

Development of Social Media Addiction Scale for COVID-19 Pandemic (SMACOP)

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ABSTRAK

Pandemik COVID-19 ini telah menyebabkan peningkatan distres dan kesusahan di seluruh dunia. Pada masa ini, media sosial memainkan peranan yang amat penting dalam pengumpulan maklumat. Oleh itu, masa yang dihabiskan di media sosial telah meningkat secara drastik dan meningkatkan risiko ketagihan berkaitan dengan internet, seperti ketagihan media sosial. Kajian ini bertujuan untuk menubuhkan sebuah skala untuk mengukur ketagihan media sosial yang berkaitan dengan COVID-19 berdasarkan 'Bergen Social Media Addiction Scale' (BSMAS) bertujuan untuk mengenal pasti dan menilai individu yang berisiko tinggi. 'Social Media Addiction Scale for COVID-19 Pandemic' (SMACOP) diadaptasi dari BSMAS untuk disesuaikan ke dalam konteks COVID-19. Seterusnya, kajian rintis telah dijalankan ke atas 20 individu. Kemudian seramai 80 peserta direkrut melalui persampelan kemudahan dalam kalangan orang awam yang berada di sebuah universiti awam di Malaysia. Mereka terdiri daripada keluarga pesakit, pelawat atau kakitangan hospital. Kesahan konstruk dinilai melalui 'Insomnia Severity Index' (ISI), 'Generalized Anxiety Disorder 7' (GAD7) dan 'Patient Health Questionnaire' (PHQ9). Struktur dua faktor telah ditemui iaitu 'Keinginan' dan 'Distress'. SMACOP menunjukkan kesahan dalaman yang baik ($\alpha = 0.64$). Skor SMACOP berkorelasi secara positif dengan PHQ9, GAD7, dan ISI ($p < 0.01$). SMACOP merupakan instrumen psikometrik yang mempunyai kesahan dan konsistensi dalaman yang tinggi. Skala ini amat diperlukan untuk menilai ketagihan media sosial yang berkaitan dengan COVID-19, terutamanya untuk mengenalpasti individu yang berisiko tinggi untuk gangguan mental seperti kemurungan.

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ABSTRACT

The current COVID-19 pandemic and 'new normal' has resulted in much distress worldwide. Social media currently plays an essential role in information gathering. Thus, time spent on social media has increased drastically, further increasing the risk for internet-related addictions, such as social media addiction. This study aimed to develop a COVID-19-related measure of social media addiction based on the Bergen Social Media Addiction Scale (BSMAS) in order to aid in the identification and evaluation of at-risk individuals. Social Media Addiction Scale for COVID-19 Pandemic (SMACOP) was adapted from BSMAS to fit the context of COVID-19 and pilot tested on 20 individuals. A total of 80 participants were subsequently recruited through convenience sampling from the general public of a public university in Malaysia, comprising of patients' family, visitors, or hospital staff. Construct validity was assessed using the Insomnia Severity Index (ISI), Generalized Anxiety Disorder 7 (GAD7) and Patient Health Questionnaire (PHQ9). A two-factor structure was found for SMACOP, comprising of the factors 'Desire' and 'Distress'. SMACOP shows good internal consistency ($\alpha = 0.64$) and validity. SMACOP scores were positively correlated with the PHQ9, GAD7, and ISI ($p < .01$). SMACOP is a psychometrically valid instrument with high internal consistency, which is especially useful during this time in assessing social media addiction in relevance to COVID-19.

Keywords: social media addiction, COVID-19, pandemic

INTRODUCTION

COVID-19 was declared a Public Health Emergency of International Concern by The World Health Organization (WHO) on 30th January 2020 and eventually a pandemic later on 11th March 2020. The first cases of COVID-19 were detected in Malaysia mid-February, with the number currently at 880,782 cases and continuing to rise (Department of Statistics Malaysia 2020). Institutions and governments worldwide took measures to curb the rapid spread,

urging the public to carry out stricter personal hygiene practices and specifically focusing on physical distancing to flatten the curve. The resulting SOPs included curfews, restriction of social gatherings, temporary school and business closures, as well as state- and nation-wide lockdowns.

While essential to curb disease progression, these further exacerbated the psychological burden caused by the pandemic and resulting changes in daily life. Individuals were encouraged to stay home and

isolate, thus disrupting many usual coping mechanisms and increasing the risk for a myriad of negative psychological effects including post-traumatic stress symptoms, acute stress, depression and anger (Brooks et al. 2020). With otherwise traditional coping mechanisms hindered, the internet and social media became a necessity to cope during an unusual time of uncertainty and isolation. In April 2020, Facebook saw an increase in usage of more than 50% across its messaging services in areas affected most by COVID-19, while Whatsapp voice and video calling doubled in that period (Morgan 2020). They were a solution for academic and work-related issues stemming from the pandemic and provided the general public an essential platform for social connection and emotional support, information gathering, as well as a method to reduce stress and anxiety (Westerman et al. 2012).

Although these behaviours initially served as a form of coping and were adaptive in the short-term, an over-reliance in light of extended quarantine durations could lead to potentially worrying implications such as addictive behaviours (LaRose et al. 2010; Sharma et al. 2020) and other psychiatric comorbidities (Ho et al. 2014) particularly for vulnerable individuals including minors and those affected by or at risk of addiction disorders (King et al. 2019). Social media addiction is of particular concern here. Affecting approximately 12% of users across social networking sites, this number could inflate substantially given the current spike

in usage (Alabi 2013; Wolniczak et al. 2014). Previous epidemics and health crises have shown that significant mental health issues and needs often emerge post event. Additionally, recent studies have suggested the increased tendency of internet addiction (Dong et al. 2020; Sun et al. 2020) and social media addiction (Zhao & Zhou 2021) immediately following onset of the pandemic. As such, living through the pandemic period may directly impact an individual's risk of developing social media addiction, owing to the positive relationship between COVID-19 related stress and social media addiction (Zhao & Zhou 2021).

As such, the development of a pandemic-specific measure of social media addiction in relation to the current pandemic is essential in order to accurately assess any potential fluctuations in social media usage and addiction level caused by COVID-19. Additionally, this measure could help us identify individuals at risk during or post-pandemic as well as be applicable for future similar disasters. Thus, we aimed to develop a reliable and valid measure to examine social media addiction in relation to the COVID-19 pandemic, the Social Media Addiction during COVID-19 Pandemic (SMACOP) scale. SMACOP has been modified from the Bergen Social Media Addiction Scale (BSMAS), with permission from the original author, to include elements in regards to COVID-19. BSMAS is a 6-item unidimensional scale that measures social media addiction, examining the six basic addiction symptoms (salience, withdrawal, tolerance,

relapse, mood modification, conflict) based on general addiction theory (Wang et al. 2015) while showing good psychometric properties (Kaiser 1974). Besides its brevity, BSMAS has been selected for adaptation as it has been validated in different cultural samples, such as in Hungary, Italy, Persia and Norway (Schou Andreassen et al. 2016; Bányai et al. 2017; Lin et al. 2017; Monacis et al. 2017). To develop and examine the psychometric properties of the SMACOP, we implemented a 3-phase study i.e. Phase 1, adapting BSMAS for the context of COVID-19; Phase 2, pilot testing and further refining of items; and Phase 3, scale validation.

MATERIALS AND METHODS

A rule of thumb in determining a priori sample size is based on the subject to item ratio of 5:1, thus it is statistically appropriate to recruit a minimum of 50 participants (Tanaka 1987). These participants, which were members of the general public consisting of patients' family members, visitors, or hospital staff, were recruited through convenience sampling in University Malaya Medical Centre (UMMC). Those who gave their consent prior to the interview were given the following questionnaires to complete; a socio-demographic sheet, SMACOP, Insomnia Severity Index (ISI), Generalized Anxiety Disorder 7 (GAD7), and Patient Health Questionnaire (PHQ9).

Procedure

Phase 1

We obtained permission from the scale authors and adapted the original version of BSMAS, which is itself an adaptation of the previously validated Bergen Facebook Addiction Scale (BFAS), by modifying the items with regards to COVID-19, e.g. we replaced the term "social media" with "COVID-related news or updates on social media". Additionally, we removed question 3 "You use social media in order to forget about personal problems" from the original BSMAS as it was not applicable within the context of COVID-19.

Phase 2

The first version of SMACOP was pilot tested among 20 subjects, aged 18 to 45 years old and consisting of the general public or visitors of the University Malaya Medical Centre. Some items needed minor revision and were modified further. E.g. The term "planning how to use it", in Item 1 of the original SMACOP, was removed while the term "daily activities" was added into Item 5. The finalised version was also reviewed by four senior medical officers and a psychiatrist with years of experience in managing psychiatric cases in order to ensure satisfactory face, semantic, criterion, and conceptual equivalence.

Phase 3

A total of 80 subjects were then recruited from general public visiting UMMC and were given the following questionnaires after consenting i.e. (i) SMACOP, (ii) ISI, (iii) GAD7 and

(iv) PHQ9. The English version of the questionnaires were administered in order to establish construct validity as insomnia, anxiety and depression are not only pandemic-related characteristics, but are also symptoms that commonly occur along with, and have been continuously associated with social media addiction (Xue et al. 2018). As such, it was expected that SMACOP scores would positively correlate with scores on these measures.

Materials

SMACOP

SMACOP is a 5-item self-report scale intended to measure social media addiction over the past 1 month in relation to COVID-19. The scale is based on BSMAS and examines 6 basic symptoms of addiction (salience, conflict, mood modification, withdrawal, tolerance, and relapse) (Griffiths 2005). It is scored on a 5-point Likert scale, from 'very rarely' (1) to 'very often' (5), where a higher total score indicated higher COVID-19-related social media addiction.

ISI

ISI is a 7-item self-report questionnaire assessing the nature, severity and impact of insomnia over the past 2 weeks. Each item is weighted on a scale of 0-4, adding up to a total score range of 0-28 and interpreted as follows; absence of insomnia (0-7), sub-threshold insomnia (8-14), moderate insomnia (15-21) and severe

insomnia (22-28). The ISI demonstrates strong reliability in both population-based (Cronbach = 0.90) and clinical samples (Cronbach = 0.91) (Morin et al. 2011).

GAD7

The GAD7 questionnaire is a self-administered questionnaire used in screening as well as in measuring symptom severity of generalised anxiety disorder, mainly in outpatients. Responders rate the frequency of anxiety symptoms they experience in the last 2 weeks on a 3-point Likert scale, where "0" is 'not at all' and "3" is 'nearly every day'. Total scores range from 0-21, with a higher score denoting greater severity of anxiety symptoms. The GAD7 has demonstrated good internal consistency (Cronbach = 0.92) and has a cut-off point of 8, with a sensitivity of 89% and specificity of 82% (Spitzer et al. 2006).

PHQ9

The PHQ9 is a well-validated and brief self-administered diagnostic instrument used as a measure of depression symptom severity. The 9 items, scored from "0" (not at all) to "3" (nearly every day), are based on the 9 criteria for a depression diagnosis as in the the fourth edition of the Diagnostic Manual of Mental Disorders (DSM-IV) (Kroenke et al. 2001). Total scores can range from 0-27, with cutpoints at 5 (mild), 10 (moderate), 15 (moderately severe), and 20 (severe) (Kroenke et al. 2001). Our study utilised a mental health practitioner reinterview as the

criterion standard, a single cutpoint of 10, which has a sensitivity and specificity of 88% (Kroenke et al. 2001).

Statistical Analyses

The data was analysed using Statistical Package for the Social Sciences (SPSS) version 24.0 (IBM Corp, Armonk, NY, USA).. Descriptive statistics for the sociodemographic characteristics of patients are shown in Table 1. A principal component analysis with varimax rotation was performed to examine the factorial structures of the SMACOP. Internal consistency (within subscale and full scale) was explored using the Cronbach’s alpha coefficient. Spearman’s correlation test was used to examine construct validity between SMACOP, GAD7, PHQ9 and ISI. The optimal cut-off score of SMACOP for

possible depressed or anxious cases was determined from the co-ordinate points which optimal sensitivity and specificity in the Receiver Operating Characteristic (ROC). The Area Under the Curve (AUC) of the ROC was determined. All analyses were two-tailed with alpha value of 0.05.

RESULTS

Table 1 denotes baseline sociodemographic data of all subjects. From the 80 subjects who consented, 51 (63.8%) were female and 29 were male. The mean age of subjects was 39.5 years old. A majority of the participants were Chinese (63.8%), followed by Indian (27.5%), Malay (7.5%), and others (1%). A total of 55% were married, 43.8% were single and 1.2% were divorced. Most of the

Table 1: Baseline sociodemographic of all subjects (N=80)

Variables	Mean SD	n (%)
Age, y, mean ± SD	39.50 ± 11.16	
Gender, n (%)		
Male		29 (36.2)
Female		51 (63.8)
Ethnic group, n (%)		
Malay		6 (7.5)
Chinese		51 (63.8)
Indian		22 (27.5)
Others		1 (1.3)
Marital status, n (%)		
Single		35 (43.8)
Married		44 (55.0)
Divorce		1 (1.2)
Education level, n (%)		
Diploma		7 (8.8)
Degree		11 (13.8)
Master		30 (37.5)
PhD		32 (40.0)
Employment status, n (%)		
Working		69 (86.3)
Unemployed/retired		11 (13.7)

Table 2: Oblique Rotated Pattern Matrix from Principal Axis Factor Analysis of SMACOP Items.

	Desire	Distress
1. How often have you thought about COVID-19 related news/updates on social media?	0.917	
2. How often have you felt an urge to use social media more and more to search about COVID-19 related news/updates?	0.875	
3. Have you failed while trying to cut down usage of social media to search about COVID-19 related news/updates?		0.824
4. Became restless when you were prohibited from using social media to find on Covid19 related news/ updates?	0.326	0.562
5. Have you had negative impact towards your daily activities, job or studies due to Usage of social media to find information regarding Covid-19 news/ updates?		0.759
Loadings below 0.30 are suppressed		

participants were postgraduates i.e. Master or PhD (77%), while the others were undergraduates i.e. Diploma or Bachelor Degree (23%). A total of 86% of the participants were employed while 14% were unemployed or retired.

Factor Analysis

Respondents' mean score for SMACOP was 13.38. Exploratory factor analysis was conducted on the SMACOP items. Bartlett's test of sphericity was significant ($p < 0.01$), and the Kaiser-Mayer-Olkin measure of sampling adequacy for the 5-item SMACOP was 0.60, which Kaiser (Kaiser 1958) considers as the suggested minimum in order to assume the factorability of the correlation matrix.

The pattern matrix from the Principle Axis Factor Analysis of SMACOP items are captured in Table 2. Two factors were extracted using the common factor approach (Principle Axis Extraction) with eigenvalue > 1.00 . These factors combined to account for

67.4% of the variance, with the scree plot graphically confirming that there were two predominant factors. The first factor 'Desire' consists of Item 1 and 2, while the second factor 'Distress' consists of Item 3, 4, and 5.

"Desire" captured the motivation to use social media for COVID-related content, such as 'urges' and 'thoughts', while "Distress" captured the distress resulting from a loss of control, manifested by engaging in the addictive behaviour, such as 'failed to cut down usage of social media to search about COVID-19'. Item 4, 'feeling restless when prohibited from using social media to find COVID-19' is a cross-loading item, loading more strongly on 'Distress'.

Oblique rotation was used as it allows for correlation among the factors and thus provided a more compelling solution than orthogonal rotation, as we expected the two factors to be correlated with each other. Based on this rotation, two matrices were produced i.e. a pattern matrix and a structure matrix. The difference

Table 3: Correlations (Spearman’s rho) between SMACOP and the ISI, GAD7 and PHQ9

	SMACOP	ISI	GAD7	PHQ9
SMACOP		0.463	0.468	0.383
ISI	0.463		0.545	0.549
GAD7	0.468	0.545		0.713
PHQ9	0.383	0.549	0.713	

All correlations were significant at the $p < 0.01$ level.

between the high and low loading was more apparent in the pattern matrix, which indicated that all items loaded high on their respective subscales with minimal cross-loading (Table 2)

Reliability

Cronbach’s alpha was calculated for both the full SMACOP and each subscale to assess the internal reliability. Cronbach’s alpha for the full SMACOP was 0.64, while that of the ‘Desire’ and ‘Distress’ subscales were 0.79 and 0.57, respectively.

Validity

In order to estimate the concurrent validity of the scale, we examined the association between pandemic-related characteristics, SMACOP as well as symptoms that commonly occur with social media addiction, such as symptoms of depression, anxiety, and insomnia (Xue et al. 2018). Spearman’s correlation between the full SMACOP and the subjects’ respective scores on the PHQ9, GAD7 and ISI are shown in Table 3.

As expected, the scores of the total subscales of SMACOP were positively correlated with the PHQ9, GAD7 and ISI ($p < 0.01$) (Table 3)

Receiver Operating Characteristic (ROC) Curve

The AUC for ROC curve (Figure 1) was 0.73 (95% CI=0.60-0.85, $p < 0.01$). The optimal cut-off score of 13 was selected with optimal sensitivity (0.64) and specificity (0.63). The positive predictive value (PPV) and negative predictive value (NPV) of the SMACOP were 0.85 and 0.35, respectively.

DISCUSSION

This study aimed to develop and examine the psychometric properties of SMACOP in order to create a measurement for social media addiction with relation to the current COVID-19

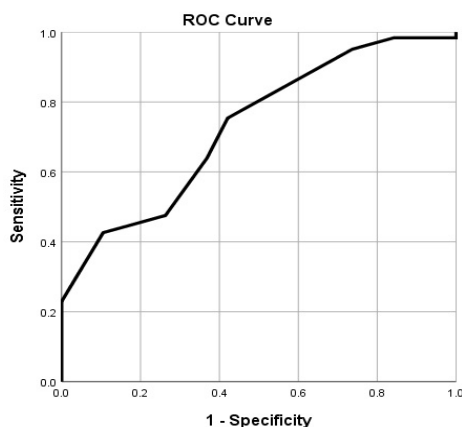


Figure 1: ROC curve for SMACOP

pandemic. Of the factor analytic studies published examining BFAS, BSMAS, and relevant counterparts, none have attempted to contrast the traditional unidimensional model suggested since its conception; Majority of these have utilised confirmatory factor analysis (CFA). This could be reflective of a potential confirmation bias as only the preferred fit of the model has been evaluated (MacCallum & Austin 2000), thus leading to a loss of information within the population studied as well as increasing possibility for incorrect inferences later on.

This is the first study that found a two-factor solution in place of the original one-factor structure found in previous validation studies (Bányai et al. 2017; Lin et al. 2017; Yam et al. 2019). From our findings, we propose a two-factor model of addiction for SMACOP comprising of 'Desire' and 'Distress' (Table 3). 'Desire' reflects the motivational facets of social media addiction such as 'salience' and 'tolerance', which leads individuals to engage in the activity, and 'Distress' reflects the distress resulting from a sense of loss of control resulting from the addiction, capturing facets such as 'relapse', 'withdrawal', as well as 'conflict'. Item 4, which reflects the symptom of 'withdrawal' was found to be a minor cross-loading item, falling both on 'Desire' (0.326) as well as 'Distress' (0.562). Although deletion was considered in order to obtain construct unity, this item was retained in the final version of the scale as it would lead to information loss of a core component of addictive behaviour, and thus an important

indicator of excessive use of social media. Thus, it is retained in the final version of SMACOP.

We found SMACOP to be significantly correlated with scores from PHQ9, GAD7 as well as ISI. This corroborates findings in previous studies which found similar significant and positive correlations with anxiety and depression (Lin et al. 2017; Yam et al. 2019). As these scales measure multiple constructs found to be associated as potential consequents of social media addiction (Xue et al. 2018), these associations indicate construct validity for SMACOP. In line with previous research in social media addiction, this provides further support that these factors tend to co-occur. Therefore, it is prudent to examine the presence of symptoms of depression and anxiety as well as sleep disturbances in individuals with high social media addiction scores, or vice versa.

The cut off score of SMACOP was determined based on possible cases of depression or anxiety. In the current study the optimal cut off score to classify at-risk social media addiction during COVID-19 was suggested as 13. The AUC of the SMACOP was 0.73 and it has a relatively high PPV (0.85) with low NPV (0.35). Thus, individuals with scores of 13 and above are considered to be addicted to social media during COVID-19 pandemic with the risk of developing anxiety or depression. While BSMAS demonstrated good validity and reliability in a number of countries, the one study utilising it as a measure of social media addiction in Malaysia was conducted on a

sample of mainly Malaysian-Chinese respondents (Wong et al. 2020). A study examining Facebook addiction in a Malaysian student sample consisting of 82.5% Malays, which used the Bergen Facebook Addiction Scale (upon which both BSMAS and SMACOP are derived from), found no significant differences among different groups of respondents based on gender, race and religion (Jafarkarimi et al. 2016). Thus, we anticipate that both BSMAS and SMACOP will be similarly suitable for use within the Malaysian context.

The main limitation of our study was its small sample size, thus it is possible that the two-factor structure proposed may be unstable. Additionally, single-item measures generally face criticism as they tend to under-represent the constructs. Past research has criticised the BSMAS, which maps each of the six components of behavioural addiction to a single item, due to the multi-faceted nature of each of the six constructs (Griffiths 2005). For instance, salience, which corresponds to item 1 on the BSMAS, measures both the cognitive and behavioural facets of salience but neglects the feeling facet. This poses a further concern as the inclusion of both facets of salience in one item could confuse respondents. However, as the goal was to develop a brief measure of COVID-19-related social media addiction that could be administered quickly and requiring little training, we argue that SMACOP is still useful especially where time and resources are limited. Another limitation is that the subjects were among recruited from a single centre and were the general public

of a university hospital. Single-centre studies frequently lack external validity or the scientific rigor required to support widespread changes in practice, and their premature incorporation into guidelines may make the conduct of definitive studies more difficult.

CONCLUSION

Our findings indicate that SMACOP is a psychometrically valid instrument with good internal consistency and is especially applicable for use during this time in assessing COVID-19 related social media addiction. The positive correlations between SMACOP with PHQ9, GAD7 and ISI additionally indicate good construct validity. Future research involving larger and more diverse samples is needed to examine the generalisability of SMACOP to other populations.

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