

An Early Glance into Smartphone Dependence in a Rural LMIC and Relationships with Mindfulness and Depressive Symptoms

Nicholas Tze Ping Pang^a, Mathias Wen Leh Tseu^b, Gloria Pei Ying Lee^c, Helda Artika Honey^d, Jane Ivana Joss^e, Mohd Amiruddin Mohd Kassim^{f*}, Min Kwong^g, ^{a,b,c,d,e,f}Faculty of Medicine and Health Science, Universiti Malaysia Sabah, Malaysia, ^gDepartment of Nursing, University of Suwon, Republic of Korea, Email: ^{f*}amiruddink@ums.edu.my

A rising issue in the child and adolescent global mental health pandemic is smartphone addiction. However, most evidence has come from urbanised countries in the developed world or university undergraduate students in LAMICs. This study aims to ascertain core psychometric properties of a previously unvalidated brief smartphone addiction scale for adolescents, determine gender-based prevalence of smartphone addiction in adolescents in rural areas, and assess relationships with concurrent measures of a state of mindfulness and depression. Secondary data from a health screening in a Dusun-speaking village in rural Borneo was analysed, with respondents filling in sociodemographic questionnaires and three Malay-language scales: MAAS, PHQ-9, and SAS-SV, which measure the state of mindfulness, depression, and smartphone addiction respectively. The SAS-SV-M exhibited satisfactory internal consistency and was consistent with a unifactorial model in the original paper. There were significant gender differences for smartphone addiction, but no significant difference between all 3 measured variables for age. Significant inverse correlations existed between mindfulness and depression, but not with neither and smartphone addiction, with these correlations persistent upon multiple regression. This study pioneeringly establishes prevalence by gender for smartphone addiction in a rural LAMIC setting, and concurs with extant findings that mindfulness and depression are inversely correlated.

Key words: *Smartphone Dependence, Mental Health, Addiction, LAMICs*

INTRODUCTION

There is a rising pandemic of mental health issues in children and adolescents (Keyes et al., 2019), and this is even more so in rural areas, where there are long distances from tertiary centres, lower mental health literacy and more widespread stigma and traditional or cultural-bound explanations to mental illness symptoms, and lower levels of healthcare resources (Bracke et al., 2019; Crumb et al., 2019; Guerrero et al., 2019). Depressive symptoms are a major cause of morbidity in adolescents as they go through hormonal changes causing physical and psychological sequelae (Lewis et al., 2018). At the same time, with the advent of recent technology, the Internet and smartphone have been used as a dysfunctional coping tool to cope with stressors of modern life (Kuss et al., 2017). The availability of ubiquitous smartphones has exacerbated this issue, leading to multiple smartphone addiction issues amongst adolescents and young adults in predominantly urban areas (Duke & Montag, 2017). Smartphone addiction is a pandemic that has exploded into visibility, initially in South Korea where Internet penetration rates are close to universal, then to other countries in the developed world (Cha & Seo, 2018).

However, there has been scant research to demonstrate whether these relationships between depression and smartphone addiction still hold in more rural and more underprivileged areas, as the vast majority of Internet and smartphone addiction research has been performed in urban areas with the predominantly university-educated (Malinauskas & Malinauskiene, 2019; Sohn et al., 2019). Hence, there is a significant gap in the research, wherein even prevalence of smartphone addiction in rural people cannot be estimated, let alone more intricate theoretical relationships. Moreover, there has been very little research whether psychological process factors like mindfulness are potentially mediators of that relationship between smartphone addiction and depression, especially in rural areas (Elhai et al., 2018). Such research can be of high value, as it can be used to design suitable and relevant interventions for young people in rural areas who are disaffected and disenfranchised.

Bundu Tuhan village in Ranau, Malaysia, is a village 3 hours' drive from the capital city Kota Kinabalu, in the foothills of the Crocker Range. The nearest psychiatrist is 3 hours away, with a visiting psychiatrist who comes every two months to a district hospital which is still 45 minutes away by road transport. A health promotion project was conducted there in August 2019 under the aegis of the Faculty of Medicine and Health Sciences, Universiti Malaysia Sabah, focusing on the pressing issues above, namely adolescent mental health and smartphone addiction. As part of the health promotion, a mindfulness one-day intervention was taught to the adolescents after doing screening for smartphone addiction and depression. The data obtained during health screening hence is certainly of great value in retrospective analysis. It would afford researchers the opportunity to explore Internet and smartphone addiction prevalence rates in a unique population, namely rural adolescents in a developing country. This would certainly be a first in the literature, as smartphones have become ubiquitous in the developing world, hence giving rise the possibility of both great benefit and great addictive

potential. On top of the pioneering findings, establishing prevalence of the newly delineated clinical syndrome of smartphone addiction in a novel population, the information collected about mindfulness and depression can also be analysed to find statistical relationships, leading to the possibility of moderation and mediation being performed if indicated.

This study aims to achieve the following objectives, both research and clinical. Firstly, it aimed to assess if there were correlations between mindfulness, depressive symptoms, and smartphone addiction in a rural area. As a consequence, the study then aimed to provide backing data to design suitable and relevant interventions for young people in rural areas who are disaffected and disenfranchised. Secondly, it aimed to briefly assess the psychometric properties of a suitable brief instrument to assess smartphone addiction in adolescents. Thirdly, the study would provide theoretical backup in terms of the prevalence of depression and smartphone addiction, and levels of mindfulness, as a baseline foundation to provide a continuing intervention in Bundu Tuhan village, featuring mindfulness. Fourthly, this study aimed to assess if sociodemographic variables, mindfulness, and Internet addiction were statistically predictive of depressive symptoms. Lastly, if there were significant relationships between the three variables measured, the study also had an auxiliary objective to assess if psychological process factors such as mindfulness were potentially mediators of the relationship between depression and smartphone addiction.

METHODS

This study utilised secondary data collected for the 2019 Faculty of Medicine and Health Sciences, Universiti Malaysia Sabah annual Health Promotion project in Bundu Tuhan village. During this health promotion project, mental health questionnaires were administered on an adolescent population at the village secondary school, with consent from parents and local education authorities, as part of a screening programme to pick up psychiatric illness and hence facilitate referrals to the nearest district hospital. Four questionnaires were administered: a simple sociodemographic questionnaire, the Malay validated version of the Mindfulness Awareness and Attention Scale (MAAS), the Malay validated version of the Patient Health Questionnaire-9 (PHQ-9), and the English and Malay versions of the Smartphone Addiction Scale-Short Version (SAS-SV). These four questionnaires were administered to two secondary school groups: Form 1 (13 years old) and Form 4 (16 years old).

Sociodemographic questionnaire A simple sociodemographic questionnaire was administered with their gender, their age and their year of schooling. As they were all of the same ethnic group (Dusun), this data was not collected.

State of mindfulness The Mindful Attention Awareness Scale (MAAS) was proposed to assess attention and awareness in everyday life. MAAS is commonly used as a mindfulness questionnaire among general populations. MAAS was developed by Brown and Ryan for

adults, in normative clinical populations (MacKillop & Anderson, 2007). The tool consists of a 15-item self-reported single-factor scale that focused on the attention awareness component of the mindfulness construct. This 15-item scale measures the frequency of mindful states in day-to-day life, using both general and situation-specific statements. Cronbach's $\alpha = 0.851$ in the Malay validation (Zainal et al., 2015).

Depressive symptoms. The Patient Health Questionnaire-9 (PHQ-9) is a 9-item self-report measure of depressive symptoms (Kroenke & Spitzer, 2002). Participants rated items on a 5-point Likert scale ranging from 1 (*never true*) through 5 (*almost always true*). A validated Malay version of the PHQ-9 (Sherina et al., 2012) was employed in this study, with Cronbach's alpha estimates for the PHQ-9 of .80. Cut-off points are usually taken as either 5 or more for "mild" or 10 or more for "moderate" to screen for depression, with different studies having disparate opinions about the correct cut-off point. Both cut-off points are presented in the current study.

Smartphone addiction. The Smartphone Addiction Scale-Short Version (SAS-SV) was developed as an adolescent-specific version of the original Smartphone Addiction Scale (SAS) which contained 33 questions (Kwon, Lee, et al., 2013). The SAS-SV is a 10-item self-report measure of addiction to smartphones (Kwon, Kim, et al., 2013), with all 10 questions extracted from the SAS. Participants rated items on a 6-item Likert scale ranging from 1 (*strongly disagree*) to 6 (*strongly agree*). It is internally consistent with a Cronbach's alpha of .91, comparing favourably with the full version of the scale for adults. Cut-off points were calculated separately by gender; for boys it was 31 whereas for girls it was 33. There is no validated SAS-SV in Malay; however, a validated Malay language version of the full SAS was available, and the wordings of the SAS-SV are adapted directly from the full SAS. Hence, the Malay version of the 10 SAS questions adapted for the SAS-SV was extracted and administered to the students (Hassim et al., 2020). It has decent Internal consistency with Raykov's $\rho = 0.713$ to 0.858. Hence, in this study, exploratory factor analysis was performed to establish similarities in psychometric properties between the English version and the Malay version adapted for use in this study. There was no translation or back-translation performed, as all 10 items from the SAS-SV Malay were adopted directly from the validated Malay version of the full SAS, which reflects a similar relationship between the SAS-SV and SAS English versions.

Data analysis

All data was analysed with SPSS 25.0. Descriptive data was presented for continuous data, and frequencies for nominal or ordinal data. Skewness and kurtosis of less than +/-2 were accepted as the cut off points for normality assumptions (Kline & Santor, 1999). As there is no validated version of the Malay language SAS-SV, exploratory factor analysis was performed, with Bartlett's test of sphericity and Kaiser-Mayer-Olkin measures of sampling adequacy being



performed. Principal component analysis with direct oblimin rotation was done to explore the factor structure of the SAS-SV-M.

Correlations were calculated between three study variables for which data was collected: depression, mindfulness, and smartphone addiction. Cronbach alphas were further calculated for all scales to ensure comparable internal validity. T-tests were used to identify if there were significant differences for gender and age of study. Multiple regression was performed upon mindfulness scores, incorporating depression and smartphone addiction as covariates.

Ethics approval

Ethics approval to analyse the secondary data was obtained from the Medical Research Ethics Committee of Universiti Malaysia Sabah. There were no conflicts of interest.

RESULTS

Descriptive Statistics for Total Population

A total of 191 respondents participated. Descriptive statistics suggest that the skewness and kurtosis was less than 2 for all continuous variables, including total scores for depression, mindfulness scores, and smartphone addiction scores. There was a total of 97 males (50.8%) and 94 females (49.2%). The students fell into two discrete groups, namely thirteen years old with 128 students (67.0%) and sixteen years old with 63 students (33.0%).

Factor Analysis of Malay version of SAS-SV

The Barlett's test of sphericity was significant ($p < 0.001$) and the Kaiser–Mayer–Olkin measure of sampling adequacy for the SAS-SV-M was 0.734 indicating acceptable sampling. Principal component analysis produced three factors > 1.000 when examining the eigenvalues. The three factors predicted 52.952% of the variance. However, observing the scree plot the kink is after the first factor, which predicted 30.786% of the variance with an eigen value of 3.079. Hence it was decided to examine both the one-factor and three-factor model.

Figure 1: Scree Plot

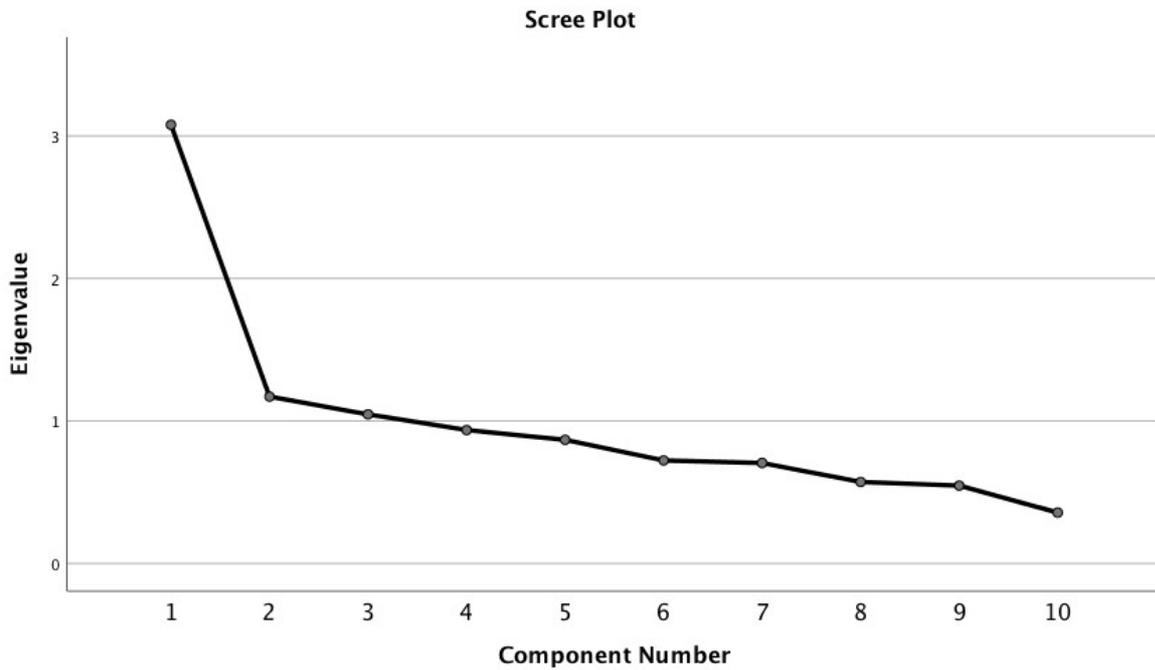


Table 1: Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings
	Total	% of variance	Cumulative %	Total	% of variance	Cumulative %	Total
1.	3.079	30.786	30.786	3.079	30.786	30.786	2.336
2.	1.171	11.706	42.492	1.171	11.706	42.492	2.145
3.	1.046	10.460	52.952	1.046	10.460	52.952	1.688
4.	.936	9.357	62.309				
5.	.867	8.674	70.983				
6.	.723	7.228	78.211				
7.	.705	7.047	85.258				
8.	.571	5.714	90.972				
9.	.546	5.462	96.434				
10.	.357	3.566	100.00				

Extraction Method: Principal Component Analysis

- a. When components are correlated, sums of squared loading cannot be added to obtain a total variance

Table 2: Component Matrix

	Component		
	1	2	3
Addiction 1	.619	-.478	
Addiction 2	.508	-.346	.593
Addiction 3	.600		
Addiction 4	.592	.375	
Addiction 5	.594	.495	
Addiction 6	.638		
Addiction 7	.496		-.378
Addiction 8	.556		-.393
Addiction 9	.540		
Addiction 10	.347	.460	

Extraction Method: Principal Component Analysis

- a. When components are correlated, sums of squared loadings cannot be added to obtain a total variance

Using the three-factor model, the component matrix analysis suggests there are 3 components, with multiple overlap, Questions 1 and 3-9 fall into one factor, whereas Question 2 (Having a hard time concentrating in class, while doing assignments, or while working due to smartphone use) falls into a second factor whereas Question 10 (The people around me tell me that I use my smartphone too much) falls into a third factor. There are no commonalities as none of the factors exceeded .800. However, there are multiple overlaps between all three factors, hence it is difficult to see three discrete factors emerge statistically. Only 3 questions fell cleanly into one factor in the current analysis. Using a one-factor model instead, all ten questions correlated with the single factor, with correlations all .347-.638, with no commonalities. As the kink was after the first factor in the scree plot, with reasonable correlations for all ten items of the SAS-SV in this study, and the three-factor revealed too much overlap for each question, it was decided to utilise the one-factor model instead for the SAS-SV in this study.

Table 3: Component Matrix^a

	Component 1
Addiction1	.619
Addiction2	.508
Addiction3	.600
Addiction4	.592
Addiction5	.594
Addiction6	.638

Addiction7	.496
Addiction8	.556
Addiction9	.540
Addiction10	.347

Extraction Method:

Principal Component Analysis

- a. 1 component extracted.

Results of Individual Instruments

MAAS scores were done with a mean score of 58.16, with no ordinal gradations of mindfulness scores or relevant cut-off points. The Cronbach's alpha was .761. The mean PHQ-9 score for depression was 3.64, with 92 students scoring mild, 38 scoring moderate, and 4 scoring severe. Hence using a cut-off point of 5 or more for "mild", the prevalence of depression was 48.2%, whereas if using the cut-off point of 10 and above, it was 21.9%. The Cronbach's alpha was .626. For the SAS-SV, the mean score for smartphone addiction was 33.85 which was above both the cut-off point of 31 for males and 33 for females. The number of males and females who scored above the cut-off points were 40/96 (41.6%) and 38/95 (40.0%) respectively. The Cronbach's alpha was .746.

T-tests were performed too that demonstrated no significant differences between mindfulness, smartphone addiction, and depression scores between the 13-year old and the 16-year-old age group.

Table 4: T-test between Age Groups (13 and 16 years)

Age Groups (13 and 16 years)

		Levene's Test for Equality of Variances		t-test for Equality of Means					95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean difference	Std. Error Difference	Lower	Upper
MAAS Score	Equal variances assumed	2.202	.140	-.241	177	.810	-.335	1.387	-3.072	2.403
	Equal variances not assumed			-.259	147.275	.796	-.335	1.292	-2.887	2.218
PHQ-9 Score	Equal variances assumed	.036	.850	-1.426	184	.156	-.806	.566	-1.922	.309
	Equal variances			-1.420	120.749	.158	-.806	.568	-1.931	.318

	not assumed									
SAS-SV Score	Equal variances assumed	6.082	.015	-.462	177	.644	-.632	1.368	-3.331	2.067
	Equal variances not assumed			-.520	134.046	.604	-.632	1.216	-3.038	1.773

There was however a significant difference between male and female students for smartphone addiction, with no significant difference for both depression and mindfulness scores between genders.

Table 5: T-test between genders

Gender

		Levene's Test for Equality of Variances		t-test for Equality of Means					95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean difference	Std. Error Difference	Lower	Upper
MAAS Score	Equal variances assumed	4.700	.032	-.855	177	.393	-.1.123	1.313	-3.713	1.468
	Equal variances not assumed			-.853	168.655	.395	-1.123	1.317	-3.722	1.477
PHQ-9 Score	Equal variances assumed	.837	.361	-1.297	184	.196	-.692	.534	-1.745	.361
	Equal variances not assumed			-1.298	183.635	.196	-.692	.533	-1.745	.360
SAS-SV Score	Equal variances assumed	.110	.741	-2.056	177	.041	-2.533	1.242	-5.003	-.103
	Equal variances not assumed			-2.507	176.969	.041	-2.533	1.241	-5.002	-.104

Bivariate Correlations

Pearson's correlations were performed between MAAS scores, PHQ-9 scores, and SAS-SV scores. There were significant correlations between mindfulness and depression scores ($r = -.324, p < .0001$). However, there were no significant correlations between smartphone addiction and both mindfulness and depression scores.

Table 6: Pearson's correlations

		MAAStotal	DepressionTotal	AddictionTotal
MAAS Score	Pearson Correlation	1	-.324**	-.086
	Sig. (2 – tailed)		.000	.270
	N	179	176	167
PHQ-9 Score	Pearson Correlation	-.324**	1	.057
	Sig. (2 – tailed)	.000		.454
	N	176	186	174
SAS-SV Score	Pearson Correlation	-.086	.057	1
	Sig. (2 – tailed)	.270	.454	
	N	167	174	179

** Correlation is significant at the 0.01 level (2 – tailed).

Multivariate Correlations

Depression, smartphone addiction scores, age and gender were regressed upon depression. It was found that only mindfulness significantly predicted depression ($\beta = -.322, p < .001$).

Table 7: ANOVA analysis of predictors of depression

ANOVA^a

Model		Sum of Squares	dF	Mean Square	F	Sig.
1	Regression	281.551	4	70.388	5.745	.000 ^b
	Residual	1948.223	159	12.253		
	Total	2229.774	163			

a. Dependent Variable: PHQ-9 Score

b. Predictors: (Constant), Age, MAAS Score, SAS-SV Score, Gender

Coefficients^a

Model		Unstandardised B	Coefficients Std. Error	Standardised Coefficients Beta	t	Sig.
1	(Constant)	13.214	2.403		5.498	.000
	MAAS Score	-.138	.032	-.322	-4.323	.000
	SAS-SV Score	.003	.033	.007	.094	.925
	Gender	.844	.560	.114	1.507	.134
	Age	1.025	.593	.129	1.728	.086

As there were no significant relationships between all 3 variables, the researchers did not proceed to perform Baron and Kenny mediation procedures and Sobel's test to assess if mindfulness is a mediator of the relationship between smartphone addiction and depression.

DISCUSSION

This is a significant study as it represents the first study to assess for smartphone addiction in rural areas in Malaysia. Previous validation studies were performed in an urban medical student population of highly educated individuals (Guan et al., 2020; Wan Ismail et al., 2020; Ching et al., 2017); the only study that could be found in the literature focusing on rural areas in Malaysia again featured an undergraduate student population (Siah et al., 2019) which would render it non-representative of a truly rural population. This study demonstrates that smartphone addiction is also present in rural areas, and surprisingly, at a similar prevalence compared to urban areas. Various theorisations can explain this unexpected phenomenon. Firstly, in urban areas, there is a greater diversity of opportunity in terms of leisure, work, social activities, and general enrichment. Hence there are greater opportunities for urban adolescents to prosper and attain success (Furstenberg et al., 2000). In rural areas in the developing world, however, there may be a sense of ennui and amotivation, as there are conversely fewer opportunities (Staff, 2011). Many rural areas in Malaysia do not have equal opportunities for work and personal advancement in adolescence, with poorer schools, healthcare facilities without specialist care, and lower job opportunities for opportune role modelling and internships or attachments (Edirin, 2018; Marwan et al., 2012; Ariff & Teng, 2002). They will not also have similar facilities like urban areas, for instance, public parks, communal sporting areas, community centres, and indoor leisure facilities. In Bundu Tuhan area, parents go out for farming early in the morning, and only return late afternoon, hence their children are largely babysat after school with smartphones that have been purchased ostensibly for assisting the parents to obtain microcredit and access Internet banking facilities. However, these smartphones have been abused by the children, and a common sight in Bundu

Tuhan is young children glued to their smartphones after school, attempting to access a world out there far from the tunnel vision that their isolated farming community affords them.

This study also demonstrates that smartphone addiction, as conceptualised by the SAS-SV-M, falls into a unifactorial model. This converges with other previous studies done with the SAS-SV validations into different languages, which also demonstrate unifactorial model (De Pasquale et al., 2017; Lopez-Fernandez, 2017; Noyan et al., 2015). However, the caveat is that the SAS-SV is not meant to be a diagnostic or comprehensive tool that covers all facets of behavioural addiction, but rather, a brief screening tool designed to capture the zeitgeist of addiction to smartphones in adolescents. As the original authors too concur, the SAS-SV is a 10-item brief screening tool that is an abbreviated version of the original SAS-SV, which contains six sub-factors as a result of factor analysis, namely 'Daily-life disturbance', 'Positive anticipation', 'Withdrawal', 'Cyberspace-oriented relationship', 'Overuse' and 'Tolerance' (16). These items hence extract the characteristics of general addiction on the conceptual framework of the existing research. For the SAS-SV, on the other hand, in a few questions, where there are too many sub-factors of a tool, it may be difficult to interpret the result of the tool (17). Hence this study concurs with extant findings that a unifactorial model for an abbreviated screening tool like the SAS-SV for adolescents is of highest utility.

However, surprisingly smartphone addiction is not associated with either mindfulness or depression scores. This diverges from the extant literature that suggests strong correlations with psychopathology, psychological process variables, and Internet or smartphone addiction (N. T. P. Pang, Masiran, et al., 2020; Arpaci, 2019; Alhassan et al., 2018; Elhai et al., 2018; Demirci et al., 2015). This however can be explained by the use of the English and Malay rather than the validated Dusun language version in the village for the SAS-SV, and likewise, usage of Malay rather than Dusun-language tools for the MAAS and the PHQ-9. However, in Malaysia, all secondary school students have studied all science and mathematics subjects in English since secondary school, and have studied all other subjects in the Malay language. Nevertheless, as this is a predominantly Dusun-speaking village which is highly geographically isolated, it stands to reason that for all students involved in this screening, they will be answering all 3 questionnaires in a second language. As this research was conducted with secondary data from a large-scale health screening and promotion activity, there was no way for the researchers to retrospectively modify the study design. Nevertheless, this brings to mind the wider issue where there will always be issues of validity when attempting to capture any qualitative or quantitative data from predominantly Dusun-language populations, who predominate in the interior of Sabah, Malaysia (Ethnologue, 2015). Researchers generally only speak Malay or English and hence all data that is captured may suffer from impaired validity due to respondents' need to self-translate, and respondents' possible lack of fluency to articulate or comprehend complicated concepts. A first attempt to validate the AUDIT, an alcohol use disorder scale, was performed as part of the same project, hence allowing more cultural and ethnic sensitivity in performing research in ethnically and geographically isolated

parts of Borneo, and allowing crucial re-examinations into the potentially differing structure of psychopathologies in Borneo island, when using language-specific instruments (N. Pang et al., 2020). Nevertheless, Cronbach's alpha was measured for all three scales, and was found to be generally internally reliable, with factor analysis of the Malay iteration of the SAS-SV finding that its factor structure is generally valid and acceptable for use as a screening tool in the Malay language.

This study, again, once again reiterates that mindfulness and depressive symptoms are associated, correlating with previous studies that have explored relationships between the same constructs (Germer et al., 2016; Deng et al., 2014; Pepping et al., 2014). Again, as this was secondary data, it was not possible to further explore via mediation or moderation the underlying theoretical constructs. Nevertheless, this mirrors partially previous work in students in higher education institutions in Western countries, suggesting that higher mindfulness and lower psychopathology can increase their participation in health promotion behaviours (Pačić-Turk & Pavlović, 2020). Hence, if we are to encourage school students to be more active and respond more effectively to health promotion activities such as the one we obtained this secondary data from, it is incumbent that interventions be designed that can address both mindfulness and depressive symptoms. One follow-up activity from this health promotion screening was the design of an innovative circus-based mindfulness programme, where mindfulness classes were gamified into a novel circus skills programme incorporating juggling, unicycling and stilt walking. Circus skills have been shown in the literature to have highly positive relationships with connectedness, participation, self-confidence and self-esteem (Spiegel et al., 2015; Maglio et al., 2008; Bolton, 1999), while mindfulness itself is a highly efficacious intervention for lowering psychopathology (Byrne et al., 2014; Beitel et al., 2005; Franco et al., 2010). As a result, through circus-based gamification, a technique which makes learning itself more efficacious (Izzyan et al., 2018; Nevin et al., 2014), we were able to widen drastically the provision of mindfulness education in secondary school students, with preliminary unpublished qualitative and quantitative results showing that the students' levels of psychopathology have dropped significantly, with corresponding increases in a state of mindfulness. At the same time, it is important that ultra-brief techniques to deliver mindfulness education be operationalised that can be task shifted to non-mental health professionals such as teachers, counsellors, and local community leaders. The Sabahan state university has to that end developed an Ultra Brief Psychological interventions package which is grounded in mindfulness that has been successfully delivered by trained university students to the population at large (N. T. P. Pang, Shoesmith, et al., 2020).

CONCLUSION

In conclusion, this study highlights two important findings in rural adolescents in Malaysia that should be brought to the attention of policymakers and educationalists. Firstly, Internet or smartphone addiction is not an urban problem; it afflicts both urban and rural areas equally,



and the plight of rural areas may paradoxically be higher, as there are less avenues for productive activity and employment prospects compared to urban areas with more opportunity. Secondly, even in adolescents, there are relationships between mindfulness and depression, which suggest that interventions to improve a state of mindfulness will contribute to decreasing depressive symptoms. On a similar note too, due to the paucity of Dusun-language research instruments, there is a clear and urgent need to validate more instruments that measure common psychological parameters like depressive and anxiety symptoms, so that researchers, clinicians, and policymakers can get a more accurate, holistic, and ethnologically sensitive view of the psychological makeup of hitherto neglected interior areas of Borneo without specialist psychiatry services.

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CONFLICT OF INTEREST

The authors declare that they have no conflict of interest.

INFORMED CONSENT

All procedures followed were in accordance with the ethical standards of the responsible committee on human experimentation (institutional and national) and with the Helsinki Declaration of 1975, as revised in 2000. Informed consent was obtained from all participants for being included in the study.

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