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Smartphone addiction percentage among dental student during COVID-19 pandemic: a cross-sectional study

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ABSTRACT

Introduction: During COVID-19 pandemic, smartphones can be used as media of an effective learning, information center, communication, and as a device to increase students' knowledge. Many advantages can be obtained by using a smartphone during distance learning. However, excessive use of smartphones may also lead to many disadvantages. The users have become dependent on the features provided by smartphones. Consequently, they will experience anxiety if they do not use their smartphone for too long. This condition is called smartphone addiction. The aim of study is to determine the percentage of smartphone addiction among dental students during COVID-19 pandemic. **Methods:** This study was utilizing the cross-sectional design and random sampling technique. The questionnaires of Smartphone Addiction Scale-Short Version (SAS-SV) were distributed using Google Forms and then analyzed using Microsoft Excel. The total number of respondents included in the inclusion criteria was 289 active students, and they were willing to participate in this study. **Results:** The majority of respondents (33,9%) agreed that they have lost time completing their assignments due to smartphone use, while the least respondents (29,1%) disagreed that people around them used smartphones too often. The majority of the respondents claimed to have smartphone addiction (88,2% male, 76,5% female). **Conclusion:** The majority of respondents are experiencing smartphone addiction. Further education regarding the early symptoms of smartphone addiction is required among dental students in order to control smartphone use according to their needs.

KEYWORDS

Smartphone addiction, dental students, COVID-19, SAS-SV questionnaire

INTRODUCTION

Smartphones provide convenience online for every individual with a variety of applications that allow users to access social media, play online games, surf the web, and perform many other tasks. The use of smartphones for a long period of time can gradually cause users to become increasingly obsessed with smartphones.[1] In 2017, there were 74.9 million smartphone users, then it increased again in 2018 and 2019. Approximately, 83.5 to 92 million smartphone users are from Indonesia.[2] Based on a survey of internet usage, especially among the younger generation, they use smartphones more during the lockdown during COVID-19 pandemic.[3]

Statista, one of the world's statistical institutions, reported that around 40% of internet users used their laptops more often than usual during the pandemic, and 22% of internet users around the world increased their use of tablets. Globally, internet users have increased their use of smart TVs and streaming media by internet by 30% compared to before the pandemic. The average internet users who participated in the global survey watched about 51% more movies via streaming services, such as Netflix. Internet users around the world spend more time than 45% on social media and messaging services, while 35% spend more time on video games and listening to music online through services such as Apple Music and Spotify. Internet users around the world also agree that around 14% of users have created and uploaded more videos on YouTube and Tik Tok.[5]

During the COVID-19 pandemic, smartphones can be used as media for effective learning, information centers, communication media, as well as instruments to broaden students' horizons. Smartphones offer numerous benefits for distance learning. On the other hand, excessive use of smartphones may also lead to negative side effects, such as loss of concentration, neck and back

pain, sleep disorder and device addiction. If the user has become dependent on the device, he or she will feel anxious if they don't use the smartphone for an extended period of time. This condition is called smartphone addiction, which is often associated with negative impacts on humans.[5] In 2015, WHO issued a report on the public health implications of the use of the Internet, smartphones and other electronic devices.[7]

Khumar et al,[7] conducted a study on smartphone addiction measurement using the SAS-SV score in India, which showed a smartphone addiction prevalence of 44.7%. Based on the study of Indrakusuma et al[6], on medical students at Udayana University, an analysis of the Smartphone Addiction Scale-Short Version (SAS-SV) questionnaire revealed that most respondents experienced a high level of smartphone addiction (58.24%), while some other students experienced a low level of smartphone addiction (41.76%).[6] In 2020, Leonard et al[9], surveyed 574 medical students in Malaysia and discovered that 40.6% of them were addicted to smartphones. Furthermore, according to Research conducted by Serra et al[3], in 2021, before the COVID-19 pandemic, among 184 people, 31.5% individuals were found to be at high risk of smartphone addiction, and 26.1% had shown smartphone addiction. During the COVID-19 pandemic, it was reported that the proportion of individuals with smartphone addiction increased to 46.7%, while 27.2% were at high risk of smartphone addiction.

Various studies have been conducted to identify sociodemographic factors in smartphone addiction. Age demographic factors have a significant relationship with smartphone usage habits and smartphone addiction. The results of a study conducted by CBS in 2013 confirmed that the younger generation and adolescents are active users of smartphones. The rate of smartphone usage in Indonesia is increasing by an average of 33% every year and is dominated by people under the age of 30, as much as 61% of all smartphone users.[10]

Continuous use of smartphones causes many health problems such as eye strain, back pain, neck pain, and sleep disturbances. In Kumar's 2018 study, the majority of 90.5% of research participants were found to use smartphones, which 57.5% had problems related to vision, 39% had hearing problems and 20% had reduced physical activity.[8] These results were similar to research conducted in Karachi, which 88.5% individuals owned a smartphone, of whom 71% reported problems concentrating in daily activities, 36.5% had hearing problems, and 7% had vision-related problems.[11] These results showed that the use of gadgets has similar effects on health. The amount of time spent (duration and frequency) using smartphones has several adverse effects such as physiological disorders, psychological disorders, social disorders and emotional disorders.[6] Smartphone use can cause sleep disturbances, which can affect concentration levels and academic performance.[12] In addition, poor sleep quality is also associated with an increased risk of physical and mental disorders.[13]

In 2017, Prasad et al. also conducted research to find out the pattern of smartphone use and its effect on 554 dental students in India. The results showed that 39.5% of dental students experienced a decrease in academic achievement due to the excessive use of smartphones. This shows how smartphones have a detrimental impact on academic achievement.[14] There are several methods for measuring smartphone addiction, such as the Smartphone Addiction Scale (SAS), the Smartphone Addiction Scale - Short Version (SAS-SV), the Smartphone Addiction Proneness Scale (SAPS), and the Korean Self-Reporting Internet Addiction Scale Short-Form Scale (KS-scale). This study was conducted using SAS-SV which was a modification of the SAS method, consisting of 33 questions and 6 points; whereas SAS-SV only has 10 questions so it takes less time and increases the interest of the respondents. The SAS-SV measurement method was tested by Kwon et al, in 2013 and showed that this method had good reliability and validity for measuring smartphone addiction.[14] In general, smartphone addiction consists of four main aspects: obsessive smartphone use, such as repeated behavior of checking messages or updates, longer and more intense duration of smartphone use, feelings of anxiety and suffering without a smartphone, and functional impairment or disruption of other social and life activities.[16,17]

During COVID-19 pandemic, dental students in University of Sumatera Utara (USU) underwent online lectures, resulting in having more free time at home, which potentially increased smartphone use activities and smartphone addiction rates. The objective of this study was to identify the characteristics of smartphone use, smartphone addiction percentage, and its percentage by gender among dental students at the USU, thus, the factors that have led to the students' addiction to smartphones could be determined. Although the use of smartphones has benefits for students, excessive use of the device may cause a decrease in academic achievement because it affects the students' concentration and performance. In addition to the importance of this study, the researchers were interested in investigating smartphone addiction during the COVID-19 pandemic among students of the Faculty of Dentistry, USU. Aim of study is to determine smartphone addiction percentage among dental students during COVID-19 pandemic.

METHODS

This study was a descriptive study using a cross-sectional method, and was conducted online in March 2022 at Faculty of Dentistry, USU. The participants were dental students from USU. Estimated proportion was used as the sampling formula of Lemeshow, the formula was $n=[Z^2_{1-\alpha/2}.p.(1-p)]/d^2$ with Z Score 1.645 and the proportion was taken from the previous study: 0.584 (58.4%)[3,4]. The total sample needed was 289 respondents.

Smartphone Addiction Scale-Short Version (SAS-SV) questionnaire was used. This questionnaire was translated into Bahasa Indonesia by a previous study in 2019. The study was conducted to measure internal consistency, and the Cronbach alpha value was 0.740.[15] Each question has a scale that ranges from 1 to 6 (1=strongly disagree, and scale 6=strongly agree). The scores of the ten questions are summed to produce an overall score that ranges from 1 to 60. There were differences in measurements of smartphone addiction between men and women. For males, an overall score of 31 is classified as "smartphone addicted", while a score of lower than 31 is classified as "not addicted to smartphones". For women, an overall score of 33 is classified as "smartphone addicted", while a score of lower than 33 is classified as "not addicted to smartphones".[14]
The questionnaire was created in Google Forms. The respondents were given detailed explanations through WhatsApp, along with the aims of this study. All participants spontaneously and voluntarily completed the survey. Lack of partial and/or total completion of the questionnaire was the only exclusion criteria. Their answers were recorded on a web-based Google Sheet form and then analyzed.

This study involved 289 dental students of USU. According to gender characteristics, the majority of respondents were women (77.9%). Based on the year class characteristics, there were 17.3% of second-year students, 42.9% of third-year students, and 39.8% of fourth-year students (Table 1).

Table 1. Characteristics of respondents.

Variables	n	%
Gender		
Male	225	77.9
Female	64	22.1
Total	289	100
Year class		
2nd year	50	17.3
3rd year	124	42.9
4th year	115	39.8

The results showed that 98 respondents (33.9%) agreed that smartphone use could cause the loss of study plans. Of 88 students, 30.4% agreed that smartphone use could affect concentration in class or while working on assignments. On the other hand, 20.1% respondents (58 individuals) disagreed that smartphone use might cause some health problems, such as wrist pain or back pain.

Then, nearly thirty percent of the respondents (29.8%) admitted that they could not survive without smartphones. Meanwhile, 58 respondents (20.1%) disagreed that they felt impatient and anxious without a smartphone. Additionally, 88 respondents (30.4%) did not agree that they were thinking about smartphones even if they were not using them.

Furthermore, Almost a quarter of respondents, 65 individuals, claimed that they would not stop using smartphones even though the device use had affected their daily lives. Eighty-eight respondents (30.4%) confirmed that they constantly checked their smartphones so as not to miss conversations on Twitter or Facebook. Moreover, 30.4% respondents or 88 individuals stated that they were using smartphones longer than they wanted. However, 84 respondents (29.1%) disagreed that people around them said they used smartphones too often (Table 2).

According to the data in Table 3, the majority of respondents had smartphone addiction (77.9%), while 22.1% did not (Table 3).

Table 2. Characteristics of smartphone use among dental students during COVID-19 pandemic

Statement	Scale											
	1		2		3		4		5		6	
	n	%	n	%	n	%	n	%	n	%	n	%
Missing planned work due to smartphone use.	3	1	18	6.2	32	11.1	98	33.9	98	33.9	40	13.8
Having a hard time concentrating in class, while doing assignments, or while working due to smartphone use.	3	1	22	7.6	45	15.6	99	34.4	88	30.4	32	11.1
Feeling pain in the wrists or at the back of the neck while using a smartphone.	22	7.6	58	20.1	60	20.8	85	29.4	49	17	15	5.2
Won't be able to stand not having a smartphone.	7	2.4	24	8.3	52	18	65	22.5	86	29.8	55	19
Feeling impatient and anxious I when I am not holding my Smartphones.	19	6.6	58	20.1	89	30.8	71	24.6	38	13.1	14	4.8
Having my smartphone in my mind even when I am not using it.	25	8.7	88	30.4	86	298	60	20.8	25	8.7	5	1.7
I will never give up using my smartphone even when my daily life is already greatly affected by it.	9	3.1	48	16.6	81	28	76	26.3	65	22.5	10	3.5
Constantly checking my smartphone so as not to miss conversations between other people on Twitter or Facebook.	8	2.8	36	12.5	58	20.1	79	27.3	88	30.4	20	6.9
Using my smartphone longer than I had intended.	3	1	13	4.5	49	17	93	32.2	88	30.4	43	14.9
The people around me tell me that I use my smartphone too much.	17	5.9	84	29.1	81	28	53	18.3	46	15.9	8	2.8

Table 3. Smartphone addiction percentage among dental students

Variables	n	%
Addiction	225	77.9
Not addiction	64	22.1

A total of 88.2% male respondents had smartphone addiction, while 11.8% did not have smartphone addiction. On the other hand, 76.5% female respondents had smartphone addiction, and 24.4% did not have smartphone addiction (Table 4).

Table 4. Smartphone addiction percentage based on gender among dental students

Variables	Addiction		Not Addiction
	n	%	n
Male	45	88.2	6
Female	180	75.6	58

DISCUSSION

According to Table 1 regarding gender characteristics, the majority of respondents were women (77.9%), while only 22.1% were men. Based on the year class characteristics, 17.3% were the second-year students of 2019, 42.9% were the third-year students of 2020, and 39.8% were the fourth-year students of 2021.

Table 2 shows that the majority of respondents (33.9%) admitted to experience a loss of their study plans caused by smartphone use. Hawi et al and Samaha et al[18] in 2016 also explained that smartphone addiction could be dangerous because they were constantly engaged with smartphones while they had tasks or work they should complete. Furthermore, most respondents (30.4%) agreed if they had difficulty concentrating in class, while doing assignments or working caused by smartphone use. The results of this study are also similar to Baleharo et al[19] in 2020, claiming that 3.9% of individuals had difficulty concentrating. Baleharo et al[19] stated that smartphones have become an important part of everyday life. With so much personal and professional data being transferred into them, it is only natural, from the perception of users, to let smartphones dominate their minds.[19]

About 20% of respondents denied that they had any discomfort, such as pain in their wrists or on the back of their neck, while using a smartphone. This finding is not in line with a study by Toh et al. in 2019, stating that adjusting the number of hours a day spent on a smartphone was associated with an increased risk of neck/shoulder, upper back, arm, and wrist discomfort.[20] Besides, the reason is not in line because the respondent could adjust the time and needs in their daily smartphone use to carry out learning activities and completing their task using the device.

Almost thirty percent of the respondents (29.8%) admitted that they could not survive without a smartphone. According to Bisen et al[18], study smartphones have become something that are inseparable from the life of teenagers and adults. Smartphones are not only used as communication such as calling or sending messages, but also as entertainment, including accessing social media, playing games and listening to music. This shows that teenagers and also early adults consider smartphones to be an important thing in their lives.

On the other hand, 20.1% of respondents disagreed if they felt impatient and restless when not holding a smartphone. This research is not consistent with the opinion of Marty et al. in 2020 that individuals who experienced smartphone addiction also used smartphones as a way to escape from problems and improve their moods, such as feeling isolated, anxious, lonely, and depressed. Individuals who experience smartphone addiction have behavioral characteristics, such as always carrying a smartphone charger everywhere, having difficulty to stop using a smartphone, and being easily irritated when disturbed while using a smartphone.[16] Additionally, those respondents denied that they felt impatient and restless when not holding a smartphone. Many smartphone addicts are people with low self-esteem and poor social relationships, thus, they think that they should always be in contact with other people. So, cell phone silence can cause anxiety, irritability, sleep disturbances, tremors, insomnia, and digestive problems.[21]

Most respondents (30.4%) disagreed with thinking about smartphones even though they were not using them. According to Prasad's research in 2017, it was reported that 24.12% of students were nomophobic, and 40.97% of students were at risk of nomophobia. This can be caused by being away from family and being homesick, which makes them more dependent on smartphones.[14]

One-fourth respondents claimed they would not stop using their smartphones even though the device had affected their daily lives. Individuals who experience smartphone addiction will always keep themselves busy and cannot be far from smartphones, and they will find it difficult to reduce and stop using smartphones.[18]

Meanwhile, 30.4% stated that they constantly checked their smartphones so they did not miss conversations on Twitter or Facebook. This research is in accordance with Kwon's research showing that messenger applications, including Facebook, Twitter, and some popular apps in South Korea, such as Kakao Story and Kakao game, are connected to the messenger. The use of this application is considered to reflect social characteristics because people can play games and interact with their friends and acquaintances.[22]

That smartphones were used longer than desired was stated by 30.4% respondents. This is in line with JavaId's research, which reported that 30% of students used smartphones for 6 hours a day. The use of smartphones for a longer duration has a negative impact on students' lifestyles. Social media is the most relevant smartphone application associated with smartphone addiction. This repeated behavior can affect an individual's lifestyle.[23]

On the contrary, almost thirty percent of respondents (29.1%) denied reports that they have used smartphones too frequently. Kwon et al. in 2013 mentioned that smartphone addiction is likely to become a social problem, including withdrawal and difficulties in performing daily activities, or a disorder of impulse control against oneself.[22]

Table 3 shows that of 289 dental students at the University of Sumatera Utara, the majority experienced smartphone addiction with a percentage of 77.9%. The results of this study are in line with Prasad et al. 2017's study on 554 dental students in India, in which 32.6% of pre-clinical students experienced smartphone addiction.[14] The results of this study were also in agreement with Venkatesh et al.[24] who conducted research on students in Saudi Arabia, and reported that 76.6% were addicted to smartphones. The high rate of smartphone addiction is undeniably influenced by the fact that students spend almost nine hours every day using smartphones. The function of smartphones that continues to expand and develop rapidly causes the number of smartphone addictions to increase. Young adults tend to be unaware of the amount of time spent using smartphones and this has given impacts on their academic and social interactions.[24] The availability of new and attractive smartphones, the affordability of smartphones, the ease of use of smartphones, and the wide variety

CONCLUSION

The largest percentage of respondents are reported to have smartphone addiction. Further education regarding the early symptoms of smartphone addiction among dental students is required in order to control smartphone use according to the needs.

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