

The Impact of exposure to screen during COVID-19 Lockdown on the General health of students in Punjab, Pakistan

Amna Gill¹, Fatima Afzal¹, Hira Aamer¹, Amjad Khan², Ali Akram Khan¹, Asad Aslam Khan³, Saira Afzal^{1*}

¹Department of Community Medicine, King Edward Medical University, Lahore, Pakistan.

²Department of Public Health & Nutrition, University of Haripur, Pakistan.

³Department of Ophthalmology, King Edward Medical University/Mayo Hospital, Lahore, Pakistan.

*Corresponding author

Amjad Khan, Department of Public Health & Nutrition, the University of Haripur, Pakistan, Tel: +923143003388; E-mail: dramjadkhan77@gmail.com

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Abstract

Background: Since Covid-19 was declared a pandemic and a worldwide lockdown was imposed, it was predicted that there would be an increase in screen usage, especially among students, which could potentially have a lot of negative symptomology associated with it.

Objective: The objective of our study was to determine the extent of screen exposure among medical students during lockdown and to study the symptoms that they faced due to it along with their frequency.

Methods: In our descriptive cross-sectional study, we distributed the specifically designed questionnaire through online media to the concerned population, in order to gather important data about the physical and mental symptoms experienced by the medical students as a result of excessive screen exposure.

Results: Of the 400 participants, 93.75 % reported an increase in screen time during the lockdown. As a consequence of increased screen usage, 207 (51.75%) of the participants reported headache, 267 (66.75%) reported fatigue, 283 (70.75%) reported eye strain, 121 (30.25%) reported dry eyes, 143 (35.75%) reported blurry vision, 154 (38.5%) reported teary eyes, 154 (38.5%) reported ear ache, 247 (61.75%) reported neck and back stiffness and 148 (37%) participants agreed to having experienced fingers and hand fatigue. We also established that increasing screen time was associated with a progressive decrease in physical activity ($p=0.11$) and increase in food consumption ($p=0.002$). A significant association was also recorded with weight gain ($p=0.03$). We found that the students previously diagnosed with a refractive error were more likely to complain of eye strain ($p=0.004$) and those diagnosed with migraine experienced more screen related headache ($p=0.001$). Of the 11 symptoms related to mental health in the questionnaire, students with screen usage of less than 4 hours marked a median of 2 symptoms, those with screen time of 4-8 hours marked a median of 4 symptoms and those with a screen usage >8 hours ticked a median of 5 symptoms. Students who had been diagnosed with anxiety or depression in the past checked an average of 5.24 symptoms while those with no such diagnosis had only 3.51 symptoms on average.

Conclusion: The results proved a potential impact on the general health of the medical students. A significant increase in weight was observed along with other serious short and long term effects on their physical and mental wellbeing.

Keywords: Lockdown, Increased screen time, Medical students, Physical health, Mental health

Introduction

The novel coronavirus emerged in December 2019 in Wuhan, China and spread across the globe at a rapid rate. WHO declared it as a pandemic on 11th March 2020[1]. The virus multiplied

in Pakistan after the first case was confirmed in Karachi on 26 February, 2020, leading to a rapid surge in the number of confirmed cases and the death toll. In an attempt to restrain the spreading virus, international transport and trade was suspended

and a lockdown was imposed [2]. In this time of crisis, the medical students were devised to stay at home and continue their learning online which led to a break in their routines. The decreased outside exposure created an even more challenging situation by forcing them into an environment, unflattering for a healthy lifestyle [3]. With more time spent at home and decreased outside interaction, WHO predicted an increase in screen time in students [4].

Screen time is the time spent using a device such as a computer, television, or games console. Although proper recommendations for screen time restriction for children have been specified by the WHO, no such guidelines about adults, exist. It is generally recommended to keep the use less than 2 hours a day. Increased screen viewing has always been a threat to health in the modern world and this lockdown has further exacerbated the situation to an alarming level [5] because of increased exposure to devices for online studies, free time spent by students streaming TV series and shows available, online gaming, web browsing and social media applications.

One of the most significant implications of increased screen use is the sedentary behavior associated with it leading directly to gain in weight [6]. This occurs due to prolonged sitting while viewing screens that decreases the physical activity and hence the consumption of energy. Media has also been found to prompt high-caloric food intake and prolongs the meal time [7]. Prolonged screen time has also been associated with headache, eye fatigue, tiredness, dry and burning eyes along with blurred vision [8]. Backache and neck/shoulder ache have also been reported [9]. These symptoms are collectively referred to as Computer Vision Syndrome [10]. High users of screens have also been found to be more likely diagnosed with anxiety or depression, and emotional instability has also been reported [11]. Unhealthy duration of screen exposure can disturb the normal sleep cycle which can further aggravate anxiety [12]. Thus, it is right for us to say that it affects the life of our aspirant doctors greatly.

Only a few researches deal with this specific issue which has been further exacerbated owing to lockdown and to our knowledge there is no such data relating to medical students directly, especially in Pakistan. Considering long screen time exposure can have long lasting effects on our youth's personal development, more such data relating to medical students is gravely needed so that strategies can be defined in order to better shape the future health of our doctors and consequently also our patients.

Material and Methods

Study design

A descriptive cross-sectional study was conducted in district Lahore, one of the most populated city of Punjab Province, Pakistan. This study was conducted for a period of 3 months (20th July 2020-20th October 2020). Lahore was selected because its having the largest number of medical institutions in one city therefore the strength of students is high as compared to other districts.

Data collection

Data was collected using a predesigned questionnaire that contained quantitative as well as qualitative questions. Participants in the study were medical students and only those enrolled in MBBS Program aged 18-35 years were chosen. Short-term physical and mental symptoms associated with increased screen exposure were identified through extensive literature review and a special self-administered questionnaire was designed in English. The questionnaire had an informed consent section attached to it and was distributed to the medical students through social media.

Sampling

A non-probability snowball sampling technique was used to select participants for interviews in the study. A total of 400 medical students were enrolled in the study.

Data Analysis

The data was analyzed through SPSS version 26.00. Frequency and percentages of all the variables were calculated. Mean/medians were calculated for numerical data as required. Stratification was done on the basis of exposure time to screen and the symptom frequencies were calculated for each stratum. Chi-square test of significance was applied to estimate the strength of association between the strata and the symptoms less obviously linked to increased screen use at 95% Confidence interval. P-value of <0.05 was considered significant.

Results

Out of the total 400 participants that responded, 69.8% (n=279) were female and 30.3% (n=121) were male. Mean age was calculated to be 21.43 +/- 1.51. From the total, an alarming 93.75% (n=375) reported an increase in screen time during the lockdown. The screen time was more than 8 hours for 39.5% (n=158) of the students, 4-8 hours for 47.3% (n=180), 2-4 hours for 12% (n=48) and only 1.3% (n=5) reported a screen time of < 2 hours. As a consequence of increased screen usage, 207 (51.75%) of the participants reported headache, 267 (66.75%) reported fatigue, 283 (70.75%) reported eye strain, 121 (30.25%) reported dry eyes, 143 (35.75%) reported blurry vision, 154 (38.5%) reported teary eyes, 154 (38.5%) reported ear ache, 247 (61.75%) reported neck and back stiffness and 148 (37%) participants agreed to having experienced fingers and hand fatigue. We also found that students diagnosed with refractive errors were more likely to complain of eye strain (p=0.004) and those diagnosed with migraine were more likely to face the issue of screen related headache (p=0.001). In addition to these, 213 (53.25%) participants reported a decrease in physical activity, 135 (33.75%) reported an increase in screen associated food consumption and 207 (51.75%) reported an increase in their body weight.

Stratification of data based on the average screen time that the participants had during the lockdown produced the percentages of symptoms as shown in Table 1. For less obvious symptoms, we applied the tests of significance and were able to identify a

relationship of increasing screen time with decrease in physical activity ($p=0.011$), increase in food consumption ($p=0.002$) and with increase in weight ($p=0.03$) (Table 2).

In the case of mental symptoms, we found that out of 11 total symptoms mentioned in the study questionnaire, students with screen usage of <4 hours marked a median of 2 symptoms, those with screen time of 4-8 hours ticked a median of 4 symptoms and those with screen usage >8 hours had a median of 5 symptoms. The individual symptoms were selected as overwhelming sadness by 163 (M=28.09%, F=44.08%), feeling hopeless and helpless by 131 participants (M=22.31%, F=36.2%), loss of energy by 207 participants (M=36.37%, F=55.56%), self-hate by 77 students (M=9.91%, F=21.86%), smoking and substance abuse by 12 participants (M=5.78%, F=1.79%), excessive worrying by 160 students (M=38.01%, F=41.93%), feeling agitated by 204 students (M=46.28%, F=51.97%), difficulty concentrating by 260 students (M=52.06%, F=69.89%), loss of interest in daily activities by 176 students (M=35.53%, F=45.51%), reckless behavior by 34 students (M=5.78%, F=9.67%) and trouble sleeping by 177 students (M=36.37%, F=43.72%). In addition we also found that students who had been diagnosed with anxiety and depression in the past checked 5.24 symptoms while those with no such diagnosis checked 3.51 symptoms on average.

Discussion

As the educational institutes world-wide closed in an attempt to contain the highly transmissible COVID-19, medical students all over the world, suddenly relieved of many of their academic and clinical activities, found a lot of free time at their hands. There was a lot of concern regarding their overuse of screens in this era of internet and globalization and our research shows that these concerns were rightly placed as 93.75% (n=375) reported an increase in screen usage during this lockdown. The data suggests that this increase in screen usage was up to an alarming level of >8 hours of screen for 39.5% (n=158) of the students. In addition, 47.3% (n=180) of the students reported a screen time of 4-8 hours, 12% (n=48) reported a screen time of 2-4 hours and only 1.3% (n=5) reported a screen time of <2 hours, the actual recommended duration of screen use. Our data also shows that most of the screen usage was limited to entertainment purposes (social media (86%), movies and TV series (71.3%)) and the other factors like online learning (48.5%) and web surfing (36.5%) came secondary. We speculate that the reason of these higher figures is because the students were not guided properly about the harmful effects, short-term and long-term, that increased screen use is bound to have, and also because technology has become such an integral part of lives that we use it for everything and are unable to form proper boundaries to limit its use. Detailed results are depicted in the tables and figures.

Table 1: Description of health signs in medical students interviewed.

	<4 hours	4-8 hours	>8 hours
Headache	26 (49%)	110 (58.2%)	71 (44.9%)
Fatigue	28 (52.8%)	139 (73.5%)	100 (63.2%)
Eye strain	37 (69.8%)	136 (71.9%)	110 (69.6%)
Dry eyes	18 (33.9%)	57 (30.1%)	46 (29.1%)
Blurry vision	18 (33.9%)	71(37.5%)	54 (34.1%)
Teary eyes	23 (43.3%)	68 (35.9%)	63 (39.8%)
Earache	16 (30.2%)	83 (43.9%)	55 (34.8%)
Neck/back stiffness	19 (35.8%)	122 (64.6%)	106 (67.1%)
Finger/hand hurting	15 (28.3%)	66 (34.9%)	67 (42.4%)

The results of our research showed that 70.75% (n=283) medical students agreed to having experienced eye strain during the increased screen usage, whereas a research conducted on teenage students in Rawalpindi showed that only 22.3% of the participants faced this symptom [9]. Spending too much time in front of the screen can lead to eye strain which is natural since excessive and repetitive use of anything for extended period of time can lead to its fatigue. In addition, the conditions in which screens are viewed are mostly far from ideal including lighting, posture and focus. In case of people who already have minor vision problems, the situation is even worse and it can significantly affect the level of performance and comfort while using devices [13] as also depicted through our study. It might be because that individuals who have already been diagnosed by refractive errors are more informed and are better adapted to identify eye strain than the individuals who do not have such a vision problem.

The continuous movement of eyes, shifting of focus and rapid signaling required to send varying images to the brain require a lot of effort from the eye muscles. In addition, there is also a tendency to blink less when looking at devices. All of this adds up to cause strained, dry, irritated eyes and that can result in blurred vision [14]. Our research results seconds this notion as 30.25% (n=121) students reported to have experienced dry eyes and 35.75% (n=143) reported blurry vision. In addition, 38.5% (n=154) of the participants agreed to having teary eyes during prolonged screen use.

An extended period of time spent in front of a screen can result in headache due to the flicker and glare from the screen, brightness of the device being too much or less, poor lighting conditions in the workspace, or all of these factors combined. According to our research, 51.5% (n=206) medical students complained of headache and this is fairly similar to a research conducted in college students in Rawalpindi in which 47.3% of the participants complained of headache [9]. We were also able to identify a significant relationship between students diagnosed with migraine and headache ($p=0.001$)

suggesting that those with migraine have a greater tendency of developing headache with screen usage. This is in accordance to a research done in France which established a relationship between screen usage and migraine headache [15]. Using computer or any other device at night, also leads the biological clock into thinking it is still daylight. This results in disturbance of circadian rhythm because the body delays melatonin production [16]. Many studies have proven that light from our laptops or desktops can cause many problems such as late night headaches, a lethargic and fatigued body after waking up, loss of ability to concentrate and reduction in the amount of sleep [17]. Bad posture, immobility for longer periods of time during screen time, abnormal sleep wake cycle, and continuous usage of certain muscles causing them to spasm or get tired can all result in fatigue. Our research data indicates that 66.5% (n=266) students complained of fatigue after excessive screen usage.

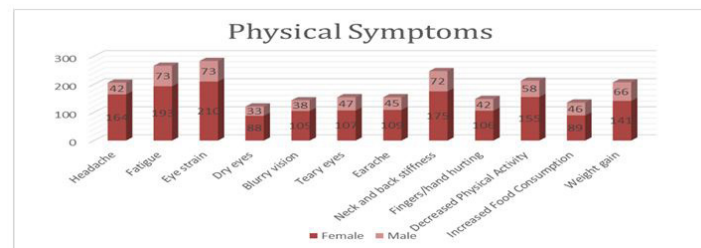


Figure 1: Description of physical symptoms faced by the students.

The considerably increased usage of headphones or earphones with mobile phones has raised concerns among healthcare professionals about damage to the auditory health of the youth. In our research, 38.5% (n=154) of the students reported to have experienced earache with prolonged use of earphones with screens. The major problem with earphones is the high volume of sound they can produce which can be detrimental to the ear. In addition, the headphones and earphones, especially those with an improper fit, when placed on the ears for a longer duration result in fatigue and ear ache. Chronic exposure to loud sounds causes the hair to lose their sensitivity to vibration, and irreversible damage can lead to earache and hearing loss [18].

Most students tend to use their devices either in a poor reclined posture or while lying down. This might be why we observed that 61.75% (n=247) students experienced neck/back stiffness. Heavy

mobile phone users are often seen in a forward flexed position of their necks which can cause upper back and neck pain. Excessive neck flexion can also irritate the brachial plexus leading to pain in the shoulder and arm. This poor posture leads to stiffness of the muscles of neck and shoulder. This collection of symptoms is referred to as ‘text neck syndrome’ which is seen predominantly in people who use mobile phones excessively [19]. Our results are in accordance with another research done on college students in which 42% of people had neck pain and 35% had mild neck disability index scores due to mobile phone overuse [20]. Another study conducted among undergraduate students of Punjab University and University of Lahore showed that 56.7% of the total participants who were heavy mobile phone users had neck pain [21].

Extended use of cell phones can cause damage to the muscles and tendons of the fingers and thumb. Unsuitable positioning of the hands while texting or scrolling can affect the flexibility of the fingers and can also cause pain in the upper limb over time. It has been observed that texting and gaming for a long duration of time gives rise to the complaints of pain in the fingers, soreness of hand muscles, numbness and tingling of the fingers, which is commonly referred to as ‘Text claw’ [22]. According to our research, 37% (n=148) students have had pain in their hands/fingers due to overuse of mobile phones and laptops, out of which 28.4% (n=42) were males and 71.6% (n=106) were females. The results of another study conducted at Sheikh Zayed Medical College, Rahim Yar Khan, showed that 40% of the mobile phone user students in the study were experiencing thumb pain because of cellphone usage [23].

It is a well-established fact that insufficient physical activity is a major cause of many health risks, including weight gain. Sedentary behavior and screen time is concluded to have increased during the lockdown, contributing to a decrease in daily physical activity, increase in food consumption and possible increase in weight. The concept of displacement hypothesis explains the effect of screen time on physical activity. The hypothesis postulates an all or none relationship, stating that as a person spends more time on screens, he will ultimately be left with less time to engage in physical activities [24]. Our research confirms this hypothesis as we were able to establish a significant relationship between increasing screen times and decreasing physical activity.

Table 2: Association of screen usage with physical activity and food consumption in medical students.

	< 4 hours	4-8 hours	>8 hours		p-value
Physical activity	9 (17%)	26 (13.8%)	23 (14.6%)	increased	0.011
	27 (50.9%)	60 (31.4%)	42 (26.6%)	neutral	
	17 (32.1%)	103 (54.5%)	93 (58.9%)	decreased	
Food consumption	9 (17%)	69 (33.3%)	63 (39.9%)	increased	0.002
	42 (79.2%)	103 (54.5%)	75 (47.5%)	neutral	
	2 (3.8%)	23 (12.2%)	20 (12.7%)	decreased	
Weight change	23 (43.4%)	102 (54%)	82 (51.9%)	increased	0.03
	21 (39.6%)	52 (27.5%)	49 (31%)	no change	
	9 (17%)	35 (18.5%)	27 (17.1%)	decreased	

The lack of a proper work routine and more leisure time can increase the intake of food and snacks, particularly while viewing screens. This inevitably leads to significant weight gain. 51.8% (n=207) students observed an increase in their weight due to reduced physical activity and increased food consumption. We were able to identify significant relationships of increasing screen time with decrease in physical activity (p=0.011) and with increase in food consumption (p=0.002). These both factors combined led to a significant weight gain (p=0.03) with increasing screen exposure.

For mental symptoms, we asked the participants to check all of the symptoms of anxiety and depression (out of 11) that they frequently felt and we observed that students with a screen time of <4 hours ticked a median of 2 symptoms, those with a screen time of 4-8 hours ticked a mean of 4 symptoms and those with a screen time of > 8 hours checked 5 symptoms implying that with the increase in screen usage, the frequency of mental symptoms might increase as well. One such research on children and adolescents clearly highlighted how screen time cause increased anxiety and depression [11]. We also found that students who had been diagnosed with anxiety on average checked 5.24 of the symptoms while those who were not checked 3.51 symptoms on average which suggests that people who have already been vulnerable mentally, are more affected. However, we cannot ignore the fact that most of these mental symptoms might actually be because of the COVID-19 pandemic situation rather than the screen usage and hence this in a way, becomes a limitation of our study. The main symptoms that students faced are given in the Figure 2 with their respective frequencies. The major symptoms include difficulty concentrating (65%), loss of energy (51.7%) and feeling restless/agitated (51%). Increased screen usage disturbs the circadian rhythm, as already described above that further exacerbates these symptoms [16,17].

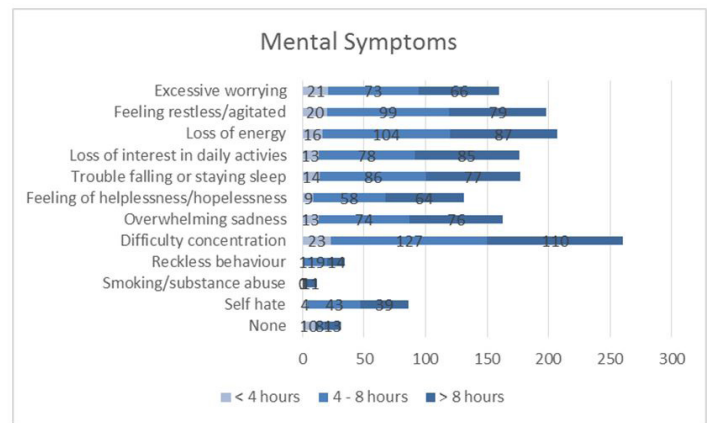


Figure 2: Frequency of the mental symptoms that the students faced

According to most of the students, praying, resting and talking to friends and family were very effective in eliminating their symptoms. Exercising, going for a walk and healthy eating were

among the second most chosen solutions. Only 7.5% (n=30) admitted that taking medicines to alleviate their symptoms helped.

Conclusion

The COVID-19 lockdown proved to be very detrimental to the students' health as over 90% of them experienced increase in their screen usage. This subsequently resulted in significant physical and mental manifestations that negatively affected their performance in daily activities. Our research emphasized that if the screen exposure of students is not kept under check especially during times such as a lockdown, their physical and mental well-being can be compromised with some serious short term and long term effects. Hence, there forms a clear need for more research and awareness in this regard so that medical students are able to spend their time in a more productive and useful manner.

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