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A Model for the Incidence of Phone Addiction in University Students at Sub-Urban Areas

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ABSTRACT

Indonesia is the fourth country worldwide regarding smartphone use, reaching 100 million users. The use of cell phones has a negative effect called phone addiction, which can lead to further health problems, both physical and non-physical health problems. This study aimed to model the incidence of phone addiction in students in suburban areas. The population of this study were students of Muhammadiyah University Gresik who were 17 years old, had a smartphone, used a smartphone for> 2 years, and had internet access. Data was collected online from March - April 2020 with 101 respondents. Samples were selected using simple random sampling. The condition of phone addiction was measured using the Smartphone Addiction Scale Short Version (SAS-SV) questionnaire. Analysis was carried out using Pearson chi-square and multiple logistic regression. The results of the bivariable analysis obtained variables associated with the onset of phone addiction, namely age, last education, residence, location of residence, and faculty of origin of respondents. The results of the multivariable analysis that was carried out obtained several significant variables, namely the age of the respondent (0.09; aPR 0.393) and the duration of daily cellphone use (0.05; 1.543). Students are a population with a high risk of developing phone addiction. One of the most critical factors for the onset of phone addiction is the high duration of cell phone use. Preventive measures need to be taken to reduce and prevent the onset of phone addiction in students before it causes further health problems.

INTRODUCTION

Life in the millennial era cannot be separated from a device with various functions, which is often called a smartphone/smartphone. This device is one of the objects people must own due to its many functions. Ranging from completing work to entertainment and other functions that can be done through a smartphone (1,2). In addition, improving the mobile phone user interface (UI), which makes it easier to use, is also one of the factors that cause impulsive behavior toward cell phone use (3). With the functions offered to be very abundant, the number of smartphone users is increasing along with the population growth that continues to grow. The increasing number of smartphone users not only occurs in developed countries but also in developing countries ranging from China, the United States, India, and Indonesia, which is the 4th ranked country in the use of smartphones, reaching 100 million users. (4,5). As a multi-functional device, smartphones provide many functions that are very useful in human life, such as facilitating communication, mobile gaming, etc (6). The reality that must be accepted from the many functions of a smartphone is the adverse effects that also often haunt the excessive use of smartphones. Problems that usually arise from too much smartphone use are addictions that can occur, such as smartphone addiction, nomophobia, mobile game addiction, internet addiction, or even cyberbullying (6,7).

When someone starts experiencing smartphone problems, it will cause several issues ranging from economic and social problems due to decreased work productivity/school assignments to the onset of physical, psychological, and psychosocial health problems that result in a reduced quality of life. (6–8). Other health issues are issues ranging from problems related to physical health, such as decreased visual acuity, pain in the shoulders and neck, brain disorders, and cancer, and even minor physical impairments that can interfere with daily life, such as text neck syndrome (9,10). Their health problems that also often arise besides physical issues are mental, ranging from anxiety, loneliness, shyness, withdrawal, stress, depression, and insomnia (9,11). Smartphone addiction is the most common smartphone use problem, and it is estimated that 50% of adolescents in the world experience

phone addiction (12). Teenagers make smartphones a lifestyle and necessity because they grow up with smartphones and the digital world (6).

Suppose adolescents who experience phone addiction are not treated immediately. In that case, this will have an impact on various aspects of adolescent life, such as the learning process, the process of getting to know the social environment, and social adaptation, and it can lead to physical health problems in the long term. (13). With these conditions, researchers want to model the incidence of phone addiction in students so that it can be a reference in determining the appropriate steps to prevent the incidence of smartphone addiction in students in suburban areas. This study aims to develop a model of the incidence of phone addiction in students in suburban areas.

METHODS

This research is an analytical observational research with a cross-sectional design. The research was conducted at Universitas Muhammadiyah Gresik from December 2020 - March 2021. The population of this study were students at the Faculty of Health, Universitas Muhammadiyah Gresik, with a total sample of 101 people. Samples were selected using a simple random sampling technique with inclusion criteria, namely at least 17 years old, owning a smartphone, having used a smartphone> 2 years, having internet access, and being willing to follow the data collection process until the end.

The research was conducted online using an e-form provided by Google. The dependent variable of this study is the condition of phone addiction experienced by students. Independent variables are divided into socio-demographic variables, such as cell phone use habits and sleep patterns. The data collection process was carried out for 20-30 minutes while maintaining the confidentiality of respondents and remaining anonymous.

The phone addiction variable is measured using the Smartphone Addiction Scale Shorth Version (SAS SV) for students/adolescents compiled by Kwan M et al. (2013) (14). The SAS SV scale was developed based on the Smartphone Addiction Scale (SAS), Smartphone Addiction Proneness Scale (SAPS), and The Korean Self-Reporting Internet Addiction Scale (KS-Scale). The SAS SV consists of 10 questions that are measured to identify the level of smartphone addiction disorder in adolescents. Each question has a maximum score of 5 points (Likert scale) with a total achievable score of 10-50 points. The higher the score owned by the respondent, the more severe the level of smartphone addiction experienced. The questionnaire has undergone validity and reliability testing by Ching et al. (2020), where the measurement results show convergent validity for excessive cellphone use, while the reliability test results show a Cronbach's alpha score of 0.88. (15)

The researcher used a questionnaire to collect the socio-demographic variables of research respondents. Data related to socio-demographic data include age, gender, latest education, category of residence, location of residence, monthly salary, and employment status. The researcher also measured cellphone usage habits using a questionnaire. Data related to mobile phone usage collected were daily mobile phone usage time, most frequently accessed applications, sleeping hours, waking hours, operating system used, and monthly expenses related to mobile phone usage.

Data analysis was carried out in univariable, bivariable, and multivariable. Univariable data analysis is done by displaying the frequency distribution of each variable to see the percentage and amount of each variable. The bivariable analysis is carried out using the Pearson Correlation test. It is also a selection for multivariable analysis tests, and bivariable tests are carried out to find the relationship between the dependent and independent variables. Multivariable test candidates are variables that have significance> 0.25. Multivariable analysis uses multiple logistic regression tests on candidates that have successfully passed the selection; multivariable tests are carried out to see interactions between variables.

RESULT AND DISCUSSION

RESULT

The analysis shows that most respondents who experience nomophobia are > 2 years old. The results of the analysis show that age is related to the incidence of phone addiction (0.06). Female gender dominates the group of respondents who experience phone addiction, but the results of the statistical analysis are not significant. Most of the respondents who experienced phone addiction had a history of high school education with social studies specialization.

Most of the respondents who experienced phone addiction lived with their parents, and the results of the

statistical analysis were significant (0.08). Respondents who live in rural areas have a greater percentage of phone addiction with statistically significant results (0.09). Almost all respondents did not work part-time or full-time and had a monthly salary of <1 million. The waking hours of respondents who experience phone addiction are mostly >05.00 AM, which is in line with the sleeping hours in the group of respondents who experience phone addiction, sleeping >11.00 PM.

Table 1. Socio-demographic Characteristics of Respondents

Variable		Phone Addiction				Sig	PR
		Yes	%	No	%		
Age	>21	17	65.4	62	82.7		
	<=21	9	40.9	13	17.3	0,06*	0,396
Sex	Male	7	26.9	28	37.3	0,34	-
	Female	19	73.1	47	71.2		
Education Level	High School Science Concentration	7	26.9	19	25.3	0,08*	1,5
	High School Social Studies Concentration	18	69.2	42	56		
	Vocational secondary school	1	3.8	14	18.7		
Type of Residence	Living with Parents	15	57.7	30	40	0,09*	2,035
	Living Alone	11	42.3	45	60		
Location of Residence	Suburban	15	57.7	42	56	0,09*	2,045
	Urban	11	42.3	33	44		
Employee Status	Not Employed	24	92.3	65	86.6	0,43	-
	Part-Time	1	3.8	7	9.4		
	Full-Time	1	0	3	4		
Monthly Salary	>1 Million	11	42.3	27	36	0,56	-
	<= 1 Million	15	57.7	48	64		
Wakeup Time	<=05.00 AM	9	34.6	35	46.7	0,28	-
	>05.00 AM	17	65.4	40	53.3		
Sleep Time	>=11.00 PM	14	53.8	42	56	0,84	-
	<11.00 PM	12	46.2	33	44		

*p < 0,1
Source: Primary Data, 2021

Respondents who suffer from phone addiction use cell phones daily for>6 hours, with the most frequently used application being messaging. Most of the respondents with phone addiction choose to use their phones with the highest intensity between 19.00 and 24.00. Almost all respondents spend <150k per month on their phone usage.

Table 2
Characteristics of Mobilephone Use

Variable		Phone Addiction				Sig	PR
		Yes	%	No	%		
Duration Of Mobile Phone Use	<=6h	6	23.1	30	40	0,07*	1,9
	>6h	20	76.9	45	60		
Frequently Used Applications	Social media	5	19.2	19	25.3	0,87	-
	Messaging	17	65.4	40	53.3		
	Game	0	0	6	8		
	Online Shopping	0	0	0	0		
	Video Streaming	4	15.4	10	13.4		
Highest Access Time	19.00 - 24.00	16	61.5	38	50.7	0,26	-
	13.00 - 18.00	4	15.4	13	17.3		
	07.00 - 12.00	6	23.1	21	28		
	01.00 - 06.00	0	0	3	4		
Operating System	IOS	1	3.8	3	4	0,81	-
	Android	25	96.2	71	94.7		
	Others	0	0	1	1.3		
Cellphone Usage Cost	>150k	2	7.7	12	16	0,51	-
	<=150k	24	92.3	63	84		

*p < 0,1
Source: Primary Data, 2021

Candidate variables have a significance level <0.25 from the previous bivariable selection results. After selection, 5 variables were obtained as candidates: the category of respondent's residence, duration of cellphone use, location of residence, respondent's last education, and respondent's age.

The analysis results conducted in the omnibus test obtained a significance of 0.002 <0.1, so the Fit model shows that adding independent variables can really influence the model. While the R2 obtained is 0.218, the existing model can explain the ability of the independent variable to explain the dependent variable by 21.8%, and other factors outside the model influence the rest (78.2%). The results of the analysis related to the Goodness of Fit test (Gof) showed that the model was acceptable (the results of the Hosmer and Lemeshow Test 0.724> 0.1), with model accuracy reaching 75.2%.

Table 3. Multivariate Analysis

Variable	B	Sig	aPR
Age	0.933	0.09*	0.393
Type of Residence	0,367	0,46	-
Location of Residence	0.239	0.62	-
Education Level	0.438	0.18	-
Duration Of Mobile Phone Use	0.627	0.05*	1.543

p = 0,1; R^2 = 21,8%; Constanta = 1,029

The analysis results obtained only significant variables, namely the respondent's age and the duration of use of the respondent's cell phone. The results of the analysis showed that the prevalence of respondents aged <21 years was related to the incidence of phone addiction in respondents and had a greater number of 0.3 times than those aged> 21 years. In addition, the duration of using the respondent's cell phone> 6 hours is related to the incidence of phone addiction in respondents and has a greater number of 1.5 times greater than those who use cell phones < 6 hours a day. From the results of the analysis conducted, the model obtained is as follows;

$$n = \frac{\exp(1{,}029 + 0{,}93\ X_1 Age + 0{,}62\ X_n \text{Duration Of Mobile Phone Use})}{1 + \exp(1{,}029 + 0{,}93\ X_1 Age + 0{,}62\ X_n \text{Duration Of Mobile Phone Use})}$$

DISCUSSION

The results of the research that has been conducted found that most respondents who experience phone addiction are <21 years old. Similar results were also obtained in research conducted by Shylaja and Annapoorani (2019) on students at technical colleges in Tirunelveli in South India (16). Research that has been conducted shows that most respondents who experience phone addiction have an age of <21 years. The results of a systematic review conducted by Sohn et al. (2019) show that adolescents aged 18-19 are at risk of having the highest cellphone use disorder compared to other age groups (17).

The results of the research that has been conducted show that respondents with female gender dominate the gender of respondents who experience phone addiction. Research conducted by Demirci, Akgönül, and Akpinar (2015) at Admiral University shows that most students who experience phone addiction are female (9). The results of this study are also by research conducted by Bian and Leung (2015), where there is no influence between the gender of a person and the incidence of phone addiction. (18). However, different research results were shown in research conducted by Bragazzi, Re, and Zerbetto (2019), where women have a higher risk of experiencing cellphone use disorders compared to men. (19). The results of this study are also the same as the literature review conducted by Sohn et al. (2019), where women have a greater risk of experiencing phone addiction than women. (17).

Research has shown that most of the respondents who experience phone addiction have a high school education with a social studies specialization. The last education of the respondent is associated with the incidence of phone addiction experienced by the respondent. Education is one of the critical variables in the incidence of phone addiction, and education affects the time management and lifestyle of respondents (20). The research that has been done states that most of the respondents who experience phone addiction live with their parents. Similar research results were found in a study conducted in South India by Shylaja and Annapoorani (2019) on engineering students (16). The research conducted shows insignificant results between the category of residence and the incidence of phone addiction in respondents. However, from the research conducted, most of the respondents who experienced phone addiction lived with their parents, and there were only a tiny number

who lived alone / separately with their parents. Similar research results were also found in research conducted by Mohammadbeigi et al. (2016), where most of the respondents in the study he conducted lived with their parents, which resulted in more free time because the respondents did not need to do household chores (20).

The research that has been conducted found that most respondents who experience phone addiction live in rural or suburban areas. Different research results were found in research conducted by Mohammadbeigi et al. (2016), where most of the respondents who experienced phone addiction mostly lived in urban areas (20). Respondents who live in urban areas tend to have a higher lifestyle of using cell phones because the use of cell phones is more directed towards lifestyle. Their lives are closely related to technology.

Students who do not have additional jobs (full-time students), whether part-time or full-time, have a greater risk of experiencing phone addiction. The results of research conducted by Enez Darcin et al. (2016) show that most students who experience phone addiction are students who have minimal activities, namely not having a side job or never having activities outside of lectures such as side jobs, extracurricular activities, etc. (21). This causes students to tend to have excessive free time and is often used by students to use cell phones. The results of the research that has been conducted show that most of the respondents with phone addiction have a monthly salary of <= 1 million rupiah per month. Similar research results were also found in a study conducted by Sohn et al. (2019), where the incidence of smartphone use disorder was positively associated with monthly living expenses, family income, and economic status. (17).

High monthly income or high economic status leads to increased use of mobile phones as a lifestyle, such as high use of social media and use of other mobile phone functions such as marketplaces, etc., which will ultimately result in the onset of mobile phone use disorders The results of the research conducted state that most respondents who experience phone addiction use cell phones> 6 hours a day. Similar results were also obtained from the research conducted by Shylaja and Annapoorani (2019), showing that the duration of daily cellphone use by students is one of the predictors of phone addiction. (16). Most respondents have a duration of mobile phone use> 4 hours a day, where the higher the duration of use of the respondent's cellphone, the higher the risk of phone addiction. Similar research results are also shown by research conducted by Thomée, Härenstam, and Hagberg (2014), where the duration of cellphone use is very high,resulting in a person becoming addicted to the cell phone they have. (22).

The results of the research show that most respondents who experience phone addiction have a favorite application, namely messaging, such as WhatsApp, line, telegram, etc. This is an interesting finding where none of the respondents with a favorite mobile game use experience phone addiction. This is quite an interesting finding, as none of the respondents with a favorite mobile game use experience phone addiction. So far, phone addiction is often associated with cellphone users who have high cellphone usage habits; this is because many students/teenagers who experience the hobby of playing games on cell phones have a high addiction, which often results in physical and psychological disorders. Further research is needed to determine this phenomenon. Similar research results were also obtained from research conducted by Shylaja and Annapoorani (2019), where people with phone addiction have a level of use of the main application, namely chat/messaging applications. (16). The analysis results also have similar results where there are no significant results between applications that patients with the incidence of phone addiction in students often access. Similar research results were also obtained from research conducted by Enez Darcin et al. (2016), where excessive use of chat applications increases the risk of phone addiction in adolescents. (21). no respondents experienced phone addiction, with their favorite apps being games and online shopping.

The research that has been conducted shows the results that most respondents spend monthly costs for cellphone use <=150 thousand rupiahs. The funds used to meet their cellphone-related needs come from their monthly salary from various sources owned by the respondents. Research conducted by Kim et al. (2021) shows that the higher the costs incurred by adolescents related to cellphone use, for example, for data packages, application purchases, and microtransactions, has a positive correlation with increased cellphone use in adolescents; this is because the more costs incurred will improve their interaction with cellphones, causing them to experience phone addiction disorder (23). Teenagers often incur monthly expenses related to the telecommunication services needed by mobile phones to function optimally, such as internet networks and text and telephone functions. The higher the costs incurred by teenagers for communication service costs, the indirectly increases the use of the respondent's cellphone. The higher the service costs incurred, the higher the service benefits, the higher the internet quota, and the use of more texts and calls; this will affect the increase in cellphone use, ultimately resulting in the onset of phone addiction or other cellphone use problems.

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The results of the research conducted showed that most respondents slept at night >= 11.00 PM and showed the same results in the group of respondents who experienced phone addiction. Research conducted by Mohammadbeigi et al. (2016) shows that people who experience phone addiction tend to have late night sleep hours; this is because adolescents often access applications on cellphones before bed, such as messaging applications and social media, so that they reduce their sleep hours. (20).

CONCLUSION

The results of research that has been conducted show that students are one of the populations that have a high risk of developing phone addiction. The onset of phone addiction in students is influenced by various factors, one of which is the very high duration of cellphone use. The condition of phone addiction in students, if left unchecked, has the opportunity to have an impact on student health, both physical and psychological health problems and even psychosocial, which ultimately affects student learning achievement. Preventive measures need to be taken for students who experience phone addiction to reduce the risk of health problems.

Based on the results of the research that has been carried out show that the number of phone addiction cases is relatively high, including among students in suburban areas. Thus, further research can be carried out to measure the impact of phone addiction experienced by students, both physically, psychologically, and psychosocially, which is feared to be detrimental to the health of students, especially in suburban areas.

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