Original Article :

Frequency of Screen Time Exposure During COVID-19 Pandemic and its Impact on patients wellbeing in Saudi Arabia: A Questionnaire-Based Study

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Abstract

Background and Aims:

Ever since the declaration of COVID-19 pandemic, the usage of digital devices has increased, whether in the educational field, entertainment or for communication and social purposes. In our study, we aim to investigate the influence of digital devices usage in health-related problems during COVID-19 and its correlation to headache.

Methods:

This questionnaire-based cross-sectional study was conducted from August 2021 to December 2021 at of Imam Mohammad Ibn Saud Islamic University in Riyadh city, Kingdom of Saudi Arabia. An electronic self-administered questionnaire distributed via student's emails to assess the characteristics of headache.

Results:

384 students were recruited; the most common age group was 18-21 years old. Most of the students reported increased use of digital devices during the pandemic. Additionally, it revealed that 71% of the students reported experiencing a headache for the last year during lockdown period, and more than half (52.2%) of them reported an increase in the frequency of headaches which usually lasted for hours (71%) with a medium severity (75.4%). The commonnest associated headache triggers were loud noises (61%), followed by difficulty concentrating (58.8%).

Conclusions:

The pandemic had a general negative impact on patients' health, and an increase in frequency of headaches due to increased exposure to screen time. Several risk factors for these negative results have been distinguished. It is therefore critical to establish long-term strategies to reduce severity and frequency of headache in order to improve the quality of life of patients.

Keywords:

Headache, COVID-19, Digital devices.

Introduction

Electronic media such as television, computer, video games, mobile phones, and tablets have become essential day-to-day life activities related to work, education, and leisure time, by all age groups[1,2]. Regarding educational purposes, the usage of digital devices has been increased to ensure good quality and better learning environment[3]. Notably, digital screens, especially mobile phones, have increased in the last decade[4]. The speed of development of mobile phones has invented many benefits to people other than communication[5].

Furthermore, mobile phone addiction was reported with the excessive use, although still there is no specific criteria for diagnosis, but it is believed to be related to physical, social and psychological aspects[6]. And with time, concerns started to develop regarding health-related problems with the excessive use of electromagnetic fields emitted by digital screens, as one of the most important long-term adverse effects on health is headache[3,6]. Headaches were commonly reported increasingly with exposure to digital screens especially among university students[7].

Most studies regarding the association of headache and electronic device use were related to mobile phones specifically[7]. There have been a number of studies conducted on this topic, none of which were conducted during the COVID-19-time frame. Given the marked increase in the use of electronic devices during the outbreak, we therefore aim to investigate the influence of digital devices usage in health-related problems during COVID-19 and its correlation to headache and sleep disturbance by assessing a sample of college students at a public university in Riyadh city, Kingdom of Saudi Arabia.

Methodology

Study design and setting:

This cross-sectional questionnaire-based study was conducted from August 2021 to December 2021 at Imam Mohammad Ibn Saud Islamic University in Riyadh city, Kingdom of Saudi Arabia. The study group included undergraduate college students from different specialties and educational levels. Adults aged ≥18 years old, both gender, and who have been/ not been diagnosed previously with any type of primary headache disorder were included in this study. Those who did not agree to participate in this study have been excluded.

Sampling technique, data collection method, instrument used:

After obtaining the institutional review board (IRB) of Imam Mohammad Ibn Saud Islamic University, an electronic self-administered questionnaire which was

distributed via Student's emails to assess the characteristics of headaches related to digital devices use. The authors have developed a questionnaire which was adapted from multiple previous studies, and the validity and reliability of this questionnaire was checked by pilot study.

The questionnaire was divided into four sections (demographic data and participant health status, digital device use, headache characteristics, including it's symptoms and triggers, and several questions were written to assess if headache symptoms increased during the COVID-19 pandemic in order to correlate digital screen exposure with headache).

Statistical Analysis:

Categorical variables were summarized using counts and proportions (%). The relationship between the increased severity of headaches during the pandemic in regard to the socio-demographic characteristics, duration of headaches, and the increased usage of the digital devices during the COVID-19 pandemic had been conducted using Chi-square test. A P-value of 0.05 was considered statistically significant. All statistical data were analyzed using Statistical Packages for Social Sciences (SPSS) version 26 (Armonk, NY: IBM Corp., USA.).

Result

Table 1: Socio demographic characteristics of the students (n=384)

Study Variables		N (%)
Age group	18 -21 years	226 (58.9%)
	>21 years	158 (41.1%)
Gender	Male	58 (151.1%)
	Female	326 (84.9%)
Nationality	Saudi	373 (97.1%)
	Non-Saudi	11 (2.9 %)
College	college of medicine	111 (28.9%)
	College of Economics and Administrative Sciences	99 (28.9%)
	College of Media and Communication	43 (11.2%)
	College of Sharia and Islamic Studies	19 (4.9%)
	College of Social Sciences	37 (9.6%)
	College of Applied Science	18 (4.7%)
	College of Languages and Translation	14 (3.6%)
	College of Computer and information	14 (3.6%)
	College of Arabic language	11 (2.9%)
	Others	18 (4.7%)
Do you suffer from frequent headache episodes	Yes	181 (47.1%)
	No	203 (52.9%)

Study Variables		N (%)
Types of headaches being diagnosed	Migraine headache	28 (7.3%)
	Tension headache	9 (2.3%)
	others	5 (1.3%)
	Not applicable/I haven't been diagnosed	342 (89.1%)
When have you been diagnosed with a headache?	In the last 3 months	4 (1.0%)
	In the last 6 months	5 (1.3%)
	In the last 9 months	3 (0.80%)
	In the last 1 year	4 (1.0%)
	more than 1 year	26 (6.8%)
	Not applicable	342 (89.1%)

In total, 384 students were able to be recruited. (Table 1) presented the socio-demographic characteristics of the students. The most common age group was 18 – 21 years old (58.9%) with most students being female (84.9%) and nearly all being Saudis (97.1%). Majority of students were from College of Medicine students constitute with percentage of 28.9%, followed by College of Economics and Administrative Sciences, College of Media and Communication, and College of Social Science constitute of (25.8%, 11.2%, and 9.6%) respectively. While (9.6%) were from the College of Sharia and Islamic studies and college of applied science. The prevalence of students who experienced frequent headaches was (47.1%). (10.9%) of the participants have been diagnosed with primary headache previously, 6.8% of the students had been diagnosed with a headache more than a year ago.

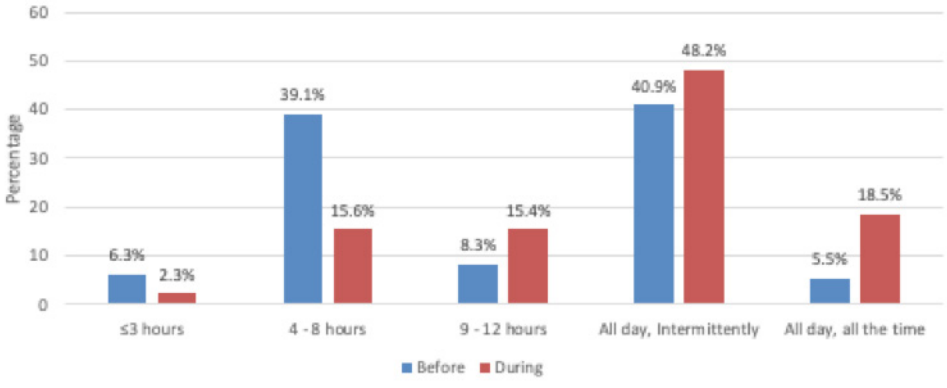


Figure 1: The number of hours spent in front of digital devices before and during COVID-19 Pandemic

Figure 1 depicts the comparison of the number of hours spent in front of digital devices before and during the COVID-19 pandemic. There was a stark increase in the number of students using digital devices all day, intermittently during the pandemic

(during: 48.2% vs before: 40.9%) or all the time (during: 18.5% versus before: 5.5%). There is a higher rate of use of the device for short periods of time (4-8 hours) during the pandemic than before it (before: 39.1% versus during: 15.6%).

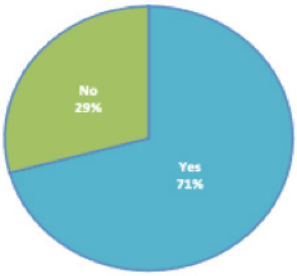


Figure 2: Suffered from headache during COVID-19 lockdown period

Figure 2 depicts the prevalence of students who suffered from headaches during the COVID-19 lockdown period. It revealed that (71%) of the students reported experiencing a headache during the COVID-19 era, while others were not (29%).

According to Table 2, it was revealed that nearly all students (99.5%) were using digital devices during the pandemic, and the most frequently used digital devices were Mobile phones (75.8%). Most of the students indicated increased use of digital devices during the pandemic (92.2%) with entertainment (84.6%), educational (74.5%) and communication (66.1%) being the most common reasons for utilizing digital devices. However, those who stated that they do not use any digital device (n=2) and those who have not suffered

Table 2: Behavior of students in using digital devices (n=384)

Study Variables		N (%)
Do you use digital devices?	Yes	382 (99.5%)
	No	2 (0.50%)
Most frequent devices have been used during lockdown period?	Mobile phone	291 (75.8%)
	Computer/laptop	47 (12.2%)
	Tablets	39 (10.2%)
	Electronic games	4 (1.0%)
	Television	1 (0.30%)
	Others	2 (0.50%)
During lockdown period, did your usage of digital devices become more?	Yes	354 (92.2%)
	No	30 (7.8%)
Reasons for using digital devices	Entertainment	325 (84.6%)
	Educational	286 (74.5%)
	Communication	254 (66.1%)
	Health	40 (10.4%)
	Others	4 (1.0%)
Do you have trouble sleeping?	Yes	227 (59.1%)
	No	157 (40.9%)
I sleep less because I use digital devices?	Yes	181 (47.1%)
	No	203 (52.9%)

from headaches during the lockdown period (n=112; fig 2) were not considered in the following questionnaire sections.

As shown in Table 3, the characteristics of the students who experienced headache during lockdown period (272/384). More than one-third of the students (34.9%) experienced frequent headaches 1 – 3 times per month while more than half (52.2%) indicated that the frequency of headaches increased during the time of the pandemic which usually lasted for hours (71%) with a moderate severity (75.4%).

Table 3: Characteristics of students who experienced headache during lockdown period (n=272)

Study Variables		N (%)
The average number or frequency of headaches	It happens 1-3 times every day	44 (16.2%)
	It happens more than 3 times every day	11 (4.0%)
	It happens 1-3 times every week	56 (20.6%)
	It happens more than 3 times every week	24 (8.8%)
	It happens 1-3 times every month	95 (34.9%)
	It happens more than 3 times every month	24 (8.8%)
	It did not happen frequently	18 (6.6%)
Has the frequency of headaches increased during the COVID-19 pandemic	Yes	142 (52.2%)
	No	130 (47.8%)
The headache usually lasts for	Minutes	56 (20.6%)
	Hours	193 (71.0%)
	Days	23 (08.5%)
Usually the severity of the headache (how bad the headache is)	Mild	28 (10.3%)
	Moderate	205 (75.4%)
	Severe	39 (14.3%)
Increased the severity of headache during COVID-19	Yes	119 (43.8%)
	No	153 (56.2%)

Figure 3 shows the list of headache-relat-

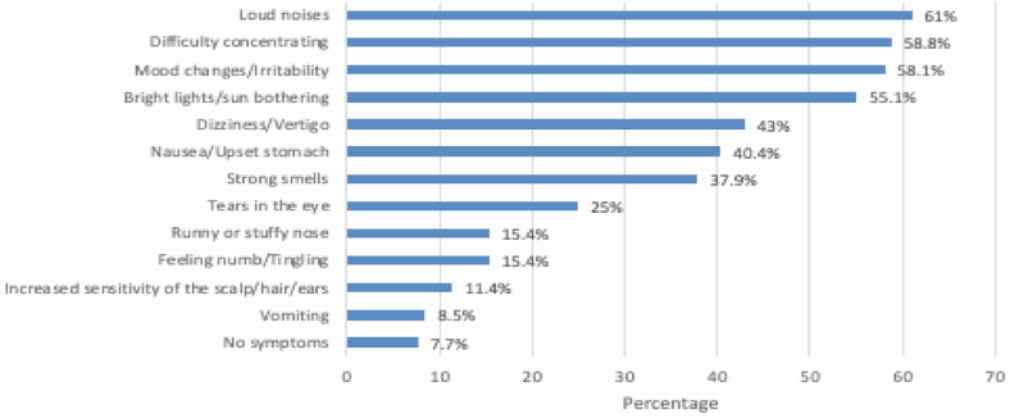


Figure 3: Headache associated symptoms and triggers

ed symptoms and triggers. It can be shown that the most common associated headache triggers were loud noises (61%), followed by difficulty concentrating (58.8%) and mood changes/irritability (58.1%) while (7.7%) of the students did not experience any symptoms associated with headaches. When measuring the relationship between

Table 4: Relationship between the increased of severity of headache during the pandemic and the increased usage of digital devices during the pandemic (n=272) *

Study Variables yes (N=119)		Increased the severity of headache during COVID-19		P-value
		No (N=153)		
Has the frequency of headaches increased during the COVID-19 pandemic	Yes	110(92.4%)	32 (20.9%)	** 0.0001>
	No	9 (7.9%)	121 (79.1%)	
The headache usually lasts for	Minutes	27 (22.7%)	29 (19%)	0.131
	Hours	78 (65.5%)	115 (75.2%)	
	Days	14 (11.8%)	9 (5.9%)	
Usually the severity of the headache (how bad the headache is)	Mild	8 (6.7%)	20 (13.1%)	0.169
	Moderate	91(76.5%)	114 (74.5%)	
	Severe	20 (16.8%)	19 (12.4%)	
Frequent headaches in general	Yes	87 (73%)	76 (49%)	** 0.0001>
	No	32 (26.9%)	77 (50.3%)	
Increased of usage of digital devices during pandemic	Yes	113 (95%)	141 (92.2%)	0.357
	No	6(5%)	12 (7.8%)	
Sleep disturbance	Yes	88 (73.9%)	91 (59.5%)	0.013 **
	No	31 (26.1%)	62 (40.5%)	

* Patients who were without headaches were excluded from the analysis.

§ P-value has been calculated using Chi-square test.

.Significant at $p<0.05$ level **

the increased severity of headache during the pandemic and the increased usage of digital devices during the pandemic, it was found that there is a significant relation between severity of headaches and frequency of headaches during the pandemic ($p<0.001$). Meanwhile, the severity of the headache and the increased usage of digital devices during the pandemic had no significant relationship ($p>0.05$). (Table 4).

Discussion

This study aims to analyze the relationship between digital screen exposure and headache during COVID-19. The surrounding circumstances during digital screen usage may contribute to triggering headaches including radio frequency fields (RFs), psychological factor, temperature change, noise, and various combinations thereof. What we found in our study was that the most frequently associated headache trigger was loud noises, and a contrary result was found in previous literatures where psychological and physical factors was

the most frequently reported triggers[8,9]. Although, a series of double-blind provocation studies failed to demonstrate a causal relationship between provokers and headache symptoms, as it reported no robust evidence in support of this connection[10-12]. On the other hand, a similar conclusion was reached by some researchers who found that total time spent daily using mobile phone had a strong positive correlation with pain intensity, headache, eye symptoms and concentration[9,13-15].

In this current study (92%) of students reported using digital devices more during the COVID-19 pandemic than before lockdown period. Nearly 90% of individuals indicated that the severity headache was mostly in range of medium to severe during COVID-19 period. A similar pattern of results suggests that using digital devices are widespread among college students with a percentage of 79.3% being smartphone users, and some consequences related to overuse of digital devices were reported where the majority of the participants complained of headache[6,16,17]. Additionally, during the lockdown period digital devices were increasingly involved in learning, resulting in an increase in screen time, which is consistent with our research findings that shows that university students are increasingly using devices[18]. Other studies findings supported the hypothesis of higher severity and frequency of headaches are present for long-time smartphone[5,18]. Our findings did not support this concept as there was no significant relationship between increasing usage of digital devices and severity of headache during lockdown period.

Regarding sleep quality, study found that 43% had a reduced amount of sleep and were sleep-deprived when using digital device for more than 8 hours[19]. This result ties well with our findings, where we found that (47.1%) had sleep disturbance due to digital device. Additionally, there was a significant relationship between increasing severity of headache during COVID-19 period and sleep problems. Conversely, comparing the results from another study, where sleep disturbance was associated with psychological factors such as anxiety rather than headache or digital device usage[20].

This study has potential limitations, first the measure used to collect data holds self-reported bias. Ultimately this study depends on patient's perception which may have some variation from one to another patient, so our result is purely subjective. However, this was due to lack of access to target sample during lockdown period. Second limitation is the number of participants and the variation from different specialties, which may show a difference of

viewpoints as some specialties depend entirely on digital devices and others do not.

Conclusion

The severity of headaches during the lockdown was significantly correlated with the frequency of headaches and sleeping disturbances. However, there was not a significant correlation between increased exposure to screen time and the severity of headaches during the lockdown period. Several triggers for these negative results have been identified. It is therefore critical to establish long-term strategies to reduce severity and frequency of headache in order to improve the quality of life of patients.

Acknowledgement

Not applicable

Conflict of Interest Statement

There are no conflict-of-interest to declare in relation to the content of this article

Commercial Relationships Disclosure

none

Funding Sources

Nil.

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