

ORIGINAL ARTICLE

Is There any Effect of Online Platform Overuse on Headaches During the Pandemic?

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Abstract

Introduction: Social constraints experienced during the pandemic have increased the use of online systems in both education and business life. Our aim is to evaluate the effect of overuse of online platforms on headache.

Methods: This study was conducted with 1627 participants with online data collection form which includes sociodemographic data and 25 questions related to the use of online platforms during the pandemic.

Results: One thousand four hundred and ninety-five participants with a mean age of 20.76 ± 2.21 years were university students or graduates. While the average daily screen time exposure was 2–4 h (743/1627), this time has increased to 8 h and above (966/1627) in the pandemic. While 68.6% of the participants reported an increase in headaches during the pandemic, 62.4% of the participants believed in parallel that this was related to the increase in the use of online systems. When comparing the pre- and post-pandemic periods, the headache duration ($p < 0.001$), frequency ($p < 0.001$), severity ($p < 0.001$), and use of analgesics ($p < 0.001$) increased significantly in both genders.

Discussion and Conclusion: In addition to COVID-19, the unfavorable role of changes in social life should also be considered in the increase of headache. Questioning the active use of online platforms during the pandemic in people with headache complaints may guide the regulation of treatment.

Keywords: COVID-19; headache; online; pandemic; screen.

After the World Health Organization declared the new type of coronavirus infection as a pandemic, the concept of face-to-face work in both education and business life began to change around the world^[1]. The necessity of social distancing required to reduce the pace of the epidemic has caused online platforms to be used more actively. These systems began to be used, where anyone with an internet connection could connect to devices such as

smartphones, tablets, computers, or televisions, without specifying a physical location or time limit. However, studies have shown that headache frequency can increase with prolonged screen time exposure, as a result of more widespread and active use of online systems^[2,3]. It is known that especially people miss their classes due to headaches they experience in their education life, sometimes, they have to repeat their classes or choose a school with a lower success

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level^[4]. It is estimated that online systems, whose usage has increased during the pandemic period, may worsen this situation, and negatively affect people's careers.

This study aims to examine the relationship between online platforms, which have become more widely used during the pandemic, and headaches with increasing frequency.

Materials and Methods

This study was conducted with 1627 participants aged between 18 and 30 years. An online questionnaire was sent to the participants between March 01, 2021, and March 31, 2021. The questions were revised to be more understandable in line with the opinions of the first 25 participants. The online data collection form, which consisted of two parts including basic sociodemographic data and headache characteristics, was sent to the participants. In the first part, there were five questions about the sociodemographic characteristics of the participants, including age, gender, education, and business life.

In the second part, there were 20 questions including the time of screen exposure and headache features (location, frequency, severity, duration, and use of analgesics). Participants have to choose only one option for all questions. The answers of the participants who answered all the questions were analyzed. (Ethics Committee approval number: E-46418926-050.01.04-11115). The study was conducted in accordance with the Declaration of Helsinki.

Statistical analyses were performed using IBM 21 Statistical Package for the Social Sciences. Descriptive analyses calculated the frequency (n) and percentage (%) for categorical variables, and mean, standard deviation, median, and 25th and 75th percentile for continuous variables. Compliance of the variables with normal distribution was assessed with visual methods (histograms and probability plots) and analytical methods (Kolmogorov–Smirnov/Shapiro–Wilk tests). Chi-square and paired samples t test were used in comparisons. Statistical significance was accepted to be $p < 0.05$.

Results

A total of 70.7% of the 1627 participants were female. About 91.9% of the participants whose mean age was 20.76 ± 2.21 years were either university graduates or continuing their education at the university. The effect of online systems on headache during the pandemic and the variables of gender, education, being a student, or working in a regular job is shown in Table 1. The increment of screen exposure time during the pandemic is shown in Figure 1.

Table 1. Demographic data and the impact of online systems on headaches

	n	%
Gender		
Female	1151	70.7
Male	476	29.3
Age		
18-24	1528	93.9
25-30	99	6.1
Education status		
High school	132	8.1
University	1495	91.9
Student status		
Yes	1558	95.8
No	69	4.2
Regular employment status		
Yes	149	9.2
No	1478	90.8
Having frequent headaches before the pandemic		
Yes	922	56.7
No	705	43.3
Increase in headache frequency during the pandemic		
Yes	1116	68.6
No	511	31.4
Location of headache		
Frontal	655	40.3
Occipital	167	10.3
Right / left side	95	5.9
The idea that online systems increase the headache		
Yes	1015	62.4
No	242	14.9
Maybe	370	22.7
Going to hospital due to headache in pandemic		
Yes	223	13.7
No	1404	86.3

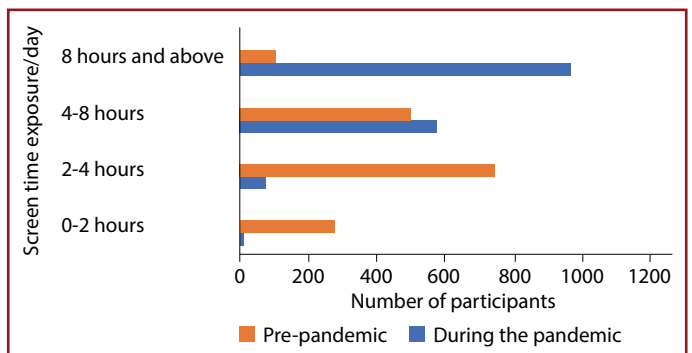


Figure 1. Comparison of daily screen time exposure of the pre and during pandemic.

Table 2. Comparison of the relation between the features of headache and gender

	Female - number(%)		Male - number(%)		p*	p**
	Before Pandemic Period	Pandemic Period	Before Pandemic Period	Pandemic Period		
Frequency of headache (number of attacks/month)						
<1	298 (25.9)	83 (7.2)	204 (42.9)	83 (17.4)	<0.001	<0.001
1	348 (30.2)	132 (11.5)	137 (28.8)	79 (16.6)		
2-4	376 (32.7)	384 (33.4)	101 (21.2)	162 (34.0)		
>4	129 (11.2)	552 (48.0)	34 (7.1)	152 (31.9)		
Severity of headache (rating between 1-10)						
1-3	480 (65.8)	224 (19.5)	250 (52.5)	140 (29.4)	<0.001	<0.001
4-7	573 (49.8)	586 (50.9)	206 (43.3)	256 (53.8)		
8-10	98 (8.5)	341 (29.6)	20 (4.2)	80 (16.8)		
Duration of headache (hours/day)						
1-4	934 (81.1)	585 (50.8)	400 (84.0)	272 (57.1)	<0.001	<0.001
4-12	159 (13.8)	375 (32.6)	64 (13.4)	147 (30.9)		
>12	58 (5.1)	135 (11.7)	12 (2.5)	57 (12.0)		
Analgesic use (number/month)						
<1	722 (62.7)	476 (41.3)	377 (79.2)	279 (58.6)	<0.001	<0.001
1-3	322 (28.0)	376 (32.7)	76 (16.2)	114 (23.9)		
>4	107 (9.3)	299 (26)	23 (4.6)	73 (17.5)		

Before pandemic and pandemic period values for female* and male** were compared with paired samples t test.

Seven hundred and sixty-four female and two hundred and fifty-one male participants thought that online working systems increase their headache. The frequency, severity, and duration of headache and use of analgesics were significantly increased between pre and during the pandemic period in both male and female participants (all with $p < 0.001$) (Table 2).

Discussion

For the 1st time, the relationship between online platforms, which are increasingly used during the pandemic, and headache, was examined in a large population of 1627 participants in this study. The duration of screen time exposure, which was 2–4 h before the pandemic, is over 8 h during the pandemic. In the pandemic, particularly in the education system, using the online systems more frequently due to secondary social constraints has caused a considerable increment in the attack number, frequency, duration of headache, and use of analgesics ($p < 0.001$). The ongoing pandemic that is already spanning all over the world will keep people work and study online for an unpredictable period of time. The negative impact of using online systems on headache has to be comprehensively evaluated since it might lead to overuse of analgesics and medication

overuse headache, which is relatively difficult to treat and also prone to be chronic. In a study by Montagni et al.,^[5] in participants with an average age of 20.8 at a university or higher education institution, a relationship was found between screen time and migraine, especially without aura, but no relationship was found between non-migrainous headaches. The authors suggested that the screen time exposure decreases the threshold value that initiates migraine attacks or that the screen band light frequency triggers the migraine attacks^[6,7]. In our study, 68.6% of the participants stated that their headache attacks increased during the pandemic and 62.4% of them stated that this rate was related to the increase in screen time exposure due to more active use of online platforms. Three hundred and seventy participants were undecided about this issue.

There are studies showing that acute-onset headaches with a different character than the previous ones develop in COVID-19 patients, and even headache may be the first sign of the disease.^[8-10] Baykan et al.^[11] suggested the use of new diagnostic criteria for headaches accompanying COVID-19 to guide researchers. However, both social limitations experienced during quarantine periods and during the pandemic, the psycho-sociological effects of changing daily living habits and its effect on pain have not been suffi-

ciently studied^[12]. In our study, the frequency of 2–4 attacks per month in female participants increased from 32.7% to 33.4% and the frequency of 4 or more attacks per month increased from 11.2% to 48.0% during pandemic compared to pre-pandemic period, strikingly (all with $p < 0.001$). A similar increase was seen in male participants. While the most frequent (42.9%) attack frequency was below 1 per month before the pandemic, 2–4 attacks were experienced most frequently (34%) after the pandemic ($p < 0.001$).

Internet addiction, the definition of which is discussed by clinicians, is important for the young generation, who use the internet extensively for both education and social activities, and can cause health problems^[13,14]. Headache, fatigue, sleep disturbance, and musculoskeletal pain are the primary somatic disturbances^[15]. The number of studies examining the relationship between computer use and headache has also increased in parallel with the increase in internet use^[16,17]. Li et al.'s^[18] study with 2216 information technology staff members found a relationship between the increase in computer use and tension-type headache (TTH). Participants with a daily screen viewing time of more than 8 h were found to have a 1.5-fold higher risk of developing TTH. In our study, the rate of increase in headache during the pandemic was higher in students compared to non-students ($p = 0.011$). This was attributed to the fact that the rate of using online systems was higher in education compared to business life ($p = 0.020$).

It was stated that before the pandemic, headache in women most frequently lasted between 1 and 4 h (81.1%). Although the duration of headache increased in the pandemic, they still most frequently experienced headaches between 1 and 4 h (50.8%) ($p < 0.001$). A similar situation is valid for men. While 1–4 h headache was 84.0% before the pandemic, it decreased to 57% after the pandemic ($p < 0.001$). The rate of headache that lasted between 4 and 12 h and over 12 h increased significantly after the pandemic in both groups (for each $p < 0.001$). In line with the increase in headache duration, the number of monthly analgesic use also increased. While the rate of using analgesics less than once a month in both genders decreased after the pandemic, the use of analgesics 1–3 to 4 and more increased during the pandemic period (for each $p < 0.001$). Although the frequency, severity of headache, and use of analgesics increased during the pandemic, the rate of consultation with health institutions remained low (13.7%), which can be interpreted as participants being cautious in consultation with health institutions associated with the pandemic.

In a study with a group of university staff and students who spend more than 3 h a day online, 44.7% had musculoskeletal problems and 46% had headaches^[19,20]. In the study of Xavier et al.,^[3] the use of electronic devices longer than 4 h a day was found to be associated with headache. It is thought that as the time spent in front of the screen increases, less time is devoted to social activities, and increased visual stimuli trigger headache^[21]. In our study, an increase in the frequency of headaches during the pandemic process was observed in participants who used laptops, smart phones, desktop computers, and tablets to connect to online platforms ($p = 0.015$). It was observed that the participants used the online systems most frequently with a laptop (1085/1627) and a smartphone (323/1627). Before the pandemic, 743 people stated that there was a 2–4 h daily screen time exposure, after the pandemic, this rate increased to 8 h and above with 966 people. The most increase in the frequency of headaches was observed in people who used online platforms 4–8 h a day during the pandemic ($p < 0.001$).

Limitations

Since our study is an online survey study, the participants were not evaluated by the physician and the answers given may include the possibility of recall error of the participants. Participants were also not questioned specifically for primary headaches, and the rate of increase in headaches during the pandemic was generally evaluated. Therefore, rates of migraine and tension headache in patients are not known. In addition, since participants are not asked whether they have had COVIDs, it is thought that headache may be related to the use of online systems as well as infection in COVID-positive patients. Especially during the pandemic period, changes in daily habits, depression, anxiety, sleep disorders, and even the development of metabolic acidosis due to continuous mask use may also lead to an increase in headache^[18,22]. The fact that only online systems were questioned in this study is a limitation.

The strongest aspect of the study is the high number of patients. In addition, the fact that the majority of the participants are between the ages of 18–25 and actively use the online system before the pandemic has enabled more accurate results to be obtained before and during the pandemic. Since the complaints of headache were questioned in detail, the characteristics of headache changed during the pandemic period could be evaluated in detail.

In headaches that emerged after COVID-19, the real triggers remained in the background during the pandemic. The increases in the frequency, duration, and severity of

headache and the use of analgesics in both genders in parallel to the daily screen time exposure are worrisome in young people. Questioning the use of online platforms, which are among the most important triggers during the pandemic period, can contribute to the treatment, especially in people who present with headache during the COVID-19 period.

Ethics Committee Approval: The study was conducted in accordance with the Declaration of Helsinki (E-46418926-050.01.04-11115).

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