

## Acute Migraine Attack in Students while taking Online Classes during Pandemic

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### ABSTRACT

**Objectives:** To determine the frequency of migraine in students taking online classes during Covid-19 pandemic.

**Study design and setting:** Cross-sectional study design using a non-probability convenient sampling technique was conducted and carried out for a period of three months from August 2021 to November 2021 at Bolan Medical College. Total n=500 students of secondary, high school, and undergraduate students of different disciplines attending online classes during the COVID-19 pandemic were the target population.

**Methodology:** The questionnaire comprised of four sections; students' demography, mean duration of using digital devices before and during the COVID-19 pandemic, and presenting to the hospital with complaints of headache/migraine. Students willing to participate were included while students that refused to participate were excluded. SPSS version 23.0 was used for data analysis. To determine the association between mean duration usage of digital devices, presenting with headache/migraine or the use of glasses in-between pre-COVID and COVID era, a one-sample t-test was applied keeping  $p < 0.05$  statistically significant.

**Results:** From 500 students, the mean age was  $18 \pm 3.2$  years. There were n=274 (54.8%) males and n=226 (45.2%) females. The mean duration of using digital devices in the pre-COVID era were  $1.8 \pm 0.7$  hours while in the COVID era were  $3.6 \pm 1.9$  hours. A significant difference was observed in terms of mean duration of digital device usage, frequency of migraine and use of glasses in COVID-19 era when compared with pre-COVID era.

**Conclusion:** Increase in use of digital devices during COVID-19 pandemic caused increased complains of headache/migraine among the students. Additionally majority of students reported decrease in visual acuity during the pandemic due to which they had to wear glasses.

**Keywords:** COVID-19, Headache, Migraine, Online classes, Stress.

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### INTRODUCTION:

Migraine is a common, chronic, debilitating neurovascular disorder, which is characterized by recurrent attacks of severe headache and dysfunction of autonomic nervous system.<sup>1</sup> It is unilateral and throbbing in nature, frequently associated with a variety of other non-specific symptoms such as nausea, vomiting, photophobia, and phonophobia.<sup>2</sup> Migraine attacks can last up to 4-72 hours and are diagnosed based on a combination of features. However, not all features must be present in every spell, and may differ from patient to patient.<sup>3</sup>

Worldwide, an acute headache disorder are estimated at about 46%, according to International Headache Society criteria for migraine and tension-type headache. Migraine is 11%, tension-type headache is 46% and chronic daily

headache is 3%.<sup>4</sup> The reported values revealed that headache disorders are causing disability in patients' daily routine lives on a global scale. According to WHO, such figures would make migraine the most disabling condition for both genders.<sup>5</sup> Preventive therapy may decrease the frequency of migraine attacks by up to 50% or more. To diagnose and evaluate the patient diagnostic screening is important.<sup>6</sup>

Digital device usage has been linked with increased frequency of migraine attack. The extensive use of computer as medium of teaching and learning in universities required self-analysis into the extent of computer related health disorders among students population.<sup>7</sup> Constant exposure to internet creates negative impact on life and imparts serious health issues like chronic fatigue, altered sleep, visual problem, migraine and low immunity.<sup>8</sup> The severity of internet addiction is associated with severity of headache. Since the beginning of the pandemic in 2020, the COVID-19 virus impaired the global health care system and all aspect of human's life as well. All educational institution remains closed worldwide and had to switch towards online, e-learning systems<sup>9</sup>. The pandemic affected student's social and educational academic life. They are concerned about their academic career. To

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diminish these issues educational sectors introduced online learning strategies: Prolong sessions in front of computer, laptop and mobile for online classes' students may get serious health issues and migraine is one of them.<sup>10</sup>

Thus, the objective of study was to determine the frequency of migraine in students taking online classes during the Covid-19 pandemic.

#### **METHODOLOGY:**

This cross-sectional observational study using a non-probability convenient sampling technique was carried out for a period of three months from August 2021 to November 2021 at Bolan Medical College. The study was done after approval from the Institutional Review Committee. The ERC was issued with ERC number-PGMI-2958. This was a questionnaire-based quantitative study only among students of secondary, high school and undergraduate students who were attending classes online during the COVID-19 pandemic. The sample size was calculated by using openepi software with 95 % confidence level and 50 % anticipated frequency, the sample size came out to be 385. But this study included 500 students as during the time period for data collection, 23 % more students agreed for participation in the study.

The questionnaire was comprised of four sections; students' demography, the mean duration of using digital devices before and during the COVID-19 pandemic, and presenting to the emergency department or medical out-patient department with a complaint of headache/migraine as a presenting symptom. Furthermore, questions were asked regarding the use of glasses before the COVID-19 pandemic and if glasses were used during the pandemic (for exclusion criteria). Regarding examination, the visual acuity of each study participant was checked by taking the participants to the ophthalmologist. Prior to student's recruitment, they were informed regarding the duration, purpose and anonymity of the research. Students willing to participate in the study were included in the study while those students that refused to participate in the study were excluded. For determining the average time a student spent on digital devices, it was asked from parents as well (not for confirming the answer given by the students). No other question was asked from the parents nor was any other questionnaire used. Digital devices included computers, smartphone, and any other digital device used during COVID-19 pandemic for taking online classes.

For diagnosing headache/migraine, the criterion of International Headache Society was used i.e., A. At-least five episodes fulfilling criteria B-D has occurred. B. Headache lasting 4-72 hours (untreated or unsuccessfully treated) C. Headache with at-least two of the following characteristics; unilateral location, pulsating nature, moderate to severe pain intensity, aggravating or causing avoidance of routine physical activities, during headache with at-least one of the following

i.e., nausea and vomiting, photophobia, photophobia, headache is not attached to another disorder.<sup>11</sup>

SPSS version 23.0 was used for data analysis. For descriptive data, frequency and percentages were reported while for quantitative data; mean and standard deviation were reported. For determining the association between mean duration usages of digital devices, presenting with headache/migraine as a symptom or the use of glasses in-between pre-COVID and COVID era, one-sample t-test was applied keeping p-value of <0.05 as statistically significant.

#### **RESULTS:**

Total of 500 students included in the study with mean age of  $18 \pm 3.2$  years. The frequency of males was  $n=274$  (54.8%) and females was  $n=226$  (45.2%). Total  $n=270$  (54%) of students were undergraduate students,  $n=122$  (24.4%) of students were high school students while  $n=108$  (21.6%) of students belonged to secondary schools. The mean duration of using digital devices (mobile, computers, television, laptop/notebook) in the pre-COVID era were  $1.8 \pm 0.7$  hours with  $n=422$  (84.4%) students. The mean duration of using digital devices (mobile, computers, television, laptop/notebook) in the COVID era were  $3.6 \pm 1.9$  hours with  $n=64$  (12.8%) students spending time on digital devices for <3 hours per day and  $n=436$  (87.2%) of students spending >3 hours per day=graph-I. All the included students, i.e. 500 attended online classes and presented with headache/migraine as a presenting complaint. Prior to COVID pandemic, 104 (20.8%) students used spectacles, however during the COVID era, 290 (58.0%) of students used spectacles. A 6/6 to 6/12 visual acuity was observed in 120 (24%) of students, 6/12 to 6/18 in 250 (50%) of students while <6/18 was observed in 130 (25%) of students (Table I)

The mean duration of digital devices usage in the pre-COVID and COVID era showed significant difference with P-Value <0.001. Students experiencing headache/migraine in pre-COVID era was in around  $n=104$  (20.8%) of students while in the COVID era, all students included in the study presented with headache/migraine as a presenting symptom, with p-value of <0.0001. The use of glasses in pre-COVID era, 104 (20.8%) and in the COVID era, 290 (58%) showed a significant difference of <0.001 [Table II].

#### **DISCUSSION:**

According to the study results, a significant increase in the frequency of headache / migraine along with the use of glasses was reported ( $p<0.0001$  and  $p<0.001$ ) in the COVID-19 era when compared with the pre-COVID period. The mean duration of digital device usage increased from  $1.8 \pm 0.7$  hours/day to  $3.6 \pm 1.9$  hours / day.

In accordance with our study reported, a study reported an increased frequency of headache/migraine amongst students that spent more time on digital device usage.<sup>12</sup> Similarly

Table I: Baseline demographics of patients included in the study (n=500)

Variables		Frequency	%
Mean age (years)		18	± 3.2
Gender	Male	274	54.8
	Female	226	45.2
Class	Secondary	108	21.6
	High school	122	24.4
	Undergraduate	270	54.0
Mean duration of using digital devices (pre-COVID)		1.8	± 0.7
<3 hours		422	84.4
>3 hours		78	15.6
Mean duration of using digital devices (COVID era)		3.6	± 1.9
<3 hours		64	12.8
>3 hours		436	87.2
Online classes attended		500	100
Presenting with headache/migraine as symptom		500	100
Use of glasses before COVID	Yes	104	20.8
	No	396	79.2
Use of glasses in COVID era	Yes	290	58.0
	No	210	42.0
Visual Acuity	6/6 to 6/12	120	24.0
	6/12 to 6/18	250	50.0
	<6/18	130	25.0

Figure: 1 Graphical representation of duration of digital device usage in COVID era (n=500)

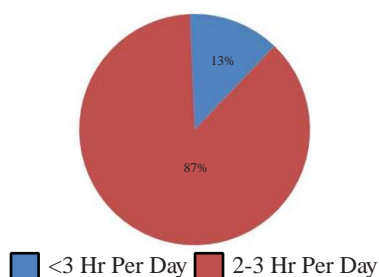


Table II: Association of various factors in online learning / use of digital devices with factors associated with headache/migraine

Variables	Pre-COVID era	COVID era	p-value
Mean duration of using digital devices (hours)	1.8 ± 0.7	3.6 ± 1.9	<0.001
Presenting with headache/migraine as symptom	104 (20.8 %)	500 (100 %)	<0.0001
Use of glasses	104 (20.8 %)	290 (58 %)	<0.001

another research also observed that the use of digital devices especially for long duration online classes were significantly associated with decrease in vision as well as increased frequency of headache/ migraine. Probably the reason of higher prevalence in undergraduate students would be having multiple factors such as increased level of stress associated with academic and economic burden, lack of sleep, improper diet and limited or lack of physical activities. These factors may increase due to more burden and responsibilities on them<sup>13,14</sup>. In yet another study to determine the screen time-exposure and reporting of headache in young adults, the results of the study suggested that the students with the highest screen time exposure reported an increased risk of migraine. The results of this study proved that long duration use of digital devices could possibly provoke headache.<sup>15</sup>

Similar to this study, another study conducted during the COVID-19 pandemic found similar effects on student’s mental health in terms of increased frequency of headache/ migraine coupled with visual impairments such as decrease in visual acuity, refractive errors etc.<sup>16, 17</sup>

Likewise in yet another research in which 46 students with mean age of 14.46 years were included with a mean duration of online classes at 3.08 ± 1.68 hours observed an increase of stressful symptoms such as headache/migraine, visual impairments and distress.<sup>18</sup>

In accordance with the findings of this study where due to increased screen time led to higher rates of migraine, published literature suggests that firstly screen time is referred to as the time duration which is spent in activities involving pairing with a digital screen, such as computer, laptop, tablet, mobile phones etc. Not only for online learning/classes, but screen time has increased in the pandemic for other services as well. Since the real-world impact of COVID-19 on migraine patients has not been extensively studied, to the

best of knowledge.<sup>19</sup>

From the results of our study and other studies on COVID-19 pandemic's impact, it can be unanimously said that the pandemic has caused a negative effect on not only the impact on migraine/mental health of patients but also on the overall health status of the population.<sup>20</sup>

The study was not free from selection and observational bias and the fact that students of a single locality / presenting to a single hospital were included; a further multi-centered study with students from different background would be revealing more information regarding the increased frequencies of headache/migraine among students of online, e-learning.

### CONCLUSION:

Increase in the use of digital devices amid the COVID-19 pandemic caused increased incidences of headache/migraine among the students. Additionally majority of students reported decrease in visual acuity during the pandemic due to which they had to wear glasses. Further studies are required for determining and addressing this health issue.

#### Authors Contribution:

**Abdul Zahir:** Manuscript Writing, Literature Review, Data Analysis and Research Monitoring

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