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Indonesian Version of Addiction Rating Scale of Smartphone Usage Adapted from Smartphone Addiction Scale-Short Version (SAS-SV) In Junior High School

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Abstract

BACKGROUND: The increase of smartphone user among Indonesian junior high school students, particularly for teenagers, indicates the addiction factor of the smartphone.

AIM: This research is designed to adapt the Smartphone Addiction Scale-Short Version (SASS-SV) to Indonesian version based on cultural adaptation of the rating scale.

METHODS: This study involves 300 participants consisted of 151 of male children and 149 female children with an average age is 13.27 years-of-old. The validity of concurrent was used to obtain the validity, while the internal consistency and Receiver Operating Characteristic (ROC) were conducted to confirm the reliability of the rating scale.

RESULTS: In purpose to measure internal consistency, the Cronbach alpha has been applied. The Cronbach alpha value was 0.740, and Concurrent validity was checked to NMP the Nomophobia Questionnaire (NMP-Q) based on Indonesian version. The analysis of ROC showed that the value of Area under the Curve (AUC) was 0.997 (0.990-1.000), with cut-off value accounted for ≥ 32, a sensitivity value of 0.91 and specificity value was 0.973 for the male children. On the hand of female children, the results showed similarity with the AUC was 0.996 (0.998-1.000), and the cut-off, sensitivity and specificity values were accounted for ≥ 34, 0.91, and 0.974 respectively.

CONCLUSION: The Indonesian version of SAS-SV provided acceptable validation results as well as the reliability, and this version can be used to evaluate the smartphone addiction in Indonesia.

Introduction

Since the release of the smartphone, the anomaly usage of the smartphone has emerged a question which is whether the usage of a smartphone can cause addict [1]. A smartphone is a device which is consisted of a combination of state-of-the-art features so that people could send messages, make a phone call, listen to music and play games. However, a few experts have reported that several users become highly dependent on their smartphones without realising the condition itself [2].

In these days, addiction is not only indicated by the consumption of drugs and matter but also it implies to gambling, the Internet, games and even smartphones [3]. The term of addiction of smartphones, mobile phone dependence, and compulsive mobile phone use, has been coined for the same phenomenon, which shows the happiness during using their smartphones and abandon their daily activities [2].

According to the survey conducted by the National Information Society Agency (NIA) in 2012, the percentage of Korean teenagers which were categorised addicted to their smartphones had been reported to be increasing annually [4]. In Indonesia, the statistical data from the Information and Communication Technology in the past three years, the use of the Internet had elevated significantly started from 15% in 2014 to 51% in the year of 2017, placing Indonesia as a nation with high growth of internet users, five times more than the global average between the year of 2016 and 2017. The number of connected users to smartphones in

Indonesia had surpassed the total population in 2014, around 112%. This number was highly significant with the average users of the smartphone to Indonesia population [5].

It is unclear about which instrument is valid to measure the potential causes made by the usage of smartphones [6]. Several self-report questionnaires have been developed to measure the addiction scale caused by smartphones since recent years. Generally, the smartphone addictions were consisted by four main aspects, which were compulsive behaviours, tolerance, withdrawal and functional misbehaviour, which was identical to the internet addiction features [3], [7]. In South Korea, the NIA has developed the Korean Scale for the Internet Addiction (K-Scale) and Smartphone Scale for Smartphone Addiction (S-Scale), and this scale has been improved into a scale to measure the addiction level to the smartphones, and it was called the Smartphone Addiction Scale (SAS) [8]. This scale also has a short version, which is called a Smartphone Addiction Scale-Short Version (SAS-SV) [3], the Cronbach's alpha coefficient was 0.91. This short version scale had been considered as one of the instruments that had been developed and validated [6]. However, in Indonesia, with the increasing number of smartphones, no addiction instruments have been validated to measure the smartphone addictions.

This research is designed to adapt the Smartphone Addiction Scale-Short Version (SAS-SV) into Indonesian version. In this study, we performed the validity of concurrent to obtain the validity, whereas the internal consistency and Receiver Operating Characteristic (ROC) were conducted to confirm the reliability of the rating scale. This scale is adapted to be able to evaluate the presence of smartphone addictions in Indonesia. From our knowledge by literature search, this study is the first that validates the rating scale of smartphone addiction in the province of Sumatera Utara, Indonesia.

Material and Methods

Participants

In this study, the participants are 300 junior high school students from two schools that are located in the city of Medan, North Sumatra Province, Indonesia. One hundred fifty-nine are boy students and 149 girl students with an average age are 13.27 years-old. This study was conducted after the informed consent written and signed by both of the participants and the schools. The ethical clearance that was followed was based on the Nuremberg Code and the 1964 Helsinki Declaration, and each participant received informed consent before participating in this study. This research was approved by the Health Research Ethical Committee, Medical Faculty of Universitas Sumatera Utara, with approval No: 685 / TGL / KEPK / FK USU-RSUP HAM / 2018.

Measurements

All the statistical analysis was performed by using the IBM SPSS statistics 22 with as following parameters: 1. Socio-demographic Characteristics. Socio-demographic characteristics were presented descriptively; 2. Concurrent Validity of SAS-SV Indonesian Version. The analysis of concurrent validity of SAS-SV Indonesia version was conducted by performing the Pearson's correlation with NMP-Q, to determine the smartphone addiction of the participants. The NMP-Q Cronbach alpha value 0.931 and had been validated to Indonesian version [9]; 3. Internal Consistency Reliability for the SAS-SV Indonesian Version. To verify the reliability of the instruments, the Cronbach's alpha correlation coefficient was used; and 4. Receiver Operating Characteristic (ROC) of SAS-SV Indonesian Version. To determine the ability of the SAS-SV Indonesia Version, we performed the ROC analysis to predict the addiction based on the scale. Also, to measure the diagnostic ability with sensitive and specified results, the Area Under the Curve (AUC) of the ROC was analysed by selecting every alternative intersection within the graph resulted from the ROC.

Results

The processes of validation and reliability tests were conducted in two junior high schools in Medan, during the study hours at both schools. The research subjects were recruited by performing the non-probability sampling, i.e. purposive sampling was performed due to the restriction regulated by schools' policies, in which to be the research subjects, they must be junior high school students with an average age between 12 and 15 years-of-old who have smartphones. Before the survey, all the informed consent and ethical clearance have been obtained from the schools.

Table 1: Socio-Demographic Characteristics of Subjects

Variables		n	%
Sex	Boy	151	50.3
	Girl	149	49.7
Age	12 YoA*	52	17.3
	13 YoA*	121	40.3
	14 YoA*	120	40.0
	15 YoA*	7	2.3
Purposes in using smartphones	Social Media:	156	52.0
	* Facebook	5	1.7
	* Instagram	41	13.7
	* Line	22	7.3
	* Twitter	31	10.3
	* WhatsApp	57	19
	Entertainment (Mp3, Watching Movies, Playing Games)	127	42.3
	Internet Browsing (Google, Yahoo.)	17	5.7

*YoA = Years of Age.

The number of 300 students was obtained to be classified as the research subjects, and the following Table 1 is the socio-demographical characteristics of the subjects.

According to the Table 1, from 300 participants, it was obtained that 151 (50.3%) students were boy, while the 149 (49.7%) students were girl, with an average age was 13.27 years old. The social media factors were the main reason from the samples in using the smartphones, and the over the half of the population chose these reasons accounted for 156 subjects (52.0%) followed by 127 subjects (42.3%) with entertainment reasons such as listening to music, watching movies or playing games. Then, 17 subjects (5.7%) used their smartphones for browsing the Internet. The following Figure 1 shows the smartphone addiction based on the gender using SAS-SV Indonesian version.

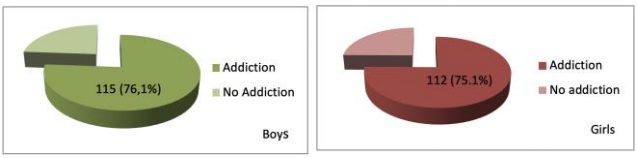

Figure 1: The percentage of smartphone addiction based on sex

Figure 1 present that the proportion of addiction in boy students was 76.1% and in a girl, students were 75.1%. Table 2, to the boy students, the highest percentage in using the smartphone is for entertainment which accounted for 94 people (62.3%), while for the girl students; almost a three-quarter of the samples chose social media for the purposes, accounted for 109 students (73.2%). Meanwhile, the least percentage of the purposes for both sexes when they use the smartphones is for internet browsing which accounted for 10 (6.6%) for boys and 7 (4.7%) for girls.

Table 2: Purpose in using smartphones based on sex

Purposes in using smartphones	Sex	
	Boy students	Girl students
Social media (Facebook, Line, Instagram, Twitter and WhatsApp)	47 (31.1%)	109 (73.2%)
Entertainment (Mp3, watching movies, playing games)	94 (62.3%)	33 (22.1%)
Internet browsing (Google, Yahoo)	10 (6.6%)	7 (4.7%)

Concurrent Validity

The concurrent validity was performed to confirm the validity of SAS-SV Indonesian version, which the scores resulted from the SAS-SV Indonesian version and NMP-Q are compared. The following Table 3 shows the correlation between SAS-SV and NMP-Q.

Table 3: The correlation between SAS-SV and NMP-Q

	NMP-Q
SAS-SV	r = 0.558 p < 0.001 n = 300

From Table 3, we use the Spearman test to analyse the data because the data was not normally distributed. In this validation test, the SAS-SV of Indonesian version is adapted from the original score which was constructed in South Korea in the form of English [3], [8], while the internal consistency shows the value of 0.931. In accordance with Indonesian culture, it has been classified as the value of r which in interval 0.5 to < 0.6 is classified as Medium [10].

Internal Consistency Reliability for SAS-SV Indonesian Version

The internal consistency reliability analyses were performed due to the adaptation process of SAS-SV into Indonesian version. The following Table 4 shows the internal consistency reliability of SAS-SV Indonesian version [11].

Table 4: The Internal Consistency Reliability of SAS-SV Indonesian version

No	Items	*Corrected Item / Total*	*Alpha if Item Deleted*
1	Kehilangan rencana kerja disebabkan oleh penggunaan smartphone *Missing planned work due to smartphone use**	0.308	0.723
2	Kesulitan Konsentrasi di kelas, sedang melakukan tugas atau sedang bekerja disebabkan penggunaan *smartphone.* *Having a hard time concentrating in class, while doing assignments, or while working due to smartphone use.**	0.381	0.722
3	Merasa nyeri di pergelangan tangan atau bagian belakan leher selama menggunakan *smartphone.* *Feeling pain in the wrists or at the back of the neck while using a smartphone.**	0.301	0.734
4	Tidak bisa bertahan karena tidak memiliki *smartphone.* *Won't be able to stand not having a smartphone.**	0.428	0.715
5	Merasa tidak sabaran dan resah saat saya tidak memegang *smartphone* saya. *Feeling impatient and fretful when I am not holding my smartphone**	0.514	0.702
6	Memikirkan *smartphone* saya walau saya sedang tidak menggunakannya. *Having my smartphone in my mind even when I am not using it**	0.432	0.715
7	Saya tidak akan berhenti menggunakan *smartphone* saya walapun kehidupan harian saya telah terpengaruh karenanya *I will never give up using my smartphone even when my daily life is already greatly affected by it.**	0.397	0.721
8	Mengecek secara konstan *smartphone* saya sehingga tidak ketinggalan percakapan di Twitter atau Facebook *Constantly checking my smartphone so as not to miss conversations between other people on Twitter or Facebook.**	0.320	0.732
9	Menggunakan *smartphone* lebih lama dari yang saya inginkan *Using my smartphone longer than I had intended.**	0.499	0.706
10	Orang-orang disekitar saya mengatakan bahwa saya menggunakan *smartphone* terlalu sering *The people around me tell me that I use my smartphone too much.**	0.432	0.715

*Adapted with permission from [3].

From Table 4 above, the result that was analysed from the internal consistency reliability instruments of SAS-SV Indonesia version had the reliability value; with the Cronbach's alpha value is 0.740. This value is acceptable. Based on Table 4, the values of the corrected item and the total item correlation are over 0.3, which indicate ten validated statements [10].

The Receiver Operating Characteristic (ROC)

In this study, we performed the analyses of Receiver Operating Characteristic (ROC) as well as the Area Under The Curve (AUC) for determining the addiction scale. Table 5 below shows the analysis of ROC with the parameters required.

Table 5: The Results of Analysis Receiver Operating Characteristic (ROC) Based on Sex

Sex	AUC	CI 95%	Cut-off	Sensitivity	Specificity
Boys	0.997	0.990 – 1.000	31.50	0.974	0.973
Girls	0.996	0.998 – 1.000	33.50	0.910	0.974

AUC, the area under the curve; CI, confidence interval.

The cut-off value of SAS-SV Indonesia version obtained for the boys was ≥ 31.5 with sensitivity and specificity percentages accounted for 97.4% and 97.3% respectively. The girl's students showed similarly, with the cut-off value was 33.5, followed by sensitivity and specificity, respectively 91% and 97.4%. Based on the scores, the subjects that are diagnosed to in experiencing the smartphone addiction produce a score for boys is ≥ 32, while for the girls is ≥ 34.

Discussion

To obtain a good measurement, the instruments are properly translated from the original language (English version) to the Indonesian version which is based on the targeted areas and cultures. Therefore, forward and backward translations were conducted in this study so that the subjects can understand the questionnaires. It means that the instruments must have to be the same, acceptable, conducted within the same guidance [12]. The forward translation which is considered to be valid requires at least two translators. Bilingual translators must be able to translate into their mothers' languages because of the awareness factors, and it is recommended to employ aware and unaware translators in determining the concepts of the questionnaires [13], [14]. Unaware translators are expected not to understand or inform the concepts of the questionnaires, and they have no medical or clinical educational backgrounds. It is exactly the same as the forward translation; the backward translation requires two translators.

In this study, the subjects are teenagers with interval ages from 12 to 15 years-old. All the subjects in this study own and use smartphones. In the original version of SAS-SV, the study has chosen the second grade of junior high school students in South Korea, so that in this study no limitation of educational levels due to the purpose in determining the smartphone addiction among the teenagers [3]. Over three-quarter of the junior high school students is addicted to their smartphones, which accounted for 76.1% for boys and 75.1% for girls. Kim et al. have argued that teenagers these days are easy to accept a new media of communication, such as smartphone [15]. As the first generation within the family, teenagers are the first members of the family that grows surrounded by sophisticated media. This also means that teenagers are more vulnerable to be affected by the bad effects of smart than those experienced by adults. For teenagers, communications based on the telephone are important factors in maintaining their social relationships [15]. On the other hand, they also depend on their parents due to the change in their physical and psychological attributes. However, they must also be independent during the growth, and smartphones are highly necessary for their life [16].

From Table 1, the main purpose of using the smartphones done by the teenagers is for social media, with over half of the samples population (52.0%). The most common social media applications used by the teenagers are WhatsApp (19%), Instagram (13.7), Twitter (10.3%), Line (7.3%) and Facebook (1.7%) because these types of social media are built-in to texted message services. These results are also concordance to the study conducted in South Korea [8] which Social Networking Sites (SNS) or Messenger, such as Facebook, Twitter, Kakao Story and Kakao Game due to their integrated systems to text message services [3]. In this study, the gender categories were analysed to determine the smartphone addiction. Based on Table 3, the entertainment purpose was the highest reasons chosen by the boy students for using their smartphones with the percentage of 62.3%, while the girl students used their smartphones for social media reasons, which accounted for 73.2%. Over half of the population, both boy and girls' students have spent their times for social interaction, such as the SNS. Overused of SNS while using their smartphones implies significantly to their academic performances, whereas a gaming smartphone that is connected to other user provides easy interaction throughout the others social networks [15].

The concurrent validity test of SAS-SV Indonesia version and NMP-Q shows r = 0.558, which contributes medium correlation result. This shows that the SAS-SV and NMP-Q are not completely identical, although it has a medium correlation. The internal concurrent reliability test obtained displays a good result (0.740), with Cronbach's alpha value is >0.6 based on the analysis. The average score of SAS-SV Indonesia version for the male students was 35.09 while the female student's score was 36.11, and the cut-off value which is analysed from the ROC test of both genders could be determined. The cut-off value of SAS-SV Bahasa Indonesia version for the boys was ≥ 31.5 with sensitivity and specificity values were 97.4% and 97.3% respectively, and these values were insignificantly different to the girls had ≥ 33.5 with 91%

of sensitivity and 97.4% of specificity.

To the best of our knowledge, this Indonesian version of SAS-SV provided acceptable validation results as well as the reliability, and this version can be used to evaluate the smartphone addiction in Indonesia. In this study, the limitation is on the uncontrollable demographical factors as the demographic results showed the ratio of the samples almost 1:1. Thus, this Indonesia version was considered to be used for identifying the smartphone addiction for teenagers aged between 12 to 15 years old. Further study needs to be conducted regarding the characteristics of the subjects.

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