



IMPACT OF INCREASED USAGE OF ELECTRONIC GADGETS ON VISION, SLEEP, HEARING AND EMOTIONAL ASPECTS DURING COVID-19 ERA

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ABSTRACT

BACKGROUND: Electronic gadgets have become an inseparable part of our life. During the COVID-19 era there has been a tremendous increase in the use of these electronic gadgets for learning and communication. These gadgets are also known to cause harmful effects to our health. Hence there is a need to promote cautious and informed use of these gadgets.

AIMS AND OBJECTIVES: To study the impact of increased usage of electronic gadgets on vision, sleep, hearing and emotional aspects during COVID-19 era. Materials and Methods: A pre-validated questionnaire was sent to 300 medical students across Kerala and the received responses were statistically analyzed.

RESULT: A tremendous increase in the usage of the electronic gadgets such as smart phones, tablets, television, laptops and desktops was observed. The study showed an increase in the use of headphones along with laptops. Increased usage of tablets was seen to affect sleep quality.

CONCLUSION: During COVID-19 era the usage of smart phones, tablets, television, laptops and desktops has increased and it was also associated with negative impact on health of medical students in Kerala.

KEYWORDS : COVID-19, medical students, electronic gadgets, sleep, hearing, emotional aspects, vision

INTRODUCTION

On 11 March 2020, WHO declared Novel Corona virus Disease (COVID-19) outbreak as a pandemic and called upon the countries to take immediate actions to treat, detect and reduce transmission to save people's lives. Practicing physical distancing by avoiding unnecessary travel and staying away from large groups of people is one of the preventive measures advised along with hygiene. COVID-19 pandemic has brought a new wave of learning and communication in our daily life. During this time of adversity, we had to adapt to a life that depends on technological gadgets to keep our lives safe and sound. These technologies are helping us fight the current health pandemic and, in the future, change how we deal with a similar health crisis. Gadgets have an impact on people of all fields and ages, both positive and negative effects even before the pandemic especially on young people. These effects are more or less dependent on duration of usage as indicated by some previous studies. This study aims to understand the impact of increased usage of electronic gadgets (smart phones, tablets, television, laptops and desktops) on health (Vision, sleep, hearing and emotional wellbeing) of medical students in Kerala during COVID-19 era. It also assesses the change in duration of gadget use during COVID-19 and its impact on health.

The study considered the case of medical students as they already undergo a stressful life because of their bulk syllabus and their health indirectly affects the quality and quantity of future doctors. Also, online mode of medical education has gained prominence now with increased number of webinars, conferences and online resources. So, there is a need to promote cautious and informed use of gadgets as they have become an inevitable part of our life.

MATERIALS AND METHODS

A cross-sectional study was conducted among students of different medical colleges in Kerala using a pre-validated questionnaire. The study population were in the age group of 18 to 25 years. A pilot study was conducted in 16 samples to validate the questionnaire. Based on the results of duration in Pre (4.19 ± 2.073) and Post (7.19 ± 2.428) usage of electronic gadgets on health of medical students observed from the pilot study conducted in 16 samples and with 80% power and 95%

confidence the minimum sample size of 9 was obtained. After obtaining approval from ethical clearance committee, the Online form containing the pre-validated questionnaire was made and sent to WhatsApp accounts of 300 medical students studying in Kerala. Out of 178 responses received, 176 students consented to be part of this study and their output was considered for the study, of which 119 were Females and 57 were males.

The results were analysed statistically to check for the significance using the SPSS software. Paired t test was used to test the statistical significance of comparison of increased usage of electronic gadgets on health of medical students.

Chi square test was used to test the statistical significance of the association of impact of duration change in usage of gadgets (smart phones, tablets, television, laptops and desktops) on vision, sleep, hearing and emotional aspects of medical students during COVID-19 era. Chi Square test was also used to test the statistical significance of association symptoms and usage of each gadget. The results thus obtained were interpreted accordingly.

Description Of Questionnaire

The questionnaire included two sections. Section A had questions on demographic details (age, gender and year of study) and questions related to gadgets used and purpose of usage.

It also had questions on time spent on gadgets. Section B had questions related to effect of gadgets on vision, hearing, sleep and emotional well-being of students. An informed consent was also obtained through the questionnaire.

RESULT

In this study 176 medicos who were studying in different medical colleges in Kerala participated and out of which 57 (32.3%) were males and 119 (67.6%) were females. The survey was carried out on students between the age group of 18 years to 25 years out of which majority of them (38.6%) belonged to 22 years.

Majority of the students used smart phones (98.8%) followed by laptops/ desktops (51.7%) and television (45.4%). There were 67% of students who used more than one gadget. Most of them use these gadgets for studying followed by entertainment and communication. The primary objective of this study was to find whether the use of gadgets have increased or not and by this study, it was found to be increased and was found statistically significant.

Table 1: The Total Time Spend On These Gadgets Before And After The Onset Of Covid-19.

GADGET	AMOUNT OF TIME SPEND BEFORE THE ONSET OF COVID 19 PANDEMIC	AMOUNT OF TIME SPEND AFTER THE ONSET OF COVID 19 PANDEMIC		
	MEAN	STANDARD DEVIATION	MEAN	STANDARD DEVIATION
Smart phones	3.95	1.690	6.24	2.524
Laptops/ Desktops	0.99	1.174	1.76	1.691
Tablets/ iPad	0.44	1.078	0.88	1.835
Television	0.87	1.121	1.64	1.629
TOTAL DURATION	6.26	3.070	10.52	3.761

Questions regarding vision and its impairment on using these gadgets for hours were asked. Of which 62.5% of the students complained of headache, 48.8% of them had pain in the eyes, 38% of them had watery eyes following the use of these gadgets. 29.5% of them had red, dry eyes, 13% of them had itchy eyes 11.3% had blurred vision. Some also had floaters and double vision. It was observed that 24.4% of them had difficulty in reading / seeing distant objects and of them, only 6.8% students have changed the power of their glasses during lockdown. 31.8% have increased blinking of their eyes while using these gadgets. It was observed that 80.1% of them use gadgets in dark room and it was also noted that 30.6% use them in dark room for 2 hours followed by 29.5% for 1 hour. 82.9% of them use headphones while using gadgets. Table 2 shows the summary of people who use headphones/headsets while using different gadgets and out of them, those who used headphones while using laptops were found statistically significant.

Table 2: The Summary Of People Who Use Headphones/headsets While Using Different Gadgets

GADGETS		MEAN	STANDARD DEVIATION
Smart phones	YES	2.2945	2.44433
	NO	2.2667	2.01603
Laptops/Desktops	YES	0.8973	1.57449
	NO	0.1000	0.71197
Tablets/ iPads	YES	0.3767	1.26022
	NO	0.7333	1.85571
Television	YES	0.7534	1.46010
	NO	0.8667	1.45586

28.4% of them used headphones for 4 hours followed by 27.2% of them used for 2 hours, 21.5% for 6 hours, 13.6% used for 0 hours. Only 9% of them used for more than 6 hours.

33.5% of them complained of having pain in the ears after using headphones for many hours. 88.6% of them complained of having buzzing sensation/ tinnitus after using headphones. And 46.5% had headache after using it. It was observed that 30.1% listen to audios at a higher sound than before, 52.8% of them swap the phone from one ear to another during a call, 27.2% of them ask people to repeat what they say to them.

It was observed that the duration of sleep before and after the pandemic has significant change, majority of them i.e., 47.5% of them slept for 7 hours followed by 34.6% for 6 hours and only 2.8% of them slept for 4 hours, 11.93% for 8 hours and 3.4% for 10 hours before the onset of COVID-19 pandemic. But after the onset of COVID-19, 39.2% of them slept for 10 hours followed by 34.6% of them for 8 hours, 18.7% for 7 hours, 6.8% for 6 hours and only 0.54% slept for 4 hours.

Majority of them said they use these gadgets in dark room and the time ranges between 1 hour to 6 hours, and they also use these gadgets just before going to bed. The time taken by them to fall asleep once they are

in bed was observed and it was found that 22.72% slept after 1 hour, 25% after 30 minutes and 37.5% slept after 15 minutes. Only 14.7% slept within seconds.

7.3% of them said they always feel sleepy during day time after using these, 25.2% said they feel sleepy during day time sometimes. The hours they slept during day time after the start of COVID-19 pandemic were observed. 27.8% said they sleep for 1 hour, 27.2% said they sleep for 2 hours. 8.5% slept for 6 hours, 1.7% for 7 hours, 3.4% for 8 hours and 0.5% for 9 hours during the day. 15.3% said they won't sleep during day time.

2.2% of them always felt not able to sleep after using these gadgets for long time, 7.3% of them felt drained and exhausted in the morning, 1.68% of them had habit of waking up too early and 1.1% had the habit of getting up in the middle of night.

Changes in sleep pattern after the onset of COVID-19 pandemic were noted and results were as follows - 38.2% sleep more at night, 13.4% sleep less hours at night, 31.4% sleep more hours during day and less during night, 16.8% had no change in sleep pattern.

When asked to mention what they felt after using these gadgets it was observed that, 10.6 % of them felt healthy and energetic, 59.5% of them felt slightly weary, tired or feeble, 24.7% of them felt moderately weary, tired or feeble, 5.0% of them felt extremely weary, tired or feeble.

76.1% of them had a major change in their sleep duration after onset of Covid-19 pandemic. It was observed that sleep quality after the onset of COVID-19 pandemic of those who use tablets were found to be statistically relevant (57.9% of students had change in their quality of sleep) and it is depicted in table 3

Table 3: Change In Sleep Quality After The Onset Of Covid-19 Pandemic

Gadgets		MEAN	STANDARD DEVIATION
Smart phones	YES	2.4608	2.73109
	NO	2.0541	1.75087
Laptops/Desktops	YES	0.8824	1.47114
	NO	0.5946	1.51629
Tablets/ iPads	YES	0.6373	1.56565
	NO	0.1622	1.02070
Television	YES	0.8333	1.58009
	NO	0.6892	1.27059

14.2% of the students always felt pain in their neck and shoulder muscles after using above mentioned electronic gadgets for a long time. 42.6% of them felt pain sometimes depending on the time.

When asked whether they felt anxious, stressed or nervous after using the above-mentioned gadgets for long time and responses were graded as extremely, moderately, slightly, and not at all. Out of the responses, 5.1% of them felt it extremely, 15.3% felt it moderately, 47.1% felt slightly, 32.3% did not feel it at all.

22.7% of them experience some inability to concentrate in study/online class because of gadgets. While 59.0% feel inability to concentrate in studies sometimes only. This shows that more than half of the students feel lack of concentration after using these gadgets.

It was observed that 51.7% were unaware about the surroundings while using these gadgets.

DISCUSSION

As stated in a previous study conducted by Revathi et al showed a deteriorating trend on comparing with the time spent on these gadgets, especially factors such as vision, hearing, memory, and logical thinking in medical students (1).

Another research conducted with PSQI (Pills Burgh Sleep Quality Index) found that students who had bad sleep quality were more than students who had good sleep quality, which was probably due to the use of gadgets (2).

The study conducted by Jyoti Ranjan et al showed various positive effects of these gadgets. it showed it had positive effects on

investigating skills, strategic thinking and creativity potential of the individuals and mentioned that these devices were sources for learning, fun, and entertainment. They also acted as stress reducers. Other negative effects pointed out in the study were people using headphones over 6 hours had hearing problems and also suffered from headache, depression, anxiety, problems in sleeping etc (3).

A few studies conducted after the start of COVID-19 pandemic had shown effect of usage of gadgets on vision, study conducted by Huseyin kaya in university students showed positive correlation between eye fatigue and online education during COVID-19 pandemic (4). Bhattacharya S et al showed digital eye strain (DES) or computer vision syndrome was on the rise due to increase time exposure to digital screens (5) of these gadgets during online classes. Raghu Nandhan et al showed there was an increasing trend in students having online classes to have a sensory disturbance (6).

Our primary objective in this study was to see if there was a duration change in usage of these. After the collected data was statistically analysed, we found that the total time spent on these gadgets after the onset of COVID-19 had significantly increased from what was before the onset of COVID-19.

When Hearing was evaluated against smart phones, tablets, television, laptops and desktops, the present study showed that there was an increase in the usage of headphones while using laptops in medical students.

From the responses to questions on sleep quality it was found that sleep quality was significantly affected by usage of tablets and it was statistically proven. It found that students used these gadgets in the dark rooms or just before they go to sleep.

In the present study under discussion, vision was evaluated, from responses, the symptom that most frequently presented was headache, followed by pain in the eyes, watery eyes and itchy eyes after using gadgets. Many also had red eyes and blurred vision. A very few complained of having floaters.

Limitations Of The Study

The study was limited to only medical students in Kerala. Students studying in courses other than MBBS were not included.

CONCLUSION

The study showed there was a tremendous increase in the usage of the electronic gadgets such as smart phones, tablets, television, laptops and desktops. It also showed there was an increase in the use of headphones along with laptops. It was seen that the sleep quality was affected when there was an increased usage of tablets.

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