

Relationship between Smartphone Addiction with Anxiety and Depression among Undergraduate Students in Malaysia

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ABSTRACT

Recently, smartphone addiction has become a public health concern because it leads to poor mental health; anxiety and depression among university students around the world. Therefore, the objective of the study was to identify the relationship between smartphone addiction with anxiety and depression among undergraduate students in one of a local university in Malaysia on September 2016. Smartphone Addiction Scale (SAS-M), Beck Anxiety Inventory (BAI-M) and Beck Depression Inventory (BDI-M) were used as a data collection tool. Analysis of the data was done using IBM SPSS software version 21.0. A total of 369 students (299 female and 70 male; mean age=19.3±0.98) participated in this study. Descriptive analysis results showed scores of smartphone addiction, anxiety and depression students were 102.52±7.21, 10.15±8.08 and 7.96±6.21. The inferential analysis found a statistically significant positive relationship between smartphone addiction with anxiety and depression ($p<0.001$). Smartphone addiction was found as predictor to anxiety ($B=0.052$, $t=4.469$, $p<0.001$) and depression ($B=0.091$, $t=6.067$, $p<0.001$) respectively. The findings of this study showed university students in Malaysia were inclined towards becoming addicted to smartphone and were exposed to anxiety and depression. Implementation of health education programs and interventions that are appropriate to deal with addiction and improve mental well-being can empower students to practice healthy behaviors.

Keywords: Smartphone addiction, anxiety, depression, undergraduate students, Malaysia

INTRODUCTION

Smartphone technology is rapidly expanding worldwide including Malaysia. The rapid development of the technology has a positive impact on users that can utilize smartphones not to just make calls and messaging, but the applications in smartphone covering various fields that complemented the life of the people. In 2016, the number of smartphone users in the world is estimated to reach 2.1 billion and expected to grow to 2.8 billion in 2020. ^[1]

Malaysia recorded 18.46 million number of smartphone users in 2016 and this number is projected to increase to more than 20 million in 2020. ^[2]

According to Smartphone User Persona Report from Vserv on 2015, smartphone users in Malaysia spent more time each day at 187 minutes each day, or 3 hours 7 minutes with their devices compared to their neighbouring countries such as Indonesia, Philippines and Thailand. During this period, the most smartphone

usage were social networks and chat applications. [3] Convenience, social needs and social influences were among the factors influencing smartphone usage among users. [4-7] Therefore, smartphones today have played an important part in our community technoculture especially among young generation.

Despite the advantages and needs of smartphone, excessive use can lead to smartphone addiction. Smartphone addiction refers to dependency, excessive and uncontrolled use of the smartphone. [8, 9] The phenomenon of smartphone addiction has been a global concern as it can contribute to poor mental health especially among university students. [10-16] Based on previous studies, smartphone addiction has also been categorized as behavioural addiction due to the inability of users to control their use. [11,17]

According to Choliz, [18] the problem of using smartphones is related to behavioural addiction due to clinical features such as psychological effects on emotions, personality and cognitive in which the younger generation is more vulnerable to excessive usage and dependency towards smartphones. Alavi et al. [19] stated that individuals suffering from behavioural addiction have symptoms such as craving, excessive behaviour, psychological and physical withdrawal symptoms. This behavioural addiction usually feature a very strong desire that encourages someone to do something repeatedly without the ability to control, to reduce or to stop. [20]

According to Chiu, [21] smartphone addiction can cause mental health problems such as anxiety and depression that will cause critical barriers in relationships, activities, physical and mental well-being. The issue has reached a significant public health concern and in 2015, WHO issued a report on Public Health Implications of Excessive Use of the Internet, Computers, Smartphones and Similar Electronic Devices. This report summarizes the problems associated with excessive use of

smartphone with mental health such as anxiety, depression and stress. [20]

In addition, recent studies have found there was a relationship between smartphone addiction with anxiety and depression. [12,21,22] Kwon et al. [23] and Demirci et al. [12] explained the higher the person addicted to smartphone, their anxiety and depression is higher. An addictive individual will loss of self-control, lack of desire and ability to communicate with others. As a result, the individual will start isolating himself or herself and continue to depend on smartphones. Indirectly, this also causes the individual to be worried when cannot use smartphone. [24]

Study done by Kumar [25] showed majority of private university students in Malaysia agreed that smartphones can cause headache, mental loss and sleep disorders. In 2009, a study conducted by Zulkefly and Baharudin [26] among university students in Malaysia found that students who spent more time with phone were more susceptible to psychological disorders caused by unhealthy and uncontrolled smartphone use.

A study by Ching et al. [27] reported 46.9% of Malaysian students were addictive to smartphone. This figure showed that they are moving towards dependence on smartphone in their daily lives. However, there is limited study done in Malaysia on the relationship of excessive use of smartphone or smartphone addiction on anxiety and, depression. Since it has been a global concern recently, there is a need to identify the relationship between smartphone addiction with anxiety and depression among undergraduate students in Malaysia.

MATERIALS AND METHODS

Design and sample: This is a cross-sectional study using purposive sampling among newly intake of undergraduate students in one of a local university in Malaysia in September 2016. Those who were absent and, withdraw during data

collection as well as uncompleted questionnaire were excluded in the study.

Data collection procedure and ethics: A pilot study was administered to 30 undergraduate students who were not participating in the study. Result showed that the students did not have difficulty in understanding and completing the questionnaire. Then, actual study was carried out. A brief introduction on the purpose of the study was given to the students. Those who agreed to participate were required to fill in the consent form before answering a set of questionnaire. The students took approximately 30 minutes to answer and once complete, they returned the questionnaire. Ethics approval was obtained from the university and Malaysia National Medical Research Register prior to the initiation of the study.

Instrument: A self-administered questionnaire was distributed to 435 participants. The questionnaire consists of five different sections: a) demography characteristics; information on age, race, gender, family income, b) the pattern of smartphone usage; information on duration of smartphone usage daily (hours), monthly expenses on smartphone and, main use of smartphone, c) smartphone addiction; using an adapted Malay Version of Smartphone Addiction Scale (SAS-M), d) anxiety; using Beck Anxiety Inventory (BAI)-Malay Version and, e) depression; using Beck Depression Inventory (BDI) -Malay Version.

Smartphone Addiction Scale

The original version scale has been developed by Kwon et al. [23] and has been adapted translated to Malay language by Ching et al. [27] among university students with Cronbach Alpha 0.94. The Cronbach Alpha for this study was 0.87. SAS-M includes 33 items and divided into 6 subscales (cyber-space-oriented relationship, daily life disturbance, primacy, overuse, positive anticipation and withdrawal). Each question has a response scale from 1 to 6 (1=strongly disagree to 6=strongly agree), reflecting the frequency

of the symptoms and the score range is from 33-198, with higher scores indicating the higher risk of smartphone addiction.

Beck Anxiety Inventory (BAI)

To measure anxiety, Beck Anxiety Inventory-Malay Version by Mukhtar and Zulkefly [28] was used. The BAI-Malay consists of 21 items with a four-point scale (zero to three) with Cronbach Alpha 0.91. In the present study, Cronbach's alpha coefficient was 0.82. This inventory has widely used to measure the severity of anxiety. Anxiety was divided into 4 categories, which are mild (score 0-13), moderate (score 14-19), severe (score 20-28) and extremely severe (score 29-63).

Beck Depression Inventory (BDI)

The last section in the questionnaire was used Beck Depression Inventory (BDI) -Malay Version by Mukhtar and Oei. [29] The BDI-Malay consist 20 items with a four-point scale (zero to three) with 0.91 of Cronbach alpha. The Cronbach's alpha coefficient in this present study was 0.82. This inventory requires participants to answer the questions in relation to how they felt over the past week, with higher scores indicating more severe depression. There are 4 categories under depression, which are mild (score 0-13), moderate (score 14-19), severe (score 20-28) and extremely severe (score 29-63).

Statistical Analysis: All data was entered and analysed using SPSS software version 21. The descriptive statistical analysis of data was performed to determine the mean, standard deviation, frequency, and percentage. Pearson's correlation was used to determine the strength of the relationship between the variables and, Simple Linear Regression was performed to determine the effect of smartphone addiction to anxiety and depression.

RESULTS

Out of 435 questionnaires distributed out, only 369 students returned the questionnaire with response rate 85.0%. There are 5.3% were absent during data

collection, 3.7% refused to participate in the study, 4.2% did not complete the questionnaire and 1.8% were outliers. Table 1 presented the demographic characteristics of the sample. Majority participants were among female 299 (81.0 %). Their ages range from 19 to 30 years with a mean age of 19.32 ± 0.98 years. Malay participants were dominant in the study 57.5%, followed by Chinese 29.5%, Indian 11.1% and others 1.9%. Besides that, 42.0% participants have family income above RM 4000.

Table 1: Distribution of students according to sex, race and monthly family income (n=369)

Variable	n (%)
Gender	
Male	70 (19.0%)
Female	299 (81.0%)
Race	
Malay	212 (57.5%)
Chinese	109 (29.5%)
Indian	41 (11.1%)
Others	7 (1.9%)
Monthly family income (n=345)	
Less than RM1000	43 (12.5%)
RM1000-1999	40 (11.6%)
RM2000-2999	55 (15.9%)
RM3000-3999	52 (15.1%)
More than RM4000	155 (44.9%)

The pattern of smartphone usage

Table 2 shows 70.0% used smartphone more than four hours per day. Half of them (57.2%) used smartphone for social networking sites and spent less than RM50 for smartphone monthly expenses.

Table 2: Pattern of smartphone usage (n=369)

Variable	n (%)
Duration of smartphone used(daily)	
Less than 1 hour	9 (2.4%)
1-3 hour	98 (26.6%)
4-6 hours	166 (45.0%)
7-9 hours	54 (14.6%)
More than 9 hours	42 (11.4%)
Main use of smartphone (n=315)	
Call/SMS	75 (23.8%)
Social networking sites	211 (67.0%)
Application/Games	14 (4.4%)
News/information	11 (3.5%)
Others	4 (1.3%)
Smartphone monthly expenses (RM)	
Less than RM 50	291 (78.9%)
RM 51 and above	78 (21.1%)

Level of smartphone addiction, anxiety and depression

Results from Table 3 shows the mean score for smartphone addiction in this study was

102.52 ± 21.07 . The median value in this study has been used to categorize the score.^[30] Therefore, smartphone addiction was divided into two categories which are low smartphone addiction (SAS-M score < median value 103) and high smartphone addiction (SAS-M score > median value 103). Results showed nearly half of the students (47.7%) experienced high smartphone addiction.

For anxiety, results showed that 54.2% of the respondents experienced mild, while 14.6%, 11.1%, 6.3% and 3.8% of the respondents have moderate, severe and extremely severe anxiety respectively. Mean \pm Standard Deviation for anxiety score was 10.15 ± 8.08 . In depression, 80.5% of the students were mild, 14.1% moderate, 5.1% severe and only 0.3% experienced extremely severe. Mean \pm Standard Deviation for anxiety score was 7.96 ± 6.21 .

Table 3: Level, mean and standard deviation: smartphone addiction, anxiety and depression (n=369)

Variable	n (%)	Mean and standard deviation
Smartphone addiction		
Low smartphone addiction	193 (52.3%)	102.52 \pm 21.07
High smartphone addiction	176 (47.7%)	
Anxiety		
Mild	260 (70.5%)	10.15 \pm 8.08
Moderate	54 (14.6%)	
Severe	41 (11.1%)	
Extremely Severe	14 (3.8)	
Depression		
Mild	297 (80.5%)	7.96 \pm 6.21
Moderate	52 (14.1%)	
Severe	19 (5.1%)	
Extremely Severe	1 (0.3)	

Relationship between smartphone addiction with anxiety and depression

Table 4 presented the correlation between smartphone addiction with anxiety and depression. Results showed that there is a significant positive correlation between smartphone addiction with anxiety ($r=0.227$; $p<0.001$) and depression ($r=-0.302$; $p<0.001$) respectively.

Table 4: Pearson correlation analysis of smartphone addiction with anxiety and depression (n=369)

	Anxiety		Depression	
	R	p value	R	p value
Smartphone Addiction	0.227	<0.001	0.302	<0.001

Smartphone addiction had a significant effect on anxiety, with smartphone addiction as predictor accounted 5.2% variance in anxiety (B=0.052, t=4.469, p<0.001). Results also stated that smartphone addiction explains 9.1% variance of depression (B=0.091, t=6.067, p<0.001) (refer to Table 5).

Table 5: Simple linear regression analysis of smartphone addiction with anxiety and depression (n=369)

Model	B	SE	β	t	p
Anxiety					
Constant	-1.045	0.224			
Smartphone Addiction	0.010	0.002	0.052	4.469	<0.001
R:0.227, R ² :0.052, F:19.97, p<0.001					
Depression					
Constant	-1.404	0.226			
Smartphone Addiction	0.013	0.002	0.091	6.067	<0.001
R:0.302, R ² :0.091, F:36.80, p<0.001					

DISCUSSION

University students tend to adapt early on electronic devices and, they can be categorized as early adopters. [31] For them, smartphone is something interesting, entertainment objects, can connect with friends and giving them a sense of autonomy, identity and credibility. [32] Result from this study found 45.0% of students spent 4-6 hours a day to use the smartphone. The findings of this study supported by Hatice et al. [33] who found 40.1% of students spend 4 to 6 hours a day. Meanwhile, 30% of the students spend more than seven hours on and this figure is quite worrying. This is because time allocation for smartphones more than 5 hours is inappropriate for a student who should prioritize academic issues and concentrate on learning rather than social issues as it will affect the academic achievement. [34] Amidtaher et al. [35] stated that an increase in smartphone dependency will decrease the academic achievement. Besides that, a cross sectional study in India found some of the students had experienced certain side effects of long term mobile use like headache, backache, eye strain. [36]

The finding of this study showed that most of the students used smartphones to browse social networking sites. The

finding is similar with previous study, which showed that smartphone users are now using their gadgets for social relationships It is also supported by another studies which reported that one of the key factors of smartphone use among university students are social relationships. [37,38] Besides that, a study conducted by Nee and Fan [39] showed that Malaysia university students were an active social networking sites users and it becomes part of their daily activities and, they found that as the use of social networking sites increased, their psychological well-being become decreased. Roberts, Yaya and Manolis [40] and, Salehan and Negahban [41] stated that the excessive use of social networking sites can lead to smartphone addiction.

Findings of this study also found that majority of students allocate less than RM50 per month for smartphone expenses. The findings were in line with a study by Zulkefly and Baharudin [26] who found students spending the modest amount of money on smartphone usage. In Malaysia, numerous telecommunications companies such as Maxis, Celcom, Digi and U-Mobile offer affordable plans which enable users to choose a plan that fits in their financial capability. For smartphone addiction, the mean score for this study was higher than the previous study [12,33] and nearly half of the students in this study experienced high score of smartphone addiction.

This study highlight that there was a relationship between smartphone addiction with anxiety and depression. The students who reported high scores of smartphone addiction tended to report high scores of anxiety and depression. The results of this study were in line with previous studies [12, 21,42-43] that there is a relationship between smartphone addiction with anxiety and depression among university student. A study by Demirci et al. [12] found that smartphone overuse may lead to anxiety and/or depression which can lead to sleep problems. Based on several studies, they also found that excessive use of smartphone lead to anxiety and create several disorders

such as ringxiety, Nomophobia and fear of missing out (FoMo).

According to Subba et al., [44] those who are suffering problems with smartphone usage experiencing phone ringing (ringxiety) problems and tend to use smartphones in prohibited areas (classes and libraries) and during meals. In 2008, Avvannavar et al., [45] reported that this condition occurs when an individual hears the sound of the phone while it does not ring. Besides that, "Nomophobia" is increasing among young generations. [17] According to King et al., [46] this syndrome occurs when an individual feels anxious or uncomfortable when parted from smartphone, computers or virtual communication devices.

According to Przybylski et al. [47] anxiety was also identified as a component of Fear of Missing Out (FoMO); it is defined as fears, anxiety, and concerns if unable to find out the latest information and, experiencing social interaction. The study reported university students with higher scores of FoMO will be more likely to check Facebook pages on smartphones during class compared to lower FoMO scores. A study by Skierkowski and Wood, [48] found students who restricted the usage of short messages on their smartphones experienced anger, worry and anxiety. In another study, 50.0% of young people has experienced anxiety when they cannot check their smartphones, compared to only 25.0% Gen X and 15.0% Baby Boomers. [49] In addition, Ganganahalli et al. [36] reported during examination days, nearly 90.0% of student responded that they felt very bad or had a feeling of lost or disconnected from the world if cannot using mobile for hours.

In order to overcome the issue of smartphone addiction and anxiety, Yu and Son [50] conducted a study on Acceptance Commitment Therapy involving 18 participants and divided them into two groups namely the Program Group and the Control Group. Acceptance Commitment Therapy is a psychological intervention that uses acceptance and awareness strategies

along with commitments and behavioural change strategies to enhance psychological flexibility. The program was supervised for eight sessions and a follow-up study was conducted after treatment. The follow-up period was carried out for four weeks. The results of the study showed the level of smartphone addiction and level of anxiety were decreased after the program and it proved that the program could be used as one of treatment methods for smartphone addiction.

In addition to determining a relationship between smartphone addiction and anxiety, findings of this study also reported significant relationship between smartphone addiction and depression. It was supported by previous studies that found individuals with smartphone addiction problems tend to have depression problems. [42,51,52] In 2015, Park et al. [52] has conducted a study to compare depression problems among 20 students which had been divided into two groups namely Heavy Smartphone User Groups and Control Groups; results showed that heavy users who use excessive smartphones tend to suffer depression. In addition, the finding of this study was supported by Thomee et al. [53] which conduct a year-long follow-up analysis reported that excessive use of smartphone may be a risk factor for depression symptoms. Therefore, it can be concluded that this study supports other studies concerning the relationship between smartphone addiction with anxiety and depression among university students and shows that this phenomenon also happen among university students in Malaysia.

CONCLUSION

The present study showed university students in Malaysia were inclined towards becoming addicted to smartphone and were exposed to anxiety and depression. Therefore, there is a need to create possible health education programs and interventions that are appropriate to deal with the addiction to the university students and improve their mental well-being.

ACKNOWLEDGMENT

We would like to thank the Director-General of Health and Deputy Director-General of Health (Research and Technical Support), Ministry of Health Malaysia for permission to publish this paper. We would also like to express thanks to the University for the permission to collect the data and to all students who participated in this research. A very special thanks dedicated to Ms Teresa Yong Sui Mien, for the valuable comments and suggestion to improve the manuscript. Lastly, we would also like to express appreciation for all the support from all parties that have contributed directly or indirectly to complete this study.

Funding: No funding sources

Conflict of interest: None declared

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How to cite this article: Ithnain N, Ghazali SE, Jaafar N. Relationship between smartphone addiction with anxiety and depression among undergraduate students in Malaysia. *Int J Health Sci Res*. 2018; 8(1):163-171.
