



Article

Screen Time and Level of Perceived Stress Among Students of University of Peradeniya During COVID-19 Pandemic

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Abstract

Background: In this digital age, the use of screens has become an essential part of life. The COVID-19 pandemic has intensified the use of screens, especially among students. This study aimed to find the association between screen time and the level of perceived stress among students of University of Peradeniya during COVID-19 pandemic. **Methods:** In this cross-sectional study, a pretested questionnaire consisting of the 18-item screen time questionnaire and perceived stress scale (PSS) questionnaire was distributed among all the undergraduate students of the University of Peradeniya at the time of the study, via email, and a representative sample (N = 387, mean age = 22.964 ± 1.818 years) was selected from the responses received. **Results:** Mean screen time was found to be 13h 27 min ± 4h 52 min, and the most used screen type among males was laptop/computer, and among females, smartphone. The mean perceived stress of the sample was 20.499 ± 5.393. Spearman correlation for screen time and perceived stress showed a significant weak positive correlation (Spearman rho = 0.132, p = 0.009) between screen time and perceived stress. Neither screen time nor perceived stress was associated with gender [F (1, 385) = 1.05, p = 0.307]. **Conclusions:** Most students have moderate perceived stress, and the study shows a significant weak positive correlation between screen time and perceived stress during the COVID-19 pandemic. It was observed that perceived stress is not significantly deviate from pre-pandemic values. Longitudinal studies for assessing perceived stress are necessary to find a cause-effect relationship.

Keywords: Screen time; Perceived stress; COVID-19; University of Peradeniya

Introduction

In March 2020 the World Health Organization (WHO) declared COVID-19 a pandemic. Governments of different countries, including Sri Lanka are still following several measures to minimize and prevent the spread of the virus. These measures made education and work-related activities shift from traditional office work, and classroom teaching to online platforms (1, 2). The first to third COVID-19 waves caused the closure of all the Sri Lankan universities at different time points from 2020 to 2021. Many studies show that the COVID-19 pandemic has increased screen time and reduced physical activity, which can badly affect the physical and mental health of individuals including children, adolescents, and adults, irrespective of their career and living status (3, 4).

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The term “screen time” describes an activity performed in front of a screen. This includes watching television, working on a computer or a smartphone, playing video games, etc. (5). The global recommended screen time is 2 hours per day (6, 7).

Screen time has increased rapidly since the year 2000 (8). As evidence shows, this is concerning because higher screen time is connected with adverse health consequences such as obesity and depression in children (9). A study among first-year college students in China (mean age of 18.96 ± 0.9 years) showed that low screen time is significantly associated with a lower risk of poor sleep and depression (10). High screen time was significantly associated with anxiety, depression, psychopathological symptoms, and poor sleep quality (11). More screen time, more snacking, and less physical activity were associated with higher symptoms of anxiety, depression, and loneliness across all time points during COVID-19 related lockdown in the German population (12). It is also suggested that mental health consequences of movement restriction and quarantine can be altered by increasing screen time (4).

A smartphone can be named as one of the most used screens among students (13). Among college students whose mean age was 19.11 ± 2.04 years, it was reported that males had significantly higher levels of total screen time (2h 33min per day) ($p = 0.004$) and television viewing (1h 9 min per day) ($p < 0.001$) compared to female students (14). Online education is now being practiced worldwide more than in pre-pandemic times due to social distancing guidelines. More than 5h of screen time spent on the online study was reported among 44.6% of high school students in China (15). Screen time has increased during the pandemic compared to pre-pandemic (16). Many negative effects of increased screen time such as migraines, myopia, increased smoking, alcohol use, obesity, etc., are also reported (17-19).

Stress and stressful events can affect a variety of body systems (20), and the level of stress/psychological distress is higher among undergraduates than in the general population (21). The main reasons behind this psychological distress among university students were academic workload and time management issues (22). Among students of University of Colombo, academic workload, economic hardships, personal relationships, ragging, hostel life, and cultural shock or pressure were found to be the causes of stress (23). COVID-19 was found to be exacerbating the existing mental health disorders, contributing to the onset of new stress-related disorders (24). University students are particularly vulnerable to mental health problems and are found to be experiencing severe stress during confinement (25). The female gender was found to be more affected by the pandemic, while females were revealed to be using social media more frequently as a coping mechanism (26). Financial constraints, remote online teaching, and uncertainty about the future regarding academics and careers were the main stressors among undergraduates in Malaysia (27).

It is important to assess the impact of the COVID-19 pandemic on university students. Thus, this study was carried out to determine the screen time, the level of perceived stress, and the relationship between screen time and the level of perceived stress among the students of University of Peradeniya, during the COVID-19 pandemic.

Methods

The study design was a descriptive, cross-sectional, online survey, administered among undergraduate students of the University of Peradeniya, from 2nd of May 2021 to 22nd of May 2021, using Google forms. The study population consisted of all the undergraduate students ($N = 12,114$) of age 20-28 years of the University of Peradeniya. The sample consisted of undergraduates from first year to final year from all the nine faculties (Faculty of Arts, Agriculture, Allied Health Sciences, Dental Science, Engineering, Management, Medicine, Science, and Veterinary Medicine & Animal Science) at the time of the study. Students with known long-term systemic diseases and psychiatric illness (since their stress levels may already be different from other students), who are currently working/employed, who were engaged in specific sports/exercise training (daily routines can be different), and foreign students (many factors which were only related to them can result in outliers) were excluded. The required sample size

was 387 from nine faculties of the University of Peradeniya, and it was calculated using Solvin's formula (28). After obtaining permission from the relevant authorities (Vice Chancellor of the University of Peradeniya at the time of the study), the questionnaire was sent as a Google form to the currently enrolled students of University of Peradeniya via E-mail, and an option was provided for them to click yes to enter and fill the questionnaire by giving consent to participate after reading the information sheet.

Two-stage sampling mechanism was used. In the first sampling stage, responses were obtained from the population of 12,114 students. The response rate was 6.8%. In the second stage of sampling, the stratified random sampling method was used with proportion allocation for each faculty (strata), to obtain a total sample of 387 from the 826 responses, representing the student population of each faculty. Level of perceived stress, total screen time per day, screen time category, total background screen per day (use of a television or another screen near you while performing other activities such.), type of screen used, age, and gender were the main variables of the study. The study questionnaire consisted of three sections, including demographic data, Screen Time Questionnaire (29) (Screen Time Questionnaire was shown to have fair to excellent relative reliability (Interclass Correlation Coefficient (ICCs) = 0.50–0.90; all $p < 0.001$)) and Perceived Stress Scale (30) (PSS - adequate internal consistency reliability ($\alpha = .78$); moderate concurrent criterion validity) (31).

The questionnaire consisted of a total of 40 questions. In the Screen Time Questionnaire, the participants had to report the number of hours and minutes they spent in front of screens, for each question. In the PSS scale, five alternatives (0 – never, 1 - almost never, 2 – sometimes, 3 - fairly often, 4 - very often) were given for each question. The questionnaire was pre-tested on readability and understandability. It was administered as a Google form via email, among the undergraduate students of University of Peradeniya, in English. Screen Time Questionnaire analysis was done by categorizing the participants into light (45min – 10h 53min per day), moderate (11h – 15h 45min per day), and heavy (16h – 24h per day) users according to tertiles. PSS score was analyzed by adding the values given for each question by each participant. The scores on the PSS can range from 0 to 40, with higher scores indicating higher perceived stress. Then they were categorized into three levels by the author (30); scores ranging from 0-13 were categorized as low stress, 14-26 as moderate stress, and 27-40 as high perceived stress.

Minitab 18 (Minitab Statistical Software. State College, PA: Minitab, Inc.) software was used for the statistical data analysis. One-way ANOVA, Tukey pairwise comparison, two-sample t-test, and Spearman correlation test were used for the analysis. α value for the above tests was set to 0.05, where the confidence level was 95%.

Results

A total of (826) responses were received within a period of 3 weeks. From the 826 responses, 33 duplicated responses were removed, and 323 responses were excluded as per the exclusion criteria. From 470 eligible responses, 387 responses were randomly selected to represent each faculty proportionately. This representative sample was selected by generating random numbers using MS Excel 2013. Figure 1 depicts the faculty- and year-wise distribution of the study sample.

From the selected sample of 387, 29.2% were males, and 70.8% were females, with mean ages of 23.487 ± 1.632 and 22.748 ± 1.849 years, respectively. The majority of the participants were from Kandy district (17.8%), followed by Kurunegala (10.1%) and Gampaha (9.3%). Figure 2 shows the district-wise distribution of the sample.

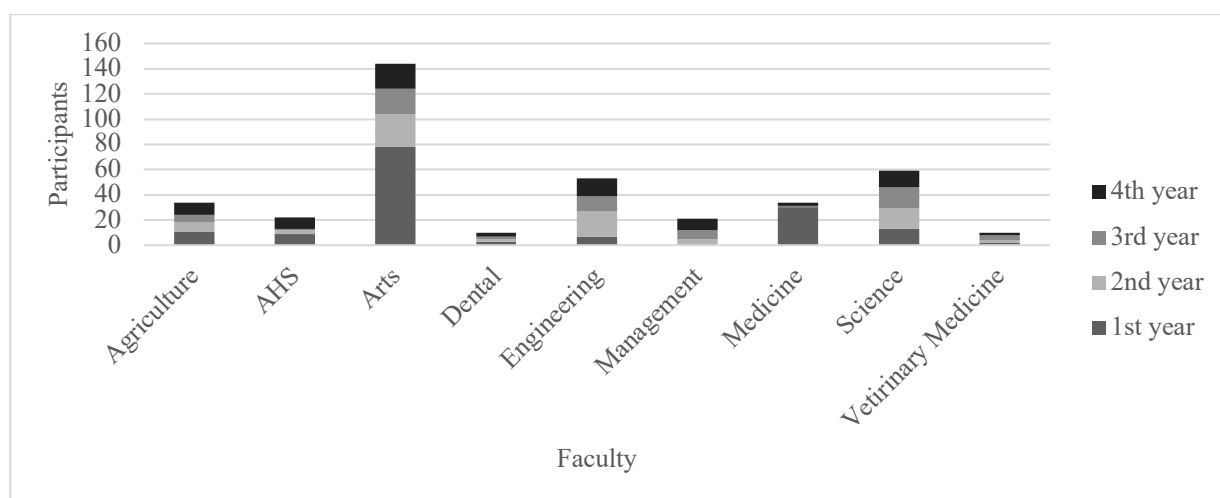


Figure 1. Faculty- and year-wise distribution of the study sample

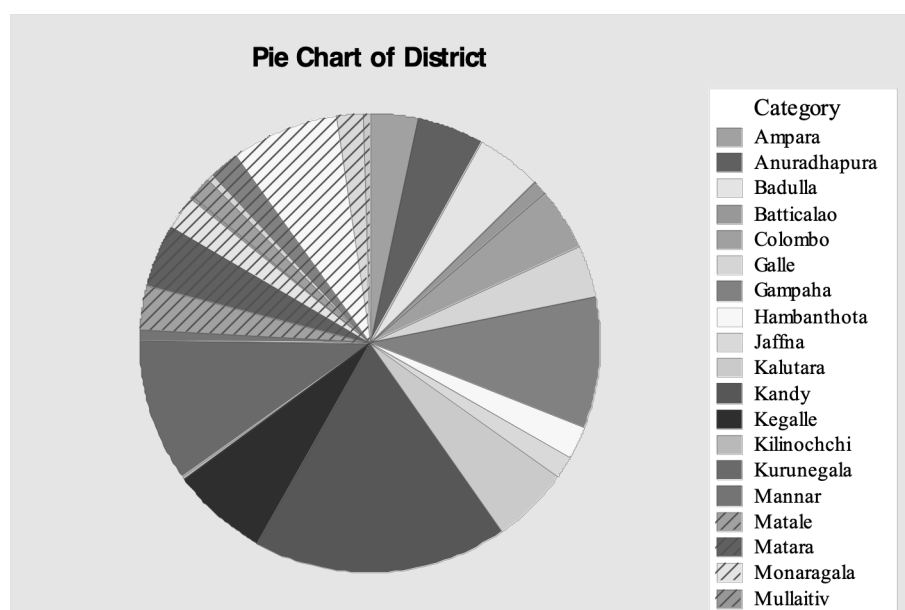


Figure 2. Distribution of the sample according to the district

The sample's overall mean screen time (ST) was 13h 27min $\pm$ 4h 52min. The majority (34.1%) of the participants were heavy screen users (mean = 18h 46min $\pm$ 7h 53min), followed by moderate (33.3%, mean = 13h 26min $\pm$ 1h 26min), and light (32.6%, mean = 7h 53min $\pm$ 2h 7min) users (Table 1). The highest screen time was reported in the Faculty of Engineering (14h 47min $\pm$ 4h 22min), and the lowest was reported in the Faculty of Medicine (10h 45min $\pm$ 3h 27min) (Figure 3). A one-way ANOVA revealed differences in mean screen time between faculties [$F(8, 378) = 2.71, p = 0.007$], academic years [$F(3, 383) = 6.92, p < 0.001$], and age groups [$F(7, 379) = 3.02, p = 0.004$]. No significant difference in screen time was revealed between genders [$F(1, 385) = 0.62, p = 0.433$]. The highest ST (14h 55min $\pm$ 4h 54min) was reported in 4th-year students. The most used device was the smartphone (6h 42min $\pm$ 3h 48min) followed by computer/laptop (4h 7min $\pm$ 3h 27min) and television (1h 52min $\pm$ 1h 39min). Males had higher use of laptops/computers ($t(171) = -4.47, p < 0.001$), while females were reported to have higher use of smartphones ($t(269) = 3.30, p = 0.001$) (Table 2). Median background screen use per day was found to be 3h (mean = 4h 6 min $\pm$ 4h 8min).

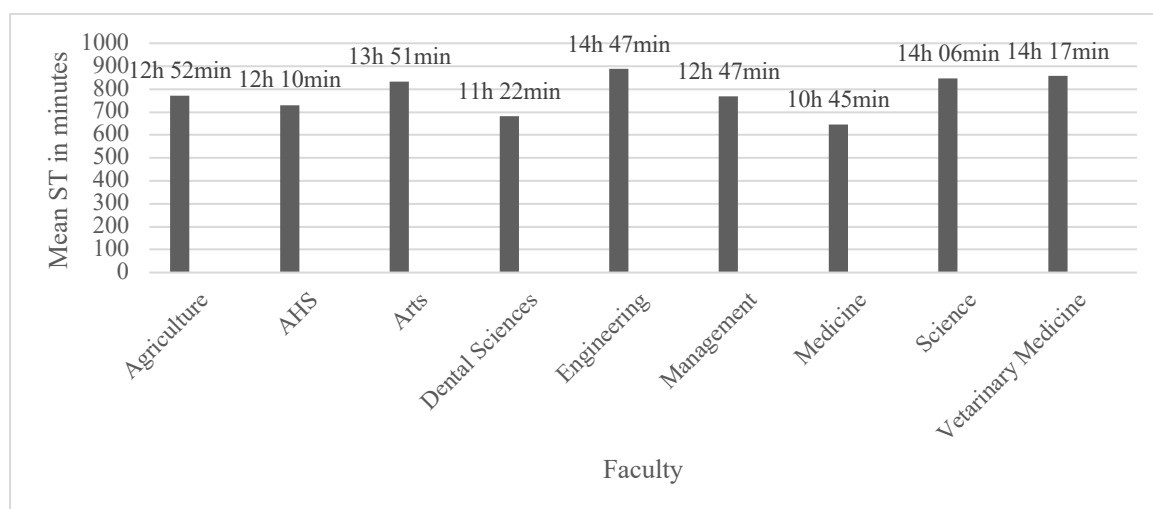


Figure 3. Mean Screen Time in Each Faculty

Table 1. Screen Time Categories

	Screen Time Category		
	Heavy	Moderate	Light
N	132	129	126
Mean	18h 46min ± 7h 53min	13h 26min ± 1h 26min	7h 53min ± 2h 7min
Range	16h – 24h	11h – 15h 45min	45min – 10h 53min

Table 2. Screen Type and Gender

	Screen Type and Gender			
	Laptop/Computer		Smartphone	
	F	M	F	M
Mean	3h 35min ± 3h 5min	5h 26min ± 3h 55min	7h 5 min ± 4h 1min	5h 50min ± 3h 5min
Median	3h 15min	5h	6h 30min	5h 15min
t-test	M>F, p < 0.001		F>M, p = 0.001	

80.1% of participants reported their perceived stress level as moderate, 12.1% were highly stressed, and 7.8% had a low-stress level. The mean PSS score was found to be 20.499 ± 5.393 (Table 3). One-way ANOVA showed differences in mean PSS scores between age groups [$F(7, 379) = 2.12, p = 0.041$] and academic year groups [$F(3, 383) = 3.64, p = 0.013$]. No statistically significant difference was revealed in mean PSS scores between genders [$F(1, 385) = 1.05, p = 0.307$] and faculties [$F(8, 378) = 0.68, p = 0.708$].

Table 3. Perceived Stress Levels

		N	Percentage	Range	Mean	Median
Stress Levels	High	47	12.14%	27 - 40	30.383 ± 3.505	29
	Moderate	310	80.10%	14 - 26	19.932 ± 2.047	20
	Low	30	7.75%	6 - 13	10.867 ± 3.149	11

Spearman correlation for screen time and perceived stress showed a significant weak positive correlation (Spearman $\rho = 0.132$, $p = 0.009$) between screen time and perceived stress. Mean PSS scores of heavy, moderate, and light screen time categories are 21.371 ± 5.728 , 20.744 ± 5.301 , and 19.333 ± 4.949 , respectively. One-way ANOVA showed differences in mean perceived stress and screen time categories [$F(2, 384) = 4.90$, $p = 0.008$], where Tukey Pairwise Comparison showed the only significant difference of mean perceived stress between light and heavy screen users ($p = 0.006$). Mean screen time of high, moderate, and low-stress levels are $14\text{h } 33\text{min} \pm 5\text{h } 14\text{min}$, $13\text{h } 33\text{min} \pm 4\text{h } 42\text{min}$, and $10\text{h } 41\text{min} \pm 5\text{h } 8\text{min}$, respectively.

Discussion

The majority of students (34.1%) were high screen time users ($18\text{h } 46\text{min} \pm 7\text{h } 53\text{min}$), and the mean screen time was $13\text{h } 27\text{min} \pm 4\text{h } 52\text{min}$. This high screen time during the pandemic could be a result of the increased time spent on online education (32) and increased leisure time due to lockdown/movement restrictions imposed in Sri Lanka. University students in India have been using smartphone for 5.2 ± 1.73 hours per day during the COVID-19 pandemic (33). Similar findings were observed among the students of the University of Pittsburgh (5h per day) (34). 89.5% of the respondents from the Faculty of Sports Sciences, Universitas Negeri Surabaya, were engaging in activities in front of a screen for >2 hours per day (8). Similarly, 43.3% of the physiotherapy students from K.J. Somaiya College of Physiotherapy, India spent more than 6 hours on digital devices on a daily basis (35). In the present study, the mean screen time was found to be excessively high, exceeding 13 h per day. The highest screen time was reported among students of the Faculty of Engineering, and the lowest was recorded in the Faculty of Medicine. Screen time use was found to be varying depending on the undergraduate program. This may be perhaps due to the variation of academic workload delivered online and the nature of the curriculum, which might be distance learning-friendly or not. The fact that the Faculty of Engineering has a technologically oriented curriculum and students supports this finding. Previous studies, too reveal this higher usage of screens by Engineering students (36). The varying amounts of workload could have caused the variation in screen time among different academic years. Generally, final-year students share a high workload and are more likely to self-learn using digital media; thus, even changes in preference for independent learning can cause this difference. The preference for screen devices is found to be highly influenced by gender. The most commonly used device for screen-based activities was smartphones. Male undergraduates preferred to use laptops or computers, and female counterparts preferred to use smartphones. This is more or less similar to the findings of Agustia et al., (2021), who reported that the most commonly used screen device was a smartphone among 96.5% of Nigerian university students (13). The portability, availability, and user friendliness would have been the causes for the popularity of smartphones among students.

The established norm for the mean PSS-10 score of 18-29 years age group is 14.2 ± 6.2 (37). The present study showed that students of University of Peradeniya had a mean PSS score of 20.499 ± 5.393 . This slightly deviated from previously reported results in Sri Lankan context, where it was reported as 19.9 ± 5.1 (38) among 2nd year medical students of University of Colombo and as 20.72 ± 4.96 (39) among the students of Kotelawala Defense University. A comparison of pre-COVID PSS scores among 2nd year students of Faculty of Medicine, University of Peradeniya (19.9 ± 5.1) (38) and the PSS score among students of Faculty of Medicine, University of Peradeniya in the current study (19.265 ± 5.685) showed a slight decrease in PSS during the pandemic. The reduction of academic burden might have caused this due to the cessation of physical classes and increased time spent with family (40).

When the present study is compared with pre-pandemic studies, it is evident that PSS has not changed drastically from pre-pandemic time to pandemic time. Some pre-pandemic studies show that undergraduate students are experiencing moderate perceived stress ($M = 20.19$, $SD = 6.03$) (41), females ($M = 19.25$, $SD = 6.76$) (42) males ($M = 20.29$, $SD = 7.13$) (43)) and current study shows a mean perceived stress of $20.43 (\pm 7.67)$. It can be hypothesized that the increase in COVID-related stress during

the pandemic might have been masked by the reduction of academic-related stress due to reduced academic burden.

When considering gender, most of the previous studies reported that among university students, females experienced more stress than males during the pandemic and pre-pandemic (44, 45). On the contrary, the present study revealed no significant difference in mean PSS scores between females and males ($p = 0.307$).

A significant weak positive correlation (Spearman $\rho = 0.132$, $p = 0.009$) was found between screen time and PSS score. The psychological stress is multifactorial, and different course studies might have unique stressors. Even though screen time is positively associated with stress, the multi-factorial nature of it would have balanced the net change of the outcome.

Future studies in longitudinal and qualitative nature to find out the cause-effect relationship are necessary to assess the stress levels and screen time among the students of universities, especially the screen time, because there is a lack of information on screen time of Sri Lankan university students.

The cross-sectional study design, self-reported data and memory recall bias, and oversampling of particular groups were the limitations of this study (e.g., the percentage of females was considerably higher).

Conclusions

The Majority of the students had a moderate stress level, while the screen time of the students of University of Peradeniya during the COVID-19 pandemic was significantly high, with a mean screen time of 13h 27min per day, and a mean background screen time of 4h 06min per day. These values are excessively higher than the recommended daily screen time (≤ 2 hours). The most used screen type was the smartphone. A significant association was not present between screen time and gender. However, screen time was associated with faculty and age. It was observed that PSS scores have not significantly deviated from pre-pandemic values. The PSS score was not associated with gender or faculty, but it had an association with the academic year and age. Screen time and PSS score had a significant, but weak positive correlation. The present study demonstrates some unfavorable health effects that have arisen during the pandemic, in addition to the direct effect of COVID-19. This study gives a clear insight into the seriousness of the matter and will be helpful in opening up new research paths for further investigation of the complications.

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Conflicts of Interest: The authors declare no conflict of interest.

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