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Gadget usage pattern and sleep quality among medical undergraduates during COVID-19 lockdown: a cross-sectional study

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ABSTRACT

Background: The afoot COVID-19 pandemic has covered approximately every edge of the world. Schools and colleges are temporarily shut leading to children being indoors. Thus, gadgets have become an inseparable part of life and govern the daily routine of an individual. The aim of the study was to assess the pattern of gadget usage and sleep quality among medical undergraduates during COVID-19 lockdown.

Methods: Present cross-sectional study was conducted amongst 149 medical undergraduates of Shri Vasantrao Naik Govt. Medical College, Yavatmal. Their gadget usage pattern and sleep quality before and during lockdown were measured using a predesigned and pretested questionnaire based on Smartphone addiction scale-short version (SAS-SV) and Pittsburgh sleep quality index (PSQI), administered via the Google forms platform.

Results: 139 (93.28%) responses were completely and correctly filled. Smartphone addiction was seen in 71 (51.08%) study subjects. The mean sleep duration before and during lockdown had no significant changes. There was linear positive correlation between SAS-SV score and PSQI score, but the correlation was not statistically significant.

Conclusions: The proportion of smartphone addiction amongst medical undergraduates is significantly high and the mean sleep duration is reduced during lockdown.

Keywords: COVID-19, Lockdown, Gadget use, Sleep, Medical undergraduates

INTRODUCTION

The afoot COVID-19 pandemic has covered approximately every edge of the world. China and Italy have been one of the hardest hit, while countries like United States of America and United Kingdom are suffering arduous load on healthcare facility. Diagnosing its first case on 30 January 2020, India too joined in the comprehensive holocaust. Subsequently progressive rise in cases was seen, though they rose remarkably in concluding days of March. Thus, to control community transmission, nationwide lockdown was declared by Indian government from 25th March 2020.¹

The lockdown is not only affecting the adults but also the youngsters equally. Schools and colleges are temporarily shut leading to children being indoors. As Government

Medical colleges are the prime settings for treatment of COVID-19 affected patients, medical undergraduates are too sent home. This paves way to creation of an ideal condition to involve in recreational activities like watching TV sets and engrossing oneself in online activities.² The simplest and handy gadget is the smartphone which helps in accessing these features. Thus, in the current global scenario, smartphones have become an inseparable part of life and govern the daily routine of an individual.³ Studies in medical students in Jammu and Kashmir, Delhi, and Maharashtra have found a high prevalence of smartphone addiction, ranging from 34% to 40%. 4-7 According to the WHO, this increase in use is associated not only with clear and tremendous benefits to the users and societies, but also with documented cases of excessive use which often have negative health consequences. Thus, gaming disorder was introduced as a new condition in the 11th revision of the

International Classification of Diseases (ICD-11) which includes health concerns like insufficient physical activity, unhealthy diet, problems with eyesight or hearing, musculoskeletal problems, sleep deprivation, and associated health conditions such as depression and venous thromboembolism.⁸ As per Centre for Disease Control (CDC) 2012, normally an adolescent requires 8.5-10 hours of sleep. Both quality and quantity of sleep matters but, unfortunately, this smartphone overuse plays a pivotal role in decreasing the number of quality sleep hours among adolescents.⁹

Looking forth the lockdown period, research studies are required to collect data of its impact to tackle the rise of unconventional disorders. This will help in providing timely support and intervention. Therefore, the present study aims to compare screen time of gadgets before and during lockdown, prevalence of smartphone addiction using SAS-SV scale, to study quality of sleep during lockdown (using PSQI) and to see if any relation is present between gadget usage and quality of sleep.

METHODS

The present cross-sectional study was conducted during two-month time span of April 2020-May 2020 of COVID-19 lockdown at tertiary care hospital Shri Vasantrao Naik Government Medical College, Yavatmal. However, actual data collection was done from 28th April 2020 to 30th April 2020. Approval from Institutional Ethics Committee (IEC) was taken. Due permission was sought from Professor and Head, Dept. of Community Medicine.

All the medical undergraduates of 2018 batch studying in Shri Vasantrao Naik Government Medical College constituted the study population. Those who owned gadgets like smartphone, laptop, smart TV, kindle, tablet, iPad or any one of them were included in the study. While those who refused to give the consent or who had incompletely or incorrectly filled the questionnaire were excluded. A structured questionnaire was prepared using validated scales and few questions pertaining to sociodemographic data and general information were added. Most of the questions required selection of the most appropriate response. It comprised of- (a) General information questions and socio-demographic variableslike age, gender, gadgets you own, total time spent on gadgets per day before and during lockdown, bedtime, wake time etc. were added to assess the correlates of gadget usage and sleep quality-before and during lockdown; (b) Smartphone addiction scale-short version (SAS-SV)- It was a 10 question self-administered scale which aids in screening smartphone addiction. The questions are self-administered by the study subjects and scored in a six-point Likert scale with a maximum and minimum score of 60 and 10 respectively. The cut-off value, as of provided by SAS-SV is 31 for boys and 33 for girls; (c) Pittsburgh sleep quality index (PSQI)- It was a self-administered scale of 19 questions which relates to previous months' sleep pattern. PSQI measures the quality of sleep through 7 different components namely: C1-subjective sleep quality, C2- sleep quality, C3- sleep duration, C4- habitual sleep efficiency, C5- sleep disturbances, C6- use of sleep medication, C7- daytime dysfunction. Sum of all these components gives a global PSQI score which has a minimum score of zero and a maximum score of 21. Impaired sleep is denoted by a cut-off value of 5. ¹⁰⁻¹²

To prevent any breach of confidentiality, name or E-mail address or any other question which could reveal identity of the subject, was not included in the questionnaire. Setting was done in the Google form so that no study subject could fill the form again. Data collection was done through the questionnaire which was administered via the Google forms platform. Contacts of all the study subjects were taken from the official 2018 batch group on WhatsApp messenger. The link to the questionnaire was sent personally to every study subject through WhatsApp messenger by the principle investigator. The link was accompanied by the notice of information which consisted of the details of the study, it's purpose and where the responses will be used. Also, the message contained a note on voluntary participation and confidentiality of data. Although opening the link meant the study subject was willing to take part, a well-informed consent was taken prior to the filling of questionnaire. The study subject had to self-administer the questionnaire. It was clearly stated to contact the primary investigator if they had any doubt or problem in filling it. It took less than 10 minutes to completely fill it. All the participants were asked to send a message to the principle investigator once they had successfully submitted the responses to the questionnaire.

The data collected through the Google forms was manually entered in excel sheet. Descriptive data was presented as numbers and percentages. Mean±SD sleep hours was calculated. Students t test was used for statistically significant difference. Mean scores from SAS-SV scale and PSQI scale was compared using correlation coefficient. P value less than 0.05 was considered statistically significant.

RESULTS

Demographics of the study sample

A total of 149 study subjects were approached to fill the questionnaire, of which one couldn't be contacted due to unavoidable circumstances. A total of 144 responses were received in a time span of two days of which, 139 (93.28%) responses were completely and correctly filled which constituted the study population. The mean age was found to be 20.14±0.91 (18-22) years. Of the sample 77 (55.39%) comprised females (Figure 1).

Gadget usage

Of the study sample, 139 (100%) owned smartphones, while only a meagre- 7.91% had their own smartwatch

(Table 1). The mean time spent on gadgets before lockdown was 3.79 ± 1.79 hrs which raised significantly to 7.70 ± 3.17 hrs during lockdown (Table 2). The mean time spent on smartphone was found to be the maximum while the usage of smartwatch the least (Table 3). It was seen that the majority of time spent on a gadget was for social media followed closely by using it for watching videos/web series while gadgets were least preferred for reading e-books (Table 4).

Smartphone usage and addiction

In the study sample, the total SAS-SV score ranged from 13-53 with an average score of 32.12±8.58. Smartphone addiction was seen in 71 (51.08%) study subjects- 34 (24.46%) females and 37 (26.62%) males. Table 5 shows gender-wise distribution of smartphone addiction among medical students using global PSQI score. Smartphone addiction was significantly higher among males (p value=0.034).

Sleep quality

In the study sample, the mean sleep duration before and during lockdown had no significant changes. Study subjects managed good sleeping hours even in the presence of pandemic. The mean sleep duration before and during lockdown is shown Table 6. In the study population, the global PSQI score ranged from 0 to 12 with a mean score of 4.60±2.43. Of the 139, 64 (46.04%) study subjects had impaired sleep wherein 32 (23.02%) were females (Figure 2). The cut-off value for impaired sleep was 5. Figure 3 shows there was linear positive correlation between SAS-SV score and PSQI score, but the correlation is not statistically significant.

Smartphone usage and sleep quality

No significant relation was seen between individual components of PSQI with smartphone addicts and non-addicts (Table 7).

Table 1: Distribution of study subjects by gadgets in their possession (N=139).

Gadget	Number	Percentage (%)
Smartphone	139	100
Laptop	46	33.09
Smart TV	55	39.96
Tablet/iPad/Kindle	12	8.63
Gaming console	9	6.47
Smart watch	11	7.91

Table 2: Mean time spent on gadgets before and during lockdown (N=139).

Mean time (hrs)±SI	(range)	P value*
Before lockdown	3.79±1.79 (0-10)	۰۵.01
During lockdown	7.70±3.17 (1-17)	- <0.01

^{*}t-test

Table 3: Mean time spent on each gadget (N=139).

Gadget	Time±SD (range)
Smartphone	5.63±2.54 (0.67-13)
Laptop	0.71±1.33 (0-8)
Smart TV	1.07±1.47 (0-8)
Tablet/iPad/Kindle	0.09±0.36 (0-2)
Gaming console	0.32±0.96 (0-8)
Smart watch	0.03±0.20 (0-2)

Table 4: Distribution of study subjects as per the use of these gadgets (N=139).

Used for	Number	Percentage (%)
Social media	125	89.92
Texting/calling	119	85.61
Videos/web series	121	87.05
TV shows	79	56.83
Educational videos	101	72.66
Gaming	75	53.95
News	92	66.18
Kindle/e-books	26	18.70

Table 5: Smartphone addiction among medical students using global PSQI score by gender.

Smartphone addiction*			Total
Gender	Present (%)	Absent (%)	Total
Female	34 (24.46)	43 (30.93)	77
Male	37 (26.62)	25 (17.98)	62
Total	71	68	139

Note: By Chi square, p value=0.034

*The cut-off value for smartphone addiction as provided by SAS-SV is 31 for boys and 33 for girls.

Table 6: Mean sleep duration before and during lockdown.

Mean time (hrs)±SD (range)		P value
Before lockdown	7.66±1.24 (4-13)	0.3629
During lockdown	7.80 ± 1.32 (2.5-12)	

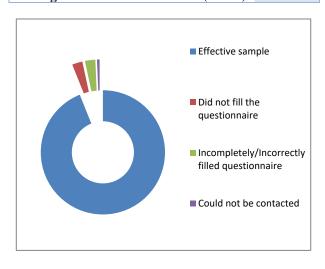


Figure 1: Enrolment of study population.

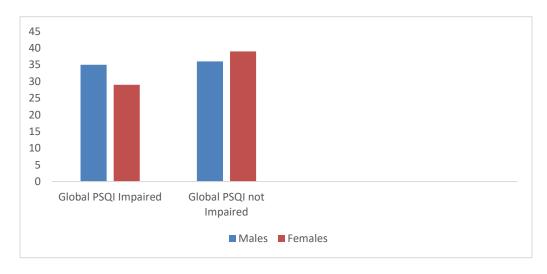


Figure 2: Impaired and non-impaired sleep among study subjects according to gender.

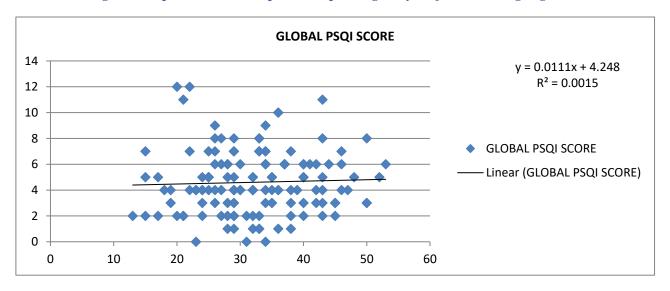


Figure 3: Correlation between global PSQI Score and SAS-SV score.

Table 7: Smartphone use and PSQI component score related differences in groups of smartphone addicts and non-addicts.

Components	Overall score mean±SD	Smartphone	Smartphone		
	Overall score mean±SD	Addicts	Non-addicts	P value	
C1- subjective sleep quality	0.79 ± 0.61	0.83 ± 0.53	0.75 ± 0.67	0.270	
C2- sleep latency	1.20±1.04	1.15±0.98	1.25±1.09	0.421	
C3- sleep duration	0.49 ± 0.75	0.54 ± 0.81	0.44 ± 0.68	0.265	
C4- habitual sleep efficiency	0.14 ± 0.46	0.15 ± 0.44	0.13 ± 0.49	0.720	
C5- sleep disturbances	1.01±0.58	1.03 ± 0.58	0.96 ± 0.60	0.323	
C6- use of sleep medication	0.12±0.36	0.11±0.39	0.12 ± 0.32	0.815	
C7- daytime dysfunction	0.86 ± 0.62	0.86 ± 0.64	0.87 ± 0.59	0.892	
Global PSQI score	4.60±2.43	4.68±2.39	4.53±2.48	0.608	

DISCUSSION

Strict implementation of lockdown eventually lead to restrictions of movement in everyday life. It meant loss of daily routine, loss of social life, reduced exposure to sun, reduced physical activity, as well as changes in living conditions- ultimately increasing the screen time of

gadgets. Through this cross-sectional study we investigated the effect of Indian restriction methods on medical undergraduate student's gadget usage pattern and sleep quality. In the present study, 100% study subjects had their own smartphone, this finding is similar to study of Tamura et al where 98.6% participants had their own cell phones. ¹³

The mean age was found to be 20.14±0.91 (18-22) years. Females comprised of 55.39% (77) of the sample.

The mean time spent on gadgets before lockdown was 3.79±1.79 hrs which as expected, raised significantly to 7.70±3.17 hrs during lockdown. This finding was similar to the study conducted during Italian lockdown by Cellini et al where digital media usage was reported increased among the residents. ¹⁴ It was seen that the majority of time spent on a gadget was for social media which is in accordance with the findings of Ammati et al. ¹⁵ This may be largely due to lack of social contact.

Based on the cut-off values for SAS-SV; more than 31 for males and more than 33 for females, our results show that slightly more than half (51.08%) medical undergraduates were addicted to the smartphone. Similar findings were reported by Dharmadhikari et al- 46.15%, Kumar et al-44.7%, Basu et al- 39.9%, Ammati et al- 36.8%, Youssouf et al- 66%. 15-19

In the present study, significant gender differences in addiction were found in males as compared to females. On the contrary Dharmadhikari et al, Basu et al found no significant gender differences while higher smartphone addiction in females students were observed by authors in Korea and Middle-East. 16,18,20-22

Mean sleep duration was reduced during lockdown, but this difference was not statistically significant. On the contary, significant findings were reported by Cellini et al.¹⁴ This might be due to errors in sample size and sampling, as all the consenting participants from 18 batch were enrolled.

The global PSQI score ranged from 0 to 12 with a mean score of 4.60±2.43. Slightly less than half (46.04%) study subjects had impaired sleep with equal number of males and females. These findings were in consonance with Jniene et al (35.3%) while on the contrary more than 50% study subjects had impaired sleep in the study of Youssouf et al, Kumar et al. ^{17,19,23}

In the present study, positive linear correlation is seen between SAS-SV and PSQI score but it was not statistically significant. However, the study of Dharmadhikari et al, Kumar et al, Wang et al, Brar et al, Kurugodiyavar et al reaveled significant positive correlation. 16,17,24-26

No significant relation was seen between individual components of PSQI with smartphone addicts and non-addicts.

CONCLUSION

The mean time spent on gadget during lockdown is raised significantly. The proportion of smartphone addiction amongst medical undergraduates is significantly high and the mean sleep duration is reduced during lockdown.

The present study is a partial snapshot of current scenario and has all limitations inherent in a cross-sectional study. As the lockdown is likely to continue for few more weeks, there is a dire need to study the mental and psychological effects of these sudden and unexpected changes in daily life. More studies with large sample size and varied study designs need to be conducted on this topic to timely identify the consequences and to reduce the adverse psychological impacts.

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