Smartphone Addiction Predictors And Subjective Health Problems Among Adolescent Boys In Technical College At Tirunelveli, South India

Shylaja .J, Annapoorani. M

Abstract: The study aims to assess smart phone addiction predictors and subjective health problems among adolescent boys. A cross sectional Institution based survey was conducted amongst 205 Technical students of FX Technical College, Tirunelveli, south India. A self-reported English questionnaire of Smartphone addiction scale short version for adolescents (SAS-SV) was used. Data were analyzed statistically by SPSS-16V. About 86.8% of students were being highly involved with their mobile phone. The major smartphone addiction predictor was frequency of mobile phone use (OR=0.43) times more likely to exhibit addiction and subjective health problems were head ache and eye burning (37%) back pain and neck pain (31%) that shown a small effect ($\omega2= 0.058$) and medium effect ($\omega2= 0.103$) among Smartphone users.

Index Terms: Adolescent boys, Smartphone predictors, subjective health problems, Smartphone addiction, Technical college.

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1. INTRODUCTION

The present student world handle technology in their finger tips using smart gadgets. The nearly universal Tavailability of smartphones in present cultures has created a new potential for widespread abuse of technology in ways that suggest addiction [1]. An excessive use leads to Smartphone addiction, which often start early in adolescence. The statistic shows the total number of mobile phone users worldwide is expected to pass the five billion mark by 2019 [2]. Among the general population, students are especially sensitive to social media and smart phones because of their pervasiveness. Smart phone multitasking is widely considered to be a major source of distraction in academic performance. While a Smartphone, tablet, or computer can be a hugely productive tool, compulsive use of these devices can interfere with work, school, and relationships. Smartphone addiction, sometimes colloquially known as "nomophobia" (fear of being without a mobile phone), is often fuelled by an Internet overuse problem or Internet addiction disorder [3]. In India, the study reveals that about 19.4% of males and 11.1% of female medical students had high mobile dependence [4]. "Problematic Mobile phone use" (dependency) at bedtime was associated with shorter sleep duration and lower sleep quality with several negative outcomes [5]. Headache and lethargy were the commonest side effects of nomophobia experienced by

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- *SHYLAJA. J, MSN. Lecturer, Nursing Department, College Of Applied Science, Muhayil Branch, King Khalid University, Saudi Arabia, PH-+966538846208. E-mail: shylasharon@ymail.com*

- *ANNAPOORANI. M , MSN. Lecturer, Nursing Department, College Of Applied Science, Al Namas Branch, University of Bisha, Saudi Arabia,*
  E-mail: anitha.siron@gmail.com

61% of students [6].
Insomnia was revealed as the most common (23.6 %) health complaint related to smartphone use [7]. Textaphrenia: An emerging silent pandemic [8]. It is defined as a "disease of text messages or addiction to text messages [9].
Physical and psychological problems have reportedly resulted from cell-phone abuse, including rigidity and muscle pain, ocular afflictions (Computer Vision Syndrome), auditory and tactile illusions – the sensation of having heard a ring or felt a vibration of a cell phone, pain and weakness in the thumbs and wrists leading to an increased number of cases of de Quervain's tenosynovitis [10] , [11].
In the light of above mentioned smart phone related problems, the present study focused on Smartphone addiction and its associations with different predictors of Smartphone use, and health problems-related variables among adolescent boys.

SUBJECTS AND METHODS

An observational, cross-sectional Institution based survey involved in FX Polytechnic College, Tirunelveli, South India. This private college situated almost 14 km outskirts of city and comprised about 800 male students only. The study subjects 205 adolescent boys from final year students having mobile phone were enrolled by convenient sampling. Unwilling students and those not owning smartphone were excluded from the study. A self-reported English questionnaire comprising background characteristics of participants, Smartphone usage, and Smartphone addiction scale short version for adolescents (SAS-SV) was used. The SAS –SV is a validated scale specifically developed by Kwon S et,al. [12] in 2013 that contains 10 items rated on a dimensional scale (1 strongly disagree to 6 strongly agree). Based on SAS score cut off for male, (>=31) score is considered as addiction and (<=30) is non- addiction. Permission from respective college authorities was obtained. The students were approached personally with the help of college representative on class section basis. Informed consent was taken from each participant after explaining the purpose of study. The participants were

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asked to fill up the questionnaire on the spot. Binary logistic regression was used for comparison of predictors of smartphone addiction among two groups of students based on their addiction score. Dependent variables were "addiction" or "non- addiction," dichotomous in nature, where "addiction" = 1; "non- addiction" = 0. Smartphone addiction related predictors were age, place of stay, Frequency of mobile use per day, Most personal relevance of Mobile function, Travelling distance per day and Total hours spent on Mobile per day. ANOVA was calculated to assess the degree of association between Smartphone addiction score and related health problems. In addition Omega square (ω2) computed to check the effect size of presenting health Problems such as head ache and eye burning, sleeplessness, back pain and neck pain, visual disturbance with corrective lens and over sized body built. The effect size for (ω2) Omega squared 0.01= small, 0.06 = medium and 0.14 = large is considered [13]. Statistical Package for the Social Sciences (SPSS) version 16 was used in all the analysis. P <   0.05   was   considered   statistically significant.

RESULTS

The findings are presented in the form of tables and diagrams under the following series:

◆ Distribution of Adolescent boys based on Smartphone addiction level:
Fig:1 shows that the majority 86. 8 % of adolescent boys were of addiction group and the remaining 13.1 % were found to be in non addiction group.

◆ Smart phone predictors based on addiction and non addiction group adolescent boys
Most of the adolescent boys who had addiction belong to age category of 17- 20 years (81.5%) and only few of them (4%) were staying with relations. About Frequency of mobile usage per day is 17.6 % of boys almost using every minute and 11.7 % of them were using every hour in addiction group. The majority (39%) were handling Smartphone more than 4 hours a day and only 16.1% were handling for less than an hour per day in addiction group. Concerning most relevance of mobile functions were found in addiction group such as Gaming (19.5%), Chatting (22.9%), watching videos (16.1%), and listening music (13.2%) the least (1.5%) for reading purpose. Among addiction group, 54.2 % of the Adolescent boys were travelling daily nearly 20 km and more than 30 km per day to attend college. (Table 1)

● Regression analysis of Smart phone predictors among addiction group adolescent boys
In logistic regression model, dependent variable was the presence of Smartphone addiction – addiction (1)/non addiction (0). Binary logistic regression was performed to ascertain the effects of age, Place of stay, travelling distance per day, Most Personal Relevance of mobile functions, Frequency of mobile usage per day and total hours spent on mobile phone on the likelihood that participants have smartphone addiction. This model was a good fit as

evident from the non significant Hosmer-Lemeshow value (P = 0.407). The logistic regression model was statistically significant, χ2(6) 22.97, p<0.005). The model explained 21.3% (Nagelkerke R2) of the variance in smartphone addiction and overall, model correctly classified 87.5% of cases. (Table: 2)
From these results that age (p = 0.701), Place of stay (p = 0.092), Travelling distance per day (p = 0.665), total hours spent on mobile phone (p = 0.913), and Most Personal Relevance of mobile functions (p = 0.524) did not add significantly to the model/ prediction, but Frequency of mobile usage per day (p = 0.001) added significantly to the model. Thus the frequency of mobile usage per day was 0.43 (Odds ratio) times more likely to exhibit smartphone addiction among adolescent boys. (Table: 3)

◆ Smartphone addiction related subjective Health Problems among Adolescent boys
Fig: 2 infers that Adolescents boys were found with the following considerable health problems such as Head ache and Eye burning (37%) back pain and neck pain (31%) and Sleeplessness (23.3%).

◆ Degree of association between Smartphone addiction score and Related subjective Health Problems
The result of the study showed a clear association between addiction to smartphone use and presenting health Problems as determined by one-way ANOVA such as Head ache and Eye burning (F=5.161, p=0.002), Back pain and Neck pain (F= 12.88, p=0.00) were statistically significant. Although most of the students go through a number of problems simultaneously, but only above two health problems among smartphone users might be related to mobile phone overuse. An Omega square (ω2) revealed that the presenting problems was statistically significant, Thus the effect size for the health problems: Head ache and Eye burning shown a small effect (ω2= 0.058), Back pain and Neck pain shown a medium effect (ω2= 0.103) among Smartphone users. (Table: 4)

4.   FIGURES AND TABLES

Figure 1: Smart phone addiction among Adolescent boys

Table :1 Smart phone predictors based on addiction and non addiction adolescent boys (N=205)

Predictors		Addiction	Non Addiction
Age category	17- 20 years	81.5%	13.2%
	21 years and older	5.4%	11.7%
Place of stay (Living with)	Parent	73.2%	9.3%
	Single parent	4.9%	1.5%
	Hostel	6.3%	2.0%
	Relations	2.0%	0.5%
Frequency of mobile use per day	every 1 minute	17.6%	0.5%
	every 5 minutes	14.6%	1.0%
	every 15 minutes	20.0%	1.0%
	every 30 minutes	21.0%	2.9%
	every hour	11.7%	6.8%
Total hours spent on Mobile per day	Less than 1 hour	16.1%	4.4%
	1-2 hours	18.0%	2.9%
	3-4 hours	11.7%	1.5%
	More than 4 hours	39.0%	3.4%
Most personal relevance of Mobile function	Gaming	19.5%	3.9%
	Chatting	22.9%	0%
	Phoning	11.7%	2.0%
	watching videos	16.1%	1.5%
	Listening music	13.2%	3.4%
	Reading	1.5%	2.4%
Travelling distance per day	Less than 10 km	10.7%	2.0%
	10-20 km	19.5%	3.4%
	20 -30 km	16.6%	1.0%
	More than 30Km	37.6%	6.3%

Table 2 : Logistic Regression model fitness statistics:

Measure	Value	Acceptable level
Nagelkerke R2 (Variance)	0.213	0 - 1
Hosmer and Lemeshow Test (model fit)	0.407	> 0.05
Model Prediction level	87.5 %	0.5 cut value
Omnibus Tests of Model Coefficients (Model Prediction significance)	(χ2=22.972, df=6, p<0.001)	<0.05

χ2= Chi square; df= degree of freedom

Table: 3 Regression Analysis predicting Smartphone addiction among addiction group adolescent boys

Smartphone Predictors	P value	OR (CI)
Total hours spent on Mobile per day	0.913	0.978 (.654 - 1.461)
Frequency of mobile usage per day	*0.001	0.433 (0.267 -0.704)
Most Personal Relevance of mobile functions	0.524	0.905 (0.665 – 1.232)
Travelling distance per day	0.665	1.101 (0.713– 1.699)
Place of stay (Living with)	0.092	0.712 (0.479– 1.057)
Age category	0.701	0.738 (0.157 - 3.471)

OR= Odds Ratio; CI = Confidence Interval; *Significant

Figure:2 Smartphone addiction related subjective Health Problems among Adolescent boys

- Over sized body built — 10.80%
- Visual difficulty with corrective lens — 6.30%
- Back pain and Neck pain — 31%
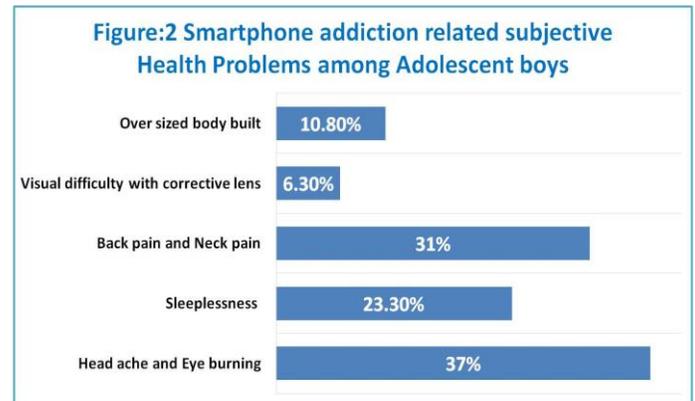- Sleeplessness — 23.30%
- Head ache and Eye burning — 37%

Table: 4 Degree of association between Smartphone addiction score and Related subjective health Problems (N=205)

Univariate Analysis of Variance	$F_{(df)}$	Significance (P value)	Omega square ($\omega 2$)	Effect size
Head ache and Eye burning	*$5.161_{(3)}$	0.002	0.058	Small
Sleeplessness	$2.786_{(3)}$	0.064	0.017	Nil
Back pain and Neck pain	*$12.88_{(3)}$	0.000	0.103	Medium
Visual disturbance with corrective lens	$0.43_{(1)}$	0.836	- 0.005	Nil
Over sized body built	$2.94_{(3)}$	0.830	- 0.015	Nil

df= degree of freedom. *Significant

5 DISCUSSION

● **Overall smart phone addiction**

Smartphone addiction is more prevalent in younger adolescents 86.8% [Fig: 1]. The prevalence of smart phone addiction was found in (17- 20 years) 81.5% and in (21 years and older) 5.4% [Table: 1]. The findings by Severin Haug. et,al. [17] support the present findings that smartphone addiction was more prevalent in young adolescents (15–16 years) compared with young adults (19 years and older).

● **Smart phone predictors distribution based on addiction and non addiction adolescent boys**

Recent work by Dasgupta, et, al. [14] concluded the similar findings that majority of students in both groups used their smartphones for talking and texting followed by gaming, music or for killing time and checking mail or social media. Texting and calling were reported the major use of smartphone in studies by Pavithra et al. [15]. In the present study subjects belong to addiction group were using smart phones for primarily Chatting, Gaming, watching videos and listening music.

● **Regression analysis of Smart phone predictors among addiction group adolescent boys**

Regression analysis for smartphone addiction predictor was mobile usage frequency per day (p = 0.001, OR= 0.433). Dixit et al [16] found similar that junior engineering students showed higher odds of NMP probably due to higher proportion of nomophobics staying in hostel and utilizing smartphone in talking or texting family. Severin Haug. et,al also concluded that

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smartphone addiction to be more strongly associated with use frequency than duration among young people [17].

● **Smartphone addiction related subjective health problems**

Head ache and Eye burning (37%); Back pain and Neck pain (31%) and sleeplessness (23.3%) were the commonest health problems that were experienced by adolescents' boys, which might be because of overuse of mobile phones [Fig: 2 and Table: 6]. In a study, the scenario of subjective symptoms of Headache and lethargy (61%) by Sharma, et.al [6] and the neck disability by Alabdulwahab. et.al and Annapoorani et.al [18], [19] among smartphone and digital users was similar.

6 CONCLUSION

In conclusion, smartphone addiction could be due to frequency of smart phone use and cause significant head ache and eye burning, back pain and neck pain associated with their use. Individuals should make an effort to reduce the amount of time spent using a Smartphone.

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