Berita Kedokteran Masyarakat
(BKM Journal of Community Medicine and Public Health)

Volume 37 **Number** 2, 2021
Page 47-50
DOI: 10.22146/bkm.v37i2.2067

Smartphone addiction and anxiety in high school students – a cross-sectional study

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Submitted:
January 10th, 2021
Accepted:
February 18th, 2021
Published:
February 27th, 2021

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Abstract

Purpose: Smartphones are a communication device that is widely used by people nowadays. Smartphones and their features have become a common need in the community. Excessive use of smartphones could lead to addiction. Smartphone addiction could affect physical and mental health. This study aims to assess the correlation between smartphone addiction and the level of anxiety among high school students. **Method:** This survey examined the correlation between smartphone addiction and anxiety in tenth-grade students of Frater Don Bosco High School (n=130) of Banjarmasin. Variables are measured using Smartphone Addiction Scale and Beck Anxiety Inventory. Data were then analyzed using proper correlation analysis. **Result:** Spearman's analysis shows that smartphone addiction had a relationship with anxiety (P: <0.001 and R 0.404). Whereas no significant correlations between age, sex, and lifestyle (smoking, alcohol, physical activity, sleep) with anxiety.

Keywords: smartphone; addiction; anxiety; adolescent

INTRODUCTION

Technological developments in recent years have increased, this is directly proportional to smartphone usage. The smartphone features make it easier for people to use so that smartphones have become a common need [1]. Aside from its main purpose in the form of a communication device, smartphone features are very related to everyday life, such as chat, social network services, games, music, and news [2]. With the coming of the internet-of-things technology, smartphones significantly impact everyday life. These impacts are unfortunately accompanied by negative impacts that occur due to behavior in their use. Excessive use results in smartphone addiction [3]. Smartphone addiction can be known by the disturbance in daily life. For example, individuals experiencing smartphone addiction would easily lose focus, have difficulty completing tasks, have excessive use, and have withdrawal symptoms such as impatience, irritability, anxiety, and depression. This addiction would impact the quality of life and health of the addicted person. Anxiety could arise as a common response to environmental changes or troublesome events associated with smartphone usage [4].

METHODS

This cross-sectional study took a consecutive sample of 130 students from the Frater Don Bosco High School, with the inclusion criteria (1) tenth-grade students, (2) actively using smartphones. Students who were previously diagnosed with psychotic disorders or those who are on treatment of anxiety were excluded.

Smartphone addiction is measured using Smartphone Addiction Scale (SAS), and anxiety is measured using Beck's Anxiety Inventory (BAI) [5]. This research uses univariate analysis in the form of frequency distribution and Spearman's Rank Correlation to find out the association between variables.

RESULTS

Table 1 shows students' characteristics. There were 58 (44.6%) male students, 72 (55.4%) female students and 15 (89.2%) aged 15 years and 14 (10.8%) students aged above 15 years. Almost all subjects are neither not smoking (94.6%) nor consuming alcohol (97.7%).

Table 1. Characteristics of the subjects (n=130)

Variable	Definition	%
Gender	Male	44.6
	Girl	55.4
Age	15 years	89.2
	> 15 years	10.8
Smoke	Yes	5,4
	No	94.6
Alcohol consumption	Yes	2,3
	No	97.7
Physical Activity	Yes	44.6
	No	55.4
Sleep	Less (<7 hrs)	18.5
	Enough (≥7 hrs)	81.5
Smartphone Addiction	Very low	1.5
	Low	11.5
	Moderate	54.6
	High	27.7
	Very high	4,6
Anxiety Level	Light	70.8
	Mild	20.8
	High	8.5

Fewer subjects claim to have routine physical activities (45,6%), and most issues have adequate sleep (81.5%). According to the SAS score, most have developed moderate (54.6%) and high (27.7%) smartphone addiction. As for anxiety levels, there are subjects with mild (20.8%) and high (8.5%) anxiety levels.

Table 2 shows that the p-value is <0.001, indicating a significant relationship between smartphone addiction and anxiety level with moderate correlation strength (R = 0.404).

Table 2. Spearman correlation of Smartphone addiction with Anxiety Level

Addiction	Anxiety Level		
	Light	mild	High
Very low	2	0	0
Low	14	0	1
Moderate	57	14	0
High	16	11	9
Very high	3	2	1

p-value 0.000 R-value 0.404

Table 3 shows no relationship between sample characteristics and lifestyle (smoking, alcohol consumption, physical activity, and sleep) with anxiety (p-value is > 0.05)

Table 3. *Spearman* correlation between sample characteristics and lifestyle with anxiety

	Anxiety level			p-value	R-value
	Light	Milid	High		
Age					
15 years	82	25	9	0.925	0.008
>15 years	10	2	2		
Gender					
Male	42	11	5	0.748	0.028
Girl	50	16	6		
Smoking					
Yes	6	1	0	0.344	-0,084
Not	86	26	11		
Alcohol consumption					
Yes	1	2	0	0.229	0.106
Not	91	25	11		
Physical activity					
Yes	44	9	5	0.309	-0,090
Not	48	18	6		
Sleep					
Less	16	6	2	0.664	-0,038
Enough	76	21	9		

DISCUSSIONS

In our study, smartphone addiction in high school students increases anxiety levels. Addiction is due to problematic behavior in smartphone usage, such as lack of self-control, excessive and risky use of smartphones [6]. Three pathways could cause this addiction; the impulsive path directs smartphone users' inability to control their behavior. The extraversion pathway forces smartphone users to keep in touch with their devices due to their desire to socialize. The excessive entertainment pathway is based on the need to maintain online relationships and the desire to get other users' acknowledgment [7].

In our study, smartphone addiction in high school students increases anxiety levels. Addiction is developed due to problematic behavior in smartphone usage, such as lack of self-control, excessive and risky use of smartphones [6]. Three pathways could cause the addiction. The impulsive pathway directs smartphone users' inability to control their behavior. The extraversion pathway forces smartphone users to keep in touch with their devices due to their desire to socialize. The excessive entertainment pathway is based on maintaining online relationships and the willingness to get acknowledged [7].

Smartphone addiction in teenagers is associated with anxiety due to fear of missing out (FOMO), a psychological process occur when someone is worried about missing the latest information and updates in

their social circles. Smartphone users would constantly check their smartphones regularly to stay connected, thus increasing smartphone usage frequency and duration. When they stop using their device, addicted users are likely to have anxiety episodes in response to unpleasant experiences [9].

Previous research showed that adolescents tend to experience anxiety compared to adults because regulations in dealing with stressors are still developing [10]. Teenage women tend to experience anxiety because of hormonal factors, such as estrogen and progesterone. Those hormones regulate sympathetic activities to be more easily excited and have longer excitation periods than men [11]. However, other research emphasizes other factors such as hereditary and environmental influences than hormones [12].

Exposure to cigarette smoke, especially at an early stage of life, is likely to increase the tendency to develop anxiety later. Nicotine and other substances in cigarettes could affect neural development, which leads to alteration in coping mechanisms against stressors [13]. In a systematic review conducted by Fluharty (2017), only a third of 148 studies examining the association between smoking and anxiety had a significant correlation. This review suggests that the prospective correlation between smoking and anxiety is still inconsistent [14].

Alcohol consumption also affects anxiety when over-consumption has occurred due to serotonin and receptors changes [15]. But in our study, we could not determine the significant correlation between alcohol consumption and anxiety. Two possible causes lead to such a result: dishonest subjects because consuming alcohol for students is illegal, so subjects don't want to be honest on this issue. No specific number and frequency of alcohol consumption are asked.

People who do not exercise regularly tend to increase the risk of experiencing anxiety because physical activity helps control the response of the sympathetic nerve and hypothalamic-pituitary-adrenal (HPA) axis so it is more adaptive in responding to anxiety [16]. Previous research says that instead of the duration of sleep affecting anxiety, it is known that anxiety is a disorder that has a distinctive sign of difficulties entering or starting sleep [17]. The difference in results obtained in lifestyle factors may be due to differences in the criteria of the variables studied by the researcher's research.

CONCLUSION

There is a moderate correlation between smartphone addiction and anxiety among high school students. Whereas no significant relationship between age, sex, and lifestyle (alcohol consumption, smoking, physical activity, sleep time) with anxiety. Future researchers should consider using a gold standard instrument or, with assistance by experts, to use medical diagnosis. Also, data retrieval can be scheduled for more extended periods so that the process is effective. The sample can be stratified in advance so that the data becomes varied.

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