Original Research Article

CORRELATION BETWEEN ANXIETY AND SMARTPHONE ADDICTION IN THE TEENAGER POPULATION at KALAM KUDUS II SENIOR HIGH SCHOOL

ABSTRACT

Aims: To find out whether there is a correlation between anxiety and smartphone addiction in the teenager population at kalam kudus II senior high school.
Study design: This research was a cross sectional study
Place and Duration of Study: Kalam Kudus II Senior High School Jakarta on December 15 2022 .
Methodology: This research was a cross sectional study, the target population in this study were all high school students. The reachable population in this study were all students at Kalam Kudus II Senior High School Jakarta. The sample of this study is part of the reachable population that meets the inclusion criteria.The minimum sample size required is 97 respondents (type I error of 5% with a research power of 95%).
Results: This study included 178 respondents who met the inclusion criteria. Based on the results of the Spearman Correlation Test, it was found that there was a positive correlation of 0.274 (Weak) and statistically significant (p-value <0.001). This means that the higher the anxiety and the higher the anxiety level will encourage an increase in the value of the Smartphone Addiction Scale.
Further analysis using post-hoc Bonferoni showed that there was a significant Smartphone Addiction Scale value between the moderate anxiety vs. mild anxiety (p-value : 0.035) and moderate anxiety vs. normal/minimal anxiety (p-value : 0.005)
Conclusion: Higher anxiety level will encourage an increase in the value of the Smartphone Addiction Scale, which is means that the more a person is addicted to a smartphone, the higher the level of anxiety that person feels.

Keywords: {Addiction, Anxiety,Teenager, Smartphone}

1. INTRODUCTION

Technology has changed the way people communicate with each other and changed communication in many ways. The development of smartphones is increasingly one of the reasons for this to happen.[1] Today's excessive use of smartphones has attracted the attention of scientists to carry out many studies.[2]
The use of smartphones has increased sharply around the world. Indonesia is the 5th ranked country in the world with around 54% screen time usage. The use of smartphones in Indonesia has been increasing since 2012. Smartphones in Indonesia are used by all ages from kindergarten to the elderly. Smartphones are usually used for various purposes such as listening to music, watching videos, accessing information on the internet, as well as playing games and social media. However, according to previous studies, smartphones are most often used for entertainment. The majority of smartphone use is to access the internet.[3]

Internet users in Indonesia in 2016 of around 256.7 million people were 132.7 million, around 51.7% of the total population from Indonesia. In 2017 internet users in Indonesia increased to 54.7% or around 143.26 million people. Most internet users are on the island of Java (86.3 million people) or around 65% of the population in Indonesia. The majority of users are children and adolescents covering around 79.5% of internet users, especially children aged 5 to 12 years.[3]
Smartphones can usually be used as a tool to aid learning and entertainment for children. Although there are many good things from using a smartphone, excessive use of a smartphone can cause bad things. One of the bad things that comes from using a smartphone is addiction.[3] Addiction to smartphones is one of the new problems that is becoming a concern because of its progressive increase worldwide.[4]
Addiction is broadly divided into behavioral addiction and substance addiction, where these two addictions have more or less the same symptoms, such as craving, impulse control problems, tolerance problems, mood modification, withdrawal, relapse, being preoccupied with the addiction and daily life disturbance.[5]
Substance addiction covers the use of substances such as marijuana, cigarettes and alcohol while behavioral addiction is more towards smartphones, porn, gambling, social media and other things related to interactions between humans and machines. [5]
Many smartphone users carry their smartphones anywhere and use them an average of 150 times per day. When many young people use smartphones for more than 6 hours each day. This suggests that an increase in individual dependency on smartphone use could be an indication of the transition from habitual smartphone use to addictive smartphone use. [5]
The nature of this addiction can cause physical detachment, accidents, countless effects on physical health, interfering with the development of children's behavior, emotions and also developing mental illness. [5]
One of the diseases caused by mental ilness is anxiety disorder. Anxiety disorders are a group of mental disorders that have persistent symptoms such as fear, worry and anxiety. Symptoms of anxiety disorders can be mild to severe so that they can interfere with the daily life of people with anxiety disorders. [5]
Approximately 20% of children and adolescents, according to the World Health Organization (WHO), suffer from mental health disorders. The prevalence of mental disorders is 16,3%, 17,8%, 16% and 18,4% for 8 years old, 13 years old, 18 years old, and 25 years old, respectively in Europe and United States. [3]
Mental Disorders are a form of psychological distress. The prevalence of mental disorders in Indonesia is 6% according to the 2013 Indonesia Basic Health Research (IBHR), with Central Sulawesi, South Sulawesi, West Jakarta, Yogyakarta and East Nusa Tenggara having the highest prevalence rates. The lowest prevalence of mental disorders in Indonesia was reported in Lampung.[3]
In light of this context, the researcher is motivated to carry out a study on the connection between teenager's anxiety and smartphone addiction. This study may advance our understanding of the connection between teenager's anxiety and smartphone addiction. The findings of this study may help educational institutions better understand mental illnesses, particularly anxiety and its connections to smartphone addiction. Future research may be required to integrate the data from this study, which could lay the foundation for future research on the same subject.

2. MATERIAL AND METHODS

This research is a cross-sectional study which was conducted at Kalam Kudus II Senior High School Jakarta on December 15 2022. The target population in this study were all high school students. The reachable population in this study were all students at Kalam Kudus II Senior High School Jakarta. The sample of this study is part of the reachable population that meets the inclusion criteria. The inclusion criteria in this study were aged 15-18 years and were students at Kalam Kudus II Senior High School Jakarta. Exclusion criteria in this study were students refusing to participate, not understanding Indonesian, and experiencing major mental disorders which caused the sample to be unable to fill out the questionnaire properly. The minimum sample size required is 97 respondents (type I error of 5% with a research power of 95%). The procedure for this research is to submit a proposal to the Tarumanagara University Institute for approval the implementation and testing of research feasibility and Ethical Clearance. After being declared research-worthy, it was followed by asking for permission from the school leadership and the research was carried out according to the agreed date. The variables of this study include assessment of anxiety and Smartphone Addiction. Anxiety assessment used the Generalized Anxiety Disorder-7 (GAD-7) instrument which consisted of 7 questions in the form of a Likert scale and converted to an ordinal scale with interpretations in the form of (1) Score 15 – 21: Severe Anxiety; (2) Score 10 – 14: Moderate Anxiety; (3) Score 5 – 9: Mild anxiety; and (4) Score 0 – 4: Minimal/Normal Anxiety.[6–8] The Smartphone Addiction Assessment uses the Smartphone Addiction Scale (SAS) Questionnaire in which the assessment is in the form of the sum of all Likert scales with the final result in the form of an interval scale.[9,10] The presentation of statistical data in this study is divided into 2, namely descriptive and analytic presentation. Descriptive presentation using centralized data distribution for quantitative data and proportion (%) assessment for qualitative data. Presentation of analytical data using the correlation test (Pearson and Spearman). Further analysis uses One-Way Anova analysis when the data distribution is normal, and the Kruskall Wallis Test when the data distribution is not normal. Analysis of significance using a significant value of 0.05 and the continuation of the test if significant using the Bonferoni Post Hoc Test

3. RESULTS AND DISCUSSION

3.1 RESULTS

This study included 178 respondents who met the inclusion criteria. All basic data of respondents are described in table 1.

Table 1. Basic Data of Research Respondents

Parameter	N (%)	Mean (SD)	Median (Min – Max)
Gender • Male • Female	 92 (51,7%) 86 (48,3%)		
Age		15,89 (0,85)	16 (15 – 18)
Weight		61,06 (17,62)	57 (35 – 123)
Height		165,21 (9,82)	164,9 (117 – 184,5)
Sistolic		119,62 (14,72)	118 (85 – 161)
Diastolic		76,39 (9,33)	75 (57 – 106)
Anxiety • Severe • Moderate • Mild • Minimal/ Normal	 24 (13,5%) 53 (29,8%) 55 (30,9%) 46 (25,8%)	8,44 (5,19)	8 (0 – 20)
Smartphone Addiction Scale (SAS)		81,49 (22,96)	81,5 (21 – 142)

Further analysis was carried out to see the correlation between the Anxiety Score and the Smartphone Addiction Scale Score. Based on the results of the Spearman Correlation Test, it was found that there was a positive correlation of 0.274 (Weak) and statistically significant (p-value <0.001). This means that higher anxiety level will encourage an increase in the value of the Smartphone Addiction Scale. (Figures 1 and 2; Table 2)

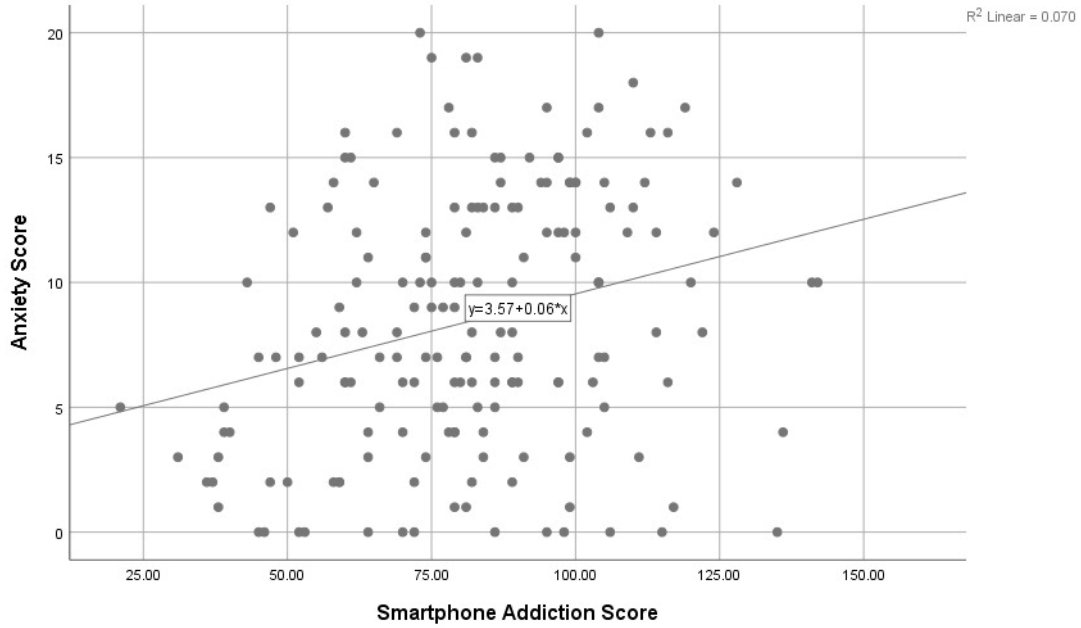

Figure 1. Correlation Between Anxiety Scores and Smartphone Addiction Scores

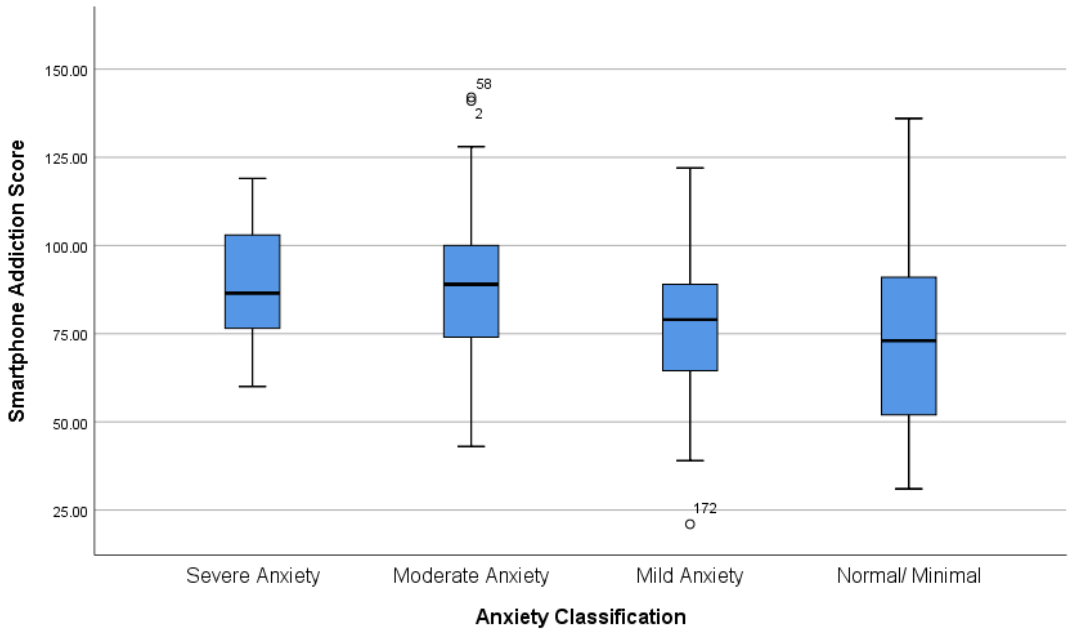

Figure 2. Comparison of Smartphone Addiction Score between Anxiety Classifications

Table 2. Correlation Between Anxiety Values, Anxiety Classification, and Smartphone Addiction

Parameter	Med (Min – Max)	Correlation and p-value	
Anxiety Score	8 (0 – 20)	0,274	
Smartphone Addiction Scale	81,5 (21 – 142)	< 0,001	0,274
Classification of Anxiety	#Ref		< 0,001

#Refer to Reference Table 3
*Correlation using Spearman Correlation

Comparative analysis of anxiety classification on the Smartphone Addiction Scale score followed by a parametric statistical test. Based on the normality test using the Kolmogorov-Smirnov data distribution was normal between groups (p-value > 0.05), therefore statistical tests used the One-Way Anova and Bonferoni Post Hoc statistical tests. Based on the One Way Anova statistical analysis, it was found that there was a difference in the average Smartphone Addiction Scale score between anxiety level groups (p-value: 0.002) (Table 3). Further analysis using post-hoc Bonferoni showed that there was a significant Smartphone Addiction Scale value between the moderate anxiety vs. mild anxiety (p-value : 0.035) and moderate anxiety vs. normal/minimal anxiety (p-value : 0.005) groups (Table 4)

Table 3. Comparison of the Average Smartphone Addiction Scale Between Anxiety Groups

Parameter	Mean (SD)	p-value
Anxiety		
• Severe	88,46 (17,61)	0,002
• Moderate	89,21 (21,97)	
• Mild	77,31 (19,76)	
• Minimal/ Normal	73,98 (26,72)	

Table 4. Post-Hoc Bonferoni Analysis - Comparison Of The Average Smartphone Addiction Scale Between Anxiety Groups

(I) Anxiety Classification	(J) Anxiety Classification	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval Lower Bound	95% Confidence Interval Upper Bound
Severe Anxiety	Moderate Anxiety	-.74921	5.45252	1.000	-15.3007	13.8022
	Mild Anxiety	11.14924	5.42153	.247	-3.3195	25.6180
	Normal/ Minimal	14.48007	5.58033	.062	-.4125	29.3726
Moderate Anxiety	Severe Anxiety	.74921	5.45252	1.000	-13.8022	15.3007
	Mild Anxiety	11.89846*	4.26567	.035	.5144	23.2825
	Normal/ Minimal	15.22929*	4.46577	.005	3.3112	27.1473
Mild Anxiety	Severe Anxiety	-11.14924	5.42153	.247	-25.6180	3.3195

	Moderate Anxiety	-11.89846*	4.26567	.035	-23.2825	-.5144
	Normal/ Minimal	3.33083	4.42788	1.000	-8.4861	15.1478
Normal/ Minimal	Severe Anxiety	-14.48007	5.58033	.062	-29.3726	.4125
	Moderate Anxiety	-15.22929*	4.46577	.005	-27.1473	-3.3112
	Mild Anxiety	-3.33083	4.42788	1.000	-15.1478	8.4861

*. The mean difference is significant at the 0.05 level.

3.2 DISCUSSION

This study explored the relationship between anxiety levels in teenager with smartphone addiction. In our study we found that smartphone addiction increases anxiety levels. The dependent variable is anxiety and the independent variable is addiction to smartphone.

Our results were consistent with previous studies, in previous studies it was found that smartphone addiction is highly correlated with anxiety. One study conducted by Ayandele O, et al showed that there was a significant relationship between the addictive use of smartphones and anxiety disorders.[5] It was shown that addictive use of smartphones showed higher symptoms of anxiety disorders. Several other studies also show that smartphone addiction causes anxiety disorders, Inokentii O, et al showed there was a significant relationship between addictive use of smartphone and anxiety disorders.[11] Studies from Richardson M, et al, Krishna N et al, and Annoni AM also showed the same results that smartphone addiction relates to anxiety disorders.[1,12,13]

Besides anxiety, it turns out that there also other bad things that arise from smartphone addiction, this is shown by, this has be shown by several studies, one of which study from Choksi ST et al showed that smartphone addiction causes anxiety and also a highly significant positive correlation with stress.[14] Research from Sohn et al, shows that in addition to anxiety disorders, smartphone addiction can also cause increased stress levels, poor sleep quality, especially in children and young adults.[15] Research from Selcuk TK et al explained that smartphone addiction was positively associated with attention-deficit hyperactivity disorder, depression, anxiety and stress.[16] There are several examples of other studies that explain the effects of smartphone addiction besides anxiety, for example that smartphone have high significant positive relation with obsessive compulsive disorder, inclined to postpone their bedtime and further experience more anxiety and depression, smartphone addiction showed a stronger relationship with anxiety disorder and depression compared to internet addiction.[4,17–20] There are also highly significant relation between smartphone addiction with smoking, insomnia, suicide, social anxiety, and social interaction.[2,21–25]

On the other hand, increased smartphone call use was found to be negatively correlated with social anxiety and positively correlated with mental health and positive affect among of 514 adults in China. Similar to this, a study conducted among 308 individuals in the United States of America found a negative correlation between the frequency of smartphone use and depression symptoms. While lower smartphone addiction scores were linked to reduced anxiety levels, higher scores were linked to higher levels of depression.[5]

The total score for smartphone addiction was found to be significantly negatively corelated with age. This demonstrates that younger age groups are more suspectible to smartphone addiction. According to the significant positive link between Rosenberg's self-esteem total score and age and the significant the total score on the interaction anxiousness scale and age, social anxiety is lower in older age groups. Males were shown to have a higher smartphone addiction than females . In terms of gender, there were no discernible differences in the self esteem and social anxiety ratings.[26]

4. CONCLUSION

Higher anxiety level will encourage an increase in the value of the Smartphone Addiction Scale, which is means that the more a person is addicted to a smartphone, the higher the level of anxiety that person feels. Future researchers should consider added other variables to assess the effects of smartphone addiction in the teenager in a more comprehensive manner. Schools and parents are expected to educate their children so they don't spend too much time on their smartphones.

CONSENT

All authors declare that written or oral informed consent was obtained from the respondent

ETHICAL APPROVAL

All authors hereby declare that all procedure have been examined and approved by the appropriate ethics committee and have therefore been performed in accordance with the ethical standards laid down in the 1964 Declaration of Helsinki.

REFERENCES

[1] Krishna N, Doshi D, Kulkarni S, Reddy MP, Srilatha A, Satyanarayana D. Does smartphone addiction affect social interaction: a study among dental students in Hyderabad. Int J Adolesc Med Health 2021;33. https://doi.org/10.1515/ijamh-2018-0291.

[2] Shen X, Wang H-Z, Rost DH, Gaskin J, Wang J-L. State anxiety moderates the association between motivations and excessive smartphone use. Curr Psychol 2021;40:1937–45. https://doi.org/10.1007/s12144-019-0127-5.

[3] Dhamayanti M, Dwiwina R, Adawiyah R. Influence of Adolescents' Smartphone Addiction on Mental and Emotional Development in West Java, Indonesia. Maj Kedokt Bandung 2019;51:46–52. https://doi.org/10.15395/mkb.v51n1.1577.

[4] Kheradmand A, Amirlatifi E. Smartphone Addiction and Its Associated Factors Among Tehran University Students. BJPsych Open 2022;8:S40–S40. https://doi.org/10.1192/bjo.2022.165.

[5] Ayandele O, Popoola OA, Oladiji TO. Addictive use of smartphone, depression and anxiety among female undergraduates in Nigeria: a cross-sectional study. J Heal Res 2020;34:443–53. https://doi.org/10.1108/JHR-10-2019-0225.

[6] Löwe B, Decker O, Müller S, Brähler E, Schellberg D, Herzog W, et al. Validation and Standardization of the Generalized Anxiety Disorder Screener (GAD-7) in the General Population. Med Care 2008;46:266–74. https://doi.org/10.1097/MLR.0b013e318160d093.

[7] Zhong Q-Y, Gelaye B, Zaslavsky AM, Fann JR, Rondon MB, Sánchez SE, et al. Diagnostic Validity of the Generalized Anxiety Disorder - 7 (GAD-7) among Pregnant Women. PLoS One 2015;10:e0125096. https://doi.org/10.1371/journal.pone.0125096.

[8] Spitzer RL, Kroenke K, Williams JBW, Löwe B. A Brief Measure for Assessing Generalized Anxiety Disorder. Arch Intern Med 2006;166:1092. https://doi.org/10.1001/archinte.166.10.1092.

[9] Kwon M, Lee J-Y, Won W-Y, Park J-W, Min J-A, Hahn C, et al. Development and Validation of a Smartphone Addiction Scale (SAS). PLoS One 2013;8:e56936. https://doi.org/10.1371/journal.pone.0056936.

[10] Kwon M, Kim D-J, Cho H, Yang S. The Smartphone Addiction Scale: Development and Validation of a Short Version for Adolescents. PLoS One 2013;8:e83558. https://doi.org/10.1371/journal.pone.0083558.

[11] Korniienko IO, Barchi B V. The Relationship between Problematic Use of Smartphones and Social Anxiety. J Intellect Disabil - Diagnosis Treat 2020;8:133–41. https://doi.org/10.6000/2292-2598.2020.08.02.7.

[12] Annoni AM, Petrocchi S, Camerini A-L, Marciano L. The Relationship between Social Anxiety, Smartphone Use, Dispositional Trust, and Problematic Smartphone Use: A Moderated Mediation Model. Int J Environ Res Public Health 2021;18:2452. https://doi.org/10.3390/ijerph18052452.

[13] Richardson M, Hussain Z, Griffiths MD. Problematic smartphone use, nature connectedness, and anxiety. J Behav Addict 2018;7:109–16. https://doi.org/10.1556/2006.7.2018.10.

[14] Choksi ST. A Study to Find Out the Correlation of Mobile Phone Addiction with Anxiety, Depression, Stress and Sleep Quality in the College Students of Surat City. Int J Curr Res Rev 2021;13:137–42. https://doi.org/10.31782/IJCRR.2021.13812.

[15] Cho YG. Excessive and Problematic Smartphone Use and Poor Mental Health in Adolescents. Korean J Fam Med 2020;41:73–4. https://doi.org/10.4082/kjfm.41.2E.

[16] Selçuk KT, Ayhan D. The relationship between smartphone addiction risk and sleep duration and psychosocial comorbidities in health professional candidates. Perspect Psychiatr Care 2019:ppc.12465. https://doi.org/10.1111/ppc.12465.

[17] Geng Y, Gu J, Wang J, Zhang R. Smartphone addiction and depression, anxiety: The role of bedtime

procrastination and self-control. J Affect Disord 2021;293:415–21. https://doi.org/10.1016/j.jad.2021.06.062.
[18] Yang J, Fu X, Liao X, Li Y. Association of problematic smartphone use with poor sleep quality, depression, and anxiety: A systematic review and meta-analysis. Psychiatry Res 2020;284:112686. https://doi.org/10.1016/j.psychres.2019.112686.
[19] Pera A. The Psychology of Addictive Smartphone Behavior in Young Adults: Problematic Use, Social Anxiety, and Depressive Stress. Front Psychiatry 2020;11. https://doi.org/10.3389/fpsyt.2020.573473.
[20] Kim Y-J, Jang H, Lee Y, Lee D, Kim D-J. Effects of Internet and Smartphone Addictions on Depression and Anxiety Based on Propensity Score Matching Analysis. Int J Environ Res Public Health 2018;15:859. https://doi.org/10.3390/ijerph15050859.
[21] Okasha T, Saad A, Ibrahim I, Elhabiby M, Khalil S, Morsy M. Prevalence of smartphone addiction and its correlates in a sample of Egyptian university students. Int J Soc Psychiatry 2022;68:1580–8. https://doi.org/10.1177/00207640211042917.
[22] Al Battashi N, Al Omari O, Sawalha M, Al Maktoumi S, Alsuleitini A, Al Qadire M. The Relationship Between Smartphone Use, Insomnia, Stress, and Anxiety Among University Students: A Cross-Sectional Study. Clin Nurs Res 2021;30:734–40. https://doi.org/10.1177/1054773820983161.
[23] Elhai JD, Tiamiyu M, Weeks J. Depression and social anxiety in relation to problematic smartphone use. Internet Res 2018;28:315–32. https://doi.org/10.1108/IntR-01-2017-0019.
[24] Solon Júnior LJF, Tomaz Ribeiro CH, Sousa Fortes L de, Teixeira Barbosa B, Silva Neto LV da. Smartphone addiction is associated with symptoms of anxiety, depression, stress, tension, confusion, and insomnia: A cross-sectional and comparative study with physically and non-physically active adults in self-isolation during the COVID-19 pandemic. Salud Ment 2021;44:193–200. https://doi.org/10.17711/SM.0185-3325.2021.025.
[25] Vahedi Z, Saiphoo A. The association between smartphone use, stress, and anxiety: A meta-analytic review. Stress Heal 2018;34:347–58. https://doi.org/10.1002/smi.2805.
[26] Thatkar P, Tonde J, Dase R, Pawar D, Chidambaram R. Assessment of Correlation between Smartphone Addiction, Social Anxiety, and Self-Esteem: A Cross-Sectional Study. MGM J Med Sci 2021;8:22. https://doi.org/10.4103/mgmj.mgmj_81_20.