Factors Associated with Smartphone Addiction during COVID-19 Pandemic Lockdown in Students of Faculty of Medicine in North Sumatera

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Abstract

BACKGROUND: The popularity of cell phones among the younger generation has increased rapidly in a short period, leading to the high prevalence of smartphone addiction among adolescents worldwide, especially during the COVID-19 pandemic lockdown period.

AIM: This study aimed to investigate the factors associated with smartphone addiction measured by the Indonesian version of the Smartphone Addiction Scale-Short Version (SAS-SV) score in both pre-clinical and clerkship students.

METHODS: A cross-sectional study was conducted from November 2020 to December 2020 in pre-clinical and clerkship students of the Faculty of Medicine from the Universitas Sumatera Utara, North Sumatra Islamic University, Hospital of North Sumatra University, and Hospital of Haji Medan academic year of 2019–2020. The Indonesian version of the SAS-SV questionnaire was distributed to the study subjects through Google Forms.

RESULTS: Bivariate analysis showed all variables to be significantly associated with SAS-SV score (all p < 0.05). Meanwhile, multivariate analysis showed all variables but the type of smartphone and the closest family members to be significantly associated with the SAS- SV score.

CONCLUSION: Age, gender, education level, monthly income, duration of smartphone use, sleep duration, parental educational background, monthly internet costs, and other uses of smartphones were found to be associated with smartphone addiction as measured by the Indonesian version of the SAS-SV score. Meanwhile, the type of smartphone and the closest family members were not associated with smartphone addiction as measured by the Indonesian version of the SAS-SV score.

Introduction

The penetration of mobile phones among the younger generation has rapidly increased in a short period. Terms such as "smartphone addiction," "problematic cell phone use," "cell phone dependence," "compulsive cell phone use," and "excessive cell phone use" are used interchangeably to describe the same phenomenon, that is, focus on smartphones personal. Adolescents exhibit weaker self-regulation abilities to withstand feelings. Teenagers spend a lot of time on their smartphones collectively every day. In a study by Kwon *et al*., 2013, smartphone addiction rates among teens worldwide were high [1], [2]. In the fifth edition of the Diagnostic and Statistical Manual of Mental Disorders and the International Classification of Diseases (11 revisions; ICD-11), addiction is a psychiatric diagnosis [3].

The COVID-19 pandemic emerged from China in December 2019 and has since spread to most countries around the world. Precautions imposed by the national government during the COVID-19 pandemic have caused individuals to spend a lot of time alone due to self-quarantine and refraining from face-to-face social interactions [4]. The younger generation use smartphones longer during the COVID-19 pandemic lockdown period. The excessive smartphone use during the COVID-19 pandemic may develop into various health problems.

Several questionnaires have been developed to measure the scale of addiction caused by smartphones in the past few years [5]. Self-report questionnaire on smartphone addiction, Smartphone Addiction Scale-Short Version (SAS-SV) with Cronbach's alpha coefficient of 0.740 reveals a high level of internal consistency. From the abovementioned background, this study aimed to investigate the factors associated with smartphone addiction measured by the Indonesian version of the SAS-SV score in both pre-clinical and clerkship students.

Methods

This cross-sectional study was conducted from November 2020 to December 2020. This study obtained approval from the Ethics Commission on

Research (No. 853/KEP/USU/2020). The subjects were pre-clinical and clerkship students of the Faculty of Medicine from the University of Northern Sumatra, North Sumatra Islamic University, Hospital of North Sumatra University, and Hospital of Haji Medan academic year of 2019–2020. The inclusion criteria were students aged 18–24 years, used smartphones with a duration of at least 3 h/day aside from online learning. The exclusion criteria were subjects with incomplete replies on the questionnaire and students who used smartphones during online learning. With type 1 error set at 5% and type 2 error at 20%, the calculation of the sample calculation resulted in 220 subjects.

The Indonesian version of the SAS-SV questionnaire was distributed to the study subjects through Google Forms. The questionnaire assessed age, gender, education level, type of smartphone, closest family members, and other uses of smartphones, monthly income of the student's parents, daily duration of smartphone use, duration of sleep, cost of using the internet on a smartphone, and the student's parental educations as potential factors associated with smartphone addiction. If the results were significant, the authors further provided counseling. All data analyses were conducted using Statistical Package for the Social Sciences version 22 for Windows.

Results

In this study, the subjects were predominantly male, as many as 136 subjects (61.8%). The majority of subjects who participated in this study were pre-clinical students (69.1%). Of the subjects, smartphones with Android operating systems were predominant (78.2%). The median student age was 21 years (18–24) years. The median parental income varied from 8 million rupiahs to 50 million rupiahs. The median duration of smartphone use was 4.98 h/day (3–8 h). The median sleep duration was 3.71 h with a minimum value of 1 h and a maximum value of 8 h. The study demographic characteristics are shown in Table 1.

A bivariate analysis was conducted with results, as shown in Table 2.

All variables were significantly associated with the SAS-SV score (all $p < 0.05$). A linear regression on the variables was conducted with the results, as illustrated in Table 3.

Discussion

This study investigated the association of age, sex, level of education at the medical faculty, type of

Table 1: Study subjects demographic characteristics

Demographic characteristics	Median (min–max)	n (%)
Age (year)	21.05 (18–24)	
Sex		
Male		136 (61.8)
Female		84 (38.2)
Education level at faculty of medicine		
Pre-clinical students		152 (69.1)
Clerkship students		68 (30.9)
Parental monthly income	18.44 (8–50)	
Type of smartphone		
Android OS		172 (78.2)
iOS		48 (21.8)
Parental educational background	19 (12–25)	
Monthly internet cost	110.95 (50–165)	
The closest family member		
Siblings		26 (11.8)
Parents		194 (88.2)
Duration of smartphone use	5 (3–8)	
Smartphone utilization		
Browsing		11 (5.5)
Social media		189 (94.5)
Duration of sleeping	3.71 (1–8)	

smartphone, closest family members, and other uses of smartphones, monthly parental income, daily duration of smartphone use, sleep duration, monthly internet costs, and parental educational background with smartphone addiction measured by SAS-SV questionnaire.

Table 2: Bivariate analysis for factors associated with Smartphone Addiction Scale-Short Version (SAS-SV) scores

Variables	SAS-SV score	Mean or median	p
Age	42.45 ± 9.315	21.05 (18–24)	0.001
Sex			
Male		43.86 ± 8.30	0.004
Female		40.17 ± 10.39	
Education status			
Pre-clinical students		40.93 ± 9.53	0.001
Clerkship students		45.85 ± 7.84	
Parental monthly income	42.45 ± 9.315	18.44 (8–50)	0.001
Duration of smartphone use	42.45 ± 9.315	4.98 (3–8)	0.002
Duration of sleep	42.45 ± 9.315	3.71 (1–8)	0.001
Type of smartphone			
Android		41.29 ± 9.40	0.001
iOS		46.60 ± 7.76	
Parental educational background	42.45 ± 9.315	19.00 (12–25)	0.004
Monthly internet cost	42.45 ± 9.315	110.95 (50–165)	0.004
Closest family member			
Siblings		41.75 ± 9.32	0.002
Parents		47.69 ± 7.48	
Other utilization of smartphone			
Browsing		40.13 ± 10.02	0.002
Social media		44.00 ± 8.49	

Independent t-test.

The previous studies have found age to be negatively associated with smartphone addictive behavior [6]. A study from Turkey found that the younger age group had an excessive rate of smartphone use. In general, adolescents have a higher risk of smartphone addiction compared to adults as they are more prone to accept new technologies than the older generation [7]. The female was found to be more addicted to smartphones than the male in this study. Women are characterized by a higher level of use of voice calls and text messages compared to men who use smartphones to listen to music, take photos, make videos, and play games. Another motivation for smartphone uses among college students found that female students used their cellphones more often to socialize [8]. The difference between the assessment of the apple phenomenon and the gender of the respondents was given by the higher sensitivity of women to fashionable ideas, appreciating exclusive luxury products [9].

Table 3: Multivariate analysis for factors associated with Smartphone Addiction Scale-Short Version (SAS-SV) scores

SAS-SV score	Correlation coefficients	Multivariate regression β	p
Constant		17.29	0.001
Age	0.28	1.47	<0.001
Duration of smartphone use	0.47	0.68	0.003
Duration of sleep	0.42	1.44	<0.001
Monthly internet cost	0.57	0.42	0.006
Monthly parental income	0.45	0.44	<0.001
Parental educational background	0.33	0.43	0.001
Browsing over social media	0.31	2.21	0.006
Pre-clinical students over clerkship students	0.36	3.28	<0.001
Male over female	0.40	1.90	0.020

Adjusted R2 = 63.1%.

This study found that the level of education in the faculty of medicine affected the use of smartphones. Adults with higher levels of education are less likely to have depressive symptoms, which is similar to the results of a study conducted in 10 European countries [7]. One study identified predictors of excessive cell phone use, higher school success and satisfaction, reading books, and increased academic motivation appear to be negatively correlated with addiction levels [10].

Parents' educational background and parents' monthly income were found to not affect smartphone addiction. However, another study showed a significant positive relationship between monthly parental income and intensive phone use and bills. An increase in the father's monthly income causes stress to students, conversely, an increase in the mother's monthly income causes reduced stress levels [11]. This study found that 30% of students use smartphones more than 6 h a day. This is by a study in Switzerland which showed that longer duration of smartphone use hurt students' lifestyles [12]. Poor sleep quality has emerged as a relevant health problem in technologically advanced societies [7]. The study conducted by Chatterjee and Kar who found a higher prevalence of smartphone addiction in male students and was associated with sleep duration. Furthermore, male students were more likely to use smartphones before bed and thereby more likely to had poorer sleep quality, avoid social interactions, become irritable when asked to limit smartphone use, and spend more time playing online and offline games [13].

One of the most important factors associated with smartphone use is the fear of missing out. Shaw, Ellis, Kendrick, Ziegler, and Wiseman in 2016 found that iPhone users were more likely to be female, younger, and perceived their smartphone as a status symbol. Griffiths defined social networking sites as virtual communities where people can create profiles and interact with real-life friends and make new friends based on shared interests. The results of Lee's, 2016, study showed that respondents use their smartphones for instant messaging, social networking services (SNSs), and messenger services. Smartphones are not only used to communicate but are also used for browsing the internet to get information, entertainment, and various other activities [14].

This study found that the closest family member was not associated with the SAS-SV score. This result contradicts the study conducted by Tan in 2019 in Malaysia. Parental attachment is "the relational bond that exists between a parent or guardian and a child." Parental attachment is formed through the closeness, safety, and security offered by the parent or guardian. Parents play an important role in the formation of an individual's attachment style [11].

This study found other utilization of smartphones to be the highest on social networking (60.0%) compared to browsing (40.0%.) These results are in line with a study conducted by Fischer-Grote *et al.* in 2019 in Austria that found smartphone use for SNS and the duration of this use seems to predict smartphone addiction. Another predictor of addiction to smartphones was the use of smartphones for entertainment. Seeking pleasure and entertainment through smartphones by watching videos, listening to music, or reading e-books were found to be associated with problematic use [10].

The strength of this study was the authors guaranteed the confidentiality of the respondents, thereby ensuring the study subjects answer the questionnaire freely and safely. The limitation of this study was attributed to its cross-sectional design.

Conclusion

Age, gender, education level, monthly income, duration of smartphone use, sleep duration, parental educational background, monthly internet costs, and other uses of smartphones were found to be associated with smartphone addiction as measured with the Indonesian version of the SAS-SV score. Meanwhile, the type of smartphone and the closest family members were not associated with smartphone addiction as measured with the Indonesian version of the SAS-SV score.

Further studies with experimental design are necessary to establish the causal correlation of the variables with smartphone addiction. Other variables to consider for future studies are differences between educational levels such as high school versus college versus graduate school, and other characteristics that may indicate a risk of addiction or other related problems.

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