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# Effects of Excessive Usage of Electronic Gadgets during COVID-19 Lockdown on Health of College Students: An Online Cross-Sectional Study

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## Abstract

The use of electronic gadgets, especially mobile phones among youth, has been a growing global concern. The worldwide COVID-19 lockdown has only amplified the issue. The extended period of lockdown and virtual classes has increased college students' time on their electronic gadgets. The debilitating health effect of excessive usage of gadgets has been well established. There are an array of effects like headache, nausea, ophthalmological concerns and psychological outcomes associated with gadget use for extended periods. The study aims to understand the difference in time spent using gadgets before and during the lockdown and the associated health impacts. The study included 348 participants (n=348), consisting of 183 female and 165 male participants. Data was collected using a semi-structured questionnaire through Google forms from college students after obtaining consent. The results suggested that the average time spent on gadgets increased from 4.75hrs/day before lockdown to 11.36hrs/day during lockdown among participants. Most health complaints like headaches, insomnia, eye complaints, tiredness and restlessness were associated with gadget use during the lockdown. The percentage of participants experiencing these complaints during lockdown was also significantly higher than before lockdown. By understanding the effects of gadget use, it would be possible to create interventions and suggest ways to manage the excessive use of gadgets. It is of prime importance to handle the issue considering the quality of life and wellbeing of students.

**Keywords:** COVID-19, Excessive Use Gadgets, Mobile Phones, Wellbeing

## 1. Introduction

### 1.1 Background

Due to the rapid advances in technology, the usage of gadgets has increased exponentially. Smartphones have become more common among the general population these days, including children. It is now well understood that using gadgets for a longer duration impacts an individual's health leading to health hazards. Possession of gadgets and gadget dependence is increasing among the younger generation[1].

Innovations like Bluetooth, video calls, video games, mobile data, camera and email have become popular along with regular voice calls in recent times[2]. Earlier studies have suggested that using the internet associated with gadget usage for a longer duration might be related to subjective distress, loneliness and social isolation[3]. Excessive gadget usage is of concern because of the growing addiction to the latest gadgets such as

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smartphones, tablets, laptops and other electronic gadgets that pose a threat to the existing social infrastructure. The term "gadget" discussed in the present study refers to the portable electronic devices that belong to either one or more of the following categories: Mobile phones, MP3 players and gaming consoles or any other wireless-enabled devices[4].

### 1.2 Health Effects of Gadget Use

Gadget usage is of significant concern due to the health implications they cause. Continuous use of gadgets leads to many reported health problems like eye strain, fingerpain, backache, neck pain and sleep disturbances. Depending on the amount of time spent on gadgets (duration and frequency), there are adverse physiological, psychological, social and emotional effects[4]. Excessive use of gadgets among youth during a time of stress is a growing threat as well[5]. There has been an established relationship between excessive internet use and loneliness, antisocial values, lower emotional intelligence and depression[6]. Social media, video calls and virtual meetings are being used extensively for various purposes during the lockdown[7]. Headache, earache, neck pain, tinnitus, painful fingers, fatigue, eye symptoms, morning tiredness, restlessness and sleep disturbances are health issues found to develop due to mobile phone usage[8]. Sañudo *et al.* found that students delayed their wake time by 12 minutes with an increase of sleep time of 5 minutes per day during the lockdown. However, no change in sleep quality was observed[9].

Mobile phone radiation and its impact on health have been generated from its innovation and researchers have tried to analyze the actual hazardous nature of radiation to human health. Organizations like WHO and IEEE Committee on Man and Radiation (COMAR) have serious public safety concerns about the exposure of individuals to Radio Frequency (RF) and Microwave (MW) field from handheld, portable cell phones since these devices use electromagnetic radiation in the microwave range[10]. The physical and psychological consequences of mobile phone users are increasing at an alarming rate.

### 1.3 COVID-19 Lockdown and use of Gadgets among Students

A study conducted by Roberts *et al.* highlighted that texting is the most important activity college students carry out using their mobiles. Sending the email was the second most important activity, followed by social media sites like Facebook. The findings also suggest that the time college students spend on social media networks and the number of calls made is a good indicator of cell phone addiction[11]. Earlier studies on mobile phone usage suggest a change of lifestyle pattern related to mobile phone use during lockdown with decreased physical activity, increased smartphone use, and increased sleeping time[9].

India had 18,985 confirmed cases and 603 deaths due to COVID-19 as of April 22, 2020. The first case of COVID-19 was reported in India on 30th January 2020. The Government of India closed down the nation's international borders and enforced a nationwide lockdown on 25th March 2020. However, the distinct and diverse nature of the Indian population posed several challenges during the lockdown, including increased gadget usage[12]. Smartphone usage has become more profound during the outbreak of the Novel Corona Virus globally[13]. Sanudo *et al.* found an increase of 2 hours/day of smartphone usage during the lockdown[9]. There was a 185% increase in gadgets like smartphones and computers in countries like Denmark[14]. Online tools like Zoom, Google Hangouts, Skype Meet up, Google classrooms, and YouTube has been used to carry out student's academic activities. Although virtual classes held during the lockdown have increased student engagement in courses[15], social media activity has also increased among students, either in content uploading or creating social awareness messages. A pressing concern associated with excessive gadget usage is the amount of content that has been binge-watched by individuals. Distress among students has increased due to binge-watching. It is also known to be associated with several adverse psychological outcomes[16].

## 2. Rationale and Significance of Study

The present study aimed to assess the gadget usage levels and the associated health hazards experienced by college students. The study intended to analyze the health impacts of increased gadget use among college students during the lockdown. Earlier studies have attempted to study the effects of increased gadget use on the health of individuals. But the lockdown has brought about a scenario that has set a field to make extended use of gadgets a necessity, especially for college students. At this point, it is essential to understand the impact of such prolonged use of gadgets on health to make necessary lifestyle changes. Such changes would benefit the students and help manage the health issues that arise from the overuse of gadgets during the extended lockdown period.

# 3. Materials and Methodology

## 3.1 Study Design and Sampling Method

A cross-sectional study design was used for the present study. Considering the difficulty for data collection during the COVID-19 lockdown and fulfilling the study's requirements, convenience sampling was adopted. Institutional Ethical Committee approval was obtained before conducting the survey.

## 3.2 Sample

The study sample consisted of college students between 18 years to 25 years who are currently attending online classes (due to COVID-19 pandemic lockdown). The study had a total sample of 348 participants (n=348), out of which 183 participants were female and 165 participants were male. The study population had 69% of students pursuing under-graduation and 31% pursuing post-graduation.

## 3.3 Inclusion and Exclusion Criteria

### *3.3.1 Inclusion Criteria*

All undergraduate and postgraduate students pursuing any degree from colleges in and around Chennai were eligible to participate in the study. Both male and female students were included in the present study. The age group of the participants was determined to be between the ranges 18 to 25. Only students who were willing to participate in the study were included.

### *3.3.2 Exclusion Criteria*

College students who were not attending classes during COVID-19 lockdown and those who were not willing to participate in the study were excluded from the present research.

## 3.4 Tools

### *3.4.1 Gadget Use Questionnaire*

The Gadget Use Questionnaire was a semi-structured modified questionnaire used to obtain data for the present study.

### *3.4.2 Questionnaire Framework*

The questionnaire had a total of 5 sections that were split in order to meet the requirements of the study.

Section - A (Informed Consent).
Section - B (Demographics).
Section - C (General Information on Gadgets Use).
Section - D (Specifics on Mobile Phone Use).
Section - E (Physical Complaint Specifics).

## 3.5 Mode of Data Collection

Students were mailed a Google form link to fill the questionnaire through mail and Whatsapp to participate in the study. Formal consent was obtained from the participants before filling the questionnaire.

## 3.6 Statistical Analysis

Descriptive statistics such as Mean, Median and Standard Deviation for quantitative variables were calculated. Chi-square test was used to assess the association between the variables. MS Excel and SPSS 16.0 version were used to carry out the analysis for the study.

# 4. Results

The current research included 348 participants, out of which 183 (52.6%) were females and 165 (47.4%) were males. Out of the 348 students, 239(68.7%) pursue their under graduation and 109 (31.3%) pursue their post-graduation.

Overall, 20% of the participants used their gadgets for gaming, 3% for attending classes, 20% for online courses/webinars/meetings, 10% for research activity, 19% for reading, 16% for listening to music and 12% for messaging during the lockdown. On average, out of the time spent on electronic gadgets everyday, 32% of the time is spent on Whatsapp, 35% of the time was spent on Facebook/Instagram/Twitter and 33% of the time was spent attending online classes/webinars. The average time spent on attending online classes and webinars was 33%, while 35% of the time on gadgets was spent on social media handles. The average time spent on gadgets before the lockdown was 4.75 hours, while the average during lockdown increased to 11.36 hours.

Table 1 depicts the difference in the percentage of participants experiencing various health complaints before and during the lockdown.

Table 2 presents the association between health complaints and gadget use before and during the lockdown. Before the lockdown, health complaints like blurring and backache are only associated with gadget use (p=0.012 and p=0.021). However, during the lockdown, all the health complaints considered in the present study are associated with gadget use. Time spent on gadgets during lockdown is associated with health complaints

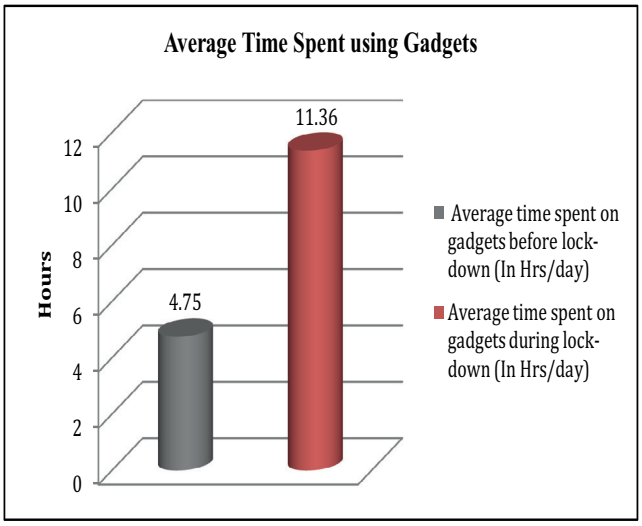


**Figure 1.** Average time spent using gadgets before and during lockdown by respondents.

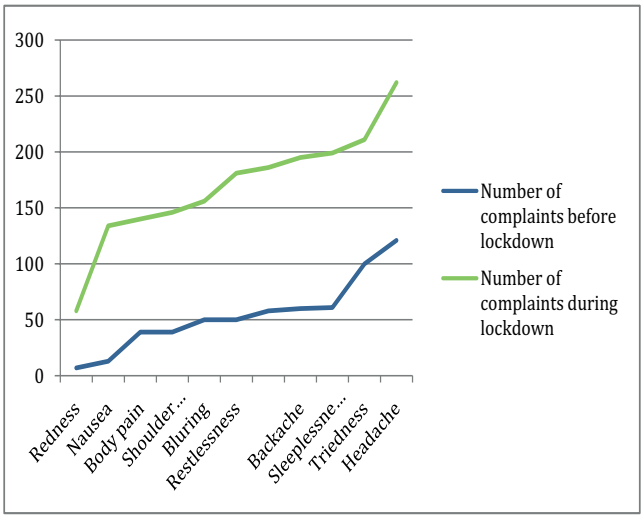


**Figure 2.** The number of each health complaint experi enced by respondents before and during the lockdown

like redness of eyes, blurring, backache, restlessness, and shoulder pain at $p<0.001$.

35% of the study participants preferred to monitor screen as well as gadget usage time and alter them to appropriate levels. 25% of participants chose to use screen time controls. In contrast, 17% preferred using productivity apps, 15% preferred increasing the hands-free length and 8% preferred to decrease the talking duration.

Only 71% of the present study respondents practiced measures to reduce gadget usage, while 29% did not practice them. Out of the 29% who did not practice the control measure did so dominantly because they could not identify an alternative to gadget use (62%). 21% did not practice them because they could not maintain restraint, 11% because they felt obsessed with overusing gadgets and 6% did not prefer using them.

**Table 1.** Percentage of complaints experiences before and during lockdown by participants

| Complaints Experienced | Before Percentage | During Percentage |
|---|---|---|
| **Headache** | 34.8% | 75.3% |
| **Nausea** | 3.7% | 16.7% |
| **Pain in the Eye Region** | 16.7% | 57.2% |
| **Redness of Eye** | 2% | 38.5% |
| **Blurring of Eye** | 8.6% | 42% |
| **Backache** | 17.2% | 52% |
| **Sleeplessness** | 17.5% | 60.6% |
| **Tiredness** | 28.7% | 56% |
| **Body Pain** | 17% | 53.4% |
| **Restlessness** | 14.4% | 44.8% |
| **Shoulder Pain** | 11.2% | 40.2% |

## 5. Discussion

The present study included 348 participants, out of which 183 (52.6%) were females and 165 (47.4%) were males. During the lockdown, 3% of the students were using their gadgets for attending online classes, 20% of the students use their gadgets for gaming, 20% for online courses/webinars/meetings, 10% for research activity, 19% for reading, 16% for listening to music and 12% for messaging. The study conducted by Gupta *et al.* showed female students were

**Table 2.** Association between average times spent on gadgets and health complaints before and during the lockdown

| Pearson Chi-Square | Time Spent on Gadget before Lockdown | | | Time Spent on Gadget during Lockdown | | |
|---|---|---|---|---|---|---|
| | Value | df | Asymp. Sig. (2-sided) | Value | Df | Asymp. Sig. (2-sided) |
| **Headache** | 18.202 | 13 | .150 | 35.026 | 21 | .028* |
| **Nausea** | 8.809 | 13 | .787 | 35.559 | 21 | .024* |
| **Pain in Eye** | 13.957 | 13 | .377 | 48.234 | 21 | .001* |
| **Redness of Eyes** | 4.728 | 13 | .981 | 58.834 | 21 | .000* |
| **Blurring** | 27.180 | 13 | .012* | 73.429 | 21 | .000* |
| **Backache** | 25.250 | 13 | .021* | 91.675 | 21 | .000* |
| **Sleeplessness** | 11.861 | 13 | .539 | 39.239 | 21 | .009* |
| **Tiredness** | 12.373 | 13 | .497 | 45.782 | 21 | .001* |
| **Body Pain** | 19.166 | 13 | .118 | 46.685 | 21 | .001* |
| **Restlessness** | 9.587 | 13 | .727 | 50.704 | 21 | .000* |
| **Shoulder Pain** | 14.232 | 13 | .358 | 63.477 | 21 | .000* |

*DF- degree of freedom*
**the association between the health complaint and time spent on the gadget is significant*

more dependent on gadgets compared to male students and also a higher dependency on gadgets was seen among medical students[17]. Dixit *et al.* evaluated psychological dependence on mobile phones among medical college students, according to which 18% of females and 19% of males were found to be nomophobic which is the fear of being out of mobile phone contacts[18]. The study conducted by Sun *et al.* showed that participants were more active on their phone, in particular, interacting with others using social apps, especially around major news events, suggesting increased physical distancing while socializing and interaction. They also further found that participants had lower heart rates, slept more and went to bed late[16].

The present study shows that 8.6% of participants had complaints of blurring vision (eye) even before the lockdown, which was more than the research findings conducted in Saudi, where 5.04% had decreased or blurred vision. In the present study, there is a drastic increase in the complaint by 42% during the lockdown due to increased gadgets usage[19].

The study conducted by Kumar *et al.* showed that out of 90.5% of study subjects, majority of participants (50.2%) were using smart-phones for more than 7 hours a day. 42.5% of study participants used gadgets for social networking, 14% for work and 13.5% for entertainment for more than 7 hours a day.

Also, in the present study, 75.3% of participants had a headache, 60.6% of participants had sleeplessness, 57.2% of participants had pain in the eye region, 56% of participants had tiredness, 53.4% participants had body pain, 52% of participants had a backache, 44.8% participants had restlessness, 42% participants had blurring of the eye, 40.2% participants had shoulder pain, 38.5% participants had redness of eye, 16.7% participants had nausea. This was similar to the study conducted by Kumar *et al.* where majority (90.5%) of the study participants were found to be using smartphones. Among them, 57.5% had problems related to vision, 39% hearing problems and 20% had reduced physical activity[20].

The study highlights the excess usage of gadgets by college students during lockdown that has led to several health impacts.

## 6. Conclusion and Recommendations

The COVID-19 pandemic has brought about numerous lifestyle and environmental changes. There have been both positive and negative impacts as a consequence. The increased usage of gadgets for educational and recreational purposes has resulted in adverse health effects for individuals. However, the need to use gadgets is at an all-time high to make attending classes and work possible. Therefore, eliminating gadgets might not be the solution, whereas controlling it to appropriate levels would be. Individuals need to be aware of the adverse effects of excessive use of gadgets. It is also essential to be informed about ways to control adverse effects of gadget use like increasing blinking frequency, screen time controls and proper seating arrangements. The key to deriving positive results from control measures is to increase the consistency of using them. The majority of the adverse health effects arise because of the inability to maintain restraints. It is of prime importance to set realistic expectations to control gadget use in the current lockdown scenario and follow them.

## 7. Limitation

Due to the ongoing pandemic situation, the researchers were able to collect data only through convenient sampling. Also, since the participants had to recall their health complaints before the lockdown, there might have been an occurrence of recall bias. The study only considers a limited number of health complaints, while the scope of problems associated with excessive usage of gadgets might be more wide and comprehensive than explored in the paper.

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## 9. Funds

No funding was utilized for the study.

## 10. Conflict of Interest

The authors report no conflicts of interest and they are responsible for the content of the article.

## 11. Ethical Approval

The study was approved by the Institutional Ethics Committee of the School of Public Health, SRM Institute of Science and Tcehnology, Kattankulathur, Chennai.

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