Original Article

Stress and its association with sociodemographic characteristics, coping and internet use among late adolescent university students in East Malaysia

HY Lai, WL Cheah

Address for correspondence: Department of Community Medicine and Public Health, Faculty of Medicine and Health Sciences, University Malaysia Sarawak, 94300 Kota Samarahan, Sarawak, Malaysia. Email id: wlcheah@unimas.my

Abstract

Introduction: Adolescents pursuing higher education at the university experience stressful life events on top of academic demands, where failure in managing those stressors can lead to stress as well as other more severe physical and mental health problems. Limited research exists locally about the association between coping and internet use with the perceived stress.

Methodology: A cross-sectional study was conducted among 527 university students between 18-19 years old in Kota Samarahan. A self-administered questionnaire containing background information, perceived stress, measures of coping, motives of utilizing the internet, and internet addiction test was used. IBM SPSS version 23 was used for the data analysis.

Result: The results showed that being female or having avoidant-emotional coping strategy was positively associated with perceived stress, whereas a problem-focused coping strategy was negatively associated with perceived stress. Internet addiction and underlying internet motives were not associated with perceived stress.

Conclusion: The need to understand the association between coping and perceived stress is essential for professionals to assist adolescents in managing their mental health.

Keywords: Adolescents, stress, coping, internet

Introduction

Adolescence is a critical phase of life where a child transitions into an adult [1]. Individuals at this stage of life are generally considered to be physically strong and healthy [2]. However, the late stage of adolescents (those aged between 18-19 years old) who are going to college or university face many challenges as it is a significant transition from late adolescence into adulthood, from living at home to living away from home, from dependence to independence. Multiple other sources of stress, such as academic demands, financial constraints, issues of interpersonal relationships, time management stress, health-related problems, and other self-imposed stressors [3], can be overwhelming to some. Coinciding with these stressful events, there is an increase in distress and vulnerability as well as a loss of well-being, strength, and support, although these challenges are likely to be tempered in the following years [4].

Stress is a natural human response to demands or pressures, and the things that cause stress are called stressors [5, 6]. According to Lazarus and Folkman's Transactional Model of Stress and Coping Theory, stress arises after exposure to situations that an individual appraised as challenging, threatening, or detrimental, which exceeded his or her capability to cope [7]. Following the lead of Lazarus and Folkman, researchers frequently group coping strategies into two categories, problem-focused and emotion-focused [8]. Problem-focused coping generally deals with stressful situations proactively by changing or removing the sources of stress, while emotion-focused coping involves all the regulative efforts to regulate the emotional consequences of stress [7]. Later, Holahan and Moos [9] subdivided emotion-focused coping into active-emotional coping and avoidant-emotional coping, where they described the active-emotional coping such as venting about the stressful situation or cognitively trying to reframe a stressor's impact, is typically viewed as an adaptive way of emotion regulatory function [10]. In contrast, avoidant-emotional coping, such as denial or self-distraction from the stressors, is viewed as a maladaptive way of dealing with stress [9].

A problem-focused coping strategy is believed to be the most effective as it focuses on identifying and eliminating the sources of stress so that they do not recur in the future [11]. However, it may not always be effective to use problem-focused strategies in all kinds of situations. For example, when dealing with the loss of loved ones, problem-focused may not be helpful. In this type of situation, emotion-focused coping will be of greater help as it involves trying to decrease the negative emotions associated with stress [12].

Adolescents going to universities today grew up in a digital world. The internet is particularly important to them because it provides the most significant source of information, maintaining relationships as well as performing thousands of other activities. The research that exists today suggests that internet use may be both a source of stress and a useful means to cope with stress [13]. Another important issue when discussing internet use is internet addiction. Several studies have shown the association between psychological health risk, suicidal ideation, and loneliness with internet addiction among adolescents and adults [14-15]. There are also studies that argued the types of underlying online motivations (e.g. coping, entertainment) may be differently associated with perceived stress [13, 16]. Such discrepancy warrants a more nuanced approach to examining the relationship between stress, coping, and internet use among university students.

Stress as a response to different stressors can result from different types of coping, and the internet can be used as a coping mechanism. The inability to cope can lead to more severe forms of mental illnesses. However, such studies were limited in Malaysia, especially in Sarawak, looking at the association between coping, internet use, and mental health. In this study, it is hypothesized that problem-focused coping strategy is negatively associated with stress, while emotion-focused coping strategy is positively associated with stress. In addition, internet addiction is hypothesised to be positively associated with stress, and that different online motives associate differently with stress. Therefore, it is the objective of this study to

justify how different types of coping and internet use can affect the stress level among adolescents pursuing tertiary education in order to identify critical factors to develop better and a more comprehensive preventive and promotive programs against adolescents' mental health problems.

Methodology

Samples

This cross-sectional study was conducted among 18-19 years old students from a public university in Sarawak. The sample size was calculated using the t-test in Power and Sample Size Programme [17]. With Type 1 error of 0.05, power of 80%, and anticipated non-response rate of 10%, the sample size needed to obtain significant results was 539. The sampling size needed for the study was similar to the whole study population (710 students); therefore, all students were recruited as the participants in the study.

Inclusion and Exclusion Criteria

All students were briefed on the inclusion and exclusion criteria. Only late adolescents between 18-19 years old studying in a local university in Kota Samarahan, East Malaysia, were recruited. Their age was counter-checked using their identification card. Those who self-declared to have been diagnosed with mental health illness were excluded from the study.

Procedure

Questionnaires were distributed from January to February 2019 to all students. However, only 527 students agreed to participate in the survey. The other 183 students were approached two to three times before it was decided to exclude them from this study as they refused to participate in the study. All the agreed participants were briefed on this research and required to sign a consent form before they answered the questionnaire.

Instruments

    1. Coping

The Brief COPE is a revised version of the original COPE Inventory [18] and has been used with college students [13]. This tool consists of 28 items and has three subscales: problem-focused, active-emotional, and avoidant-emotional. It uses a 4-Likert scale (1-4) ranging from "I have never done this" to "I've been doing this very often." A higher score indicates greater coping with the respondents. A study by Deatherage *et al.* [13] among college students using the same instrument also had good internal consistency results with Cronbach's alpha coefficient ranging from 0.77-0.83. The Malay version of Brief COPE has fairly good reliability and validity [19] and the total Cronbach's alpha value was 0.83 in a study among the Malaysian secondary school students [19]. The permissions to use both English and Malay versions of Brief COPE had been granted.

    2. Online Motives

This instrument was adapted by Bischof-Kastner [20] from a drinking motive questionnaire and was tested on adolescents. This questionnaire uses a 5-Likert scale from 1 to 5 (1 = never to 5 = very often). It consists of 16 items that can be grouped into four subscales of internet motives behind going online. The two subscales assess motivation to regulate positive effects are Enhancement and Social; the remaining two subscales assess the motivation to regulate negative affect are Coping and Conformity. This instrument has good internal consistency results with Cronbach's alpha coefficient ranging from 0.71-0.86. Higher scores on the various subscales indicate a greater tendency to utilize the internet for the described purpose. Permission to use the English version of the questionnaire has been requested from the author multiple times through emails. However, there was no response given. Nevertheless, the questionnaire was cited. The process of translation and cross-cultural adaptation of the original questionnaire in English was performed according to the recommendations by the

WHO [21, 22]. The questionnaire was translated into the Malay version using back-translation. The initial process of translating the English questionnaire into the Malay language was done by a subject expert who is well-versed in both English and Malay language. Then, the Malay version of the questionnaire was translated back into English by another independent subject expert who is also well-versed in both English and Malay language. The back-translator did not have a priori knowledge of the intent of the original instrument. The final Malay version of the questionnaire was then shown to an expert in the institution for consultation.

3. Internet Addiction

The Short Version of Young's Internet Addiction Test (s-IAT) is a self-administered 12-item questionnaire with a two-factors structure [23]. It is an adapted version from the Young's Internet Addiction Test [24]. Each of the 12 items has a 5-point Likert scale from 1 to 5 (1 = never to 5 = very often) reflecting the frequency of symptoms. The respondents answer each statement with the Likert scale that most accurately described their internet use characteristics. The suggested cut-off score for problematic internet use is >30, and pathological internet use is >37. This instrument has been validated on university students and the general public with both factors offering good reliability (Cronbach's α = 0.876 and 0.836) and good overall reliability (Cronbach's α = 0.897) [23]. The Malay version of the questionnaire was adapted from Ng et al. [25] and was tested on a group of Malaysian medical students with good internal consistency of Cronbach's alpha 0.91 and parallel reliability (intra-class coefficient = 0.88, P < .001). The permissions to use the short version of Young's IAT and Malay version of IAT had been acquired.

4. Perceived Stress

The 10-item Perceived Stress Scale (PSS-10) is a self-reported tool to measure one's perception about the degree of a given situation in life for the past one month is considered

stressful [26]. There are three versions of the PSS. According to a review of the psychometric evidence of the PSS done by Lee [27], PSS-10 is superior to PSS-14 (14-item), while PSS-4 (four-item) is the least effective among the three. Therefore, PSS-10 is chosen to be used in this study. Each of the ten items in this instrument has a 5-point Likert scale (0-4) with the scores valued as follows: 0 – never, 1 – almost never, 2 – sometimes, 3 – fairly often, and 4-very often. PSS scores are calculated by reversing the responses (e.g., 0 = 4, 1 = 3, 2 = 2, 3 = 1 & 4 = 0) to the four positively stated items (items 4, 5, 7, & 8) and then summing across all scale items. Scores ranging from 0-13 indicates low perceived stress; 14-26 indicates moderate perceived stress, and 27-40 indicates high perceived stress. Operational wise in this study, the result of PSS was categorised into two, which is "No to low perceived stress" and "moderate to high perceived stress." The Cronbach's alpha for this instrument was 0.92 among college students [13]. The Malay version of PSS-10 has been found to have psychometric properties that are comparable to the original English version of PSS-10 as it has been validated among different groups of people in Malaysia, such as medical students, diabetic patients, and nurses [28-30]. The total Cronbach's alpha coefficient of Malay version PSS-10 was 0.78 among the Malaysian medical students [31]. Permissions to use the English version of PSS-10 and the Malay version of PSS-10 had been granted from the authors.

Pilot test

A pilot test of the final questionnaire was conducted among the 30 undergraduate students [32]. Debriefing about the purpose of the pilot test was done before the respondents answered the questionnaire. All the respondents were able to understand the questions asked. There were no changes made to the final questionnaire. The pilot test analysis results showed that the 10-item Perceived Stress Scale (PSS-10) had a Cronbach alpha of .73. The Brief-COPE had a Cronbach's alpha of .73 and the Internet Motives Questionnaire for Adolescents (IMQ-A) had a Cronbach's alpha of .86. The short-version Internet Addiction Test (s-IAT) had a

Cronbach's alpha of .85. This showed that the tools used in this study had acceptable and good value of internal consistency.

Data analysis

The collected data were coded and analysed using International Business Machines Corporation (IBM) Statistical Package for the Social Sciences (SPSS) version 23. Data checking and cleaning were done before data analysis. Descriptive analysis, such as mean and frequency, was used to describe the sociodemographic characteristics, perceived stress level, coping style, online motives, and internet addiction of the participants. Then, binary logistic regression was performed to study the factors associated with stress, where a p-value of less than 0.05 was taken as a significant result.

Result

The respondents were 527 university students, aged between 18-19 years old, studying in Kota Samarahan. 70% of the respondents were females, with 30% males.

Table-1: Sociodemographic characteristics of the respondents (n = 527)

Item	n (%)	mean (SD)
Age (year)		
18	413 (78.4)	18.2 (0.41) min 18
19	114 (21.6)	max 19
Gender		
Male	158 (30.0)	
Female	369 (70.0)	
Ethnicity		
Malay	312 (59.2)	
Pribumi Sarawak	160 (30.4)	
Others (Pribumi Sabah,others)	55 (10.4)	
Place of Origin		
Sarawak	308 (58.4)	
Sabah, Labuan	35 (6.6)	
Peninsular Malaysia	184 (35.0)	
Parental Marital Status		
Married	483 (91.7)	
Divorced/Widowed	44 (8.3)	
Attended Boarding School before	250 (47.4)	

Note: n = sample size; SD = Standard Deviation

More than half (59.2%) of the respondents were Malay, followed by 30.4% being Pribumi Sarawak, and 10.4% were from other ethnics (Pribumi Sabah and others). Nine out of ten (91.7%) of the respondents' parents were married. Almost half (47.4%) of the respondents had attended a boarding school before entering university (refer to Table-1).

Table-2 showed the profile of perceived stress, coping, and internet use among the respondents. The overall mean (SD) score for the level of perceived stress among the respondents was 18.9 (5.83). The majority (73.2%) of the respondents experienced a moderate level of stress, followed by 17.1% of them had a low level of perceived stress, and 9.7% of the respondents scored a high level of perceived stress. The most practiced coping strategies were active-emotional with a mean (SD) of 25.9 (5.01), followed by problem-focused with a mean of 23.3 (4.56).

Table-2: Profile of perceived stress, coping and internet use (n = 527)

Item	n (%)	mean (SD)
Overall (PSS-10)		18.9 (5.83) min 2 max 36
Low (0-13)	90 (17.1)	
Moderate (14-26)	386 (73.2)	
High (27-40)	51 (9.7)	
Brief-COPE		
Problem-focused		23.3 (4.56)
Active-emotional		25.9 (5.01)
Avoidant-emotional		19.1 (4.05)
Hours per day spent on the internet		6.4 (4.12)
IMQ-A		
Enhancement		14.5 (3.53)
Coping		14.0 (3.94)
Social		14.9 (3.88)
Conformity		7.6 (3.72)
Overall Internet Addiction		30.5 (8.83) min 12 max 60
No problematic internet use (12-29)	258 (49.0)	
Problematic internet use (30-36)	152 (28.8)	
Pathological internet use (37-60)	117 (22.2)	

The mean time the respondents spent on the internet every day was 6.4 hours. The most common motive in using the internet was for social purposes with a mean score of 14.9, followed by internet motive for enhancement with a mean score of 14.5 and coping purposes with a mean score of 14.5. The overall mean score for the internet addiction test of the respondents was 30.5. Near half (49.0%) of the respondents had no problematic internet use, while 28.8% of them had problematic internet use, and 22.2% of the respondents had pathological internet use (Table-2).

Univariate analysis was performed to identify the potential factors that were associated with perceived stress (see Table 3). All the independent variables in the univariate analysis with p-value < 0.2 [33] were shortlisted into the final model.

Table-3: Association between sociodemographic characteristics, coping and internet use with perceived stress (n = 527)

	Variable	Crude OR	95% CI OR	X^2 stat (df)[a]	p-value
1	Gender				
	Male	1.00			
	Female	1.5	0.95;2.46	3.11 (1)	0.078
2	Coping Strategies				
	Problem-focused Coping	0.88	0.84; 0.93	19.33 (1)	0.000
3	Coping Strategies				
	Avoidant-emotional Coping	1.27	1.17; 1.37	35.92 (1)	0.000
4	Internet Motives				
	Coping	1.11	1.04; 1.17	11.43 (1)	0.001
5	Internet Addiction Test				0.000
	No Problematic Internet Use	1.00			
	Problematic Internet Use	2.26	1.29; 3.95	8.21 (1)	
	Pathological Internet Use	4.40	2.03; 9.53	14.16 (1)	

[a] Likelihood Ratio (LR) test

A multivariate logistic regression model was conducted to identify the factors associated with perceived stress (see Table 4). The result showed that gender was associated with perceived stress with a p-value < 0.05. Female students appeared to have more perceived stress than

male students (OR 1.80, 95% CI 1.06-3.04). Both the problem-focused and avoidant-emotional coping strategies were also found to be significantly associated with perceived stress. Students who practiced problem-focused coping were less likely to be stress (OR 0.83, 95% CI 0.78-0.89) while the students who used the avoidant-emotional type of coping were more likely to be stressed (OR 1.37, 95% CI 1.25-2.50).

Table-4: Factors associated with perceived stress (n = 527)

		Adjusted OR	95% CI OR	X^2 stat (df)[a]	p-value
1	Gender				
	Male	1.00			
	Female	1.80	1.06; 3.04	4.75 (1)	0.029
2	Coping Strategies				
	Problem-focused Coping	0.83	0.78; 0.89	31.70 (1)	0.000
3	Coping Strategies				
	Avoidant-emotional Coping	1.37	1.25; 1.50	44.93 (1)	0.000

[a] Likelihood Ratio (LR) test Adj. OR = Adjusted odds ratio
Assumptions:
1. SLR – Gender, Problem-focused coping, Avoidant-emotional coping
2. Variable selection – Forward LR
3. Interaction and MC – no interaction, VIF < 10
4. Model assumptions and outliers
   - Hosmer and Lemeshow Test: p=0.351
   - AUC = 79.3%
Outliers: highest point = 0.14 (<1.0)

Discussion

In general, the majority (73.2%) of the studied population experienced a moderate level of perceived stress, with 9.7% of them perceived a high level of stress. This finding was consistent with other similar studies [2, 34]. Therefore, it is important to equip the students with knowledge of mental health issues, such as the symptoms and outcomes of stress, depression, and anxiety, the way to manage, and when to seek help.

The overall mean score of the perceived stress of the studied population was 18.9 (SD 5.83). Although this study could not examine the difference between junior and senior university

students in terms of perceived stress, the perceived stress score was higher when compared to one study where the mean of the perceived stress score among senior college students was 16.51 (SD 5.11) [35]. Studies have shown that those entering university or college for the first time perceived more stress than the senior students because these juniors, as freshmen, were adjusting themselves to the new environment on top of the academic stress that they were facing [36–37]. Therefore, the university needs to pay attention to this group of students (freshmen) in order to help them embrace these challenges.

In this study, female respondents were found to perceive more stress than male respondents. This finding is consistent with past researches indicating that female university students reported a higher level of stress compared to their male peers [37, 38]. In general, women are more likely to report that they are stressed compared to men [39], but it does not mean men perceive less stress than women. Men are well-known to be less expressive about their feelings due to the idea of masculinity, and that leads to their poor health-seeking behaviour as that is perceived as a weakness [40]. Hence, during the planning for mental health programs, activities should be targeted to address this gender difference so that both male and female students can benefit from the program.

The most popular stress coping strategy practiced by the 18-19 years old university students in Kota Samarahan was active-emotional coping, followed by problem-focused coping. Although active-emotional coping was the most practiced coping strategy, it did not appear to have any association with perceived stress. Problem-focused coping was found to be significantly and negatively associated with perceived stress. In contrast, avoidant-emotional coping was found to be positively associated with perceived stress. These findings were slightly dissimilar to past research where active-emotional coping was a negative predictor of stress, while avoidant-emotional coping was a positive predictor of stress, and problem-

focused coping did not associate with stress [13]. Nevertheless, these findings were useful in planning for mental health promotion for university students.

The Internet has become part and parcel of every individual's life. It is particularly important for university students who need to search for information online for assignments and projects. In this study, the respondents spent about 6.4 (SD=4.12) hours a day on the internet. This finding was consistent when compared to the result of an internet survey in Malaysia, where internet users below the age of 20 spent about 6.7 hours a day on the internet [41]. It was also found that the time spent on the internet was not to be significantly associated with stress, and this was consistent with a study done among college students [13]. This is an important finding as assessing the time an individual spent on the internet alone cannot examine the relationship between the internet and stress. People are spending more time on the internet today because almost everything is digitalised now. Adolescents could be listening to music online and, at the same time, looking for information relevant to their studies and keeping themselves connected with family and friends through social media. Therefore, when looking at problematic internet use, the duration of using the internet is not enough to justify the seriousness of the issue.

In looking at whether internet addiction leads to stress, the result of this study showed that there was no association between internet addiction and the level of perceived stress. This was consistent with several other studies where there was no association seen between internet addiction or problematic use of the internet with mental health [13, 42]. However, there were also studies that have shown association between excessive internet use and general well-being of internet users in negative ways, such as increased feelings of loneliness, poorer self-esteem, poorer life satisfaction, worsen the quality of sleep and poor mental health status, like depression, anxiety and stress [43-48]. This showed that the relationship between internet addiction and mental health status were reciprocal. It could be explained that

the individuals who suffered from depression, anxiety, and stress turned to the virtual world and the internet to escape the reality of lives and their disorders or maybe the internet addicts were prone to poor mental health status due to their dependence on the internet [49]. Thus, in-depth research is recommended for having a better understanding of this issue.

Deatherage *et al.* [13] suggested the need to study the motives of the students in engaging online activities to predict the level of perceived stress. In their study, it was found that enhancement-related online motives were negatively associated with perceived stress. In contrast, coping-related online motives were positively associated with perceived stress [13]. In another study, Garett and colleagues also reported that using the internet as a way of coping with stress was associated with higher stress [50]. However, those findings were not found, as shown in this study, none of the online motives were found to be significantly associated with perceived stress. Another way of studying the relationship between internet use and psychological well-being could be by looking at the specific online activities that the users were engaged in. It was suggested that online chat functions might provide those who fear to socialise with a way to approach their social phobia and adjust their behaviour, as the result of the study had shown that internet users who specifically used chat functions were less socially fearful [42]. The previous study had also shown that social media use did not influence stress level [50]. This proposed that the internet and the use of social media might influence the individual's perceived stress differently. Therefore, future studies may need to distinguish the general interest of using the internet from using specific types of online activities when assessing the perceived stress among adolescents.

Several limitations must be considered in this study. First, generalisability of the findings was limited due to the sampling method and sampling population where it was done only among the 18-19 years old students in one local university in Kota Samarahan. The results might not be representative of the same population in this region, but it could be used as a baseline for

future studies. Second, the nature of a cross-sectional study precludes causal interferences. Future research using longitudinal study approach and concentrating specific online activities and motivation can be included to identify if there are associations between mental health and specific types of online activity (e.g., Facebook, YouTube) with certain underlying motives for using the internet (e.g., social, coping, enhance) for adolescents. Third, there are important confounding factors that can potentially influence the link between adolescents, stress, and pathological internet use, such as academic performances, financial concerns, quality of sleep, relationships with family and friends, over-all health, perceived body image, self-esteem, and substance use. These factors were not examined in this study. More comprehensive research can be done to look into more of these stress influencers. Next, there was no structured interview for the diagnosis of psychiatric illnesses before the survey was conducted, leaving the possibility that there might be some respondents who participated in the study might actually have a certain mental illness. Lastly, the sample size needed to obtain significant results was 539. However, only 527 students agreed to participate in this study.

To conclude, the results of this study highlighted several important points on the mental health of adolescents pursuing tertiary education. Even though the prevalence of stress among the late adolescents pursuing tertiary education in Kota Samarahan was consistent with the findings from other studies involving undergraduates, it is still significant to address the mental health status of the students so that negative consequences of poor mental health, such as depression, suicide, personality disorder or even other health problems, such as cardiovascular problems, obesity and many more [51] can be prevented. Stress is an unavoidable reality of life, and knowing that different coping strategies can help with different situations of life challenges. Therefore, it is necessary to educate university students on how to cope with stress in different situations [9, 52]. There was no association between

time spent online, the underlying motives to go online, or internet addiction as opposed to several other studies. This suggests a further study involving a more generalized population of adolescents before a conclusion could be made. The study's findings can serve as a baseline for further research concerning adolescents' mental health and other factors associated with it.

Funding

Acknowledgement

Conflict of interest: None declared

References

1. UNICEF. Mental health. UNICEF Data [Internet] 2018 [cited 2018 Oct 13]. Available from: https://data.unicef.org/topic/adolescents/mental-health/

2. Gonmei J, Devendiran C. Perceived Stress and Psychosocial Factors of Stress among Youth. Int J Acad Res Dev 2017, 2:766-770.

3. Chou W-P, Ko C-H, Kaufman EA, Crowell SE, Hsiao RC, Wang P-W, et al. Association of Stress Coping Strategies with Internet Addiction in College Students: The Moderating Effect of Depression. Comprehensive Psychiatry 2015, 62:27–33.

4. Conley CS, Kirsch AC, Dickson DA, Bryant FB. Negotiating the Transition to College: Developmental Trajectories and Gender Differences in Psychological Functioning, Cognitive-Affective Strategies, and Social Well-Being. Emerging Adulthood 2014, 2:195–210.

5. Salleh MR. Life Event, Stress and Illness. Malays J Med Sci 2008, 15:9–18.

6. Yusoff MSB. Stress, Stressors & Coping Strategies among Secondary School Students in a Malaysian Government Secondary School: Initial Findings. ASEAN Journal of Psychiatry 2010, 11: 1-10.

7. Lazarus RS, Folkman S. Stress, Appraisal, and Coping. New York: Springer Pub. Co.; 1984.

8. Folkman S, Lazarus RS. An Analysis of Coping in a Middle-Aged Community Sample. Journal of Health and Social Behavior 1980, 21:219-239.

9. Holahan CJ, Moos RH. Risk, Resistance, and Psychological Distress: A Longitudinal Analysis with Adults and Children. Journal of Abnormal Psychology 1987, 96:3–13.

10. Folkman S, Lazarus RS. If It Changes It Must Be a Process: Study of Emotion and Coping During Three Stages of a College Examination. Journal of Personality and Social Psychology 1985, 48:150–70.

11. Peer JW. Coping Strategies. In: Shehan CL. (ed.) Encyclopedia of Family Studies Vol. 1. Hoboken, NJ, USA: John Wiley & Sons, Inc.; 2016, p. 441–5.

12. McLeod S. Stress Management. Simply Psychology [Internet] 2009 [cited 2019 Apr 23]. Available from: URL: https://www.simplypsychology.org/stress-management.html

13. Deatherage S, Servaty-Seib HL, Aksoz I. Stress, Coping, and Internet Use of College Students. J Am Coll Health 2014, 62:40–6.

14. Fu KW, Chan WSC, Wong PWC, Yip PSF. Internet Addiction: Prevalence, Discriminant Validity and Correlates Among Adolescents in Hong Kong. Br J Psychiatry 2010, 196:486–492.

15. Christakis DA, Moreno MM, Jelenchick L, Myaing MT, Zhou C. Problematic Internet Usage in US College Students: A Pilot Study. BMC Medicine 2011, 9:77.

16. Bessière K, Pressman S, Kiesler S, Kraut R. Effects of Internet Use on Health and Depression: A Longitudinal Study. J Med Internet Res 2010, 12:1.

17. Dupont W. Power and Sample Size Calculations: A review and Computer Program. 1990.

18. Carver CS, Scheier MF, Weintraub JK. Assessing Coping Strategies: A Theoretically Based Approach. J Pers Soc Psychol 1989, 56:267–283.

19. Yusoff MSB. The Validity of the Malay Brief Cope in Identifying Coping Strategies among Adolescents in Secondary School. International Medical Journal 2011, 18:29-33.

20. Bischof-Kastner C, Kuntsche E, Wolstein J. Identifying Problematic Internet Users: Development and Validation of the Internet Motive Questionnaire for Adolescents (IMQ-A). J Med Internet Res 2014, 16:e230.

21. WHO. Process of translation and adaptation of instruments [Internet]. 2004 [cited 12 January 2019]. Available from:
https://www.who.int/substance_abuse/research_tools/translation/en/

22. Guillemin F, Bombardier C, Beaton D. Cross-Cultural Adaptation of Health-Related Quality of Life Measures: Literature Review and Proposed Guidelines. J Clin Epidemio 1993, 46:1417-1432.

23. Pawlikowski M, Altstötter-Gleich C, Brand M. Validation and psychometric properties of a short version of Young's Internet Addiction Test. Computers in Human Behavior 2013, 29:1212–1223.

24. Young KS. Caught in the Net: How to Recognize the Signs of Internet Addiction--and a Winning Strategy for Recovery 1st ed. New York, USA: John Wiley & Sons, Inc.;1998.

25. Ng CG, Isa SM, Hashim AH, Pillai SK, Singh KH. Validity of the Malay Version of the Internet Addiction Test: A Study on a Group of Medical Students in Malaysia.Asia Pac J Public Health [journal on the Internet]. 2012 [cited 2018 Oct 31], 27(2). Available from: http://aph.sagepub.com/content/early/2012/05/16/1010539512447808

26. Cohen S, Kamarck T, Mermelstein R. A Global Measure of Perceived Stress. J. Health Soc. Behav 1983, 24:385–396.

27. Lee E-H. Review of the Psychometric Evidence of the Perceived Stress Scale. Asian Nursing Research 2012, 6:121–127.

28. Gillani SW, Sarriff A, Amin A, Baig M. Perceived Stress Scale Psychometric Validation for Malaysian Diabetic Patients. Br. J. Pharm. Res 2011, 1:156-163.

29. Radman SA, Ahmed M, Gopal K, Aziz N. Factor Structure and Reliability of the Malay Version of the Perceived Stress Scale among Malaysian Medical Students.Malays J Med Sci 2012, 19:43-49.

30. Singh S, Hassim N, Gopal K. The Malay Version of the Perceived Stress Scale (PSS)-10 is a Reliable and Valid Measure for Stress among Nurses in Malaysia. Malays J Med Sci 2015, 22:26-31.

31. Al-Dubai S, Alshagga MA, Rampal KG, Sulaiman NA. Factor Structure and Reliability of the Malay Version of the Perceived Stress Scale among Malaysian Medical Students.Malays J Med Sci 2012, 19:43-49.

32. Browne R. H. On the Use of a Pilot Sample for Sample Size Determination. Stat. Med. 1995, 14:1933–1940.

33. Cheah WL, Ensayan JM, Hazmi H, Chang CT. Hypertension and Its Association with Anthropometric Indices among Students in a Public University. Malaysian Family Physician 2018, 13:2-9.

34. Ganesan Y, Talwar P, Norsiah Fauzan, Oon YB. A Study on Stress Level and Coping Strategies among Undergraduate Students. Journal of Cognitive Sciences and Human Development 2018, 3:37-47.

35. Khan MJ, Altaf S, Kausar H. Effect of Perceived Academic Stress on Students' Performance. FWU Journal of Social Sciences 2013, 7:146-151.

36. Geng G, Midford R. Investigating First Year Education Students' Stress Level. Australian Journal of Teacher Education [journal on the Internet]. 2015 [cited 2018 Oct 15], 40(6). Available from: http://ro.ecu.edu.au/ajte/vol40/iss6/1

37. Jia Y, Loo Y. Prevalence and Determinants of Perceived Stress among Undergraduate Students in a Malaysian University. JUMMEC [journal on the Internet]. 2018 [cited 2018 Nov 20], 21(1). Available from: https://jummec.um.edu.my/article/view/11016

38. Thawabieh AM, Qaisy LM. Assessing Stress among University Students. Am. Int. J Contemp. Res 2012, 2:110-116.

39. American Psychological Association. Gender and Stress [Internet]. 2010 [cited 2018 Nov 11]. Available from: http://www.apa.org/news/press/releases/stress/2010/gender-stress.aspx

40. Ogrodniczuk J, Oliffe J, Kuhl D, Gross PA. Men's Mental Health. Can. Fam. Physician 2016, 62:463–464.

41. Malaysian Communications and Multimedia Commission. Internet Users Survey 2018 [Internet]. 2018 [cited 2019 Jun 27]. Available from: https://www.mcmc.gov.my/skmmgovmy/media/General/pdf/Internet-Users-Survey-2018.pdf

42. Campbell AJ, Cumming SR, Hughes I. Internet Use by the Socially Fearful: Addiction or Therapy? CyberPsychology & Behavior 2006, 9:69–81.

43. Yao MZ, Zhong Z. Loneliness, Social Contacts and Internet Addiction: A Cross-Lagged Panel Study. Computers in Human Behavior 2014, 30:164–170.

44. Jun S, Choi E. Academic Stress and Internet Addiction from General Strain Theory Framework. Computers in Human Behavior 2015, 49:282–287.

45. Al-Gamal E, Alzayyat A, Ahmad MM. Prevalence of Internet Addiction and Its Association with Psychological Distress and Coping Strategies Among University Students in Jordan. Perspectives in Psychiatric Care 2016, 52:49–61.

46. Błachnio A, Przepiorka A, Pantic I. Association between Facebook Addiction, Self-Esteem and Life Satisfaction: A cross-sectional study. Computers in Human Behavior 2016, 55:701–705.

47. Woods HC, Scott H. #Sleepyteens: Social Media Use in Adolescence is Associated with Poor Sleep Quality, Anxiety, Depression and Low Self-Esteem. Journal of Adolescence 2016, 51:41–49.

48. Andreassen CS, Pallesen S, Griffiths MD. The Relationship between Addictive Use of Social Media, Narcissism, and Self-Esteem: Findings from a large national survey. Addictive Behaviors 2017, 64:287–293.

49. Gholamian B, Shahnazi H, Hassanzadeh A. The Prevalence of Internet Addiction and its Association with Depression, Anxiety, and Stress, among High-School Students. Int. J. Pediatr 2017, 5:4763-4770.

50. Garett R, Liu S, Young SD. A Longitudinal Analysis of Stress Among Incoming College Freshman. J. Am. Coll. Health 2017, 65:331–338.

51. WebMD. Stress Symptoms: Effects of Stress on the Body [Internet]. WebMD. 2017 [cited 2019 Jul 7]. Available from: https://www.webmd.com/balance/stress-management/effects-of-stress-on-your-body

52. Riley KE, Park CL. Problem-Focused Vs. Meaning-Focused Coping as Mediators of the Appraisal-Adjustment Relationship in Chronic Stressors. Journal of Social and Clinical Psychology 2014, 33:587–611.

HY Lai, WL Cheah, Assoc. Prof, Department of Community Medicine and Public Health, Faculty of Medicine and Health Sciences, University Malaysia Sarawak, 94300 Kota Samarahan, Sarawak, Malaysia.