly significant (P value: $P \leq 0.01$)

When we look at the pattern of internet usage among the students we found students were using their smartphones for communication, videos/ music and social networking which is more prevalent among both male and female students. However, nearly 42.2% female students and 38.4% male students had responded use of smartphones for academics as well. (Figure: 1)

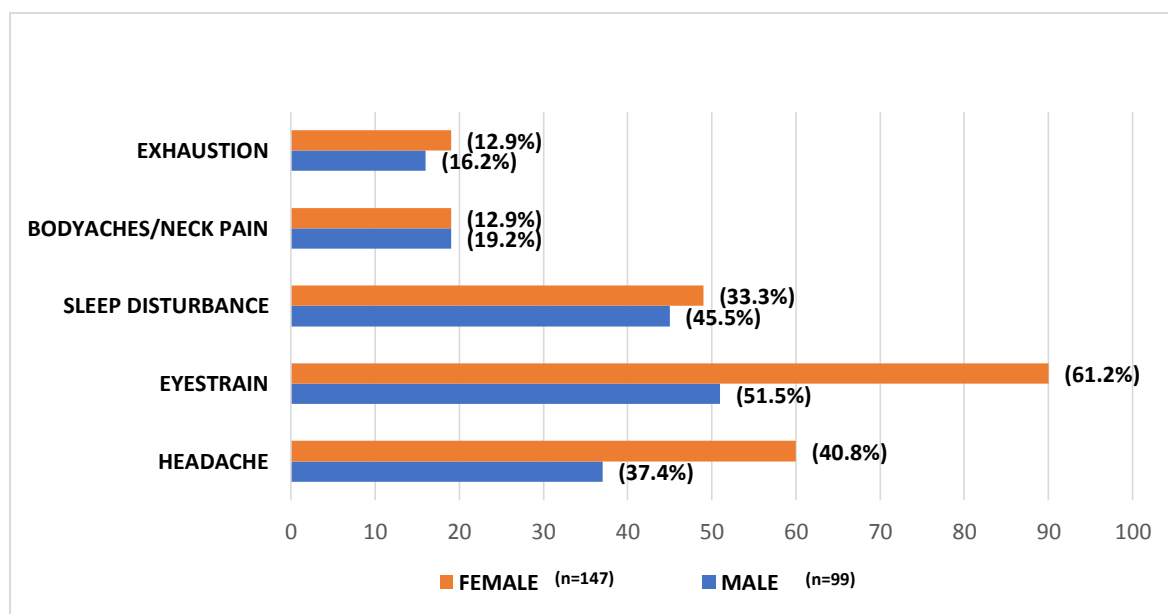
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Figure 1: Internet usage pattern among medical students



When we assessed the physical health related problems due to use of smartphones and most of the students had health hazard which was attributed to excess smartphone usage and among which eye strain and sleep disturbance were predominant concerns (Figure 2).

Figure 2: Health problems due to smartphone usage



DISCUSSION

Today's world has become difficult without smartphones that to with the availability of numerous mobile applications fostering the dependence pattern on smartphone later prompting addictive behaviors. In this current digital world most of the individuals especially young people spend more time on internet/smartphones. The present study group consists of

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246 medical students from both second and third year batch among which male students 40.2% (N=99) and female students 59.8% (n=147).

In this study population majority of the students had moderate levels (65.8%) of nomophobia which is slightly higher when compared to the studies done among students across various countries like 39.5% in India (Pavithra, Madhukumar, & Mahadeva, 2015), 37.2% in Poland, 68.8% in Belarus (Krajewska-Ku\lak et al., 2012) . Studies from various medical colleges have also reported a prevalence of nomophobia as 14.9% (Choudhury et al., 2019) & 18.5% (Dixit et al., 2010).

Infact, all the students in this study group were using smartphone which indicates mobile phones have become integral part in student's life. Almost all the students were using internet predominantly for social networking (77.2%), watching videos & listening music (76.4%), communication (75.6%), gaming (35%). Surprisingly, inspite of increasing use of smartphones for social networking sites, students also used for academics (40.7%) as well.

Studies on stress and academic performance have shown conflicting results, wherein a German study by Hahn et al., among preclinical students did not show any correlation between test anxiety and academic performance (Hahn, Kropp, Kirschstein, Rücker, & Müller-Hilke, 2017). A study by Wilkinson et al., among final year medical students did not show any association between anxiety, depression & stress with their academic performance (Wilkinson et al., 2016). A metaanalysis done by Lyndon et al., showed a positive correlation between stress/anxiety with impaired academic performance and more so among female medical students (Lyndon et al., 2014). Current study shows a statistically significant and strong association between smartphone usage and the academic stress among medical students, which indicates stress, academic performance and nomophobia are inter-related. A study by D'Souza et al (D'Souza, Manish, & Raj, 2018) found similar findings among university students wherein strong association was noted between internet addiction and academic stress with peer stress being predominant stress factor.

Most of the studies (Vyas, Stratton, & Soares, 2017) (Hill, Goicochea, & Merlo, 2018b) have reported higher levels of stress among female medical students due to academic pressure and relationship issues with friends and family members. However, studies have not found gender difference with respect to nomophobia which in par with current study findings (Pavithra et al., 2015) (Bianchi & Phillips, 2005).

Although, the use of smartphones has lot of benefits in terms of gathering information, social interaction, entertainment and relaxation (Elhai, Dvorak, Levine, & Hall, 2017) (Van Deursen, Bolle, Hegner, & Kommers, 2015) but it can also cause harmful effects like low academic performance & productivity (Duke & Montag, 2017), poor time management, sleep disturbances (Yogesh, Abha, & Priyanka, 2014) and psychological disturbances like anxiety and depression (Wolniewicz, Tihamiyu, Weeks, & Elhai, 2018) (Elhai, Levine, Dvorak, & Hall, 2016), provided it is of a problematic usage. In the current study although students reported the negative health consequences of smartphone usage however, eye strain and perceived sleep disturbance was marginally significant compared to any other physical conditions and the finding are similar to previous studies (Salama & Abou, 2004) (Thomé, Härenstam, & Hagberg, 2011) .An explanation for significant sleep disturbance could be the blue rays emitted from smartphones can interfere with sleep (Oh, Yoo, Park, & Do, 2015) and increasing work demands digitally connected can bring about a lot of stress among people (Derks-Theunissen & Bakker, 2014).

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Indeed the current study highlights the significance of academic stress and problematic mobile usage which is known as “Nomophobia” which is more prevalent among medical students. Hence, need for specific interventions which could help the students in handling the academic stress and better academic performance and for safety use of technology.

CONCLUSION

Smartphones have become an integral part of student’s life due to the constant developments in its softwares/applications, which has made life simple, convenient and interesting for students and has hence led to fostering of addictive behaviours. This study highlights the negative effect of this addictive behaviour on academic performance of the medical students. Hence there is a need to plan effective interventions and awareness programs to address the healthy and safety use of smartphones and effective management of stress among medical students at the initial stages of their career.

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Conflict of Interest

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