Relation between Smartphone Addiction, Sleep Quality and Psychological Health among adolescents in Malaysia

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ABSTRACT--Dependency on digital causes today's generation to have inactive lifestyle that could instigate negative impact towards health, social interaction and individual intellectual skill. Besides affecting individual's sleeping time, smartphone addiction can disturb a person psychological well-being. This research was carried out to identify the relationship of smartphone addictions with sleep quality with psychological health of Kolej PERMATA Insan's (KPI), Universiti Sains Islam Malaysia (USIM) students. Research respondents were 158 KPI students comprise of 76 male students and 82 female students aged between 13 to 16. A set of questionnaires consisted of four parts have been distributed to all respondents in order to acquire their information. The questionnaire comprised of demographic section; the instruments Smartphone Addiction Scale (SAS), Pittsburgh Sleep Quality Index (PSQI) and General Health Question-12 (GHQ-12).Findings shown there were significant relationship between smartphone addiction and sleep quality with mental health (p<0.05).The level of smartphone addiction and sleep quality with respondents' psychological health were correlated. Demographically, 51.9% respondents were addicted towards smartphone, 65.2% respondents have weak sleep quality and 64.6% respondents have a worrying state of psychological health. This research suggests that smartphone addiction level must be reduced, and sleep quality must be increased in order to ensure a good mental health level.

Keywords-- Smartphone addiction, Sleep quality, Mental health, Kolej PERMATA

I.   INTRODUCTION

In moving towards todays' world modernization, smartphone has become the main gadget in every layer of society around the world. Smartphone is a gadget that can facilitate humans in managing their daily life more efficiently. However, the usage of smartphone also gives negative effect towards its users if its usage is being abused. Nowadays, children, teenagers, adults and even elderly are now addicted to mobile phone.Excessive use of

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smartphone is connected to addiction towards smartphone. World Health Organization (WHO Expert Committee, 1964) defined excessive usage as dependence syndrome, substituting the term addiction or habit. Smartphone addiction is similar in many aspects to internet addiction.[1]The term addiction has generally been associated with substance abuse and such excessive use of smartphone is considered as addiction since the symptoms of internet addiction is comparable to the symptoms of nicotine, alcohol and drug addiction.[2]

Smartphones are popular devices among adolescents. With an easy access to the internet, it makes smartphones become more influential in their life and attract the eyes and interests of the adolescents such as games, social networks, videos, messaging, and part of their medium of communication.[3,4]Access to the internet is increasingly easy due to improvements in mobile technology and the prevalence of owning a smartphone at a young age. Previous research has shown the importance of parents having knowledge and understanding on the use of smartphone to have social control over their children's usage especially on social media.[5]

In Malaysia, statistics released by Malaysian Communications and Multimedia Committee in 2006 found that 20.5 percent out of 92.5 percent mobile phone users are adolescents. In this era of industrial development of smartphone, many adolescents have become addicted to its usage. Previous research has shown significant relationship between smartphone addiction with anxiety and depression.[6,7]In 2011, statistics show that 1 out of 10 individuals have mental health problem and in 2016, statistics show that 1 out of 5 individuals have mental health problem. At the end of 2016, statistics show that 1 out of 3 individuals suffer from mental problem. The statistics indicate that there is substantial increase within 5 years.[8]

In a Korean study, 58% of adults owned smartphones while 84% of Korean college students used smartphones in 2011.[9]This rate is comparable with the prevalence around the world such as in United States, 56% of the adults were smartphone users,[10] 72% of adolescents among 12 – 19 years old owned smartphones in Germany[11]and 79% in 2012 for Switzerland.[12]

Excess smartphone use can cause maladaptive behavioural difficulties, reduce real-life social interactions, interferes with school or work and may lead to relationship disorders,[13]social competence[14] and this may start as early as in their pre-school years.[15]As a basic need of human, sleep is important for health and quality of life of all ages. Poor sleep quality has emerged as a significant public health problem in the technology advanced societies. Several existing studies have focused findings association between adolescents and smartphones addiction. It was reported that smartphones addiction is associated with sleep problems, including poor sleep quality and subjective insomnia.[16,17]

The present study was intended to determine the smartphone addiction in the secondary school students, examinethe existence of significant difference between smartphone addictions and sleep quality with psychological health and determine the association between the addictions with sleep quality with mental health.

II.   METHODOLOGY

This cross-sectional study was conducted among the secondary school students of Kolej PERMATA Insan (KPI) of Form 1-4. The data was collected in September 2017. The respondents' selection was carried out using purposive sampling in which all students of KPI that fulfils the set criteria by the researcher; only the students who have smartphone were selected as respondents. The researcher had acquired the respondents' approval to be involved in the research and also the approval from Kolej PERMATA Insan administration.

A set of questionnaireswas carried out; comprises of four sections demography section; Smartphone Addiction Scale (SAS), Pittsburgh Sleep Quality Index (PSQI) and General Health Question 12 (GHQ-12). Data was analysed using two methods which were inferential statistics and descriptive statistics. Descriptive statistics was used to answer the objectives and the research questions. Thus, researcher had used Multivariate Statistics ANOVA, Pearson Correlation and T-test in this research.

III.   MEASURES

The Smartphone Addiction Scale (SAS) is a 33-item, six-pointLikert-type self-rating scale based on the Internet addiction scale and the features of smartphones.[18] The options of SAS range from 1 (definitely not), to 6 (absolutely yes). The higher the scores indicate a higher risk of smartphone addiction and total score on the scale vary between 33 and 198. The Cronbach's alpha of SAS is 0.967.

The Pittsburgh Sleep Quality Index (PSQI) was used to measure sleep quality.[19]PSQI measures subjective sleep quality during the preceding 1-month period. PSQI consists of 19 items and the items are grouped into score with the seven following components: subjective sleep quality, sleep latency, sleep duration, sleep efficiency, sleep disturbances, use of sleep medication, and daytime dysfunction. These component of scores were added to a global PSQI score with range of 0 to 21, with higher scores indicates worse sleep quality. PSQI scores above 5 were considered as abnormal.

The psychological health was assessed using the 12-item General Health Questionnaire (GHQ-12).[20]GHQ-12 is a screening tool which was used to identify the severity of psychological distress experienced by an individual within the past few weeks. The scale covers disorders or patterns of adjustment associated with distress, each item of GHQ-12 has four responses from "better than usual" to "much less than usual". The scoring method was 0-0-1-1 and the scores were summed up by adding all the items on the scale ranging from 0 to 12. The cut-off point 5/6 was used to determine the respondents' level of psychological well-being.

IV.   RESULTS

A total of 158 students were included in the study. Of the 158 students, 76 (48.1%) were males and 82 (51.9%) were females. The younger age of participants (13 years) was 39 (24.7%), followed by 14 years age 42 (26.6%), 15 years of age was 43 (27.2%), and 16 years of age 34 (21.5%) respectively (Table 1).

The median value of SAS scores was found to be 105[21] with high smartphone users >105 and low smart phone users <105. Of the participants enrolled in the study, 82 (51.9%) were in high smartphone user group and 76 (48.1%) were low in smart phone user group. More than half of the participants (n=103) or 65.2% reported having some abnormal sleep quality as measured by PSIQ according to the cut-off levels presented in Table 2. As for the psychological well-being, 50.6% participants reported of having low psychological well-being, while 49.4% were having a good psychological well-being.

Table 1: Description of sample characteristics

	N (%)
Gender	
Male	76 (48.1)
Female	82 (51.9)
Age (years)	
13	39 (24.7)
14	42 (26.6)
15	43 (27.2)
16	34 (21.5)
Educational level	
Form 1	37 (23.4)
Form 2	40 (25.3)
Form 3	46 (29.1)
Form 4	35 (22.2)
Age upon receiving smartphone	
6	3 (1.9)
7	1 (0.6)
8	9 (5.7)
9	14 (8.9)
10	31 (19.6)
11	16 (10.1)
12	39 (24.7)
13	37 (23.4)
14	8 (5.1)

Table 2: General characteristics of the participants

	N (%)
SAS	
High smartphone addiction	82 (51.9)
Low smartphone addiction	76 (48.1)
PSQI	
PSQI <5 (good quality)	55 (34.8)
PSQ1 ≥6 (low quality)	103 (65.2)
GHQ-12	
Low psychological well-being	80 (50.6)
High psychological well-being	78 (49.4)

The overall mean score of Smartphone Addiction Scale (SAS) was 106.61±9.44, while the mean score for PSIQ was 7.07±2.73 and for GHQ-12 was 4.56±2.36 (Table 3). PSQI score was 7.07 (2.73), subjective sleep quality was 1.00 (0.66), sleep latency was 0.85 (0.74), sleep duration was 1.50 (0.90), habitual sleep efficiency was 0.79 (0.99), sleep disturbance was 0.03 (0.51), use of sleeping medication was 0.03 (0.24) and daytime dysfunction was 1.44 (0.86) for participants (Table 3).

Table3: Distribution of the mean scores of SAS, PSQI and GHQ-12

	Mean ± SD
SAS	
SAS total score	106.61±9.44
Cyberspace Oriented Relationship	17.87±5.64
Daily Life Disturbance	21.12±5.37
Primacy	13.75±4.42
Positive Anticipation	18.50±4.48
Withdrawal	9.67±3.53
Overuse	25.71±5.82
PSQI	
PSQI global score	7.07±2.73
Subjective sleep quality	1.00±0.66
Sleep latency	0.85±0.74
Sleep duration	1.50±0.90
Sleep efficiency	0.79±0.99

Sleep disturbance	0.03±0.51
Use of sleep medication	0.03±0.24
Daytime dysfunction	1.44±0.86
GHQ-12	
GHQ total score	4.56±2.36

The smartphone use severity was positively correlated with GHQ-12 (r=0.286, p<0.05), PSQI global score (r=0.403, p<0.05), the Subjective sleep quality (r=0.437, p=0.000), the sleep latency (r=0.423, p=0.000), the sleep duration (r=0.738, p-0.000), the sleep disturbance (r=0.392, p<0.05), use of sleep medication (r=0.545, p<0.05) and daytime dysfunction (r=0.567; p=0.000). Meanwhile, it was negatively correlated with sleep efficiency (r=-0.570, p=0.000). The correlations between the SAS and other scales are demonstrated in Table 4.

Table 4: The correlations between the scores of SAS and the other scale scores

	SAS	
	r	**P**
GHQ	0.286	0.00
PSQI	0.403	0.00
Subjective sleep quality	0.437	0.000*
Sleep latency	0.428	0.000*
Sleep duration	0.738	0.000
Sleep efficiency	-0.570	0.000
Sleep disturbance	0.392	0.000
Use of sleep medication	0.545	0.000
Daytime dysfunction	0.567	0.000

Gender differences for smartphone addiction, sleep quality and mental health

Accordingly, all participants, irrespective of the year of study, were somehow affected with smartphone addiction, sleep quality and mental health issues. Mean scores of male participants in the smartphone addiction scale were slightly lower than the female participants which were 105.08 ± 18.09 and 108.04 ±20.62 respectively. This indicates no significant difference between genders with smartphone addiction.

Table 5: Gender differences for smartphone addiction, sleep quality and psychological health

	Male, n=76 Mean ± SD	Female, n=82 Mean ± SD	p
SAS	105.08 (18.09)	108.04 (20.62)	0.34

PSIQ	6.63 (2.64)	7.48 (2.77)	0.05
GHQ-12	4.30 (2.23)	4.80 (2.46)	0.18

As for sleep quality, results showedthe mean score of male participantwere 6.63 ± 2.64 while mean score for female participants were 7.43 ± 2.77, while p value was (p≤0.05) indicating that there was a significant difference between genders with sleep quality. The mean score of psychological health were slightly higher in female participants 4.80 ± 2.46, while male participants' score were 4.30 ± 2.23, while p>0.05 showed that there was no significant difference between genders with psychological health.

V.   DISCUSSION

Smartphone addiction has become a more dominant of public health issue for research concerns from abundant scientific areas including psychology, psychiatry, behaviour addictions, and neuroscience. In the present study, the response rate of the participants was 76%, which is very similar to a previous study.[22] Female participants were slightly outnumbered by their male counterparts.

Our main finding was more than half of the participants (51.9%) were at risk of developing smartphone addiction. This was based on their SAS scores more than 102. Possible reason to explain this results is due to the high prevalence of smartphone addiction expected, as according to local survey showed that 85% of Malaysians owned a mobile phones.[22]A previous study showed that the SAS mean score was 110.02.[18] Similarly, the SAS mean score was 106.61±9.44, whereas in a different study[23] reported SAS mean score of 85.66±23.46 in their 587 adolescents.

Overuse smartphones may cause various physical and psychological health problems. Various studies investigated the relationship between smartphones and the internet accessibility, and on the other hand, the depression and psychological well-being and sleep disturbances among adolescents rigorously been evaluated.[24, 25] Moreover, the study evaluated adolescents' electronic media usage at night, along with sleep disturbances and depressive symptoms.[25] They found that smartphone ownership was associated with later bedtimes but was unrelated with sleep disturbances.

There were significant positive relationship between the SAS scores and PSQI and GHQ-12 scores. This is in agreement with findings from other studies done among university and high school students. In another study, high usage of mobile phone was reported to have relationship to sleep disturbances.[26]Another study also proved that poor sleep quality gave significant effect towards mental health among problematic mobile phone users compared to those who were not in the said category.[27] The findings were also aligned with a different research that stated there was a significant positive relationship between smartphone addiction and mental health.[28] A study carried out among a sample of 362 Swiss high school students found out that adolescents with smartphones reported

significantly more sleep difficulties, had delayed bedtimes, reduced of sleep duration compared to those using conventional mobile phones.[29]

No difference was found between the females and males with regard to the smartphone addiction level and mental health (p>0.05). Similarly, a study reported no significant differences between genders.[19]Previous research mentioned that smartphone addictions were higher among female respondents[30] but it contradicted with the findings of our research. As for sleep quality variable, managed to prove that female respondents had lower sleep quality compared to male respondents.[31]

VI.   CONCLUSION

In conclusion, this research managed to prove and support past researches that there was relationship between smartphone addiction, sleep quality and mental health. There were a few research hypotheses that were rejected even though past researches had proven them such as gender differences for every variable. This might be due to the small number of respondents. Research results that stated smartphone addiction had no significant relationship with mental health might be influenced by the way the respondents answered the given questionnaire. The researcher's suggestion for future research is to study external factors that cause mental health problems among students aside from asking the respondents to record their sleeping routine for a period of time before conducting a research in order to gather the best data on respondents' sleep quality. This research also suggests that smartphone addiction level must be decreased and sleep quality must be increased in order to ensure that mental health level is in a good state.

VII.   ACKNOWLEDGEMENT

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