Social support as a mediator in the relationship between perceived stress and nomophobia: An Investigation among Malaysian university students during the COVID-19 pandemic

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Abstract

This study examined the mediating role of social support in the relationship between perceived stress and nomophobia among Malaysian university students during the COVID-19 pandemic. A cross-sectional study was conducted with N = 547 university students. Participants answered a self-administered questionnaire measuring nomophobia, social support, and perceived stress. Exploratory analyses were conducted using partial least square structural equation modelling. We found that perceived stress was positively associated with nomophobia during the COVID-19 pandemic, whilst social support partially mediated the relationship between perceived stress and nomophobia. The results of this study indicated that stress may be buffered by social support in individuals with higher levels of nomophobia.

Technological advancement has led to the worldwide adoption of smartphones (Yildirim & Correia, 2015) and with their affordable prices, the dependency on smartphones worldwide has increased (Dasgupta et al., 2017). This has concurrently given rise to the issue of internet addiction, which is significantly associated with a number of psychiatric conditions (Ho et al., 2014). One of the problems associated with this increased dependence is smartphone addiction, which is now a widespread phenomenon (Ahmed et al., 2019). The prevalence of smartphone addiction has been increasing. A study showed that the pooled prevalence of smartphone addiction globally is at 27.0%,

and disproportionately affects low and lower-and-middle income countries (Meng et al., 2022).

A condition associated with smartphone addiction is nomophobia. A number of studies have found a strong association between nomophobia, smartphone addiction, and digital addiction (Çobanoğlu et al., 2021). Nomophobia, which stands for "NoMobilePhone" phobia, refers to an individual's fear of not having contact with their mobile phone (Gurbuz & Ozkan, 2020; King et al., 2010; Yildirim & Correia, 2015). The concept of nomophobia was constructed based on the criteria for specific phobia in the Diagnostic and Statistical Manual of Mental Disorders-IV (DSM-IV; American Psychiatric Association, 1994; Battacharya et al., 2019). It has been used to describe pathological fear resulting in anxiety, discomfort, distress, and nervousness caused by the non-availability of a mobile phone (Bragazzi & del Puente, 2014; King et al., 2010).

Nomophobia develops as a result of an individual's high reliance on mobile phones and frequent use of social media, as well as other activities such as access to entertainment and information gathering from the internet. These eventually may lead to different negative psychological, social, intellectual, and professional outcomes (Beard & Wolf, 2001; Caplan, 2002). Due to the nomophobic individual's dependence on internet content when using mobile phones,

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nomophobia may constitute a withdrawal symptom of internet addiction. People who have nomophobia are afraid of missing out on social media messages, events, and experiences (Yildirim and Correia, 2015). When they forget to bring their phones, the battery runs out, or there is no network coverage, they tend to feel excessively nervous and anxious (Gezgin et al., 2018). Individuals with nomophobia are prone to have access to their phone almost 24 h a day, and even taking it to bed with them (Bragazzi & Del Puente, 2014). Among university students, nomophobia affects the individuals' academic performance and motivational level during their learning processes (Dixit et al., 2010). Limone and Toto (2021) reported that dependency on the mobile phone has increased during the COVID-19 pandemic, and it is a critical risk factor leading to nomophobia.

A systematic review of nomophobia indicated that, especially among young people, nomophobia was significantly associated with a number of psychological disorders and symptomatology similar to internet addiction (Ho et al., 2014), such as depression, anxiety, stress, and sleep disorders (Bekaroğlu & Yılmaz, 2020; Bhattacharya et al., 2019; Mir & Akhtar, 2020; Rodríguez-García et al., 2020; Rosen et al., 2016). The relationship between nomophobia and stress was investigated in a few studies. For example, Bhuvaneswari and Emiline Joy (2021) found that nomophobia was more likely to occur among individuals who self-reported to be more stressed. Terzioğlu and Uğurlu (2021) found that perceived stress was closely associated with all dimensions of nomophobia, specifically the "Inability to communicate" had the strongest relationship, followed by "To give up comfort", "Losing online connection," and "Inability to access information". On the other hand, social support has been shown to be a protective factor against stress. The findings of Besthorn et al. (2018) showed that perceived stress negatively influenced perceived social support.

Thus far there are no extant studies investigating the relationship between nomophobia and social support. Studies by Ergin and Ozer (2021) and Purnama and Sununianti (2020) found that nomophobia was significantly associated with social alienation, which may be inversely associated with social support. Tams and colleagues (Tams et al., 2018) had also found that nomophobia will lead to a higher level of perceived social threat. Based on a study by Ozdemir et al. (2018), loneliness was the strongest predictor of nomophobia among Turkish and Pakistani undergraduates. In Malaysia, a study by Ali et al. (2017) showed that nomophobia was associated with fear of connection loss and fear of loneliness. Individuals gain positive social support through their smartphones (Gökçearslan et al., 2018). This could have led to the development of the 'losing connectedness' dimension of nomophobia because people fear to lose the connectivity with others provided by smartphones (Yildirim & Correia, 2015). Therefore, this study will shed more light

on the role of social support in mediating the relationship between perceived stress and nomophobia, which may positively contribute to the formulation of evidence-based social interventions for nomophobia.

Theoretical Consideration

We used the stress-buffering hypothesis (Cohen & Wills, 1985) as our theoretical framework to investigate the role of perceived social support in the relationship between perceived stress and nomophobia. The theory proposed that social support can act as a buffer to intervene in the perception of stress/stressful events and stressful reactions, which in turn could increase well-being and lower psychopathology risks (Cohen & Wills, 1985). This theory had been used in different contexts, for instance, in psychological health during the COVID-19 pandemic (Szkody et al., 2021) and smartphone addiction (Wang et al., 2018).

In light of the lack of studies investigating the relationship between social support and nomophobia, we aimed to examine the relationship based on the stress-buffering hypothesis and the relevance of social support as a mediator in the relationship between perceived stress and nomophobia. Social support has been heavily tested as a mediator throughout the literature (Li et al., 2018; Xie et al., 2018; Zhang et al., 2017). We therefore propose the hypotheses below:

H1: Perceived stress will negatively predict social support
H2: Social support will negatively predict nomophobia
H3: Perceived stress will positively predict nomophobia
H4: Social support will mediate the relationship between perceived stress and nomophobia

Methods

Study Design and Sample

This was a cross-sectional study. The a-priori sample size calculator (Soper, 2021) with an 80% power level and effect size of 0.15 showed that we need at least 545 participants for this study. Inclusion criteria were students who were actively enrolled in a university and owned a smartphone. Individuals unable and unwilling to provide informed consent were excluded.

Measures

Nomophobia was assessed using the Nomophobia Questionnaire (NMP-Q; Yildirim & Correia, 2015). The NMP-Q consists of 20 items that measure nomophobia based on a

7-point Likert scale on how much participants agree or disagree on each statement. The NMP-Q has a 4-factor dimension, which are not being able to communicate, losing connectedness, not being able to access information, and giving up convenience. Higher scoring on the scale denoted a higher nomophobia level.

Perceived social support was assessed using the Multi-dimensional Scale of Perceived Social Support (MSPSS; Zimet et al., 1988). The MSPSS consists of 12 items that measure the sources of support based on a 7-point Likert scale on how much participants agree or disagree on each statement. The MSPSS had a 3-factor dimension, namely, family, friends, and significant others. Higher scoring on the scale denoted a higher social support level.

Perceived stress was assessed using the Perceived Stress Scale 4 (PSS-4; Cohen et al., 1983). The PSS-4 comprises 4 items that measure stress level based on a 5-point Likert scale, which were 0 = never, 1 = almost never, 2 = sometimes, 3 = fairly often and 4 = very often. The scale has two inversely scored items (item 2 and item 3), in which reverse coding is needed. Higher scoring on the scale denoted a higher stress level.

Procedures

The survey was carried out using an online survey form. Convenience and snowballing sampling were used. All the questionnaires were self-administered in English.

Data Analysis

We used partial least square structural equation modeling (PLS-SEM) in this study. According to Henseler et al. (2014), PLS-SEM was a prime candidate for exploratory analysis. Secondly, it was a better statistical method to access the mediation model compared to the more traditional methods such as the Sobel test and PROCESS Macro (Ramayah et al., 2018).

We used SmartPLS as the main statistical tool to assess the measurement and structural models in this study. We used IBM SPSS Statistics for Windows, version 26 to conduct the descriptive analysis.

Results

Table 1 shows the descriptive information of the survey. In total, we recruited 547 participants. There were 249 male participants and 298 female participants in this study, the majority of whom were Buddhist (72.7%), and 292 of them (53.4%) were classified as the high change readiness group (Table 1). Bivariate correlation analyses were conducted

Table 1 Socio-demographic Characteristics of Participants (N = 547)

Variables	Frequency	Percent (%)
Gender		
Male	249	45.5
Female	298	54.5
Religion		
Islam	15	2.7
Buddhist	392	72.7
Hindu	20	3.7
Others	120	21.9

prior to fitting the multivariate model. All variables were considered significantly correlated with each other at $p < 0.05$.

Assessment of the Measurement Model

All constructs have higher value of factor loadings, AVE, and CR compared to the threshold value suggested by Hair et al. (2017), but some of the lower-order constructs (LOCs, e.g., not being able to communicate, losing connectedness, family, friends, and significant other) have an exceptionally high CR value which is more than 0.90; this suggests that most of the indicators are measuring the same phenomenon, therefore, decreasing the reliability of the constructs. Besides, one item (e.g., PS3) from the perceived stress construct is deleted to achieve optimum AVE and CR value.

To remedy this, we used the disjointed 2 stage approach (Sarstedt et al., 2019) to assign all the LOCs to their respective higher-order constructs (HOCs), for instance, nomophobia (LOCs: not being able to communicate, losing connectedness, not being able to access information, giving up convenience) and perceived social support (LOCs: family, friends, and significant other) are the 2 HOCs from the current study. Both of the HOCs showed significantly improved CR value.

All the Heterotrait-Monotrait ratio of correlations values (Henseler et al., 2015) fulfilled the criteria of being lower than 0.85 (Williams & Vogt, 2011) and 0.90 (Gold et al., 2001). Therefore, discriminant validity was justified.
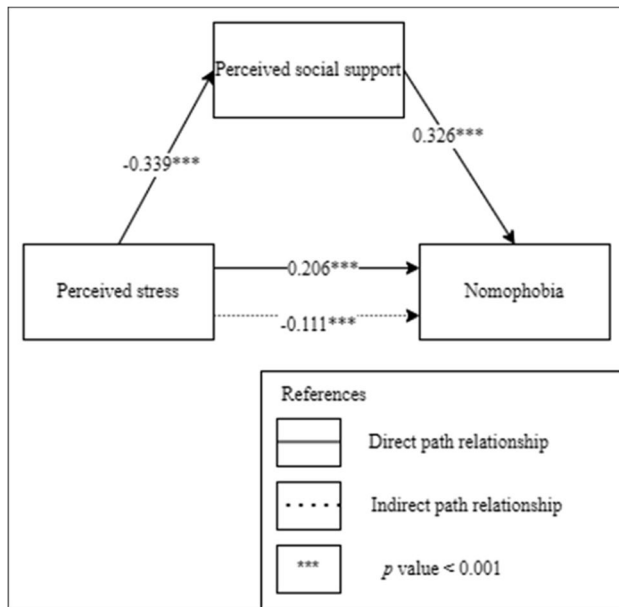
Assessment of the Structural Model

We evaluated the common method bias and multicollinearity issue by referring to the value of the Inner Variance Inflation Factor (VIF). All the Inner VIF values were lower than 3.3, therefore, no common method bias and multicollinearity issues in the structural model were detected (Kock, 2015). We used the segmentation approach to test the mediation model and also test the direct effect of the relationship between perceived stress and nomophobia (Rungtusanatham et al., 2014).

Table 2 Hypotheses Testing

Hypothesis	Std Beta	Std Error	t-value	95%CI LL	95%CI UL	VAF
PS—> PSS	-0.339	0.044	7.699***	-0.407	-0.259	0.02
PSS—> N	0.326	0.048	6.811***	0.238	0.396	
PS—> N	0.206	0.047	4.405***	0.124	0.279	
PS—> PSS—> N	-0.111	0.022	4.970***	-0.150	-0.077	

*Note.*N is nomophobia; PSS is perceived social support; PS is perceived stress. ***p < .001

Fig. 1 Mediating role of perceived social support in perceived stress and nomophobia

Table 3 PLSpredict Assessment of Research Model

Indicators	PLS-RMSE	Q.^{2}_predict	LM-RMSE	PLS-RMSE-LM-RMSE
NC	1.004	-0.004	1.006	-0.002
GV	**0.997**	**0.009**	**1.001**	**-0.004**
LC	0.999	0.006	0.996	0.003
NI	**0.997**	**0.009**	**1.002**	**-0.005**

*Note.*The bolded text and number indicate good predictors; NC is not being able to communicate; LC is losing connectedness; NI is not being able to access information; GC is giving up convenience; PS1 is "in the last month, how often have you felt that you were unable to control the important things in your life?"; PS2 is "in the last month, how often have you felt confident about your ability to handle your personal problems?"; PS4 is "in the last month, how often have you felt difficulties were piling up so high that you could not overcome them?"

Both indicators (e.g., not being able to communicate and losing connectedness) had a high prediction error, and both indicators were related to the social dimension (Table 3).

Discussion

This study was aimed to examine mediating influence of social support in the relationship between perceived stress and nomophobia among university students during the COVID-19 pandemic. Based on relevant literature, four hypotheses were developed. The results suggested that all the hypotheses were accepted except the second hypothesis, in which we hypothesized that social support would negatively predict nomophobia.

With respect to our first hypothesis, the results from this study confirmed that individuals reporting higher perceived stress had lower social support. This finding was in line with many contemporary studies (Bonavita et al., 2021; Khodara-himi et al., 2016; Roohafza et al., 2016) which highlighted that social support was a key component in buffering the effect of stress, with persons receiving more social support reporting better ability to manage stress in comparison with those who had less social support. Positive social support may alleviate the harmful effects of stress due to the presence of other individuals who are able to provide objective

We evaluated the model using bootstrap with 5000 resamples. Table 2 showed that all the proposed hypotheses were significant. Perceived stress negatively influenced social support (β = -0.339, p < 0.001) and positively influenced nomophobia (β = 0.206, p < 0.001), while perceived social support positively influenced nomophobia (β = 0.326, p < 0.001). The indirect effect of the relationship showed that perceived social support negatively mediated the relationship of perceived stress and nomophobia (β = -0.111, p < 0.001). As suggested by (Zhao et al., 2010), we concluded that the model was competitively partially mediated. (Table 2, Fig. 1).

In the model, 10% variance of nomophobia was explained by perceived stress and perceived social support. Both perceived stress ($f^2 = 0.042$) and perceived social support ($f^2 = 0.105$) had a small effect on nomophobia. We used the PLSpredict (Shmueli et al., 2016) to identify the prediction power of the models. In Table 3, half of the indicators (e.g., giving up convenience and not being able to access information) have lower RMSE in the PLS analysis. Therefore, the model is interpreted as having a medium predicting power.

help (such as offering food and shelter) or subjective help (such as providing a listening ear) to those who are going through a stressful situation (Bender et al., 2019). Social support was also crucial in alleviating psychological issues like depression and anxiety (Guo et al., 2021; Roohafza et al., 2014).

The present study found a positive significant relationship between perceived social support and nomophobia, i.e., individuals experiencing higher levels of social support will also report higher levels of nomophobia. Hence the second hypothesis was rejected. Our finding was in contrast with previous studies which found that social support was negatively associated with nomophobia (Shirani, 2017; Zhou et al., 2021; Zwilling, 2022). During the COVID-19 pandemic lockdown, non-face-to-face contact through social media use was one of the methods to increase social support (Chen et al., 2021; Zhang et al., 2021). Past studies had found that the mobile phone was a means to receive social support through social media (Selkie et al., 2020), and individuals who were addicted to the internet were more open to interpersonal influences from their online friends (Tran et al., 2017). The increased importance of online social support sources, due to limitations to face-to-face social contact imposed by the pandemic, may possibly result in the tendency for higher nomophobia.

Our study found that higher perceived stress was positively associated with higher nomophobia; the results supported our third hypothesis. Our results were consistent with findings obtained by a number of researchers (e.g., Bano et al., 2021; Farchakh et al., 2021; Lelapary et al., 2020; Pavithra et al., 2015). According to Lelapary et al. (2020), university students with nomophobia may have used their mobile phone as a coping tool against study-related or relationship-related stress. However, this coping mechanism to alleviate stress may have become maladaptive, leading to nomophobia.

The fourth hypothesis examined in the present study was the mediating role of social support in the relationship between perceived stress and nomophobia. Regarding the partial mediation of social support in the relationship between perceived stress and nomophobia, our study confirmed that social support acted as a buffer or protective factor against the influence of stress on nomophobia, thus supporting the stress-buffering hypothesis (Cohen & Wills, 1985). Pavithra et al. (2015) suggested that young adults developed stress due to the need for social connection, in which 56% of young adults put social networking as the reason of daily phone usage. This may explain why higher social support was a protective factor against nomophobia, and partially mediated the relationship between stress and nomophobia. In a different context, Tams et al. (2018) examined the relationship between nomophobia and stress using perceived social threat, which saw that high levels

of perceived social threat were associated with increased stress level among nomophobes. A number of studies have also found that loneliness mediated the relationship between stress and nomophobia (e.g., Bano et al., 2021; Kara et al., 2021; Nguyen et al., 2022). People who had higher levels of stress often faced the risk of loneliness (Campagne, 2019); however, they may feel less lonely when social support was offered, especially during stressful situations (Zhang et al., 2018). This may indicate that people who lacked social support may rely on their mobile phones as a tool to seek affiliation with other socialization agents (Herrero et al., 2019). Therefore, social support may play an important role in alleviating perceived stress and nomophobia, and it needs to be considered in interventions for individuals with nomophobia.

Implications

In clinical settings, when formulating the treatment for individuals with nomophobia, stress levels need to be addressed. Stress management skills and problem-focused solving could be taught to those facing nomophobia. Social support as a mitigating factor needs to be thoroughly assessed and comprehensive social support interventions could be applied to university students who experience social isolation, especially during and after the COVID-19 pandemic. Internet cognitive behavior therapy (I-CBT; Zhang & Ho, 2017) may be considered an amenable treatment modality to address nomophobia symptoms, especially due to the numerous restrictions imposed by the COVID-19 endemic.

This study has a few limitations. Being a cross-sectional study, we could not infer causation. Future cohort or intervention studies would be able to understand the contributions of perceived stress and social support towards the development and maintenance of nomophobia. Even though the study was carried out during the COVID-19 pandemic, we did not measure the impact of COVID-19 on stress level. Finally, being an online survey, we could not control for bias due to using convenience and snowball sampling. Future studies on nomophobia among college students may benefit from randomization and stratification in the sampling methods to ensure greater representativeness among the participants.

Conclusions

This study found that higher perceived stress was associated with higher nomophobia, and social support partially mediated the relationship between perceived stress and nomophobia during the COVID-19 pandemic. The result highlighted the importance of perceived social support

in reducing nomophobia. This study carries clinical implications for the treatment of university students who suffer from nomophobia.

Data Availability The datasets generated during and/or analyzed during the current study are available from the corresponding author on reasonable request.

Declarations

Competing Interests The authors have no competing interests to declare that are relevant to the content of this article.

Ethics Approval The questionnaire and methodology for this study was approved by the UCSI University Institutional Ethics Committee (IEC-2020-FOSSLA-053).

Consent to Participate Informed consent was obtained from all individual participants included in the study.

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