

The Prevalence of Smartphone Addiction and Its Association with Parenting Styles among Secondary School Students in Kota Bharu, Kelantan

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ABSTRACT

Objective: The aim of this study is to determine the prevalence of smartphone addiction and its association with parenting styles among secondary school students in Kota Bharu, Kelantan.

Design: cross-sectoral study involving 538 secondary school students in Kota Bharu, Kelantan.

Materials and Methods: The socio-demographic characteristics examined include age, gender, family income per month, parent level of education, and duration of smartphone use. The assessment of smartphone addiction is based on the Malay version of the smartphone addiction scale (SAS-M). A total possible SAS-M score ranges from 33 to 198 and a total score of more than and equal to 98 is considered to be smartphone addiction. The parenting style is evaluated using the Malay version Parental Bonding Instrument.

Results: 249 male and 289 female students participated in the study. Almost all of the participants were Malays. The average duration of smartphone use (hour/day) was 6.16 hours (SD 3.47). A total of 74% of the participants were addicted to the smartphone. Multiple linear regression has shown that caring parenting style and giving autonomy to their children has been positively associated with smartphone addiction among participants.

Conclusion: The prevalence of smartphone addiction among adolescents in Kota Bharu is high compared to previous adolescent and adult studies. The findings suggest that students who perceived their parents' practice of either caring or giving autonomy are vulnerable to smartphone addiction. The prevention and intervention programs therefore need the involvement of both students and parents.

KEY WORDS

smartphone addiction, parenting styles, secondary school students

INTRODUCTION

Smartphones are becoming increasingly indispensable in everyday life and offer a wide range of mobile applications for information, communication, education and entertainment purposes¹⁾. Other than adults, younger generations are also vast users of these smartphones. More than 10 percent of users of smartphones were adolescents in Malaysia, and the rate of adoption among adolescents was 86.9 percent²⁾. With these degrees of use, there is a strong fear that smartphone addiction has begun to emerge. "Smartphone addiction" is a term commonly used in literature³⁾, and is also known as "mobile phone dependence" "compulsive mobile phone overuse" or "mobile phone overuse" This addiction is mainly characterized by excessive or poorly controlled concerns, urges or behaviors with regard to smartphone use, to the extent that individuals neglect other areas of life⁴⁾. Smartphone addiction is also linked to Internet addiction due to its similarity and negative effects on users and could be categorized as behavioral addiction⁵⁾. Although smartphones

bring convenience to people's daily lives, they are also associated in some cases with patterns of addictive use involving negative outcomes⁶⁾.

As digital natives, adolescents are very vulnerable to smartphone addiction. Their tendency to use online space to express their thoughts, keep up with fashion, socialize, search for emotional relationships, and support and use different types of applications increases their risk. Characteristic novelty-seeking during adolescence combined with their immature control skills also put them at high risk of smartphone addiction⁷⁾.

Adolescence is a period in which parental influence decreases as opposed to peer influence. Earlier parenting has been shown to have a significant impact on the interpersonal relationship between the child and the parent and has been shown to be central to many addictive behaviors, such as substance abuse, the internet and smartphone addiction⁸⁾. In the case of smartphone addiction, a parenting style that is higher authoritative or democratic is associated with a lower risk of addiction^{9,10)}. By comparison, authoritarian or over-protective and permissive or self-reliant are associated with a higher risk of addiction^{11,12)}. The par-

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Table 1: Subdomains of the parental bonding instrument scale.

Parenting style	Items	Range score
Care	1, 2, 3, 4, 8, 9, 11, 13, 14, 19	10 to 40
Autonomy	5, 12, 16, 17, 20	5 to 20
Overprotection	6, 7, 10, 15, 18	5 to 20

enting style may be influenced by one's upbringing, educational exposure, and cultural practices. Geographic differences may therefore show a different parenting style. Since it has been shown that adolescents are a significant user of a smartphone in Malaysia, the aim of this study was to determine the prevalence of smartphone addiction and its association with the type of parenting style among secondary school students in Kota Bharu, Kelantan. It is hoped that this study will help in the future intervention of internet and smartphone exposure among adolescents and school-going children.

MATERIALS AND METHODS

Study design and sample

This cross-sectional study was conducted between December 2017 and May 2018. A multi-stage cluster random sampling method has been used in this study. Boarding schools were excluded from this study as most boarding schools do not allow students to bring a smartphone to the hostel or school and students have different social exposures. A total of 585 participants were required for the study based on a single proportion formula. This calculation also considered 10 percent non-response rate and design effect when the sample size was doubled due to cluster effect. A simple random sampling was used to select six schools based on the retrospective calculation of the sample. Four classes were chosen randomly in each school and all students in the class were included if they were living with their parents or guardians, using their own or other smartphones, and with their consent. The consent forms were forwarded to the parents through the respective students and collected on the date of data collection.

The research was approved by the Human Research Ethical Committee of the University (USM/JEPeM/17070333) and the Ministry of Education of Malaysia (KPM.600-3/2/3 Jld 51(30)).

Research tools

The questionnaire used in this study contains sociodemographic data and includes two other validated questionnaires: the Malay version of the Smartphone Addiction Scale (SAS-M) and the Malay version of the Parental Bonding Instrument (PBI-M).

The higher the score, the higher the degree of pathological use of smartphone⁹. The Malay version of the Smartphone Addiction Scale (SAS-M) was validated for use among the Malay-speaking population⁹. The SAS-M exhibited good internal consistency (Cronbach's alpha = 0.94) with the respective coefficients for the six factors ranging from 0.837 to 0.877. In this study, smartphone addiction was defined as having a score of 98 and above using SAS-M. The higher the score, the higher the degree of pathological use of smartphone⁹.

The Malay version of the Parental Bonding Instrument (PBI-M) is a validated instrument for assessing the parenting style of Malaysian youth and applicable to Malaysian cultures, since different cultures may view parenting styles differently¹³. PBI-M consists of 20 items which can be divided into three-domain models consisting of ten items for care, five items for autonomy and five items for overprotection as shown in Table 1. Items were presented in a 4-point Likert-type scale (1 = very unlike, 2 = moderately unlike, 3 = moderately like and 4 = very like). Cronbach's alpha of the three domain ranges from 0.86 to 0.88, 0.69 to 0.70 and 0.54 to 0.56, respectively¹³.

Statistical analysis

Data of participants were entered and analysed using SPSS version 22. Descriptive statistics were carried out to assess the prevalence of smartphone addiction. Simple and multiple linear regression analyses methods were used to test the association between parenting styles and smartphone addiction. Controlled variables were family income, parent

Table 2: Characteristic of participants according to smartphone addiction status (n = 538)

Variables	Addicted (n = 399) n (%)	Not addicted (n = 139) n (%)
Gender		
Male	185 (46.4)	64 (46)
Female	214 (53.6)	75 (54)
Race		
Malay	396 (99.2)	139 (100)
Non- Malay	3 (0.8)	0 (0)
Household income (RM/month)		
< RM 2000	251 (62.9)	88 (63.3)
RM 2000- 3999	78 (19.5)	24 (17.3)
> RM 4000	70 (17.5)	27 (19.5)
Father education level		
Secondary and lower	95 (23.8)	38 (27.3)
Tertiary		
Mother education level		
Secondary and lower	79 (19.8)	34 (24.5)
Tertiary	6.9 (3.44) ^a	3.8 (2.37) ^a
Duration of smartphone use (hour/day) ^a		

^a Mean (SD)

education level and duration of smartphone use, as these factors may have an impact on the outcome of the study.

RESULTS

Demographic characteristics of the participants

Five hundred thirty-eight students agreed to study with almost equal sex distribution, most of them were Malays. Details of the socio-demographic and medical characteristics of the participants based on the status of smartphone addiction are shown in Table 2.

Prevalence of smartphone addiction and parenting styles

The prevalence of smartphone addiction among form four students in Kota Bharu is 74 per cent. (n = 399). The simple linear regression result revealed a significant linear relationship between the SAS score and the father's and mother's scores and gave a parenting style of autonomy ($p = 0.001$, $p < 0.001$) (Table 3). Those who had a higher score for father and mother care and gave their own parenting style had a higher SAS score. There is no statistically significant linear association between overprotective parenting style and smartphone addiction for father ($p = 0.374$) and mother ($p = 0.060$).

Table 4 showed a significant linear relationship between the SAS score and the father's care parenting style score ($p = 0.002$) and the parenting style of the mother's care ($p = 0.001$), there is also a significant linear relationship between the SAS score and the father's and mother's autonomy parenting style score ($p < 0.001$) after controlling the duration of smartphone use, income and educational level.

Table 3: Association between parenting style of father and mother, and smartphone addiction using Simple Linear Regression

Independent variable	<i>b</i>	95% CI	R ²	t-statistics (df)	<i>p</i> -value
Father's parenting style					
Care	1.00	(0.43, 1.57)	0.023	3.48 (526)	0.001
Gives autonomy	1.89	(1.21, 2.56)	0.055	5.51 (526)	< 0.001
Overprotective	0.35	(-0.42, 1.13)	0.002	0.88 (526)	0.374
Mother's parenting style					
Care	0.94	(0.39, 1.48)	0.021	3.38 (524)	0.001
Gives autonomy	1.63	(0.99, 2.28)	0.045	4.98 (524)	< 0.001
Overprotective	0.73	(-0.03, 1.49)	0.007	1.88 (524)	0.060

b = Coefficient

Table 4: Association between parenting style of father and mother and smartphone addiction using Multiple Linear regression

Independent variable	<i>b</i>	95% CI	R ²	t-statistics (df)	<i>p</i> -value
Father's parenting style					
Care	0.81	(0.30, 1.33)	0.216	3.12 (526)	0.002
Give autonomy	1.37	(0.75, 1.99)	0.229	4.35 (526)	< 0.001
Overprotective	0.38	(-0.32, 1.08)	0.203	1.06 (526)	0.287
Mother's parenting style					
Care	0.82	0.33, 1.31	0.217	3.29 (526)	0.001
Give autonomy	1.12	0.53, 1.71	0.221	3.72 (526)	< 0.001
Overprotective	0.59	-0.09, 1.27	0.205	1.69 (526)	0.091

b = Adjusted coefficient

DISCUSSION

Sociodemographic characteristics of participants and the prevalence of smartphone addiction

In this study, we recruited 538 students, from four age 16 years old, from six selected day schools in Kota Bharu. This group of people is vulnerable and susceptible to smartphone addiction. A survey conducted by the Malaysian Communications and Multimedia Commission found that the ownership of smartphones among adolescents is higher between 15 and 19 years of age²¹. In addition, studies have also shown that adolescents between 15 and 19 years of age are more vulnerable to smartphone addiction¹⁴. A total of 289 (53.7 per cent) female students participated in the study compared to 249 (46.3 per cent) male students. Higher recruitment of female participants was shown in other studies^{3,15,16}. The majority of students in this study had a low household income background of less than RM 2000 per month. Similarly, a study by Long *et al.* (2016) among undergraduate students in China showed that the majority of them came from lower socio-economic status⁹. Higher ownership of smartphones, even among people with low socio-economic status, was due to affordable smartphone prices on the market². However, a different socio-demographic feature was found in a study in Korea. The majority of participants were of medium economic status (83.9 per cent), 8.8 per cent of high level, and 7.3 per cent of low level¹⁷. However, the level of the socio-economic situation varies from country to country. Most respondents have parental education up to secondary level and less than 25% of parents have tertiary education up to tertiary level (diploma, degree, master, PhD). Similar parental education background is shown in adolescent studies in Malaysia and Turkey^{18,19}.

In this study, we found that the mean duration (SD) of smartphone use among students was 6.16 hours (3.47) and the mean duration (SD) among those with addiction was 6.9 hours (3.44) and 3.8 hours (2.38) among non-addicted individuals. This finding is almost similar to a study by Zulkefley and Baharuddin (2009) in Malaysia that documented mobile phone use as an average of five hours a day among undergraduates with addiction¹⁸. The prevalence of smartphone addiction in this total study population was 74 percent, with 54.6 percent female and 46.4 percent male. This finding is similar to the results of a study in Korea that found that female students were more addicted to smartphones than males¹⁷. On the contrary, while in India, male students were at higher risk for mobile phone dependence than their female counterpart²⁰. This suggests that the smartphone appeal is gender-unbiased, and smartphone technology is equally embraced by both sexes. According to the study, the desire for communication and networking through smartphones is stronger in women than in men. They regularly pick up their devices to check social networking sites like Instagram and Facebook. While the male used their device during a break, the female tends to sneak a glimpse while talking to the other¹⁷.

The prevalence of smartphone addiction in this study is 74 per cent higher than in other countries such as Thailand, China, Korea, Poland, Spain, Italy, Australia, Switzerland and India, where the prevalence of smartphone addiction has been found to range from 5.57% to 39.6 per cent^{14,15,17,20}. The prevalence of smartphone addiction varies across countries due to different smartphone penetration rates in some countries. Asian countries have a higher penetration rate for smartphones com-

pared to European countries^{21,22}. Higher penetration means that smartphones are easily available among the population, leading to over-use. In addition, each population takes a different approach to smartphone usage in their lives. Ownership and smartphone usage were higher in countries like China, Korea and India, especially among younger generations compared to Europe²³. In addition, the cost of smartphones and internet subscriptions is lower in Asian countries²². According to Chamber *et al.* (2003), adolescents are a high-risk group for smartphone addiction, as they are firmly attached to their smartphone, and view the smartphone as their second self. Developing adolescents experience a number of physical and psychological changes. They depend on their parents for their lives and identity. At the same time, however, they are trying to be independent in order to establish their identity and create an independent space for themselves. A smartphone becomes indispensable for adolescents during these changes.

Association of parenting and smartphone addiction

Parent-child relationship and parenting style have a major impact on interpersonal relationships in adolescents. Interpersonal problems may influence the addictive behavior of adolescents during childhood⁸. In this study, we used PBI-M as a tool for assessing perceived parenting style. We found that students who perceived their father and mother to be caring and giving autonomy had higher risk of smartphone addiction. While overprotective parenting has not been significantly associated with smartphone addiction. Previous studies have reported mixed findings of smartphone addiction and its association with parenting styles. Studies have suggested that authoritative and democratic parenting is significantly associated with a lower risk of smartphone addiction^{8,10,24}. A study in Iran indicated that authoritarian and permissive parenting was the most effective method of susceptibility to addiction²⁵. On the contrary, Kumcagiz and Gunduz (2016) found that students who perceived their parents to be authoritarian and overprotective were vulnerable to smartphone addiction¹².

Care type of parenting style and smartphone addiction

Care type of parenting style was used interchangeably with other terminology such as democratic and authoritative parenting style in the description of positive parenting. It depends on the different tools used to evaluate the parenting style. Authoritarian or caring parenting styles are known to be highly responsive but very demanding, along with nurturing and warm²⁶. In this study, care type of parenting style was a statistically significant factor associated with smartphone addiction. Linear regression analysis showed a positive relationship between the smartphone addiction score and the care parenting score. Increased mobile addiction scores affected by increased parental care scores. This finding of the study contradicted other studies by Bae (2015), Yoo and Kim in Korea (2015) and Kumcagiz and Gunduz (2016) in Turkey, which show positive parenting through affective, supervisory and rational approaches as protective factors against smartphone addiction^{8,12,24}.

The reasons for these findings may be related to the parent-child relationship. It would be very important for parents to spend their time with their children. The previous study found that healthy parent-child relationships and interpersonal relationships were negatively correlated with Internet addiction, while parent-child conflict was positively related to Internet addiction²⁶. In current practice, where most parents work,

the time spent with their children is limited. Parents with lower socio-economic status, as most of them in this study, may need to work longer hours and leave their children independently. As a result, children spent more time with smartphones due to lack of attention, contributing to the risk of addiction.

Autonomy type of parenting style and smartphone addiction

Autonomy type of parenting is often described as a permissive type of parenting style. According to Baumrind's parenting style theory (1971), autonomy or permissive parenting is indulgent, extremely loving, affectionate and responsive. They don't expect much from their children, however, and don't offer a lot of advice or guidance²⁶⁾. This study found that the type of parental autonomy was a statistically significant factor associated with smartphone addiction. Increase in smartphone addiction scores influenced by increased parental autonomy scores. A study in Korea reported that children with a permissive type of parent were vulnerable to smartphone addiction¹¹⁾. Similar findings in other studies by Kang (2008) and Park and Noh (2019) suggested that permissive parenting of children was more addicted to media devices such as smartphones or computers^{27,28)}.

Based on the Problem Behavior Theory (Jessor *et al.*, 1991), children and adolescents who are not properly supervised or monitored by parents may be vulnerable to behavioral addictions, such as overuse of the Internet and smartphones, and problem behaviors, including alcohol, smoking, and substance use⁹⁾. Previous research has shown that children and adolescents from permissive parents are impulsive, selfish, stubborn, and hysteric, with a higher smartphone addiction rate²⁹⁾. In addition, permissive parents also allow their children to use smartphones more easily and for longer periods of time, resulting in higher rates of smartphone dependence. Meanwhile, a study by Chang (2019) suggested that restrictive parental mediation reduces the risk of smartphone addiction among students in Taiwan³⁰⁾.

The findings of this study were supported by the results of various studies in which the granting of autonomy and the permissiveness of their children could lead to smartphone addiction. Research suggests that adolescents raised by permissive parents may have difficulty in problem-solving and decision-making skills. They also show more aggression and less emotional understanding because they don't deal effectively with their emotions. Children with permissive parents are more likely to commit delinquency and misconduct¹¹⁾. Because of the lack of structure and rules, these children cannot manage their time or habits. All of these factors contribute to an increased risk of smartphone dependence among adolescents. In dealing with the situation, parents must become stricter, enforce the rules, and be upset about their children. It is essential to draw up a list of basic rules in order to know how to behave. Parents need to make sure they understand the penalty for breaking the rules. Another important strategy is to try to be firm and consistent, even though it may be the biggest fight for parents with permissive behaviour. These approaches can prevent adolescents from becoming addicted to smartphones and can also be part of the intervention.

Overprotective type of parenting style and smartphone addiction

The over-protective type of parenting is also known as the authoritarian parenting style. Authoritarian parenting styles are characterized by rigid rules and high demands made by parents. Children are expected to abide by the rules all the time, with no room for negotiation or exceptions²⁶⁾. In this study, we found that overprotective parenting was not a statistically significant factor associated with smartphone addiction. The increase in the smartphone addiction score was not affected by the increase in the overprotective parenting score of both parents. Based on previous studies, the impact of overprotective parenting on smartphone addiction was inconsistent. In a study among students in Turkey, there was no significant difference in smartphone addiction score and father's over-protective attitude¹²⁾. There was also no relationship between restrictive and over-protective parenting behaviour and child Internet addiction in other different studies^{31,32)}. Overprotective parents have a lot of anxieties about their children, often focusing on the fear that their children will be adversely affected, harmed or seriously injured, or become ill or even die.

CONCLUSION

The prevalence of smartphone addiction among secondary school students in Kota Bharu is 74% and is higher than previous findings in Malaysia. A higher risk of smartphone addiction among secondary school students in Kota Bharu was positively associated with the perception of their parents' parenting style of care and giving autonomy. This study highlights the need to identify a specific population when conducting a study to achieve the highest and most valuable yield. It also highlights the seriousness of smartphone addiction among our youngsters in our community. As a result, proper preventive measures need to be developed to address the problem.

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