SHORT COMMUNICATION

Effects of excessive screen time during online teaching on the physical and mental health of medical and dental students

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Abstract

To assess the effects of excessive screen time on the health of medical and dental students due to online teaching during the COVID-19 pandemic.

It was a descriptive cross-sectional study, conducted in Bahria University of Health Sciences from June 2022 to September 2022 after getting ethical approval. A total of 200 students who attended online teaching modules for at least one year through online teaching Apps, were included. A structured questionnaire was distributed using google forms. The results revealed that factors including strain on the eyes, restlessness, declined academic performance and exercise during lockdown, along with feeling connected as a group had a significant association with increased screen time. Excessive screen time has various adverse effects on the physical and mental health of medical and dental students. For improving students' physical and mental health during online teaching we need to change teaching strategies and support the introduction of flipped classroom.

Keywords: Online Teaching, Screen Time, Academic Performance, Mental Health.

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Introduction

COVID-19 pandemic enormously changed the lives of everyone since December 2019. One significant shift in communication has occurred since the COVID-19 pandemic hit our lives.[1] All around the world, people were pushed towards media applications that effectively facilitated live connection and interaction among individuals, firms, countries, and even institutes. When at its peak, COVID-19 led to country-wide lockdowns in almost every part of the world, leading to new working methodologies, like work from home and online teaching and assessment.[2] A major turn in the education system for students enrolled in different universities, colleges and schools was caused due to the widespread lockdown.[3] Online education systems were implemented widely which increased the screen time for most students.[4] Online assessment and teaching strategies became a part of the educational system and were difficult to adapt by both teachers and students.[5] The communication substantially shifted from live face-to-face communication to a virtual one. Academic conferences, business meetings, education systems, and government management systems were forced to accept and adapt to the risks and challenges that COVID-19 imposed.[6] Most universities also stopped holding events like workshops, conferences, sports, and practical demonstrations. The semester and final examinations were also suspended which became a big concern for the students.[7] Communication through Zoom, Microsoft teams, Skype, WhatsApp, and Facetime, kept the educational and economic sectors functioning during the lockdown period. This massive change from classrooms to virtual mode raised many concerns related to the availability of technical resources, privacy issues, skilled human resources, and technical problems.[8] Previously, excessive exposure to gadgets and smart devices has been reported to increase the levels of burnout and stress.[9] Stress is defined as an emotional, physical, or mental reaction that causes tension. An increase in the screen time that was associated with lockdown turned out to be a major burnout and stress factor in most people. Screen time is the sum of time spent in front of electronic screens, such as laptops, television, and mobile phones. The definition for excessive screen time varies in literature but mostly falls between two to three hours per day.[9] The association of stress and burnout with increased screen time has become a topic of interest for researchers globally.[9] It is often assumed that excessive exposure to smartphones and computer screens causes a lot of stress-related symptoms. These symptoms may appear in the form of cognitive problems, and psychological or musculoskeletal impairments. Most people complain of headaches, backache, and stress due to excessive exposure to online devices. Lack of physical exercise, excessive screen time, and decreased socialising are the key factors that promote frustration and mood disturbances in youngsters.

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These changes may affect an individual's quality of life and day-to-day functions. Studies have observed that the time spent in front of the screen is directly related to the severity of the symptoms. During the pandemic, students were forced to stay at home and their interaction with the outside world was limited to the virtual realm.[9] This age group was particularly vulnerable to the negative impact of this loss of social interaction as they are at the developmental stage of 'narrative identity'. The same phenomenon can be observed through the lens of the Affective Neuroscience Theory, which places these adolescents and young adults at a risk of psychological disturbances due to increased screen time and decreased outdoor activities.[10] The objective of the present study was to assess the effects of excessive screen time on the health of medical and dental students due to online teaching during the COVID-19 pandemic. It was hypothesised that excessive screen time during online education has negative impact on the physical and mental health of the medical students. Hence, the aims of this study were to assess the effects of excessive screen time on the health of medical and dental students during online teaching in COVID-19 pandemic and the impact of online teaching on the overall health and well-being of medical and dental students.

Rationale: Online teaching and learning during the COVID-19 pandemic were a new experience for the students and the faculty. This study aims to find the impact of the increased screen time associated with online teaching on the health of the students. The findings can be used to modify the teaching practices to minimise the negative effects and effectively incorporate technology as a teaching modality.

Methodology

The study was descriptive cross-sectional in design. It was conducted in Bahria University of Health Sciences for the duration of four months (June 2022 to September 2022). Sample size of 200 was calculated using open EPI website calculator using a reference study.[1] Data was collected using non-probability convenience sampling method, and students of third and fourth year MBBS and third year BDS were enrolled in the study after applying the inclusion and exclusion criteria. Informed consent was obtained from all the participants. A structured questionnaire formed using Google forms was utilised that consisted of two components: 1) age, gender, and the year of study; 2) qualitative exploratory question developed reviewing published literature. A total of 200 students who attended online teaching module for at least one year duration (third year MBBS, fourth year MBBS and third year BDS) through online teaching Apps (Microsoft teams, WhatsApp, Skype, and Facetime) were included, students who either did not attend online classes or attended online teaching for less than one year, as well as those who were not willing to participate, were excluded. Excessive screen time was considered to be more than three hours of screen exposure per day. Approval was obtained from Ethical Review Committee of Bahria University of Health Sciences (ERC 44//2022).

Data was stored and analysed using IBM-SPSS version 23.0. Counts with percentages were reported on the baseline characteristics of the studied samples including class, specialty, duration of online class, electronic devices frequently used to attend online classes, duration of screen time, and factors that may have affected the physical and mental health of students due to excessive screen time during online teaching. The association was tested using Pearson Chi Square test. Binary logistic regression was used to estimate the chances of associated risk factors of excessive screen time during online teaching, Univariate and multivariate analysis was done with class, specialty, and factors that were given significant association in Pearson chi square test with $p<0.05$. Odds ratio with 95% confidence interval were reported. All p-values <0.05 were considered statistically significant.

Results and Discussion

Our study included 32 students from third year BDS with mean age 20.56±1.17, 89 students from third year MBBS with mean age 20.92±1.60 whereas 78 students participated from fourth year MBBS with mean age 21.9±1.86 as shown in Figure 1.

The results show a significant correlation between the increased duration of the class and the experienced eye strain and restlessness. Physical challenges of online learning had been reported in literature even before the pandemic. But the additional features of reduced physical activity due to the lock-down as well as increased non-

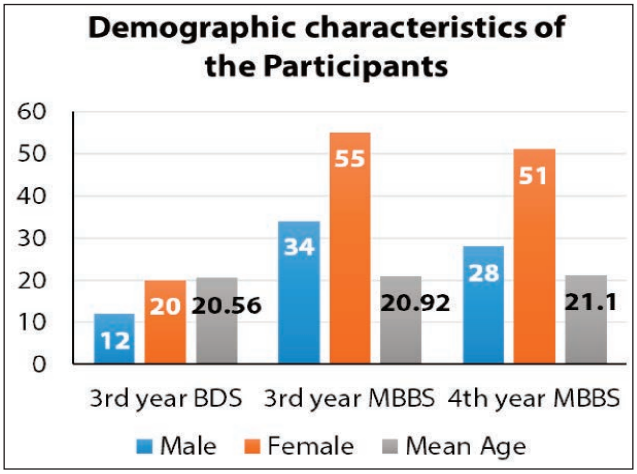

Figure-1: Bar chart showing Demographic characteristics of the study Participants.

academic screen time worsened the effects on the students' physical health. Figure 2 shows the maximum duration of screen time at a stretch while attending online classes. Table reports the findings of logistic regression analysis, in univariate model samples of third year (OR=0.8) and samples who always experienced strain in the eyes (OR=0.4) were less likely to be observed with excessive use of screen time, whereas samples that always felt restless (OR=2.9), did exercise (OR=2.9), experienced decline in academic performance (OR=1.9), and felt that online teaching helps them stay connected as a group (OR=2.2) were more likely to be associated with excessive use of screen time. In multivariate model the same direction of association was also observed.

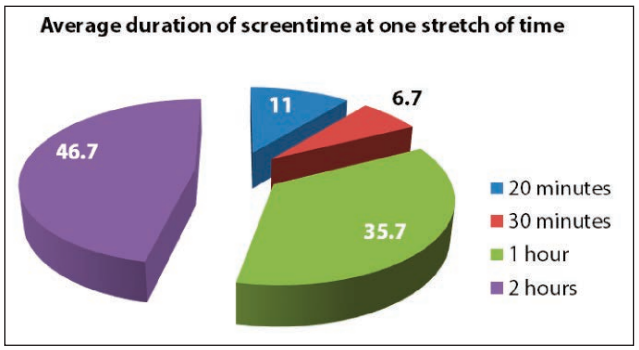

Figure-2: Pie chat showing average duration of screentime of the study Participants.

Table: Risk Estimation of Associated risk factors of excessive screen time during online teaching on the physical and mental health.

Factors	Univariate Odds Ratio (95% C.I)	Multivariate Odds Ratio (95% C.I)
Class		
4th year	Reference	Reference
3rd year	0.8(0.4-1.8)	0.7(0.4-1.9)
Specialty		
BDS	Reference	Reference
MBBS	1.0(0.4-2.3)	0.9(0.4-2.4)
Never	Reference	Reference
Did you feel a strain on your eyes during online classes?		
Sometimes	0.3(0.0-2.8)	0.2(0.0-2.1)
Often	0.3(0.0-2.9)	0.1(0.0-1.2)
Always	0.4(0.0-4.1)	0.1(0.0-1.5)
Never	Reference	Reference
Did you feel restless during online classes?		
Sometimes	0.8(0.1-3.7)	0.9(0.1-5.3)
Often	2.0(0.4-8.7)	2.9(0.5-16.)
Always	2.9(0.6-13.)	3.9(0.6-23.)
Improved	Reference	Reference
Do you feel your academic performance improved/declined during this period?		
Declined	1.9(0.9-4.1)	1.4(0.5-3.6)
Never	Reference	Reference
Did you do exercise during the lockdown?		
Sometimes	1.7(0.5-5.1)	2.1(0.6-7.0)
Often	2.2(0.4-10.)	3.4(0.6-19.)
Always	2.0(0.9-4.5)	1.5(0.6-3.7)
No	Reference	Reference
Do you feel online teaching helps you feel connected as a group?		
Yes	2.2* (1.0-4.5)	1.9 (0.8-4.7)

Dependent variable: Excessive Screen time >30 min; *odds ratio considered significant with p<0.05

A statistically significant number of students in the present study also reported that they did not exercise during the pandemic. Lack of physical activity and isolation proved to be the major factors that led to restlessness among the students.[7]

The introduction of new teaching methodologies always proves challenging for the teachers and students. But the challenges brought about by the unforeseen pandemic were unprecedented. There was no time to plan and organise the infra-structure or to familiarise and train the stakeholders. This contributed towards elevating the stress and anxiety experienced by the students during online teaching. There was also an overall decrease in the mental well-being of students during the lockdown due to fear for health, social isolation, financial issues, and the general environment of uncertainty.[7]

However, a noteworthy finding in our study was that a significant number of students viewed online classes as an effective tool to feel connected as a group. Relatedness is an important component of the Self Determination Theory (SDT), and helps to keep the students motivated.[8] According to the SDT theory motivation is enhanced by autonomy, competence, and relatedness, and once these intrinsic needs are met academic excellence can be achieved.[9,10] With the loss of physical contact, maintaining relatedness was expected to be most challenging. But our results show that through teacher preparedness and active participation of the students' connectedness was successfully maintained.

Along with the existing challenges in managing teaching and evaluation during the COVID-19 outbreak, universities have to prepare a road map for dealing with similar situations in future that would impose least possible burden on the physical and mental well-being of the students. Through this study, we have tried to identify factors that lead to increased physical and mental stress in medical and dental students due to online teaching. This study will help the medical educationists in improving the teaching and learning strategies and the introduction of flipped classroom in medical education.

Conclusions

COVID-19 has drastically affected the lives of medical and dental students. Physical and mental health of students was adversely affected due to online teaching. Faculty

members should embrace technology but pay careful attention to students' experiences to make the learning rich and effective.

Limitations and suggestions: The major limitations of this study are its small sample size and study population from a single centre. Medical students in other colleges including students in government medical colleges may be exposed to different conditions. Our study did not include clinical year medical students; more generalised results can be achieved if future studies by including participants from different medical colleges.

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Conflict of Interest: None.

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