

Assessment of Smart Phone Usage on Stress and Associated Day Time Sleepiness in College Students - A Prospective Cohort Study

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1. Introduction

Mobile or cell phones are now a day's an integral part of modern telecommunications in every individual life. As billions of people use mobile phones globally, a small increase in the incidence of adverse effects on health could have major public health implications on long term basis. Besides the number of cell phone calls per day, the length of each call and the amount of time people use cell phones are important factors which enhance the health related risk. Because of the quick development and widespread use of mobile phones, and their vast effect on communication and interactions, it is important to study possible negative health effects of mobile phone exposure. Mobile phone use is near ubiquitous in teenagers. Paralleling the rise in mobile phone use is an equally rapid decline in the amount of time teenagers are spending asleep at night.

Smart phone is intelligent mobile phone with computer supporting function. But if it is used excessively, it can cause changes of daily life of its owner, directly affecting her health and sleep patterns. Sleep, taking up 1/3 of human lifetime, is essential in our survival. It is known that sleep allows humans to do physiological and emotional recharge, and that sleep before learning something plays an important role to store what is learned in brain. It was reported that quality of sleep is related with life quality of students such as efficacy, mental health, stability, physical health, activity, etc. So sleep is a very important element for student's life.

Excessive use of mobile phones is known to be associated with headache, ear ache, warmth sensations and also perceived concentration difficulties. There are also various studies which have showed that majority of mobile users suffer from sleep deprivation and increased stress affecting their cognitive and learning abilities. Hence this study was attempted with an aim to investigate whether there are association between psychosocial aspects of mobile phone use and mental health symptoms of depression and daytime sleepiness in a prospective cohort of students.

2. Methodology

The present study was a Prospective Cohort study to assess the smartphone usage on stress and associated day time sleepiness in college students and was conducted over a period between August 2018- March 2019. Cross sectional design has been used for this study. The study was conducted at Department of Medical Physiology, Little Flower Institute of Medical Science and Research,

Angamaly. The study population consist of a cohort of students, 18-25 years old is screened based on the extend of mobile phone usage using questionnaire. Whoever give consent to participate were included, so that finally constituted the sample size. Calculated minimum sample size using the formula.

$$N = 4 PQ/D^2$$

N= Sample size, P-Prevalence of previous study

Q- 1-P, D- 20% of Prevalence.

Minimum sample of 300 is obtained using this formula.

The present study was conducted among students of age 18 to 25 years old. At first, study group responded to a questionnaire. Mobile phone exposure variables included frequency of use, but also more qualitative variables:- demands on availability, perceived stressfulness of accessibility, being awakened at night by the mobile phone, and personal overuse of mobile phone. Mental health outcomes included current stress. Prevalence ratios (PRs) were calculated for cross- sectional and prospective association between exposure variables and mental health outcomes for girls and boys separately.

A questionnaire containing an Epworth Sleepiness Scale (ESS) modified for use in students and questions about qualitative and quantitative use of mobile phone is completed by students.

Inclusion Criteria

- Students aged between 18-25 and were using mobile on a regular basis.
- Willing participants.

Exclusion Criteria

Students reporting mental health symptoms

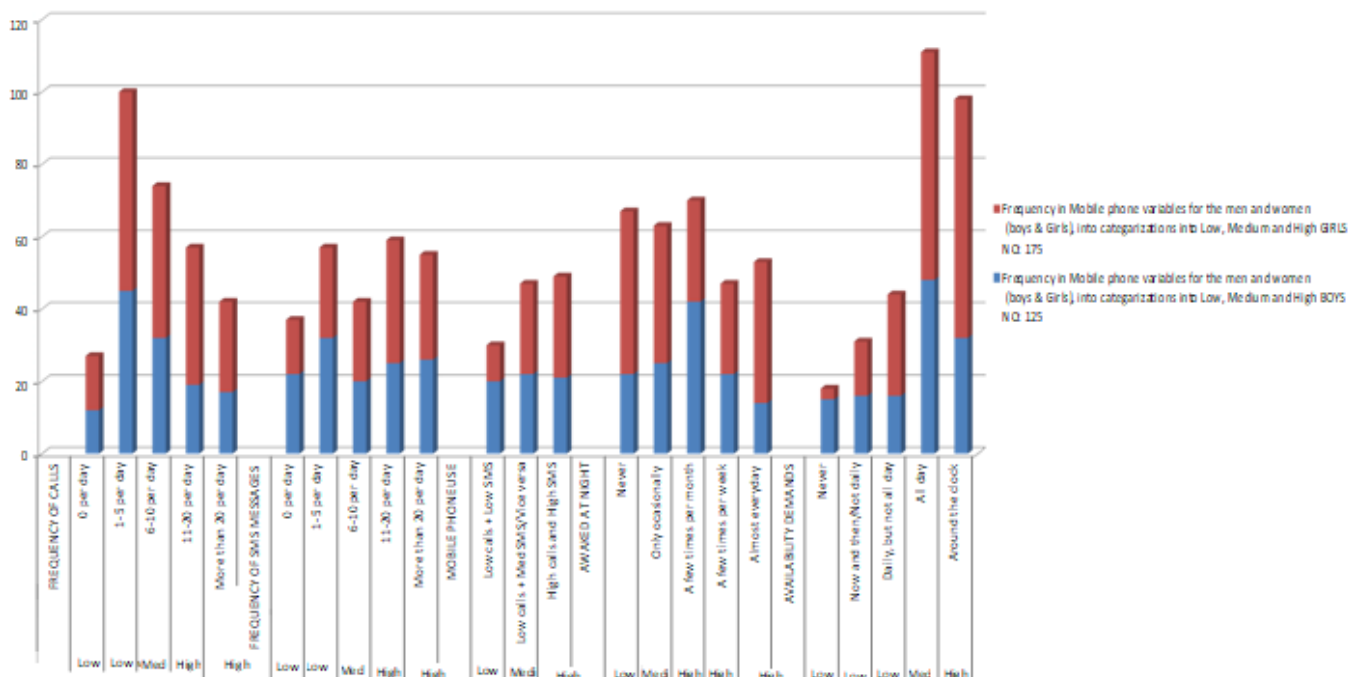
Statistical Analysis

Data collected was entered in Excel and analysed by statistical software package SPSS, version 19. Spearman correlation analysis was done to examine associations between the mobile phone exposure variables, and between mobile phone use and social support.

3. Results

A total of 300 students, including boys and girls were take part in these study, between the age group 18 to 25 years old.

Frequency in Mobile phone variables for the men and women (boys & Girls), into categorizations into Low, Medium and High			
CATEGORY	MOBILE PHONE VARIABLES	BOYS NO: 125	GIRLS NO: 175
FREQUENCY OF CALLS			
Low	0 per day	12	15
Low	1-5 per day	45	55
Medium	6-10 per day	32	42
High	11-20 per day	19	38
High	More than 20 per day	17	25
FREQUENCY OF SMS MESSAGES			
Low	0 per day	22	15
Low	1-5 per day	32	25
Medium	6-10 per day	20	22
High	11-20 per day	25	34
High	More than 20 per day	26	29
MOBILE PHONE USE			
Low	Low calls + Low SMS	20	10
Medium	Low calls + Med SMS/Vice versa	22	25
High	High calls and High SMS	21	28
AWAKED AT NIGHT			
Low	Never	22	45
Medium	Only occasionally	25	38
High	A few times per month	42	28
High	A few times per week	22	25
High	Almost everyday	14	39
AVAILABILITY DEMANDS			
Low	Never	15	3
Low	Now and then/Not daily	16	15
Low	Daily, but not all day	16	28
Medium	All day	48	63
High	Around the clock	32	66



Considering frequency of calls 1-5 calls per day was more among boys and girls. Among which girls had more frequency of calls (55) when compared to boys (45).

Considering frequency of messages more girls (34) had 11-20 per day whereas more boys had 1-5 per day (32).

Most of the boys had medium mobile phone use whereas most of the girls had high usage.

Most girls stayed a few times awake at night(42) whereas most boys never was awake at night (45).

While considering availability demands most boys had medium score whereas girls had high score.

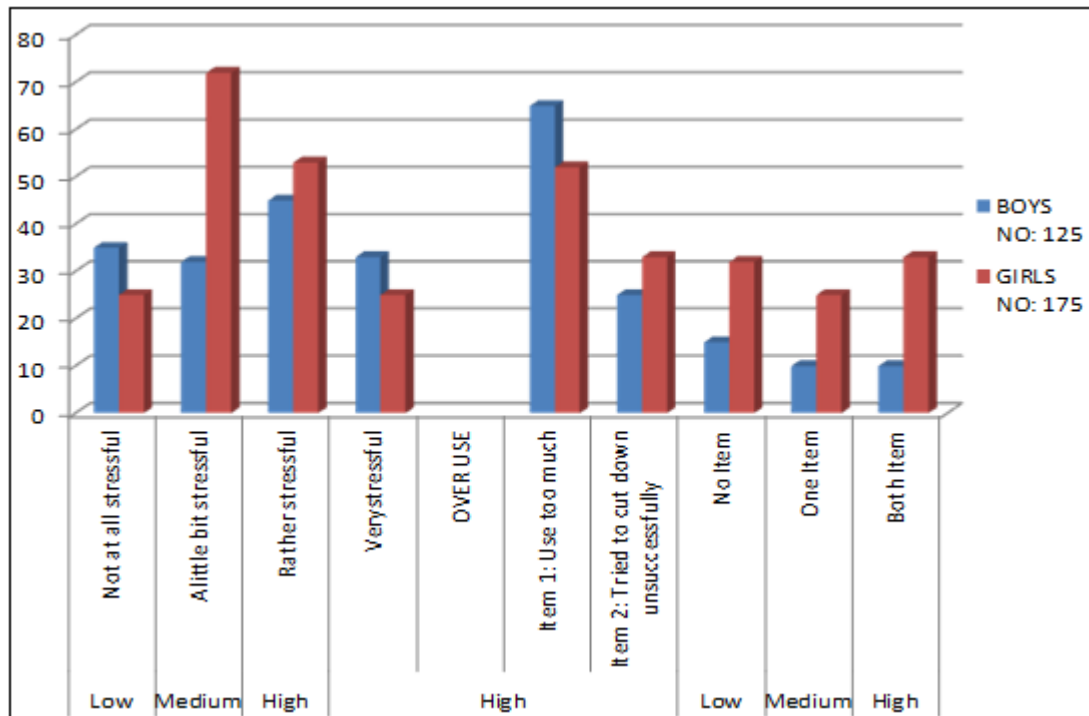
Category	Accessibility Stress	Boys NO: 125	Girls NO: 175
Low	Not at all stressful	35	25
Medium	A little bit stressful	32	72
High	Rather stressful	45	53
High	Very stressful	33	25
Over Use			
	Item 1: Use too much	65	52
	Item 1:	25	33
Low	No Item	15	32
Medium	One Item	10	25
High	Both Item	10	33

Day Time Sleepness

Epworth Sleeping Scale

12 to 18 Questions (Questionnaire)

ESS Score	Girls	Boys
10	25	20
16	45	25
20	52	65
24	24	15



Considering accessibility rates most girls (72) were a bit stressful and most boys (45) were rather stressful.

Both girls and boys said they used phone too much.

Considering daytime sleepiness most girls had ESS score 24(53) whereas most boys had ESS score 20(65).

So concluding girls had more frequency of mobile phone usage when compared to boys.

4. Discussion

In this study the average use of mobile phone was 7 hours per day which was lesser than study done by Abhishek et al. in which average daily use was 6 hours and they were using mainly for social networking, followed by playing games, listening to music and for academic purpose. Majority of them in our study regularly used smartphone at late night which was similar to all other studies^{5,9,11}. Another study by Anju et al, explored nearly 72% of were using the cell phone for less than 2 hours in a day and very few of them were aware of the protective measures. In our study there was significant association between increased mobile phone usage on stress and associated day time sleepiness. These finding was supported by a study of Gupta al, where it was revealed that 76.4% students were using smartphones in night time. They also found an association of night time phone usage and time spent on mobile phones with decline in study habits, difficulty in concentration, increase in missed classes, and going late for classes¹¹. Deepali et al showed that there was a significant relationship between increased mobile phone usage and stress among 1st year medical students. In our study also we find an association of mobile usage with stress. In some other studies few students felt lack of concentration during study hours due to urge for using phones very often^{5,11}. A study by Rupani et al, showed 38.7% of students feel distressed by thought of being

without their mobile phone and 35.9% often were able to reduce their mobile phone use¹². In our study increased stress level and poor sleep quality had significant co-relation with daytime sleepiness and poor academic performance. Also it was evident that girls were a bit stressful and when comparing with ESS scores, girls had felt more day time sleepiness. From our study it was find that college students had become addictive towards the mobile phone usage despite development of health problems.

Our study was conducted among 300 students. However results of this study add to the existing evidence

5. Conclusion

The study perceived that mobile phone use during normal sleeping hours may cause stress and contribute to day time sleepiness in college students. It was evident that girls had more frequency of mobile usage when compared to boys. Also the study revealed that there were prospective association between mobile phone use on stress and daytime sleepiness. Also girls were a bit stressful than boys. It is possible that limiting smart phone usage during normal sleeping hours might help in alleviating some degree of daytime sleepiness.

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