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Mental health issues in southeast asia regions: Looking back and moving forward

Edited by
Kit-Aun Tan, Shian-Ling Keng and Mansor Abu Talib

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Mental health issues in southeast asia regions: Looking back and moving forward

Topic editors

Kit-Aun Tan — Universiti Putra Malaysia, Malaysia
Shian-Ling Keng — Monash University Malaysia, Malaysia
Mansor Abu Talib — USCI University, Malaysia

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Wulf Rössler,
Charité University Medicine Berlin, Germany

*CORRESPONDENCE
Kit-Aun Tan
✉ tanka@upm.edu.my

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Editorial: Mental health issues in Southeast Asia regions: looking back and moving forward

Kit-Aun Tan[1]*, Shian-Ling Keng[2] and Mansor Abu Talib[3]

[1]Department of Psychiatry, Faculty of Medicine and Health Sciences, Universiti Putra Malaysia, Selangor, Malaysia, [2]Department of Psychology, Jeffrey Cheah School of Medicine and Health Sciences, Monash University Malaysia, Selangor, Malaysia, [3]Centre of Research and Mental Health and Wellbeing, UCSI University, Kuala Lumpur, Malaysia

KEYWORDS

mental health, Southeast Asia, prevention, assessment, evaluation, management

Editorial on the Research Topic
Mental health issues in Southeast Asia regions: looking back and moving forward

Mental health has not been given high priority in Southeast Asian countries. Looking back, in some Southeast Asian countries, the healthcare sector has primarily focused on infectious and tropical diseases, and other emerging public health concerns. Mental health, which falls under the domain of non-communicable diseases, has received comparatively less attention.

Southeast Asian nations differ in terms of their economic progress and per capita income, with some countries being more developed and prosperous, while others face greater disparities and lower level of income. These differences contribute to variations in the availability of resources and services related to mental health.

Despite the fact that Southeast Asia comprises ~8.58% of the global population, authors from this region have not received proportional attention or inclusion in the body of literature addressing mental health. This gap in representation can impede the advancement of holistic and culturally appropriate approaches to mental health interventions and services within the region.

In response, the 12 articles composing this unique *Frontiers Research Topic* seek to provide a clearer understanding of how mental health issues can be prevented, assessed, evaluated, and managed. Of these articles, most were quantitative, only one was qualitative, and one combined quantitative and qualitative. It is notable that most of the quantitative studies were cross-sectional by design. There is also one review article. We organized the articles in this Research Topic following the themes of prevention (three studies), assessment (three studies), evaluation (five studies), and management (one study) to give readers a cohesive structure and easier navigation (see Figure 1).

Focusing on the theme of *prevention*, Abd Hadi et al. conducted a qualitative formative analysis that extended the conceptualization of social and emotional competencies in a local context. This expansion was achieved by integrating Asian cultural values such as preservation of interpersonal relationships. The study suggests a potential treatment strategy for emotional regulation that is culturally sensitive to Malaysian adolescents. In a single-arm prospective study, Roslan et al. reported the development, as well as examination of an online advanced suicide prevention gatekeeper training program aimed at raising awareness and self-efficacy in dealing with suicidal individuals in healthcare educators. The potential exists

to expand this program to a wider population of healthcare educators in other Southeast Asian settings. Such expansion would involve providing these healthcare providers with hands-on skills to act as gatekeepers. A mixed-method study by Ke et al. reported that exposure to coastal environments and stress reduction were associated with psychological wellbeing in coastal communities from Malaysia and Indonesia.

Focusing on the theme of *assessment*, Adnan and Matore developed an index measuring adversity quotient—the capability to effectively handle challenges and convert obstacles into favorable circumstances—for use in a sample of pre-service teachers during practicum training. Investigating the psychometric properties of the Malay Version of the Beck Anxiety Inventory (Malay-BAI), Ismail et al. found that the Malay-BAI is a reliable and valid tool for assessing anxiety in a sample of adolescents in Malaysia. Efforts to validate psychological scales were shown in another study by Amin et al. The authors revealed that the Indonesian Version of the Scale for the Assessment of Negative Symptoms, a measure of negative symptoms in patients with schizophrenia, has robust psychometric evidence that supports its use in local mental health setting.

Focusing on the theme of *evaluation*, Ibrahim et al. found that those who were younger, had lower physical activity levels, and engaged in problematic internet usage demonstrated more severe symptoms of depression in a sample of Malaysian adolescents. In two studies involving university students, Sahimi et al. reported that excessive smartphone use was linked to high social anxiety and low self-esteem and quality of life, whereas Ooi et al. reported that those who experienced lower depression and anxiety reported higher life satisfaction when perceived burdensomeness (i.e., as a moderator) was low and that those who experienced lower stress reported higher satisfaction with life when thwarted belongingness (i.e., as a moderator) was high. As far as clinical population is concerned, the findings of Wahad et al. concluded that childhood emotional and physical abuse were negatively correlated to parenting satisfaction in a sample of women abusing amphetamine-type stimulant. The positive correlations between

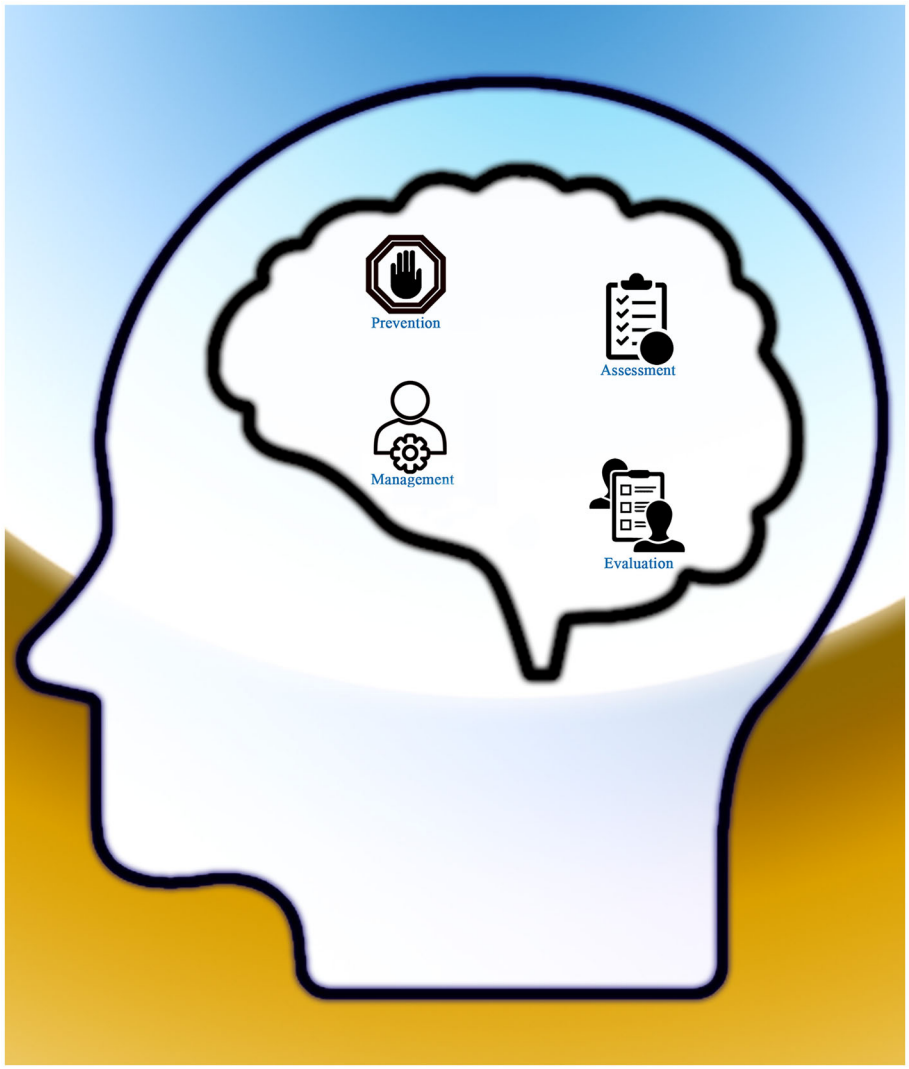

FIGURE 1
An integrative depiction of themes covered in this Research Topic.

job stress and depression, as reported by Nordin et al., were stronger among anti-drug professionals who exhibited higher levels of avoidant coping (i.e., as a moderator) or lower levels of control coping (i.e., as a moderator).

Focusing on the theme of *management*, Kamaruddin et al. in their systematic review and meta-analysis suggested that the dynamic of social-online interactions is central in promoting cyber awareness and media literacy in existing classroom instructions. The authors called for the engagement of all stakeholders, particularly field-level practitioners, for developing effective interventions with emphasis on identification, prioritization, and planning.

Conclusion

In conclusion, while momentum toward greater inclusion of Southeast Asian authors in mental health literature grows, this Research Topic represents just a small step in expanding Southeast Asia-based research representation. Notably, the studies in this article collection mainly stemmed from Malaysia and Indonesia. Moving forward, we strongly advocate for the inclusion of culturally diverse studies conducted in various regions within Southeast Asia. This line of studies will bring valuable insights and perspectives vis-à-vis prevention, assessment, evaluation, and management of mental health issues within the region.

Author contributions

K-AT contributed to the conception of the Research Topic, wrote the first draft of the editorial, and revised the editorial for intellectual content. S-LK reviewed and edited the editorial. All authors approved the submitted version.

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Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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Depression and Its Association With Self-Esteem and Lifestyle Factors Among School-Going Adolescents in Kuala Lumpur, Malaysia

Mohamad Faez Ibrahim, Wan Salwina Wan Ismail, Nik Ruzyanei Nik Jaafar, Ummi Kalthum Mohd Mokhtaruddin, Hooi Yee Ong, Nur Hidayah Abu Bakar and Hajar Mohd Salleh Sahimi*

Department of Psychiatry, Faculty of Medicine, Universiti Kebangsaan Malaysia, Kuala Lumpur, Malaysia

Introduction: Depression is a prevalent mental health condition worldwide and in Malaysia. Depression among adolescents has been steadily increasing. Self-esteem has been known to be associated with depression. It has been postulated that a poor lifestyle among adolescents is associated with depression. This paper aims to study the correlation of self-esteem, lifestyle (eating behavior, physical activity, and internet usage) with depression among Malaysian youth.

Methodology: This is a cross-sectional study among secondary school children from 5 random schools in an urban city of Kuala Lumpur, Malaysia. Those with intellectual disability and/or difficulty to comprehend Malay language, and without parental consent and assent, were excluded. Students from randomly selected classes aged 13-year-old to 17-year-old were invited to fill in these questionnaires: Socio-demographic Questionnaire, Rosenberg Self-esteem Questionnaire, Physical Activity Questionnaire (PAQ-A), Eating Disorder Examination Questionnaires (EDE-Q), Internet Addiction Test Scale (IAT), and Children's Depression Inventory (CDI).

Result: 461 students participated in the study. 21.5% of the participating students were found to have depression ($n = 99$). Younger age and Chinese race showed significant association with adolescent depression with a p-value of 0.032 and 0.017 respectively. Other significant correlations with depression were self-esteem ($p = 0.013$), disordered eating ($p = 0.000$), lower physical activity ($p = 0.014$) and problematic internet usage ($p = 0.000$).

Discussion: The prevalence of depression among adolescents in this study (21.5%) is in line with previous prevalence studies in Malaysia. Self-esteem is postulated to be a moderating factor for depression hence explaining the significant association. A sedentary lifestyle may increase the risk of developing depression, The causal relationship between problematic internet usage and depression is complex and difficult to establish. This is similar to the relationship between problematic eating behavior and depression as well.

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Kit-Aun Tan,
Universiti Putra Malaysia, Malaysia

Reviewed by:
Mohd Najmi Daud,
Putra Malaysia University, Malaysia
Su Wan Gan,
Tunku Abdul Rahman University, Malaysia

***Correspondence:**
Nik Ruzyanei Nik Jaafar
njruzyanei@gmail.com

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Conclusion: There is still a need to explore the causal relationship between lifestyle factors and depression among youth. Despite that, the results from this paper have accentuated the gravity of the importance of a healthy lifestyle among adolescents. An appropriate preventive measure is governmental strategies and policies aiming at improving a healthier lifestyle in this age group.

Keywords: adolescent, south-east asia, eating disorder, internet addiction, physical activity

INTRODUCTION

Depression is characterized by persistent low mood, anhedonia, insomnia, fatigue, loss of appetite, feeling worthless, impaired concentration, and recurrent suicidal thoughts that are persistent and severe enough to cause impairment in function (1). Worldwide, depression is a common mental health problem and a leading cause of disability among adolescents. Approximately, 1.1% of adolescents aged 10–14 years, and 2.8% of adolescents aged 15–18 years are estimated to have depression (2). In America, 4.1 million adolescents experienced at least 1 episode of major depression (3). Adolescent depression is also prevalent in Malaysia, ranging from 18.3 to 32.7% (4–7) A large local survey involving 21,764 adolescents, found 16.6% of participants had mild depression, 12.8% had moderate depression whereas 3.8% had severe depression (8).

Several studies have examined adolescent depression in Malaysia, exploring different variables including sociodemographic factors, risky behavior and substance use, childhood adversities such as being bullied, and family-related factors (8–11). However, other important variables such as self-esteem and lifestyle factors are less frequently explored.

Self-esteem is defined as a stable sense of personal worth (12). It has been suggested that self-esteem was significantly lower among Asian adolescents (13) including adolescents in Malaysia (14). Notably, self-esteem has been significantly associated with adolescent depression (15–17) and reported as the strongest predictor of adolescent depression (16). It plays important role in mediating the relationship between loneliness and depression (18) and protects against suicidal ideation among Malaysian adolescents (19).

Unhealthy lifestyle factors such as physical inactivity, disordered eating, and excessive or pathological use of internet users have been shown to have significant relationships with adolescent depression.

The World Health Organization (WHO) Guideline 2020 defines physical inactivity as failure to complete at least 150 minutes of moderate physical activity or 75 min of vigorous physical activity or the combination of both intensities per week (20). According to the Adolescent Health Survey 2017, the prevalence of physically active adolescents in Malaysia was low (19.8%) as the majority did not participate inadequate physical activities. This is worrying since many studies reported an association between low physical activity and depression among adolescents. A longitudinal study found depression scores were lower among adolescents with persistently high levels of light activity. At age 12 and 14 years old, moderate to vigorous physical activity was negatively associated with depressive symptoms (21). Physical activity during early adolescence has also been found to predict lower levels of depressive symptoms in later years (22). Tajik et al. (23) investigated the relationship between physical activity and psychological correlates for example stress, depression, and anxiety, among 1,747 adolescents from the southern part of Malaysia. Their findings showed that level of physical activity was associated with anxiety and stress but not depression (23).

Disordered eating refers to unhealthy eating patterns with consequent negative psychological and physical effects (24). It is highly prevalent among adolescents in Malaysia (25) and the possible significant association with depression justifies special attention. An Iranian study found an association between disordered eating with adolescent depression, suggesting that very low self-esteem may be a shared correlate or risk factor for disordered eating and depression in Iranian adolescents and young adults (26). Two local studies observed a significant association between disordered eating and depression however the studies were conducted among University students instead of adolescents (27, 28). Conversely, a study among secondary school students in Malaysia, found a significant association with the emotional problems however it was not able to specify the type of emotional problems experienced (24).

The concept of internet addiction is an ongoing debate, hence is not currently recognized as a disorder in the World Health Organization (WHO), Diagnostic Statistical Manual of Mental Disorders−5 (DSM5), or International Classification of Disease−11 (ICD11) classifications (1, 29). In this study, internet addiction refers to the pattern of internet use by Young 2016, which was categorized into normal use i.e. "average online users" and pathological use i.e. "frequent problems due to internet usage" and "significant problems due to internet usage" (30).

The high internet penetration rate in Malaysia contributed to the increase in internet use over the past few years (24). According to the Internet Users Survey 2020, internet users among children and adolescents aged 5–17 years in Malaysia have increased from 28.5% in 2018, to 47% in 2020 (31) and 92% of adolescents have social media accounts (32). Alarmingly, awareness of parental control was low (31) despite the easy accessibility and increased use of the internet among adolescents. This new trend of internet use has strongly influenced the lifestyle of adolescents. Adolescent depression has been significantly associated with internet addiction (33, 34). Consistently, various local studies also reported a significant association between adolescent depression and internet addiction (35).

Adolescents comprise approximately 15.6 % of the total Malaysian population (36) Given that adolescence is a critical transitional period to adulthood with increased vulnerability for mental health problems, adolescent depressioneeds specific focus. Depression and its complication such as suicide, and social and academic impairment, among the large proportion of young people in the country, will potentially give a negative impact on the nation at large. Hence, understanding risk factors for adolescent depression is very important, allowing for early detection and treatment and consequently more favorable outcomes.

Self-esteem and lifestyle factors are important correlates of adolescent depression but were not adequately explored in Malaysia. This cross-sectional study aimed to determine the prevalence of depression and its associated factors such as socio-demographic factors, lifestyle factors, and self-esteem among adolescents attending secondary schools in Kuala Lumpur, Malaysia.

METHODOLOGY

Study Design, Setting, and Sample Population

A cross-sectional study was conducted in five randomly selected national secondary schools in the Federal Territory of Kuala Lumpur. Students from the randomly selected classes, aged 13 to 17 were invited to participate. Those with intellectual disability and/or difficulty to comprehend Malay language, and without parental consent and assent, were excluded. The study was conducted in mainstream public schools, indicated for students without learning disabilities, hence students with the stated issues would have been excluded. In isolated situations, teachers would screen the students to exclude those with learning and language issues. A total of 461 participants were required to complete the questionnaires during the given time in school. This study was approved by the Ministry of Education and department of education, Kuala Lumpur, Malaysia.

Research Tools

Socio-Demographic Questionnaire

The demographic questionnaire consists of age, sex, race, religion, parental education, and marital status.

Rosenberg Self-Esteem Questionnaire

Rosenberg Self-esteem questionnaire (37) is a 10-item self-reported questionnaire used to assess global self-worth, including positive and negative feelings about the self. It is scored using a 5-point Likert scale from strongly agree to strongly disagree, with scores ranging between 10- and 50. The scores will be categorized as low (10–29), moderate (30–39), and high self-esteem (40–50). The questionnaire has been translated into Bahasa Malaysia and validated with good psychometric properties (38).

Physical Activity Questionnaire (PAQ-A)

The PAQ-A (39) is a self-administered questionnaire developed to assess general levels of physical activity for high school students aged 14 to 19 years of age. It provides a summary of physical activity scores derived from eight items, each scored on a 5-point scale. The mean of the 8 items is calculated and classified into low physical activity and high physical activity. The PAQ-A questionnaire was translated into Malay language and back-translated independently with permission by the authors.

Eating Disorder Examination Questionnaires (EDE-Q)

It is a 36-item (40) self-reported questionnaire assessing eating habits. It has four subscales i.e. eating concern, shape concern, weight concern, dietary restraint, as well as assessment for binge eating and compensatory behaviors. A higher score in the global and subscale denote more severe symptoms. The cut-off point for a global score of 4 is considered clinically significant. (41). Studies reported good internal consistency (42), test-retest reliability (43), convergent validity (42), and discriminative validity (44). The scoring will be measured quantitatively based on the result. EDE-Q had been translated to the Malay language and validated with good psychometric properties (45).

Internet Addiction Test Scale (IAT)

The pattern of internet usage among respondents was measured using the Internet Addiction Test Scale (IAT) (30), which is a 20-item self-reported scale. Items are scored using a Likert scale of 0–5 and categorized into "average online users" (i.e. score of 20–49), "frequent problems due to internet usage" (i.e. score of 50–79), and "significant problems due to internet usage" (i.e. score of 80–100). The higher the score depicts the more problematic the usage of the internet. IAT had been translated into Bahasa Malaysia and validated with good psychometric properties (46).

Children's Depression Inventory (CDI)

Depression among adolescents was assessed using the Children's Depression Inventory (CDI) (47). It is a 27-item self-reported scale assessing depressive symptoms in children and adolescents aged 7–17 years old. It has two scale scores and five subscale scores. Scale scores are for questions regarding the emotional problem and functional problem while the subscale scores are specified for negative mood/physical symptoms, negative self-esteem, interpersonal problems, anhedonia, and ineffectiveness. For each item, the respondent is presented with 3 choices from the absence of a symptom to a definite symptom that corresponds to three levels of symptomatology, ranging from 0-to 2. The higher the total score, the more severe the level of depression is. The total sum score of 20 was used as a screening cut-off score. (48) CDI has been translated to Bahasa Malaysia and validated with good psychometric properties (49).

Ethical Issues

The study received ethical approval from Universiti Kebangsaan Malaysia (UKM) Research Ethics Committee (FF-2014-049), and approval from the Ministry of Education, Malaysia to approach schools for data collection.

TABLE 1 | Sociodemographic profiles and adolescent depression.

Variables	Characteristics	Non depressed ($n = 362$) *N (%)*	Depressed ($n = 99$) *N (%)*	Tests	*p*-value
Age	13–15	217 (59.9)	71 (71.7)	4.596[a]	**0.032**
	16–17	145 (40.1)	28 (28.3)		
Sex	Male	140 (38.7)	48 (48.5)	2.705[b]	0.100
	Female	222 (61.3)	51 (51.5)		
Ethnic group	Malay	253 (69.9)	55 (55.6)	10.131[a]	**0.017**
	Chinese	68 (18.8)	33 (33.3)		
	Indian	35 (9.7)	10 (10)		
	Others	6 (1.6)	1 (1)		
Religion	Muslim	257 (71.0)	56 (56.6)		
	Buddha	63 (17.4)	35 (35.4)		
	Hindu Cristian	31 (8.6)11 (3.0)	7 (7.1) 0 (0)		
	others	0 (0)	1 (1.0)		
Socio-economic status (SES): FatherMother	Low	242	69	1.151[a]	0.283
	High	99	21		
	Low	262	67	0.002[a]	0.965
	High	85	22		
Parents marital status	Married	328 (92.1)	85 (87.6)	1.923[a]	0.166
	Divorced	28 (7.9)	12 (12.4)		
	Others				

[a]*Pearson Chi-square.*
[b]*Yates continuity correction.*
[c]*Independent t-test. Bold values signify statistical significance.*

TABLE 2 | Association between self-esteem and adolescent depression.

Variables	characteristics	Non depressed ($n = 362$) *N* (%)	Depressed ($n = 99$) *N* (%)	tests	*p*-value
Self-esteem	Low	34 (9.4)	47 (47.5)	2.488[c]	**0.013**
	Moderate	254 (70.6)	50 (50.5)		
	High	72 (20.0)	2 (2.0)		

[a]*Pearson Chi-square.*
[b]*Yates continuity correction.*
[c]*Independent t-test. Bold values signify statistical significance.*

Statistical Analyses

Data analysis was done using the Package of Social Sciences (SPSS) for windows version 20. Descriptive statistics were reported for all variables. Correlation analyses were done using the Pearson chi-square test for categorical variables while the independent *t*-test was used for analysis between one categorical variable (depression) and one continuous variable (self-esteem). Yates's continuity correction was used for the correction of approximate error. Mann Whitney test was done to compare mean ranks between disordered eating/ physical activity and depression.

RESULT

Prevalence of Depression

21.5% of the participating students were found to have CDI total scores of above cut-offs for depression ($n = 99$).

Socio-Demographic Characteristics of the Study Respondents

A total of 461 students participated in the study. Most of the participants were females (59.3%) and younger adolescents (62.5%). 66.8% were Malays ($n = 308$), 21.9% Chinese ($n = 101$), 9.8% Indian ($n = 45$) and 1.5% ($n = 7$) for other race, which is a representative of the Malaysian ethnic distribution. 67.5% of fathers and 71.4% of mothers had lower educational backgrounds, and most of the parents were married 89.5% ($n = 413$).

Association Between Socio-Demographic Profiles and Adolescent Depression

Age and race showed significant association with adolescent depression. The younger adolescents aged 13–15 years ($N = 71$) were significantly more depressed compared to the older adolescents. In terms of ethnicity, 55.5% of the depressed adolescents were Malays, followed by

TABLE 3 | Lifestyle and adolescent depression.

Lifestyles i.e. eating patterns and physical activity					
		Lifestyle Mean rank (*N*)		**Mann-Whitney test value**	***P*-value**
		Disordered eating	No disordered eating		
Depression		276.16 ($N = 97$)	213.61 ($N = 356$)	−4.172	**0.000**
		Low physical activity	High physical activity		
		175.89 ($N = 91$)	210.24 ($N = 313$)	−2.470	**0.014**
Lifestyle i.e. internet use					
Variables	Characteristics	Non depressed ($n = 362$) *N* (%)	Depressed ($n = 99$) *N* (%)	Tests	*p* value
Internet usage	Normal	102 (28.2)	14 (14.1)	30.165[a]	**0.000**
	Mild	162 (44.8)	31 (31.3)		
	Moderate	94 (26.0)	47 (47.5)		
	Severe	4 (1.1)	6 (6.1)		

[a] *Pearson Chi-square.*
[b] *Yates continuity correction.*
[c] *Independent t-test. Bold values signify statistical significance.*

Chinese (33.3%) and Indians (10%). Among the Chinese students, 33% were depressed compared to lower rates of 22 and 17% among the Malays and Indians respectively. (**Table 1**).

Association Between Self-Esteem and Adolescent Depression

Self-esteem and internet use were significantly associated with depression among adolescents. Low self-esteem was associated with 47.5% of depression whereas high self-esteem was associated with only 2% of depression among adolescents (**Table 2**).

Association Between Lifestyles and Adolescent Depression

Physical activity and disordered eating were significantly associated with depression. Physically active adolescents showed a significantly lower level of depression compared to less physically active adolescents. Adolescents with disordered eating were significantly associated with depression compared to those without. Depression was significantly associated with frequent use of the internet. Among the depressed adolescents, nearly half of them were moderate users of the internet (**Table 3**).

DISCUSSION

The current study found that 21.5% of the participants scored above the cut-off point for depression in the CDI questionnaire. This was akin to the prevalence reported by another local study using CDI (26.2%) in Kuching (the capital city of Sarawak, a state in Malaysia) (7). Other local studies (6, 8, 23, 50) also reported similar prevalence but the direct comparison was difficult given the different questionnaires used and the different locations where the studies were conducted.

Age and ethnicity were significant sociodemographic factors in depression among adolescents. The younger adolescents aged 13–15 years were significantly more depressed compared to older adolescents. This could be due to difficulties in adjusting to the new school environment and the lack of coping skills among the younger students. The combination of transitioning between primary school to secondary school and the onset of puberty may also be the cause of higher reports of depression in the younger age group in this sample (51). A 1-year longitudinal study in Australia reported that 32% of students transitioning from primary school to secondary school reported it being "difficult" (51). In this study, approximately half of the depressed adolescents were Malays, followed by Chinese and Indians. However, among the Chinese students, 33% were showing significantly more depressive symptoms compared to lower prevalence among the Malay and Indian adolescents. Few local studies had found significantly higher depression among Chinese adolescents (11, 52, 53), whereas another reported higher depression among Indian adolescents (8). A possible explanation, as described by Auerbach et al. is the presence of higher extrinsic aspiration (versus internal aspiration) among Chinese was linked to higher stress and depressive symptoms (54). It was also established that minority ethnic group has a higher rate of depression as compared to majority ethnic group (55, 56). In this study, the low number of Indian study respondents may be one of the reasons why this group did not show a similar relationship. Differences in races and ethnicities in Malaysia may be due to different cultural and religious practices, environmental and personal factors as well, for example, higher self-expectations and competitiveness (57). These ethnic differences need to be further explored and understood.

Consistent with previous findings (6, 15, 16), self-esteem was significantly associated with adolescent depression. Our finding showed that nearly half of the adolescents who reported high depressive symptoms reported low and moderate self-esteem, whereas only 2% had high self-esteem. Masselink et al. (58)suggested that self-esteem is a vulnerability factor in the development of depression in late adolescence, mediated independently by avoidance motivation and social problems. (58) Several theories attempt to explain the relationship between depression and self-esteem. The vulnerability model theory which proposes that poor self-esteem leads to depression has been reported to be robust and strongly supported (59). Another explanation of the relationship between self-esteem and depression is the "scar model" (depression eroding self-esteem) and also the diathesis-stress model (59).

Lifestyle factors such as internet use, physical activity, and disordered eating also showed significant association with adolescent depression. In our study, among the adolescents who reported high depressive symptoms, nearly half of them reported moderate use of the internet compared to only 26% in the non-depressed group. This was supported by previous studies reporting a significant association between internet use and depression among adolescents (60–62), but the causal relationship was unclear. The relationship between adolescent depression and problematic internet use is complex. Adolescents who were depressed may initially use the internet as a means of coping with the depressive symptoms, and the progression of untreated depression may cause anhedonia and poor energy and concentration which may reduce internet use eventually (63). On the contrary, an increase in internet use may cause social isolation, leading to depression (63).

In keeping with previous findings (64), this current study found a significant association between physical activity and depression (**Table 3**). Respondents with low physical activity reported more depressive symptoms. A recent cohort study of a large sample of adolescents found that a sedentary lifestyle at a younger age may increase the risk of developing depressive symptoms at 18 years of age (21). The mechanism is very complex. High physical fitness has been theorized to optimize the hormonal stress-responsive system, producing an anti-inflammatory effect and enhancing growth factor expression and neural plasticity (65), hence improving depressive symptoms, and vice versa.

Our findings showed adolescents with disordered eating were significantly associated with high CDI scores (depression) compared to those without. This is in line with previous studies where severe depression is associated with more severe eating behavior (66). Although some studies suggested self-esteem and depression as mediators for disordered eating (67), the link between depression and eating disorders is not yet clearly established (68). Adolescents who do have disordered eating may perceive body image disturbances which may lead to depression, on the other hand, adolescents who are depressed may also have disturbances in an eating pattern which can lead to an eating disorder.

This study contributes further to our understanding of adolescent depression in Kuala Lumpur, Malaysia, particularly the significant association of lifestyle factors with adolescent depression, which was not commonly explored in the local context. Nevertheless, findings need to be interpreted within the limitations of the study. The cross-sectional nature of the study does not allow causal interpretation of findings. Information on depression and its associated factors was based on self-reported questionnaires solely. The study was conducted in the urban area of Kuala Lumpur, hence may not be representative of Malaysian adolescents.

CONCLUSION

In summary, this study reports that younger adolescents, adolescents with lower self-esteem, those having disordered eating, or lower physical activity and problematic internet usage are significantly associated with depression. Although a causal explanation was not established, it is noteworthy to highlight these relevant factors as a target for preventive measures by the Malaysian government for the adolescent age groups. Government strategies and policies promoting a safe healthy lifestyle among youth might be an appropriate approach.

DATA AVAILABILITY STATEMENT

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

ETHICS STATEMENT

The studies involving human participants were reviewed and approved by Research and Ethics Committee UKM. The patients/participants provided their written informed consent to participate in this study.

AUTHOR CONTRIBUTIONS

MI, WW, and NN contributed to conception and design of the study. MI, UM, HO, and NA collected the data, organized the database, and performed the statistical analysis. MI, UM, HO, NA, WW, NN, and HM wrote sections of the manuscript. All authors contributed to manuscript revision, read, and approved the submitted version.

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EDITED BY
Kit-Aun Tan,
Universiti Putra Malaysia, Malaysia

REVIEWED BY
Navin Kumar Kumar Devaraj,
Universiti Putra Malaysia, Malaysia
Soon Li Lee,
Monash University Malaysia, Malaysia
Ramayah T.,
Universiti Sains Malaysia (USM), Malaysia

*CORRESPONDENCE
Pei Boon Ooi
peiboono@sunway.edu.my

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Depression, anxiety, stress, and satisfaction with life: Moderating role of interpersonal needs among university students

Pei Boon Ooi[1,2]*, Kuan Siew Khor[3], Choe Chai Tan[4] and Derek Lai Teik Ong[5]

[1]Department of Medical Sciences, School of Medical and Life Sciences, Sunway University, Subang Jaya, Malaysia, [2]Future Cities Research Institute, Sunway University, Subang Jaya, Malaysia, [3]Department of Management, Sunway University Business School, Sunway University, Subang Jaya, Malaysia, [4]MOHE General Studies, Sunway College, Subang Jaya, Malaysia, [5]Department of Marketing Strategy and Innovation, Sunway University Business School, Sunway University, Subang Jaya, Malaysia

Depression, anxiety, and stress are ranked among the top mental health concerns faced by university students in recent times perpetuated by the proliferation of digitalization. Thus, this study was performed to assess the relationship between depression, anxiety, stress, and satisfaction with life, with interpersonal needs (perceived burdensomeness and thwarted belongingness) as moderators. A cross-sectional study using a convenient sampling method was conducted among 430 Malaysian private university students (Mean aged= 20.73 years; SD = 1.26 years). A self-administered questionnaire comprising the Depression, Anxiety and Stress Scale (DASS-21), Satisfaction with Life Scale, and Interpersonal Needs Questionnaire were used. Students who experienced lower depression and anxiety reported higher satisfaction with life under the influence of low perceived burdensomeness. Perceived burdensomeness, when coupled with depression ($\beta = 0.76$, $p < 0.01$) and anxiety ($\beta = 0.79$, $p < 0.01$), contributed 15.8% of variance in satisfaction with life. Students who experienced stress reported higher satisfaction with life under the influence of high thwarted belongingness ($\beta = 0.73$, $p < 0.01$), contributing 17.3% of the variance in satisfaction with life. For university students who experienced depression and anxiety symptoms, mental health practitioners may need to be cognizant of how to support students' education and management of their perceived burdensomeness perceptions.

KEYWORDS

anxiety, depression, interpersonal needs, satisfaction with life, thwarted belongingness, stress, perceived burdensomeness

Introduction

The World Health Organization stipulates that mental health conditions among young adults are becoming a growing concern, with suicide and depression, respectively, the second and third leading cause of death among individuals aged between 15 and 29 (1). This expounds on the fact that most mental health disorders occur during young adulthood (2). Depression, anxiety, and stress are common stressors for the wellbeing of students (3), as well as their life satisfaction (4). Various studies have reported that 40 million adults in the United States have an anxiety disorder, of which 75% of them experience their first episode at age 22 which is typical during their senior college period (5). In Malaysia, the number of university students with mental health conditions has risen remarkably over the past few years with the number of people living with depression doubled and the occurrence of suicidal symptoms among students tripled over the same period (6).

The prevalence rate of mental health concerns reported by Malaysian adults has also doubled over that same period from 10.7% (1996) to 29.2% (2016) (6). While depression, anxiety, and stress were identified as being the top three mental health conditions among Malaysian students (7), this same demographic is also susceptible to developing suicidal tendencies (8) leading to poor academic performance (9). Taken together, mental health issues can significantly impact one's wellbeing and overall life performance. Thus, with almost 1.3 million Malaysian youths in college or university (10), studies on mental health conditions and the wellbeing of students are significant and crucial to promoting positive mental health among this demographic (11).

Depression, anxiety, stress, and satisfaction with life

University students who experience higher depression, anxiety, and stress in life reported a lower level of life satisfaction (4, 12). Bukhari's study revealed that among 200 university students studied in Pakistan when surveyed, 6% suffered from depression, 5% from anxiety, and 4% from stress, and with these risk factors, the participants reported a lower level of satisfaction with life (SWL) and were more vulnerable to life challenges, such as the transition to tertiary education. On the contrary, a longitudinal 6-month study by Denovan and Macaskill (12) among 192 first-year UK participants who transited into their tertiary education showed evidence that stress at week 3 of the semester and after 6 months of the semester has a significant adverse effect on the participants' life satisfaction. Interestingly, the participants' stress levels remained relatively stable over the first year and the participants reported a higher level of unhappiness and showed a decrease in academic performance across the year. In this study, the higher education institution's (HEIs) ability and university environment to provide support and instill a sense of belongingness was quoted as potential reasons for such outcomes.

Kumar and colleagues (13) study also examined the three aspects of DASS. The results of 398 participants from three universities revealed a negative correlation between depression, anxiety, and stress with SWL. This study further revealed that 9, 34, and 13% of participants reported extremely severe levels of depression, anxiety, and stress, respectively. The psychological distress reported appeared high, especially in the anxiety domain. Students are typically young adults, and they are susceptible to positive and negative affective conditions that determine their academic performance and state of happiness or wellbeing. Hence, there is an immediate need to examine the risk factors, specifically depression, anxiety, and stress, for SWL among young adults.

Existing research has found that university students' satisfaction with life negatively correlates with depression (14). According to Seo and colleagues' study (14), 13.4% of 2,338 participants from six Korean universities had depression, according to this nationwide cross-sectional study. Life satisfaction and happiness were linked to a decreased risk of depression. In addition, it was discovered that the female with a subjective obese body image and lack of finances were strongly correlated with depressive symptoms. The results particularly imply that enhancing life satisfaction would be critical to preventing depression (14). However, this study focused on the participants' depressive symptoms, not the anxiety and stress symptoms.

A study by Guney (15) too examined the relationship between mental health status and transition of adulthood into tertiary education among 364 college Turkey students. The finding revealed that life satisfaction was negatively correlated with depression and anxiety levels. In addition, when comparing four groups (i.e., the normal, anxious, depressed, and anxious-depressed groups), the mean life satisfaction score among the normal group of participants was higher than the other three groups. Those who reported experiencing anxiety, depression symptoms, or a sense of anxious-depressed not only suffered from a lower level of life satisfaction but also a higher sense of hopelessness.

A past study also revealed that more significant anxiety is associated with greater depressive symptoms (16), where individuals exhibited greater self-criticism, hypervigilance of cues triggered by disapproval from people in their surroundings, and feelings of being unworthy of being loved. On the contrary, university students score higher in life satisfaction when their anxiety stressors are managed and reported to be low (17) due to constant monitoring, assessment, and intervention of their emotional wellbeing. Without intervention, the depression and anxiety symptoms experienced could further affect their university experience, performance, and social life.

This is even more apparent with COVID-19. In the COVID-19 pandemic context, tertiary students are affected socially and academically. With this disruption, 40% of the 874 Bangladeshi students from various Bangladesh universities reported suffering from moderate-to-severe anxiety, and 72% reported depressive symptoms and anxiety living with the COVID-19 virus. These resulted in moderate to poor mental health status (18). Due to new norm disruptions brought about by COVID-19, it has undoubtedly aggravated the students' mental health status and affected their satisfaction with life.

Despite the research evidence concerning the significant effects of depression, stress, and anxiety on youths' life satisfaction, few studies focus on the relationship between depression, stress, and anxiety and life satisfaction with interpersonal needs as the moderator. However, most studies focused on the direct connection among the variables. Still, they did not consider the complexity of various factors in determining an individual's satisfaction with life. Furthermore, there are limited studies on both subdomains of interpersonal needs—that is, perceived burdensomeness and thwarted belongingness. Thus, we intend to examine the relationship and how perceived burdensomeness and thwarted belongingness, respectively, affect this relationship's strength and direction.

The theory and role of interpersonal needs as the moderating variable

According to Maslow's Hierarchy of Needs Theory (19), individuals strive to fulfill their basic needs, such as physiological and safety needs, before striving to achieve their belongingness, esteem, and self-actualization needs. Starting from the most basic, the needs are physiological (shelter, food, and air), safety (health and university's learning environment), love and belonging needs (sense of community and friendship), and esteem (respect from peers and leadership appointment in class). To a higher level in the hierarchy is self-actualization—that is, an individual's desire to realize one's highest potential and give back to the community—for example, the ability to guide juniors or represent in high-level university events. Having most-if, not all levels of needs fulfilled or achieved leads to greater SWL (20). The first four needs are named "deficiency needs"—it is a form of deprivation needs and often time motivate individuals further when these needs are unmet (21), while the "self-actualization level" is called "growth need"—the internal motivations that drive personal growth (22). As university students have greater needs for belonging and esteem than younger students (23, 24), educators have focused on building the deficiency needs of belonging and esteem instead of the basics such as shelter or food, which are not the core responsibility of HEIs. Furthermore, failure to achieve belonging and esteem needs presented them with various life challenges and resulted in mental health issues, such as suicide ideations and suicide attempts (25, 26).

In the current study, interpersonal needs refer to individuals' desires, comprising of perceived burdensomeness and thwarted belongingness. A lacuna in the research revealed that the limitation of previous studies focuses only on psychiatric patients (27). According to past studies, perceived burdensomeness and thwarted belongingness are postulated as dynamic yet distinct measures of interpersonal needs (28, 29). These interpersonal variables fluctuate over time and are greatly influenced by interpersonal and intrapersonal factors (environment, self-beliefs, and their psychological state).

Thwarted belongingness is categorized as social or belongingness needs—an emotion when an individual feels they are not part of any social circle, such as family, friends, or another valued group (28, 30). The individuals felt disconnected from others and the absence of reciprocal care. This is the third out of the five levels illustrated in Maslow's Hierarchy of Needs (31). University students are more likely to fulfill their belongingness needs through their interpersonal relationships as they are in the developmental stages of "identity vs. role confusion" and "intimacy vs. isolation," as suggested by Erikson (32). Their construction of self-identity and effort to achieve the feeling of belongingness, which comes from interacting with and being acknowledged by the individuals around them, contributes to this development. Failing to form close social interactions can trigger the feeling of thwarted belongingness and lead to suicidal ideation (33). To perform well academically, in relation to esteem needs, students need to first fulfill their social or belongingness needs (34). A study by Øverup and colleagues (35) presented the importance of interpersonal needs, specifically how thwarted belongingness mediates the relationship between anxiety and depressive symptoms. Their study revealed that individuals with a lower sense of belonging reported a higher level of burdensomeness, a greater sense of anxiety, and experienced greater depressive symptoms.

Perceived burdensomeness is an individual's mental state in which he or she perceives himself or herself as a burden to others (30). The perception that others would "be better off if I didn't exist" is a result of an unmet social ability connection. This mental state explains the role of individuals' innate need for connection and relatedness which allows them to grow and become competent life managers of the self (36). This unmet social ability could lead to lower SWL among young adults who may or may not have experienced symptoms of depression, anxiety, and stress (28). Thus, this present study posits that students are hindered from achieving a higher level of Maslow's Hierarchy of Needs if their belongingness needs are not fulfilled—testing the notion that thwarted belongingness functions as a moderator in this study.

Perceived burdensomeness investigated the individual self-worth in society (30), whereas thwarted belongingness is another self-belief of the psychological state where individuals desire

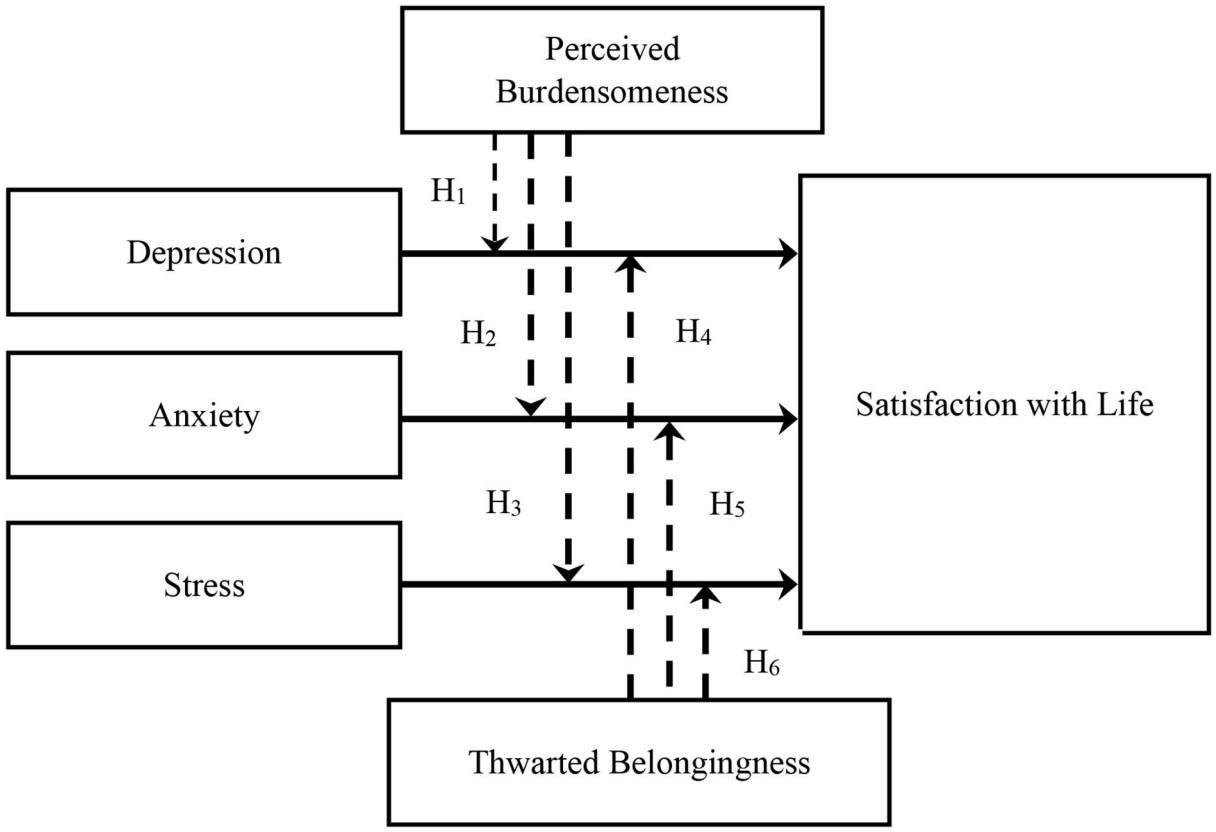

FIGURE 1
Research framework.

to connect (30). These self-perceptions are the fundamental need for connectedness and belongingness—the third and fourth levels of Maslow's Hierarchy of Needs. Risk factors such as psychological distress (e.g., depression, anxiety, and prolonged stress) experienced by an individual may exert further influence on the individual's psychological wellbeing. Individuals who experienced depression, anxiety, and stress reported experiencing a lower sense of connectedness with society and a higher level of thwarted belongingness (37, 38). Under the moderation effect, thwarted belongingness and perceived burdensomeness changed the relationship's outcomes. Individuals with psychological distress, moderated with a more elevated level of thwarted belongingness, perceived burdensomeness, or a combination of both, would be prone to higher suicidal thoughts and attempts (30, 39).

Depression, anxiety, and stress, paired with perceived burdensomeness and thwarted belongingness, may further affect individuals' wellbeing (40). Improving a sense of perceived burdensomeness and thwarted belongingness may improve SWL and result in lower suicidal risks (41–43). By building on the above understanding, we investigate the degrees to which thwarted belongingness and perceived burdensomeness alter the relationship between depression, anxiety, and stress and SWL. However, there are scarce studies on the moderating effect of perceived burdensomeness and thwarted belongingness on depression, anxiety, stress, and life satisfaction among Malaysian university students. Thus, this study is set to examine whether perceived burdensomeness and thwarted belongingness will moderate the relationship between depression, anxiety, stress, and SWL, before any suicidal risks, in Malaysian university students (Figure 1).

We hypothesized the following:

H_1: Perceived burdensomeness moderates the relationship between depression and SWL.
H_2: Perceived burdensomeness moderates the relationship between anxiety and SWL.
H_3: Perceived burdensomeness moderates the relationship between stress and SWL.
H_4: Thwarted belongingness moderates the relationship between depression and SWL.
H_5: Thwarted belongingness moderates the relationship between anxiety and SWL.

TABLE 1 Demographic characteristics of the respondents ($n = 430$).

Demographic variables	Frequency	%
Age		
18–21 years	333	77.5
22–25 years	97	22.5
Gender		
Male	176	40.9
Female	254	59.1
Nationality		
Local student	387	90.0
Foreign student	42	10.0

H_6: Thwarted belongingness moderates the relationship between stress and SWL.

Methodology

Participants

Participants ($n = 430$) were recruited from private universities in Malaysia using a convenient sampling method *via* paper self-administered questionnaires. The questionnaires in English were distributed to participants upon receiving approval from the institutional review board (IRB 2018/044). A student enumerator was hired to collect the data randomly among the private universities, and students who are aged 18 years old and above were approached to fill up the questionnaire with no compensation given. A majority of the sample (77.5%) are between the ages of 18 and 21 years old, and the breakdown of the detailed demographic characteristics is shown in Table 1.

Data analysis

The IBM Statistical Package for the Social Sciences (SPSS) software, Version 25 was used to do the numerical analysis, bivariate correlation analysis, and regression analysis to examine the proposed hypothesis. An analysis of standard residuals was carried out on the data to identify any outliers, which resulted in four participants being removed. The post-hoc test is used to justify the moderating relationships identified for the research study.

Measures

DASS-21 Questionnaire (DASS). DASS consists of three subscales, namely depression, anxiety, and stress. Each item in the questionnaire is rated on a four-point Likert scale, ranging from 0 (*Did not apply to me at all*) to 3 (*Applied to me very much, or most of the time*). DASS is widely used and has been validated to assess the severity of depression, anxiety, and stress among different samples (44). Depression is defined as a state of mind where the individual loses self-esteem and incentives as if believing that he or she is incapable of achieving life-defining goals (45). Anxiety is characterized as physiological hyperarousal, where the individual experiences nervousness, fearfulness, and autonomic arousal (45, 46). Stress is characterized as a negative affect or emotional state of mind, where the individual experiences persistent arousal and tension and tolerates a low threshold for frustration and becoming upset (45). DASS assesses stress as difficulty in relaxing, nervous arousal, easily upset, irritable or over-active, and impatient. One past study indicated that severe levels of depression, anxiety, and stress are highly associated with low life satisfaction among university students (4). We selected DASS-21 version as it is confirmed to exhibit good internal consistency and stable factor analysis structure to provide a desirable convergence to the study (47–50).

Interpersonal Needs Questionnaire (INQ). INQ is used to measure interpersonal needs in participants: Nine items measure thwarted belongingness, and six items measure perceived burdensomeness (28). Unlike DASS-21, items in INQ are rated on a five-point Likert scale, ranging from 1 (*Not at all true for me*) to 5 (*Very true for me*) (51). Van Orden et al. (28) suggest that thwarted belongingness and perceived burdensomeness are closely related yet highly distinctive aspects within areas of psychology (28). They also explained that INQ has been subject to multiple group analyses among younger vs. older adults and clinical vs. non-clinical samples and was found applicable to diverse populations. Previous studies mentioned that the scores derived from this scale provide good validity and psychometric properties (28). Hence, INQ is reliable enough to assess thwarted belongingness and perceived burdensomeness.

Satisfaction with Life Scale (SWLS) was developed by Diener et al. (52). It is a brief five-item instrument designed to measure the concept of life satisfaction, with each item rated on a seven-point Likert scale, ranging from 1 (*Strongly disagree*) to 7 (*Strongly agree*). In a study conducted by Swami and Chamorro-Premuzic (53) among the Malaysian population, SWLS demonstrated acceptable internal consistency reliability (Cronbach's $\alpha = 0.83$).

Data analysis and results

Assessment of measurement items

Common method bias was examined using Harman's one-factor test to detect the existence of a single dimension that accounts for more than 50% of the variance among the measurement items (54). Table 2 presents the descriptive

TABLE 2 Descriptive statistics of research participants.

Score	Range	Mean (SD)	Skewness	Kurtosis
Depression	0–3	1.89 (0.65)	0.656	0.051
Anxiety	0–3	1.83 (0.68)	0.789	0.004
Stress	0–3	2.07 (0.76)	0.343	−0.807
Perceived burdensomeness	1–5	1.74 (0.94)	1.259	0.635
Thwarted belongingness	1–5	2.86 (0.80)	−0.598	0.105
Satisfaction with life	1–7	4.06 (1.46)	−0.135	−0.722

statistics of variables and the measurement items for DASS, INQ, and SWLS using four-point, five-point, and seven-point Likert-type response scales, respectively, to treat the effects of common method bias.

The measurement analysis was included as common practice for social science studies. Reliability tests the consistency of instrument measures on a concept; thus, exploratory factor analysis was applied to assess the measurement items as suggested by Sekaran and colleagues (55). We assessed the measurement items to ensure that the items are reliable to the context of the study. Next, exploratory factor analysis was applied to assess the measurement items. Principal component analysis using the Varimax rotation method ensured the load of the items on the corresponding factors. The results of the factor analysis (Table 3) satisfy the Kaiser–Meyer–Olkin measure of sample adequacy (KMO-MSA) at a value above 0.6 (56), which is 0.942, and Bartlett's test of sphericity was significant at 0.000 level. Table 3 presents the final results of factor analysis, where Cronbach's alpha coefficient for all the variables was within the range of 0.847 to 0.952, which is well above the value of 0.70 recommended by Nunally (57). No items were deleted as the variables showed internal consistency. We checked whether the data met the assumption of collinearity and it indicated that multicollinearity was not a concern—the tolerance was below 1.0, and with VIF values way below the threshold of 10 (Depression, Tolerance =.45, VIF = 2.24; Anxiety, Tolerance =.45, VIF = 2.20; Stress, Tolerance =.47, VIF = 2.14; Perceived burdensomeness, Tolerance =.54, VIF = 1.85; Thwarted belongingness, Tolerance =.97, VIF = 1.03).

Hypothesis testing

Before the hierarchical regression analysis, Pearson's product-moment correlation was applied to examine the association between the variables. The strength of correlation between the variables, namely depression, anxiety, and stress, is strong and statistically significant at $r \geq 0.60$ (Table 4). Moreover, the predictor variables appear to have stronger correlations with perceived burdensomeness than thwarted belongingness, however, reported weak but statistically significant negative correlations with SWL. We performed mean centering on the predictor variables and computed a fresh interaction term. This treatment did not change the significance of the interaction terms.

The moderating effects of perceived burdensomeness and thwarted belongingness were tested using a four-step hierarchical regression analysis as recommended by Sharma et al. (58, 59). Step 1 tested the effect of gender as the control variable, and it accounts for 2.3% of variance in SWL ($\beta = -0.15$, $p < 0.01$). Step 2 then tested the effects of depression, anxiety, and stress. The results showed that depression accounted for 9.9% of the variance, and the negative coefficient value indicated that depression negatively predicts SWL. Anxiety and stress were not found to be significant predictors.

Next, step 3 examined the inclusion of moderating variables (perceived burdensomeness and thwarted belongingness). Table 4 presents the regression analyses for perceived burdensomeness (left column) and thwarted belongingness (right column). The *R*-value showed no significant change with the inclusion of perceived burdensomeness to the structural path. However, with the inclusion of thwarted belongingness to the structural path, thwarted belongingness contributed R square change of 4.7% of the variance in SWL ($\beta = 0.23$, $p < 0.01$).

This study refers to Sharma et al. (58) in analyzing the moderating effects, and we proceed with Step 4 which suggests the inclusion of DAS, perceived burdensomeness, and thwarted belongingness as predictors of SWL (58). The significant interaction between depression and perceived burdensomeness ($\beta = 0.42$, $p < 0.01$) and the significant interaction between anxiety and perceived burdensomeness ($\beta = 0.33$, $p < 0.01$) contributed R change of 5.4% of variance in Step 4, both contributed 15.8% of variance in SWL. Perceived burdensomeness appears to fully moderate the relationship between depression and anxiety with SWL. Hypotheses 1 and 2 are supported, whereas hypothesis 3 is not supported.

With thwarted belongingness as the moderating variable, only stress ($\beta = 0.56$, $p < 0.01$) appeared to be a significant predictor, with an R square change of 4.7%. Hypotheses 4 and 5 are not supported, whereas hypothesis 6 is supported. Thwarted belongingness is a quasi-moderator that interacts with stress to contribute a total of 17.3% of the variance in SWL. Following these results, the post-hoc graphs are developed only for interactions that are statistically significant in the fourth step of the hierarchical regression analysis (Table 5). This step helps visualize the relationship between depression, anxiety, and stress with SWL under the moderating influence of perceived burdensomeness and thwarted belongingness.

This study applied the Johnson–Neyman (JN) technique using CAHOST Version 1.0, which is a Microsoft Excel 2013 macro-enabled workbook, to understand the effect of the predictor variable on the dependent variable, under the influence of moderating variable (60). We refer to Carden et al. (60) for the step-by-step guide to navigating through the worksheets and

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TABLE 3 Results of factor analysis.

Construct	Item	Convergent validity			Cronbach's Alpha
		Loading	Eigenvalue	Variance	
Depression	D1	0.605	1.485	3.62	0.890
	D2	0.667			
	D3	0.711			
	D4	0.680			
	D5	0.722			
	D6	0.549			
	D7	0.571			
Anxiety	A1	0.559	2.425	5.91	0.895
	A2	0.698			
	A3	0.727			
	A4	0.627			
	A5	0.664			
	A6	0.743			
	A7	0.620			
Stress	S1	0.766	5.578	13.60	0.924
	S2	0.700			
	S3	0.760			
	S4	0.764			
	S5	0.727			
	S6	0.760			
	S7	0.650			
Perceived burdensomeness	PB1	0.817	14.059	34.29	0.952
	PB2	0.836			
	PB3	0.793			
	PB4	0.811			
	PB5	0.817			
	PB6	0.787			
Thwarted belongingness	TB1	0.848	2.881	7.03	0.847
	TB2	0.831			
	TB3	0.194			
	TB4	0.877			
	TB5	0.144			
	TB6	0.226			
	TB7	0.819			
	TB8	0.858			
	TB9	0.831			
Satisfaction with Life	SWL1	0.859	1.570	3.83	0.938
	SWL2	0.893			
	SWL3	0.893			
	SWL4	0.891			
	SWL5	0.828			

report the graphics for significant interaction terms as follows. We used the workbook for significant interaction terms reported in Table 5 and were interested in the value of moderating effect where the confidence bands do not contain zero to prove the effect of X (predictor variable) and Y (outcome variable).

We followed the reporting method of Gorgol et al. (61), and the floodlight technique revealed that the Johnson–Neyman point (i.e., the threshold for significance of the effect of focal predictor, i.e., depression on the outcome variable, i.e., SWL) was located at 2.30 in perceived burdensomeness. This means

that from low values of perceived burdensomeness up to this point, the association between depression and SWL was significant, whereas above this point, depression was not a significant predictor of SWL. The Johnson–Neyman regions presented the threshold of significance for the simple effects of depression on SWL for different levels of the moderator (perceived burdensomeness) which is shown below (Figure 2) together with the simple slope graph to show the model of interaction among satisfaction with life, depression, and perceived burdensomeness (Figure 3).

TABLE 4 Correlation between variables.

Variables	ALL					
	(1)	(2)	(3)	(4)	(5)	(6)
Depression	1					
Anxiety	0.63**	1				
Stress	0.63**	0.67**	1			
Perceived burdensomeness	0.62**	0.57**	0.54**	1		
Thwarted belongingness	0.15**	0.23**	0.24**	0.17**	1	
Satisfaction with Life	−0.28**	−0.15*	−0.15**	−0.23**	0.19**	1

** $p < 0.01$.

Figure 4 reveals that the Johnson–Neyman point (i.e., the threshold for significance of the effect of focal predictor, i.e., anxiety on the outcome variable, i.e., SWL) was located at between 1.51 and 2.82 in perceived burdensomeness. This means that the association between depression and SWL was not significant within these points, and depression was a significant predictor of SWL below and above the indicated range. The Johnson–Neyman regions presented the threshold of significance for the simple effects of anxiety on SWL for different levels of the moderator (perceived burdensomeness) which is shown below (Figure 4). The simple slope graph showed the model of interaction among satisfaction with life, anxiety, and perceived burdensomeness (Figure 5).

The floodlight technique revealed that the Johnson–Neyman point (i.e., the threshold for significance of the effect of focal predictor, i.e., stress on the outcome variable, i.e., SWL) was located at 3.41 in thwarted belongingness. This means that from low values of thwarted belongingness up to this point, the association between stress and SWL was significant, whereas above this point, stress was not a significant predictor of SWL. The Johnson–Neyman regions presented the threshold of significance for the simple effects of stress on SWL for different levels of the moderator (thwarted belongingness) which is shown below (Figure 6). Together is the simple slope graph

TABLE 5 Hierarchical regression analysis: moderating effects of perceived burdensomeness and thwarted belongingness.

Perceptions	Outcome				Perceptions	Outcome			
	Satisfaction with life					Satisfaction with life			
	Step 1	Step 2	Step 3	Step 4		Step 1	Step 2	Step 3	Step 4
Control variable					**Control variable**				
Gender	−0.15**	−0.13**	−0.13**	−0.12**	Gender	−0.15**	−0.13**	−0.11*	−0.12**
Predictor variable					**Predictor variable**				
Depression		−0.32**	−0.28**	−0.57**	Depression		−0.32**	−0.31**	−0.55*
Anxiety		0.02	0.04	−0.31*	Anxiety		0.02	−0.01	0.12
Stress		0.05	0.07	0.28*	Stress		0.05	0.01	−0.54*
Perceived Burdensomeness			−0.10	−0.13	Thwarted Belongingness			0.23**	0.50**
Interaction term					**Interaction term**				
Depression*Perceived Burdensomeness				0.42**	Depression*Thwarted Belongingness				0.28
Anxiety*Perceived Burdensomeness					Anxiety*Thwarted Belongingness				
Stress*Perceived Burdensomeness					Stress*Thwarted Belongingness				
			0.33**				−0.15		
			−0.18				0.56*		
R^2	0.023	0.099	0.104	0.158	R^2	0.023	0.099	0.146	0.173
R^2 change	0.023	0.076	0.005	0.054	R^2 change	0.023	0.076	0.047	0.028
F change	10.01**	11.82**	2.47	8.88**	F change	10.01**	11.82**	23.21**	4.65**
F	10.01**	11.56**	9.77**	9.78**	F	10.01**	11.56**	14.38**	10.96**
Durbin–Watson		1.92			Durbin–Watson		1.90		

** $p < 0.01$, * $p < 0.05$, + $p < 0.10$.

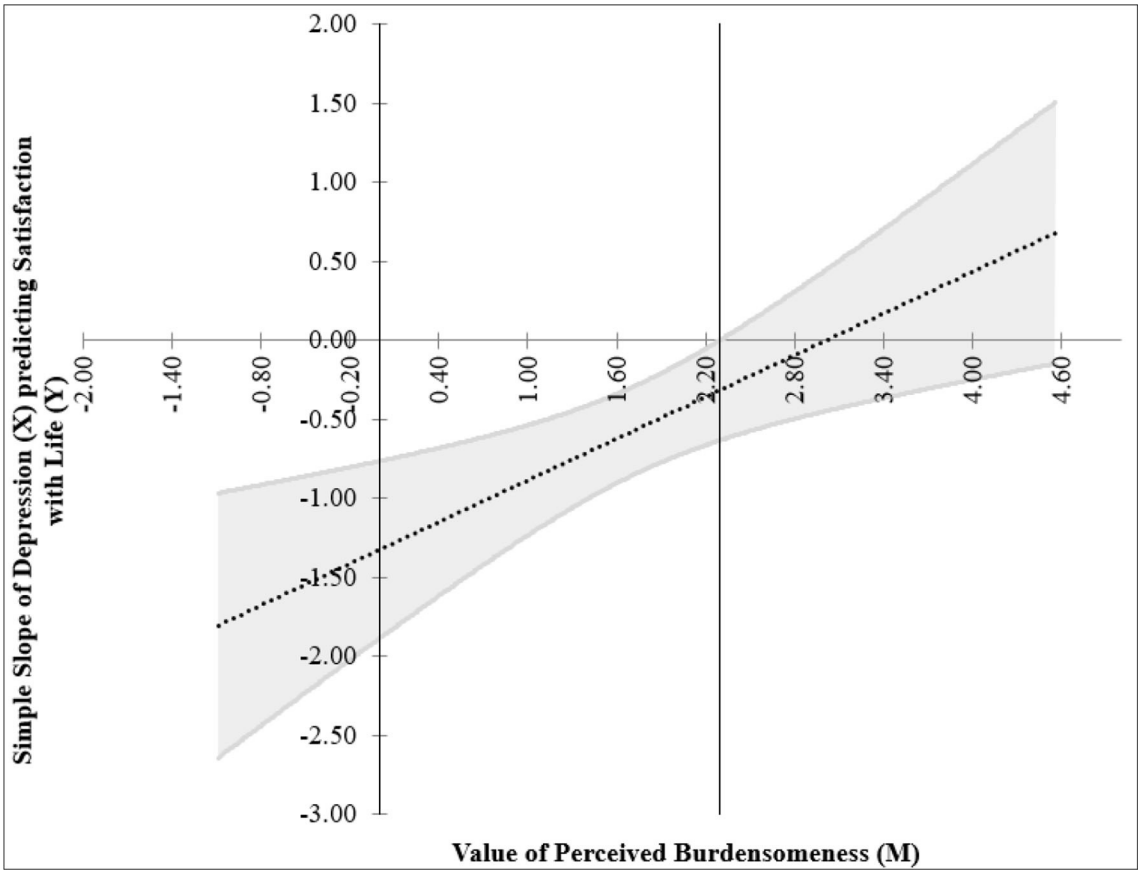

FIGURE 2
Johnson–Neyman regions representing the threshold for significant of the effects of focal predictor (depression) on the outcome variable (satisfaction with life) for different levels of moderator (perceived burdensomeness).

showing the model of interaction among satisfaction with life, stress, and thwarted belongingness (Figure 7).

Discussion

The results of the stepwise hierarchical regression analyses presented in Table 5 show that only depression predicted SWL even though all three predictor variables, namely depression, anxiety, and stress, were negatively correlated with the SWL. The results also suggest that the moderating effect of interpersonal needs (perceived burdensomeness and thwarted belongingness) could potentially reduce or raise SWL among young adults.

Table 5 presents the results of hierarchical regression analyses, where perceived burdensomeness exhibited a full moderating effect on the relationship understudy. Perceived burdensomeness was not significant as a predictor (refer to Step 3 of Table 5) and its interaction with depression and anxiety was significant (refer to Step 4 of Table 5), thus suggesting its pivotal role in individuals' SWL.

The Johnson–Neyman approach in analyzing the interaction presents further information on where depression's effect on satisfaction with life is significant when the value of perceived burdensomeness is <2.30 (Figure 2). The interaction was not significant for individuals with the value of perceived burdensomeness above 2.30. The dotted line can be seen as nearly horizontal, agreeing with the JN graph that the effect of depression on SWL is not significant for high level of perceived burdensomeness—that is, above 2.30 (Figure 3). Figure 3 presents the simple slope to visualize the relationship between depression and SWL among two groups of individuals, where one group scored low on perceived burdensomeness and the other group scored high on perceived burdensomeness.

Figure 4 shows two regions of significance where anxiety's effect on satisfaction with life is significant when the value of perceived burdensomeness is <1.51 and >2.82. The interaction was not significant for individuals with the value of perceived burdensomeness between 1.51 and 2.82. Figure 5 presents the relationship between anxiety and SWL among two groups of individuals, where one group scored low on perceived

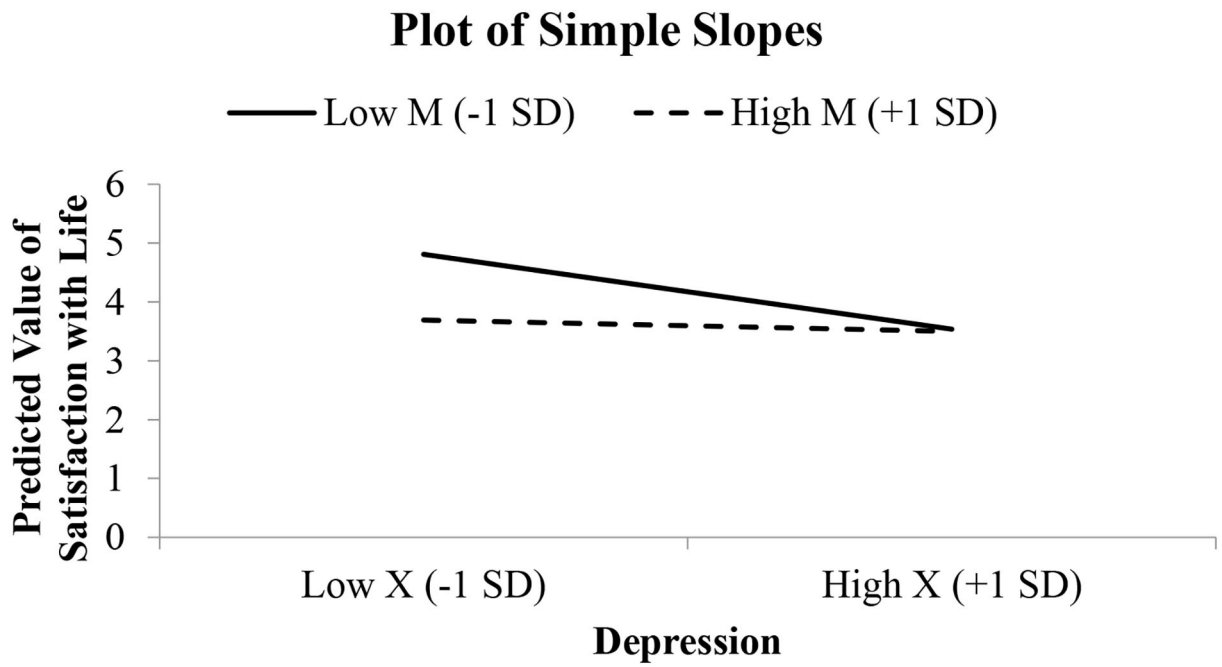

FIGURE 3
Simple slope graph for the model relating satisfaction with life to depression, perceived burdensomeness, and their interaction.

burdensomeness and the other group scored high on perceived burdensomeness.

The negative significant relationship between (i) depression and (ii) anxiety with SWL is stronger among individuals who scored low on perceived burdensomeness. This is clearly depicted in Figures 3, 5 where individuals who reported low perceived burdensomeness were also consistently less satisfied with life. Hence, from this, we opine that a negative perception of the self as a burden to others is not beneficial for maintaining one's wellbeing and could be harmful. Our findings highlight the necessity of preventing negative mental conditions and promoting positive mental health in young adults, especially the sense of perceived burdensomeness among the individuals who reported experiencing depression or anxiety. For them, having to experience psychological distress and intensified further with a sense of perceived burdensomeness, their sense of SWL was negatively affected. Delineating the role of perceived burdensomeness as a potential risk factor to improve SWL and indirectly reduce suicidal thought is of importance for HEIs to better understand and better equip themselves to prevent any suicide risk among the students. Thus, it is important that universities and colleges can offer and encourage the agenda of mental health (62) and execute activities that focus on advocating the importance of mental wellbeing among students (63), especially programs that reduced the belief that one is a burden to others. In the United States and other countries, suicide prevention programs now focus on the theme "You Matter," which highlights the importance and significance of developing a sense of belongingness (64).

In managing the sense of perceived burdensomeness, interventions with cognitive bias modification and psychoeducation were proven to be effective (65). Students who exhibited depression and anxiety symptoms, as well as those who perceived themselves as a burden to the family, community, or society, would require a systematic program which involved debuting the irrational belief of "I am a burden to a society." The nature of the program should focus on managing one's self-doubt and promoting self-care management and a sense of control. For example, cognitive behavioral therapy (CBT), could be used as a form of intervention modality to restructure or reframe the irrational and self-doubt in these individuals. The use of CBT principles to correct irrational thoughts and behavior related to perceived burdensomeness helped to dispute the irrational belief of "I am a burden to my family" and "I am useless." In the process, individuals are challenged to produce evidence which said they are of no value to society, and with the help of the programs, individuals could develop self-help strategies to dispute their negative beliefs, which are usually self-limiting beliefs in them and, thereafter, generate a new healthy self-belief in them.

Thwarted belongingness is a quasi-moderator because it was significant as a predictor (refer to Step 3 of Table 5) and its interaction with stress was significant (refer to Step 4 of Table 5 and Figure 6). The Johnson–Neyman approach in analyzing

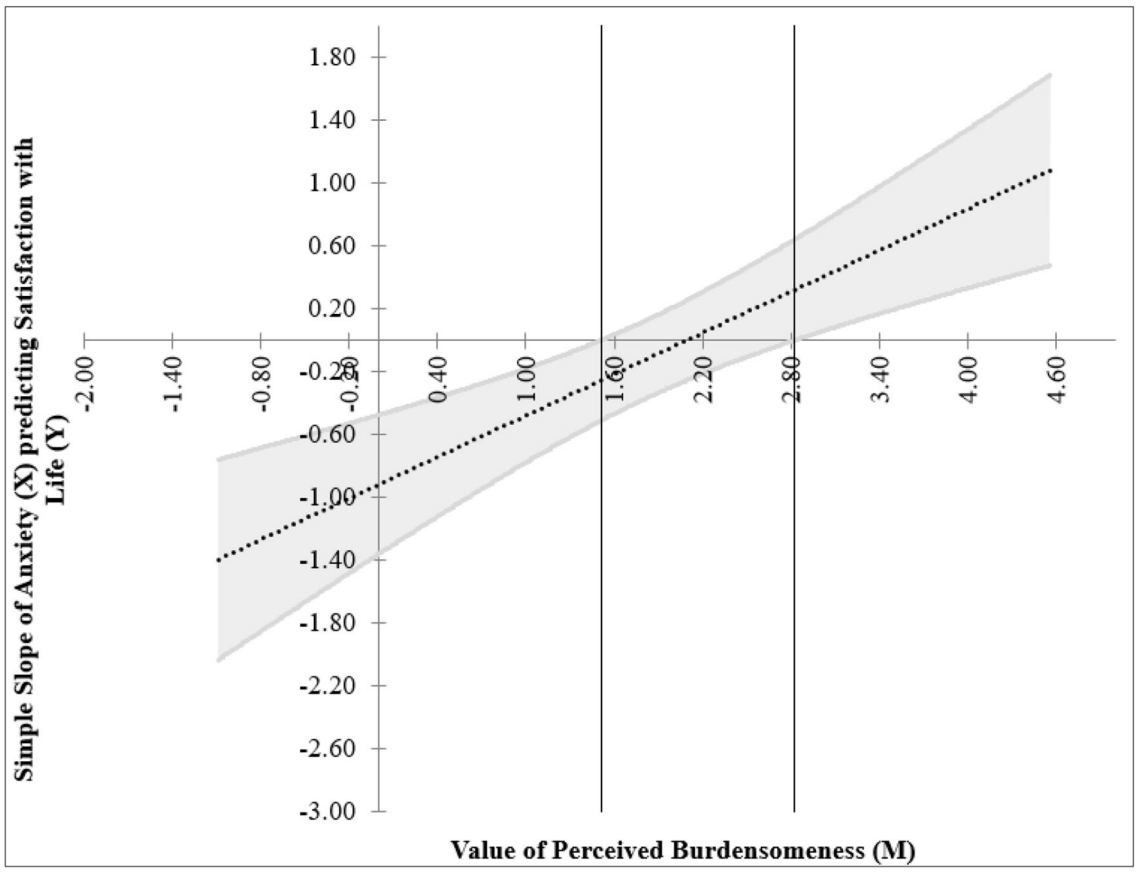

FIGURE 4
Johnson–Neyman regions representing the threshold for significant of the effects of focal predictor (anxiety) on the outcome variable (satisfaction with life) for different levels of moderator (perceived burdensomeness).

the interaction presents further information on where stress effect on satisfaction with life is significant when the value of thwarted belongingness is < 3.41 (Figure 6). The interaction was not significant for individuals with the value of thwarted belongingness above 3.41. Figure 7 presents the simple slope to visualize the relationship between stress and SWL among two groups of individuals, where one group scored low on thwarted belongingness and the other group scored high on thwarted belongingness. The dotted line can be seen as nearly horizontal, agreeing with the JN graph that the effect of stress on SWL is not significant for high level of thwarted belongingness (Figure 7). This negative significant relationship is stronger among individuals who scored low on thwarted belongingness. Our study revealed that in the presence of stress, regardless of levels, individuals with low thwarted belongingness experienced a lower level of SWL as compared to those with a high level of thwarted belongingness. The thwarted belongingness is a negative thing that needs to be addressed by encouraging social attachment, especially among students who scored high on stress.

With the advent of the digital age, young adults who are becoming less socially attached put their SWL at risk in the presence of higher stress. Young adults today are experiencing lesser social interaction as they prefer virtual interaction (66), with a desire to escape from physical realities (67, 68). This could be attributed to young adults' desire for independence while exhibiting an inclination to withdraw and isolate themselves from others, gradually reducing their social circles, and limiting their ability to seek social support when needed (69). In addition, they enveloped themselves with an escapism behavior by spending long hours within the virtual world, through imagined ideal virtual relationships. This trend affects young adults' thwarted belongingness. Stress is inevitable, and in the presence of thwarted belongingness, SWL appeared to be higher. This study recommends the importance of managing level of thwarted belongingness to manage the effect of stress on SWL.

Strengthening the sense of community and belongingness to increase the SWL among the individuals is vital. University students, who are more involved and feel belong, cope better with stress and have a better overall mental health status (24). A

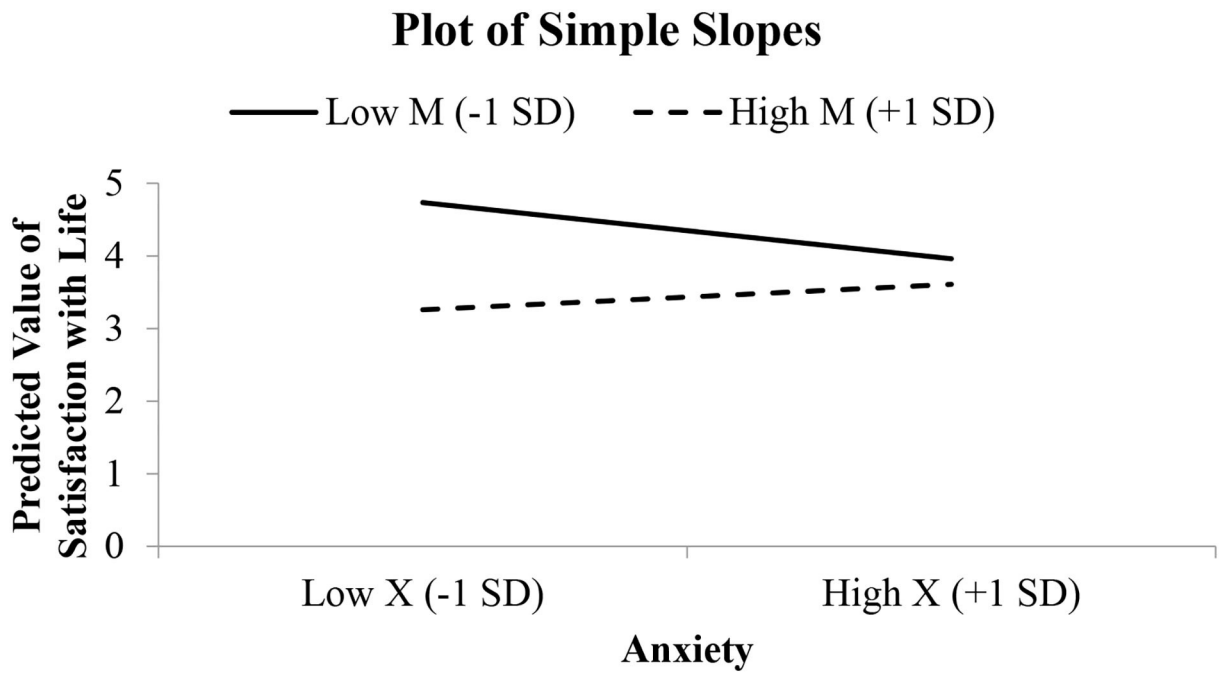

FIGURE 5
Simple slope graph for the model relating satisfaction with life to anxiety, perceived burdensomeness, and their interaction.

sense of belonging in an educational environment begins with peers and extends to the classroom, or beyond the campus. The sentiment is critical for students learning and development and contributes to positive student experiences. To instill, a higher level of thwarted belongingness among the university students in the learning and teaching context of COVID-19 and post-pandemic would require additional preparedness, design, and adequate resource allocation. The HEIs need to emphasize the importance of an inclusive climate and promote greater understanding and acceptance of diversity and differences. Furthermore, universities are comprised of members from diverse backgrounds and cultures, and each culture could be unique to each individual. The university community must be aware of the need to create a safe and engaging space in which these students can participate and no one felt being left behind.

Our finding, however, contrasts Çivitci (70)s study, which found that undergraduate students who participate more in extracurricular activities have higher belongingness and higher life satisfaction. Similarly, a study by Mellor (71) supported the idea of the "belongingness hypothesis," suggesting that individuals tend to form long-term, meaningful, and positive relationships while failure to achieve this can lead to social isolation, loneliness, and suicidal thoughts. These inconsistencies show that it is essential to be cautious in concluding the relationship between the need for belongingness and SWL.

Limitations and suggestions for future study

The study is not without limitations. The DASS instrument is not equivalent to clinical diagnosis although DASS has been used and validated in various settings. Although our study reported the positive association between satisfaction in life and thwarted belongingness, we recommend our findings be interpreted with caution and limit the generalizability of the results. Replications of this study in various settings may be necessary.

Our participants are students who the enumerator has accessed, and they were approached in their respective education settings; thus, this poses a risk of social desirability bias and influences their responses to the questionnaire. Future studies may formulate online surveys which allowed better anonymity. In addition, this is a cross-sectional study which does not allow for causal–effect relationships to be determined or generalized. Thus, future studies should use broader sampling and include evidence obtained from objective data, such as the students' records and data (e.g., Facebook and Instagram posts which may project their state of wellbeing).

Past randomized controlled trial (RCT) program by Van Orden (72) where seniors were paired with peer companions was shown to significantly increase the sense of social connectedness among participants. Given the success of this program and as

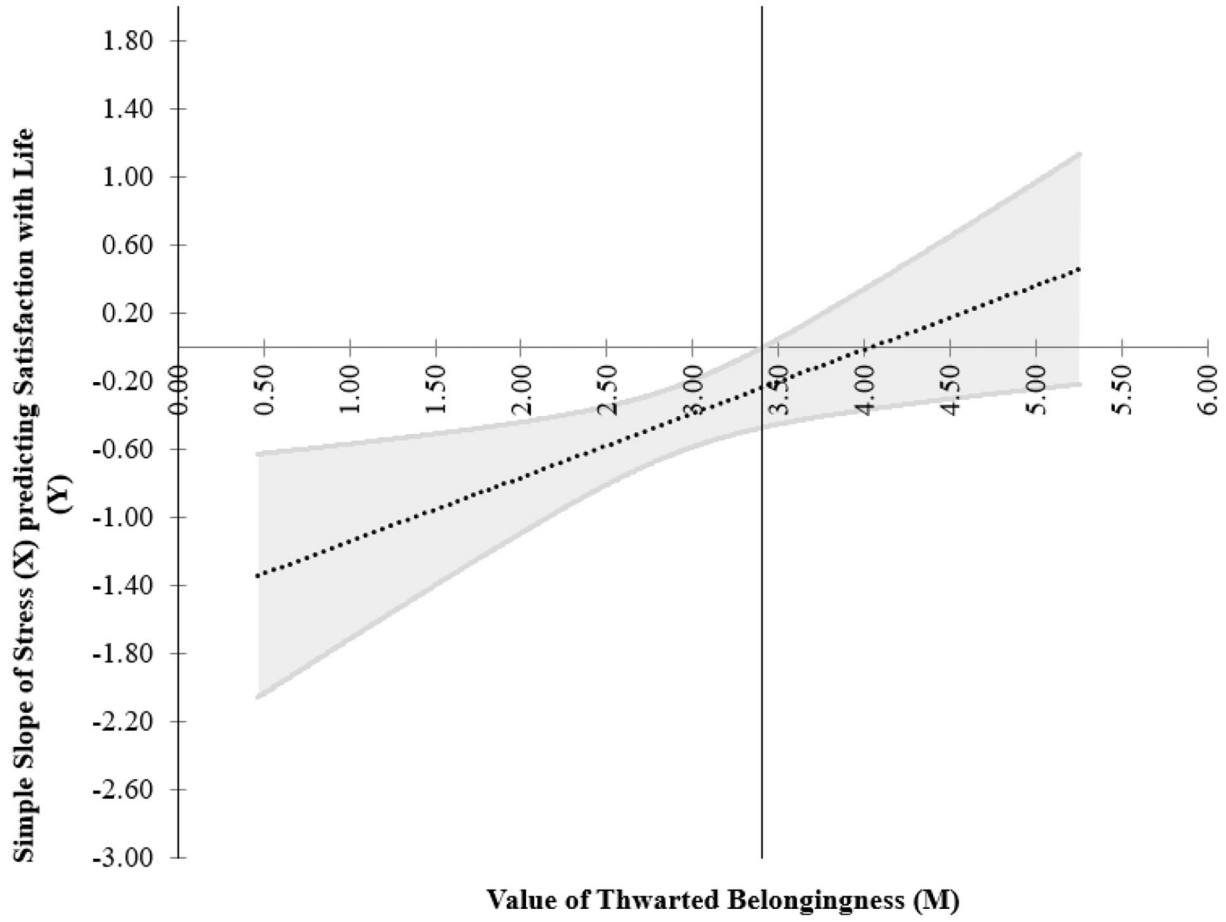

FIGURE 6
Johnson–Neyman regions representing the threshold for significant of the effects of focal predictor (stress) on the outcome variable (satisfaction with life) for different levels of moderator (thwarted belongingness).

compared to the research design of this present study (i.e., cross-sectional), researchers or educators could replicate the study where pairing exercises could be used as a method to promote a greater sense of inclusiveness in an RCT setting. RCT protocol allowed for assessments to be measured systematically over a period of time and educators would be able to trace changes in scores over time and allow immediate intervention for university students or young adults if needed as compared to cross-sectional research design which failed to evaluate the effectiveness of intervention over time.

Interestingly, we found a positive relationship between thwarted belongingness and SWL, which is in contrast to findings from past research. We attribute this unique finding to the fact that our participants are mostly "Generation Z" digital natives; hence, their lives are vastly authored by digital technology influence. These include their social and communication (i.e., through online platforms), and their sense of belongingness may be developed quite differently compared to other generations. At the point of writing, generational variance has not been given enough attention in clinical and teaching settings. We believe the concept of generational differences should be examined further in research and that mental health practitioners, as well as teaching staff, should be more aware of its effects.

In addition, future studies may also include variables such as social online behavior (e.g., types, duration, and who the users communicate virtually with) as variables and examine the relationship of these variables on SWL. Future studies may extend the current study's framework and could consider incorporating measurement of suicidal risk and behavior as the sequel to SWL, as evidenced by past studies.

Conclusion

Our study aimed to examine the relationship between depression, anxiety, stress, and SWL among university students in Malaysia. Furthermore, we explored the moderating effect

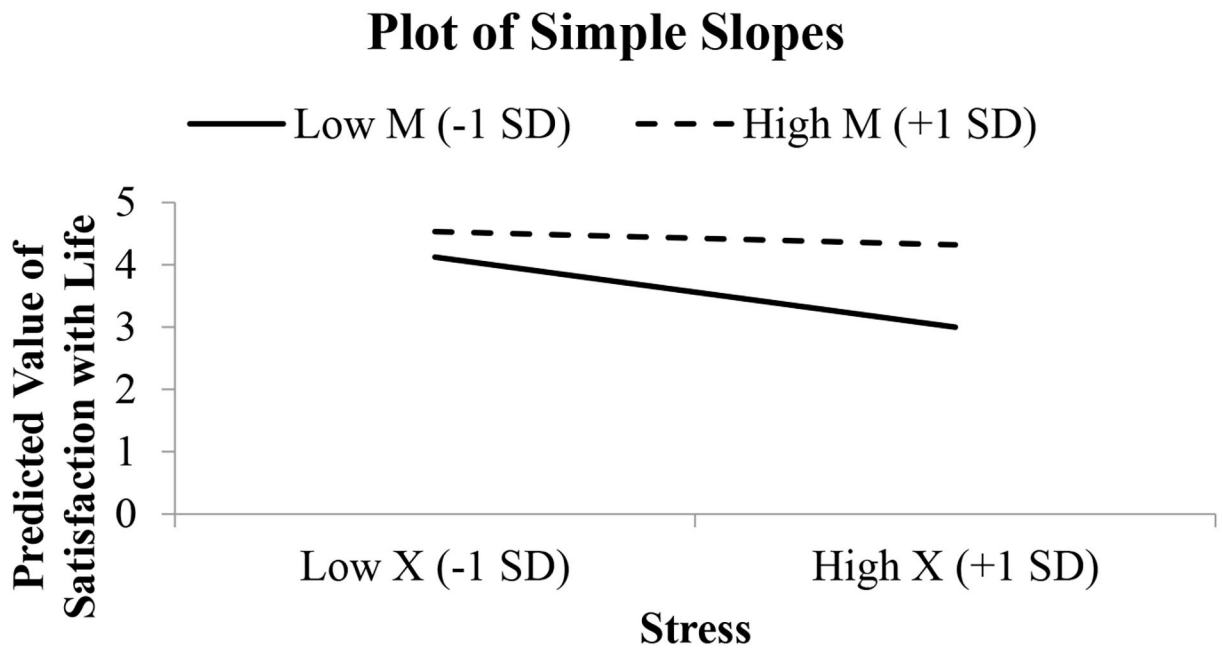

FIGURE 7
Simple slope graph for the model relating satisfaction with life to stress, thwarted belongingness, and their interaction.

of interpersonal needs, specifically perceived burdensomeness and thwarted belongingness on this relationship. Perceived burdensomeness is indeed a significant moderator of the relationship between (i) depression, and (ii) anxiety and SWL. On the contrary, thwarted belongingness exerts a significant moderating effect on the relationship between stress and SWL. Our research sets the stage for future researchers to investigate mental health conditions further, with a focus on the role of interpersonal needs.

Data availability statement

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

Ethics statement

The studies involving human participants were reviewed and approved by IRB 2018/044. The patients/participants provided their written informed consent to participate in this study.

Author contributions

KS: conceptualization and data analysis. KS, CC, and PB: methodology. CC and KS: data collection. KS, CC, DO, and PB: drafting and final writing. All authors contributed to the article and approved the submitted version.

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Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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EDITED BY
Kit-Aun Tan,
Universiti Putra Malaysia, Malaysia

REVIEWED BY
Ari Saptono,
Jakarta State University, Indonesia
Liming Yong,
Southwest University, China

*CORRESPONDENCE
Mohd Effendi Ewan Mohd Matore
effendi@ukm.edu.my

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Development of Adversity Quotient (AQ) index of pre-service teachers in Institute of Teacher Education (IPG)

Rafidah Mohd Adnan[1] and Mohd Effendi Ewan Mohd Matore[2]*

[1]Sekolah Kebangsaan (SK) Bangi, Kajang, Selangor, Malaysia, [2]Research Centre of Education Leadership and Policy, Faculty of Education, National University of Malaysia, Bangi, Malaysia

The study aims to develop the Adversity Quotient (AQ) index of pre-service teachers during practicum training. The study also has assessed psychometric characteristics using the Rasch model. The original contribution is by addressing gaps of measuring AQ accurately among pre-service teachers through index at the Institute of Teacher Education (IPG) that not been widely explored. The research design entails a survey with a quantitative approach through questionnaires. The four main constructs of AQ comprises Control, Ownership, Reach, and Endurance (CORE model). This study involves several key procedures such as challenge identification, expert validity, item development, and psychometric testing of items before developing the index. A total of 96 items were produced and piloted over 159 pre-service teachers. Findings from the pilot study showed 54 items that met all assumptions from the Rasch model such as item fit, unidimensionality, local independence, reliability, and separation index. The actual study was conducted on 542 pre-service teachers from five Malaysian Institutes of Teacher Education (IPG) in the Central Zone through stratified random sampling. The data were analyzed using SPSS version 26.0 and WINSTEPS version 3.71.0.1. The findings showed the 46.86% of practicum pre-service teachers have a moderately high AQ index with 74.80. The Control and Ownership recorded a high level AQ index with 77.30 and 77.10, respectively, while Reach and Endurance were at a moderate level AQ index with 73.20 and 71.50. The AQ index of male pre-service teachers is higher (76.29) than the female (74.09). It can be seen that eighth semester pre-service teachers is higher (75.28) than the sixth semester (74.38). The Science (SN) field recorded as a highest index (80.45), while the Visual Arts Education (PSV) field has a lowest index score (70.29). Further studies can be done by reviewing the pre-service teacher development program by empowering the reach and endurance aspects to ensure that the future teachers are resilient to challenges.

KEYWORDS

Adversity Quotient, index, pre-service, teachers, Institute of Teacher Education

Introduction

Over the past few decades, the field of education in Malaysia has declined the perception that teachers not only deliver knowledge but they also manage to become holistically quality teachers (1). Professional teachers will continue to work tirelessly to improve their own performance, including the performance of society and the

country. One of the groups of teachers' worth paying attention to is the future teachers or also known as pre-service teachers. Quality pre-service teachers are important in educating better-quality students. However, the effort in producing quality teachers is often accompanied by various issues and problems. Among the prevalent factors that prevent pre-service teachers from excelling in academia and practical training includes the various forms of problems in training by pre-service teachers vary from seven areas such as administrative support, cooperating teachers, student supervisors, peers, students, related tasks, and learning environment (2). Due to the challenges in schools that they have never experienced before, pre-service teachers tend to face self-adjustment problems (3). These pre-service teachers are often busy and exhausted as a result of all activities outside the practicum sessions that the teachers are obliged to follow. Thus, the time constraint with additional workload has made practicum training a complicated and unsettling one (4).

Mental disorders and stress are also a challenge for pre-service teachers. As opined by (2), pre-service teachers find greater difficulties in the top three areas namely students, related tasks, and peers. They suffer from confusion so much that the practicum practice at school feels extensively tormenting. This is due to their weakness in dealing with challenges, especially the failure to adapt to the burden of many tasks. Pre-service teachers who fail to prepare themselves with the skills and abilities to face changes in the world of education tend to feel stressed and worried (5, 6). Pre-service teachers with a low level of challenge control will always have feelings of dissatisfaction and rebelliousness, weak spirit, and inadequate effort; they are also easy to give up, panic quickly, and do not have high creative and innovation power. All of these are due to stress, nervousness, and too much obedience to the school management (7). Such emotions will, in turn, lead to changes in the pre-service teachers' personality types and these changes may affect their commitment to the teaching profession. In addition, some pre-service teachers are also less motivated, not as committed to the assigned tasks, and do not inquire as much information due to their own attitude (8).

However, in facing these challenges, the ability of pre-service teachers in the aspects of self-control, self-management, and social skills is low such that they are less prominent in their attitude as leaders but prefer to be followers. Based on (9), there are three problems that are often faced by student-teachers related to students' bad attitudes and their learning motivation, including disrespecting the teacher, sleep during the class and lack of participation. The teachers' resilience level is also low, in addition to their lack of social skills. Self-resilience plays an important role in enabling teachers to respond positively, for instance, to challenging employment situations. Teacher resilience, defined as the ability to withstand natural sources of stress and discouragements in teaching as a difficult profession, is critical in all education since it can create numerous positive outcomes (10).

In this regard, the teachers need intelligence called Adversity Quotient or AQ, which refers to a person's ability and spirit to continue facing life's challenges efficiently with critical ability and also a robust predictor of a person's success (11). Adversity Quotient (AQ) is defined by Stoltz (12) as an individual's ability to struggle with a challenge, difficulty, or problem at hand, as well as turning it into a golden opportunity to succeed. In the context of the current study, the term "AQ" is referred to as a measurement of pre-service teachers' ability to meet challenges, overcome existing challenges, and subsequently turn these into an opportunity to achieve success. Success in this context refers to achievement in practicum training.

Therefore, the four AQ constructs measured in this study are control, ownership, reach, and endurance. This construct had proven empirically applied by several researchers recently (13, 14). Recent studies on AQ are heavily influenced by positive psychology (8) that focusing on the identification of resources that protect individuals from experiencing adverse effects due to life challenges. Studies have also shown that the AQ levels of individuals tend to change over their lifetime (15). Besides, past research in the context of education has found that most teachers experience difficulties in changing their routines to adapt to changes (2, 4–6, 9, 16–18). From pre-service teachers perspective, they are low-skilled in overcoming life's challenges because lack of vision, mission, and true meaning of life (19). Their ability to deal with such challenges or AQ demonstrates a clear need to associate AQ with these future teachers. Literature that consistent with pre-service teacher context are very limited. Research by (20) show that AQ gives positive influence to the development of mathematical understanding ability of pre-service mathematics teacher with the influence of 57.3 percent. While, Adversity Quotient (AQ) had proven to give a positive impact on the development of mathematical argumentation ability of pre-service mathematics teacher, with the effect of 60.2% and the results revealed that the ability of mathematical argumentation of pre-service mathematics teacher is more developed on AQ of Climber type (21).

Although AQ studies in the field of education are rapid in Western countries, studies related to AQ, especially for future teachers in Malaysia are still lacking especially in the index or instrument development. Di (11) emphasized that the development of instruments for measuring AQ has received less attention. No universal instrument can be generalized at this time and no review of existing AQ instruments has been conducted. Besides, the agreement on the best methodological quality and measuring qualities provided by instruments has not been reached. Meanwhile, the strength of proof for each instrument is determined by methodological quality, and measurement features are largely unknown. Most of the literature also revealed that the state-of-the-art of AQ instrument development has not been explained indeed because

the research only adapted the original instrument of AQ provided by Stoltz.

Recently, the literature also shows a research gap from the aspect of the AQ index development which was very limited and not been widely discussed at the Institute of Teacher Education. Several new instruments including AQ index been developed and carried out but not in IPG context such as in China which re-developed and subsequent psychometric evaluation of the Adversity Response Profile for Chinese University Students (ARP-CUS) (22). In Thailand, adversity quotient test for Grade Nine students also been developed with 40 items (10 situational) three-choice items and situational with four elements based on the theories of Stoltz and tested with classical test theory (23). Research from Indonesia at the State University of Malang (UM) also develop the AQ-based endurance dimension possessed by students through Islamic Religious Education (PAI) online learning (24). The research from (25) also provide the profile of High School students with high Adversity Quotient (AQ) in learning mathematics and revealed that high AQ students are able to face the learning of mathematics in various materials and with different models of learning. Nevertheless, all these researches are not discussed in pre-service teachers' context and the instrument development phase argument especially the model of developing the instrument also not detailed explained.

This situation further creates the need to know the AQ levels of practicum pre-service teachers through an index aimed at obtaining appropriate AQ patterns from their demographic characteristics. Therefore, it is necessary to assess the psychometric properties for the index in measuring the AQ levels of pre-service teachers. The measurement of AQ in the Malaysian context is very limited as past studies have only covered for certain aspect such as youth (14) and technical students (26) context. Based on these issues, the current study aims to develop the AQ index and test its psychometric characteristics using the modern measurement theory the Rasch model. Before the AQ index calculated, the instrument of AQ for pre-service teachers was created based on the challenges faced by the teachers while undergoing practicum training. A valid and reliable AQ index is useful in providing a variety of AQ patterns including information on the differences in the AQ levels of pre-service teachers. These differences can be seen based on demographic factors such as gender, semester of study, and field of study. Empirical evidence on AQ differences can also help stakeholders empower the right target group.

Methodology

Research design

The design of the study entails a survey using a quantitative approach. The type of survey used in the current study is a cross-sectional survey, where data are collected only once from a sample at a time (27). This research design is suitable because the information through the one-time data collection from the population of Bachelor Degree of Teaching Program (PISMP) in IPG pre-service teachers in the Central Zone is suitable for the construction of the index (28). The generalization of the actual research population can also be made based on the research sample (27).

Sampling techniques

In this study, the population only entails sixth and eighth semester pre-service teachers. This is because they have completed their practicum training in the fifth and seventh semesters. Since the study comprises four phases, namely needs study, expert review study, pilot study, and validation study, different sampling techniques were used. Specifically, the needs study employed the simple sampling technique to obtain a list of challenges of the practicum pre-service teachers, while the expert review study employed the purposive sampling technique. Additionally, both the pilot study and validation study used the stratified random sampling technique because it involves the separation of the target population into different groups (29). Three strata are required in the index profile development, namely gender, semester of study, and field of study.

Index development research phases

Needs study

In the needs study, a total of 105 pre-service teachers from two IPGs were involved in determining the list of challenges faced by pre-service teachers. These challenges were then combined with the CORE model for the construction of AQ index items. The two IPGs involved are IPG Ipoh Campus, Perak and IPG Campus Tun Hussein Onn, Johor. The selection of the two IPGs also represents the Northern and Southern zones. These two IPGs were chosen because they have the highest number of pre-service teachers in their respective zones. The groups of respondents required in this study include sixth and eighth semester pre-service teachers who had undergone practicum training in the previous five and seventh semesters. A simple random sampling technique was chosen in this study because this technique is compatible with descriptive studies (30). A total of 59 challenge-related items were listed with eight constructs, namely attitude, Daily lesson plan (RPH) writing, teaching materials, task load, administrative relationship, classroom management, supervision, and facilities.

Instrument development process

The AQ instrument was developed by combining preservice teacher challenges from need analysis with

four main constructs of AQ includes Control, Ownership, Reach, and Endurance (CORE model). This instrument development model of AQ adapted by (31). There are ten steps in which are defining the construct, purpose and target of the instrument, preparing the instrument plan, developing instrument items, writing instrument implementation instructions, conducting a pilot study, conducting item analysis, performing item review and preparing the final instrument, testing the validity and reliability of instruments, and determine norms and prepare manuals. However, the last step was replaced by index development as stated by this research.

Expert review study

Two types of experts, namely professional experts and field experts, were selected to examine the developed items for content validity (28, 32). Nine experts comprising six professional experts and three field experts were selected. These numbers are based on the recommendation by (33) which states that six to ten experts are sufficient to evaluate constructs and items. The professional experts consist of six lecturers from Universiti Sains Islam Malaysia (USIM), Institut Pendidikan Guru Kampus Ilmu Khas (IPIK), Institut Pendidikan Guru Kampus Pendidikan Islam (IPIS), Institut Perguruan Raja Melewar (IPRM), and Pejabat Pendidikan Daerah Hulu Langat (PPDHL), while the field experts only consist of three education officers in PPDHL. The purposive sampling technique was also used in determining the selected experts. The criteria for the selection of expert's entail those who work as a teacher with more than 10 years of experience, hold a Bachelor of Education degree and still active in service.

Pilot study

The pilot study was conducted through item testing based on the Rasch model analysis. The main assumptions to adhere to include item compatibility, unidimensionality, and local independence, in addition to item polarity, item-individual mapping, as well as reliability and separation indexes. A total of 159 pre-service teachers from IPG Raja Melewar Campus, Negeri Sembilan were involved in the pilot study. IPG Raja Melewar Campus was selected based on the highest number of enrolments in the Southern Zone. The pilot study involved sixth and eighth semester pre-service teachers who had undergone practicum training in the last five and seven semesters. Disproportionate stratified multi-level sampling was used with three stratums were selected such as gender, semester of study, and field of study. The strata are important for showing the index patterns.

Validation study

The validation study involves a population of all sixth and eighth semester pre-service teachers of PISMP who took courses in IPG Central Zone. The selection of IPG Central Zone as the study population is based on the highest number of pre-service teachers in Malaysia. The enrolment of respondents in the IPG Central Zone constitutes 560 people. The sixth and eighth semester pre-service teachers of PISMP were selected based on the following considerations: (1) Pre-service teachers had taken the School-Based Learning (PBS) program in Semesters 1, 2, 3, and 4 for at least a week each semester; thus, they have received early exposure to real school situations; (2) Starting from Semesters 5, 6, and 7, these groups of pre-service teachers have undergone practicum training in schools where they get to apply theoretical and practical knowledge in a real classroom setting. Therefore, these groups of pre-service teachers should be selected as the study population as they have practiced the values of teaching professionalism, knowledge, and understanding as well as teaching and learning skills before they are sent to work in schools. The disproportionate stratified random sampling technique was selected due to the non-homogeneous populations among population members (29). The pre-service teachers were classified by gender, semester of study, and field of study. A total of 560 respondents responded but only 542 samples completed with 96.7 percent of return rate.

Index profile development

The calculation formula of the AQ index score adapted from the Malaysian Youth Index (IBM'16) (34) was used with percentage score calculation. A score of 100 is used as the basis to calculate the maximum score and the score of 0 serves as the minimum value. To obtain the AQ index score of the practicum pre-service teachers, the average score for all constructs was calculated. The following formula shows the calculation of the AQ score for the practicum pre-service teacher index:

$$\text{Indicator/item score} = \sum_{I=1} \left(\frac{M_1 - M_s}{R} \right) \times 100 \ldots\ldots\ldots\ldots\ldots (1)$$

TABLE 1 AQ level interpretation scale of practicum pre-service teachers.

Score value	Level	Scale
80–100	Very high	
75–79	High	
60–74	Moderately high	
50–59	Moderately low	
40–49	Low	
0–39	Very low	

$$\text{Domain/Construct score} = \left[\frac{\sum \textit{Indicator score}}{\textit{N Indicator}}\right] \quad \text{.....(2)}$$

$$\text{Index score} = \left[\frac{\sum \textit{Domain score}}{\textit{N Domain}}\right] \quad \text{.....(3)}$$

$\sum_{vc}$ = Score total
M_1 = Average score
M_s = Minimum score
R = Range (Maximum score–Minimum score)
N = Total

To divide the AQ index level of pre-service teachers, the scale shown in Table 1 was used as adapted from Malaysian Youth Index (IBM'16) (34). Score values of 100–80 indicate a very high AQ level, followed by 79–75 (high), 74–60 (moderately high), 50–59 (moderately low), 40–49 (low), and 0–39 (very low).

Instrumentation

The developed AQ instrument constitutes two parts that comprise Part A, which entails the pre-service teachers' profile, and Part B, which entails the CORE model construct with control, ownership, reach, and endurance. A level of agreement with five-point Likert scale by (29) was used with 1 (strongly disagree), 2 (disagree), 3 (neutral), 4 (agree), and 5 (strongly agreed) to examine the respondents' perceptions. This non-forced choice scales with neutral point provide respondents an easy way to express their feelings (29). The pilot study was conducted on 159 respondents and the data were analyzed using Rasch analysis. Table 2 shows the items before the pilot study, which constitute 96 items and the number of final items (i.e., 54 items).

AQ was measured using four constructs: Control (C), Ownership (O), Reach (R), and Endurance (E) or also known as CORE. Control is the most important construct in AQ. This is because control is interpreted as a defining symbol in the mind of an individual to control adverse conditions (35, 36). The control construct questions the extent to which controls are asserted (37). This construct also refers to one's degree of control over problems. The individual who obtains a high score for this construct is deemed proactive in facing challenging and able to turn difficulties into opportunities (36).

Ownership reveals the extent to which a person admits the consequences of difficulties and is willing to be held accountable for an error or failure regardless of who or what causes it (37–39). This also refers to the extent to which individuals are responsible for improving their current situation. Individuals with a high score in this construct are characterized as being responsible for their actions and learning from good results (37). Reach refers to the extent to which an individual assumes that difficulties will affect the other aspects of life (35, 37, 39). Individuals with a high score in this construct will perceive difficulties as something specific and limited as well as not affecting the other aspects of life (37, 40). Endurance is a measure of an individual's perception of the duration of adverse effects due to the difficulties that occur. Those with high endurance do not perceive difficulties as permanent; instead, they feel confident that difficulties will surely pass (37). Overall, these four components measure a person's AQ. Table 3 shows the conceptual definitions of AQ constructs.

Psychometric assessment

Before obtaining the final 54 items, a total of 96 items were tested using the Rasch model. Rasch analysis involves item fit, unidimensionality, local independence, reliability, and separation index. Item fit shows the statistical fit results for the items representing each AQ construct. In this study, the fit acceptance range is between 0.77 and 1.30 logits as per (41) recommendation. A value higher than 1.30 indicates that the item is not homogeneous with other items in one measurement scale, while a value below 0.77 indicates the overlap of the construct with another item. A total of 39 items were found to misfit because the items were beyond the specified logit value, which is between 0.77 and 1.30. All four AQ constructs show a high-reliability index of items from 0.87 to 0.96. Three constructs, namely control, reach, and endurance, show the

TABLE 2 Number of items—before and after pilot study.

Before pilot study				After pilot study			
Sec.	**Content/construct**	**No. of items**	**Total**	**Sec.**	**Content/construct**	**No. of items**	**Total**
A	Demographics	1–8	8	A	Demographics	1–5	5
B	Control	1–24	24	B	Control	1–12	12
	Ownership	25–48	24		Ownership	13–28	16
	Reach	49–72	24		Reach	29–43	16
	Endurance	73–96	24		Endurance	44–54	10
	Total number of items		96		Total number of items		54

maximum values of outfit MNSQ below 1.3 logits with 1.29, 1.29, and 1.20, respectively. However, the ownership construct should be reviewed in the pilot study because its logit value exceeds 1.30. Misfit order analysis should also be done to identify items that do not fit the Rasch measurement model. The item separation index indicates that all constructs are ranging from 2.61 to 4.88. According to (42), a well-accepted value should be more than 2.0. The highest separation index was recorded by the items in the ownership construct (4.88), followed by control (4.50), endurance (3.50), and the reach construct (2.61). This suggests that the AQ items are statistically two to four times more distributed than the square root error. Item separation index can be divided into two to four strata or difficulty levels. Table 4 shows the reliability and item fit by construct.

Table 5 shows the polarity of AQ construct items. The item polarity value of the four AQ constructs indicates the value of point measure correlation (PTMEA Corr.) or the correlation measurement point for each of the four positive constructs. Of all AQ constructs, the reach construct shows a minimum value of 0.41 for item R9 and the endurance construct shows the maximum value of item E22, which is 0.68. Overall, these findings meet the recommendation of (43), which states that a well-accepted PTMEA Corr. value is between 0.20 and 0.79. Furthermore, the polarity analysis results have statistically shown that all AQ constructs move in parallel in one direction while measuring the constructs to be measured. Subsequently, all of these items were removed from the AQ index.

Table 6 shows the unidimensionality of AQ construct items. In terms of item unidimensionality, Principal Component Analysis (PCA) was carried out to specify the items that measure only a single construct (14). To ensure that all items measure only a single construct, Reckase (44) recommended that the value of variance explained by measures should be more than 20 percent. Meanwhile, unexplained variance in 1st contrast that is <3.0 is deemed good, whereas the variance of the first principal component that is <5 percent is well-accepted. This indicates the existence of an obscure second dimension. In addition, the minimum variance ratio is 3:1 (43). The variance ratio is obtained by dividing the value of the variance explained by the item by the value of unexplained variance in 1st contrast (45).

The variance explained by measures (%) indicates that all constructs have a value of 31.6%, which exceeds a good variance value of 20% (44). Meanwhile, unexplained variance in 1st contrast indicates that all constructs exceed the value of 3 as suggested by (45), which further indicates the absence of misfit items that tend to form a second dimension. Unexplained variance in 1st contrast also shows a value of 5.0% (46), which is generally well-accepted, while the variance ratio exceeds the minimum value of 3.9:1 (43). In terms of local independence, ten pairs of items with residual correlation standard values were recorded to range from 0.33 to 0.44, which meets the local independence requirement with a correlation value of <0.7 (43). Hence, these items do not lean with other items in the same construct. Finally, a total of 54 AQ items have been agreed for use in further studies.

The pilot study results for the examination of 96 AQ items based on the analysis using the Rasch measurement model showed 39 items that did not meet the proposed fit value, as well as 3 items that exceeded the value of 0.7 in terms of item polarity. Thus, a total of 42 items were removed from this instrument and only 54 final items were retained for the AQ measurement of pre-service teachers for the purpose of index development. The final item list of the AQ instrument is shown in Table 7. The list shows the summary of removed and retained items.

TABLE 3 Conceptual definitions of AQ constructs (12, 37).

Construct	Definition
Control	A person's ability to handle and manage difficulties.
Ownership	A person's ability to take responsibility rather than blaming oneself when facing adversity.
Reach	A person's ability to ensure that the challenges faced do not affect his life.
Endurance	A person's ability to anticipate the duration of a challenge in his life.

TABLE 4 Reliability and item fit by construct.

No.	Construct	Reliability		*Infit* MNSQ		*Outfit* MNSQ	
		Item	Separation	Max.	Min.	Max.	Min.
1.	Control	0.95	4.50	1.27	0.73	1.29	0.78
2.	Ownership	0.96	4.88	1.30	0.82	1.63	0.85
3.	Reach	0.87	2.61	1.24	0.75	1.29	0.78
4.	Endurance	0.92	3.50	1.15	0.81	1.20	0.84

Results

AQ index of pre-service teachers

The AQ index of pre-service teachers was developed based on gender (male and female), semester of study (semester six and semester eight), and program types [Arabic (BA), Malay Language (BM), Teaching English as A Second Language (TESL), Music Education (PMZ), Early Childhood Education

TABLE 5 Polarity of AQ construct items.

No.	Construct	PTMEA Corr				Total items
		Min.	Item	Max.	Item	
1	Control	0.43	C22	0.62	C24	12
2	Ownership	0.42	O13	0.58	O9	16
3	Reach	0.41	R9	0.66	R22	16
4	Endurance	0.50	E1	0.68	E22	10
Total						54

(PRA), Islamic Education (PI), Special Education (PKHAS), Visual Arts Education (PSV), History (SEJ), Mathematics (MATE), Physical Education (PJK), Design and Technology (RBT), and Science (SN)]. Table 8 shows the AQ levels of practicum pre-service teachers in the Central Zone as a whole. 34.32% (157 people) of the pre-service teachers are at a very high level, followed by 15.50% (83 people) at a high level, 46.86% (282 people) at a moderately high level, 3.14% (19 people) at a moderately low level, and 0.19% (1 person) at a low level. However, no pre-service teachers were at a very low level. Overall, the practicum pre-service teachers have a moderately high AQ level.

Figure 1 indicates the AQ levels of practicum pre-service teachers for the control construct. The findings show that the AQ levels of pre-service teachers are moderately high (298 people). The data distribution shows that 21.2% (116 people) of the pre-service teachers have a very high level of control, followed by 11.1% (60 people) at a high level, 55.0% (298 people) at a moderately high level, 9.8% (53 people) at a moderately low level, and 2.8% (15 people) at a moderately low level. However, no pre-service teachers have the lowest level of control. For ownership construct, the findings show that the AQ levels of pre-service teachers are moderately high (254 people). The data distribution shows that 34.3% (186 people) of the pre-service teachers have a very high level of control, followed by 15.5% (84) at a high level, 46.9% (254 people) at a moderately high level, 3.1% (17 people) at a moderately low level, and 0.2% (1 person) at a moderately low level. However, none of them has the lowest level of control.

For reach construct, the findings show that the AQ levels of pre-service teachers are moderately high (278 people). The data distribution shows that 33.2% (130) of the pre-service teachers have a very high level of control, followed by 12.2% (70 people) at a high level, 48.5% (278 people) at a moderate-high level, 4.8% (51 people) at a moderately low level, and 1.3% (13 people) at a low level. However, no pre-service teachers have the lowest level of control. For endurance construct, the findings that the AQ levels of the pre-service teachers are moderately high (263 people). The data distribution shows that 33.2% (180 people) of the pre-service teachers have a very high level of control, followed by 12.2% (66 people) at a high level, 48.5% (263 people) at a moderately high level, 4.8% (26 people) at a moderately low level, and 1.3% (7 people) at a moderately low level. However, none of the pre-service teachers has the lowest level of control. The explanation also stated in Table 9 which mention the crosstab between AQ levels and constructs.

TABLE 6 Unidimensionality of AQ construct items.

No.	Construct	Variance explained by measures (%)	Eigen	Unexplained variance in 1st contrast
1.	Control	39.8%	1.7	8.4%
2.	Ownership	38.0%	2.2	8.6%
3.	Reach	32.6%	2.0	8.6%
4.	Endurance	38.7%	1.9	11.9%
	Total	31.6%	4.0	5.0%

AQ index profile of practicum pre-service teachers by construct

Table 10 show the overall index score of the AQ of practicum pre-service teachers with moderately high level of a score value of 74.8. The two constructs that are at a high level is endurance (score of 77.3) and ownership (score of 77.1). Meanwhile, the other two constructs show a moderately high level: reach (score of 73.2) and control (score of 71.5). Figure 2 also shows the overall AQ Index Score for all the construct visually.

AQ profile of pre-service teachers based on gender

The AQ index for each construct based on gender is shown in Table 11. The AQ index value of male practicum pre-service teachers is higher with a score of 76.29 (high) than the female practicum pre-service teachers with a score of 74.09 (moderately high).

TABLE 7 Summary of removed and retained items.

Construct	Number of initial items	Number of removed items	Removed item	Retained item	Total retained items
Control	24	12	1, 2, 5, 7, 9, 13, 14, 15, 16, 17, 18, 20	3, 4, 6, 8, 10, 11, 12, 19, 21, 22, 23, 24.	12
Ownership	24	8	28, 30, 35, 36, 43, 44, 47, 48.	25, 26, 27, 29, 31, 32, 33, 34, 37, 38, 39, 40, 41, 42, 45, 46.	16
Reach	24	8	49, 52, 58, 61, 62, 65, 67, 68.	50, 51, 53, 54, 55, 56, 57, 59, 60, 63, 64, 66, 69, 70, 71, 72.	16
Endurance	24	14	74, 75, 76, 79, 80, 82, 83, 84, 85, 86, 87, 88, 90, 96.	73, 77, 78, 81,89, 91, 92, 93, 94, 95.	10
Total	96	42			54

TABLE 8 AQ levels of practicum pre-service teachers.

AQ Level	Score scale	Visual scale	Number of pre-service teachers	Percentage
Very high	80–100		157	34.32%
High	75–79		83	15.50%
Moderately high	60–74		282	46.86%
Moderately low	50–59		19	3.14%
Low	40–49		1	0.19%
Very low	0–39		0	0%
Total			**542**	**100%**

Figure 3 show the AQ index by construct based on gender. For the control construct, the index score of male pre-service teachers is higher (74.36) than females (70.19). For the ownership construct, the index score of male pre-service teachers is higher (77.53) than that of female pre-service teachers (76.90). For the reach construct, male pre-service teachers recorded a higher index score (74.70) than the females (72.39). Finally, for the endurance construct, the male pre-service teachers' index score is above (78.37) the index score of the female pre-service teachers (76.86).

AQ profile of pre-service teachers based on semester of study

Table 12 shows the AQ index value of pre-service teachers as a whole based on their semester of study. The overall findings show that the index score of the eighth semester pre-service teachers is higher (score of 75.28) than the sixth semester pre-service teachers (score of 74.38).

Figure 4 show the AQ index for pre-service teachers based on semester of study. The endurance construct (77.41) is dominated by the sixth semester pre-service teachers (76.58) and eighth semester pre-service teachers (78.24). This is followed by the ownership construct (77.10) as the score obtained by the sixth semester pre-service teachers (77.22) exceeds that of the eighth semester pre-service teachers (76.98). In the reach construct (77.41), the score obtained by the eighth semester pre-service teachers (73.94) outperforms the sixth semester pre-service teachers (72.58). Finally, the control construct is the least dominant (71.54). Overall, the eighth semester pre-service teachers (71.54) outperform the sixth semester pre-service teachers (71.95).

AQ profile of pre-service teachers based on field of study

Table 13 showed that the overall index score obtained by SN pre-service teachers is the highest (80.45), while the PSV pre-service teachers obtained the lowest index score (70.29).

The findings for the control construct show that SN recorded the highest level of control (81.51), while the RBT shows the lowest index score (67.26). Meanwhile, the index scores for TESL

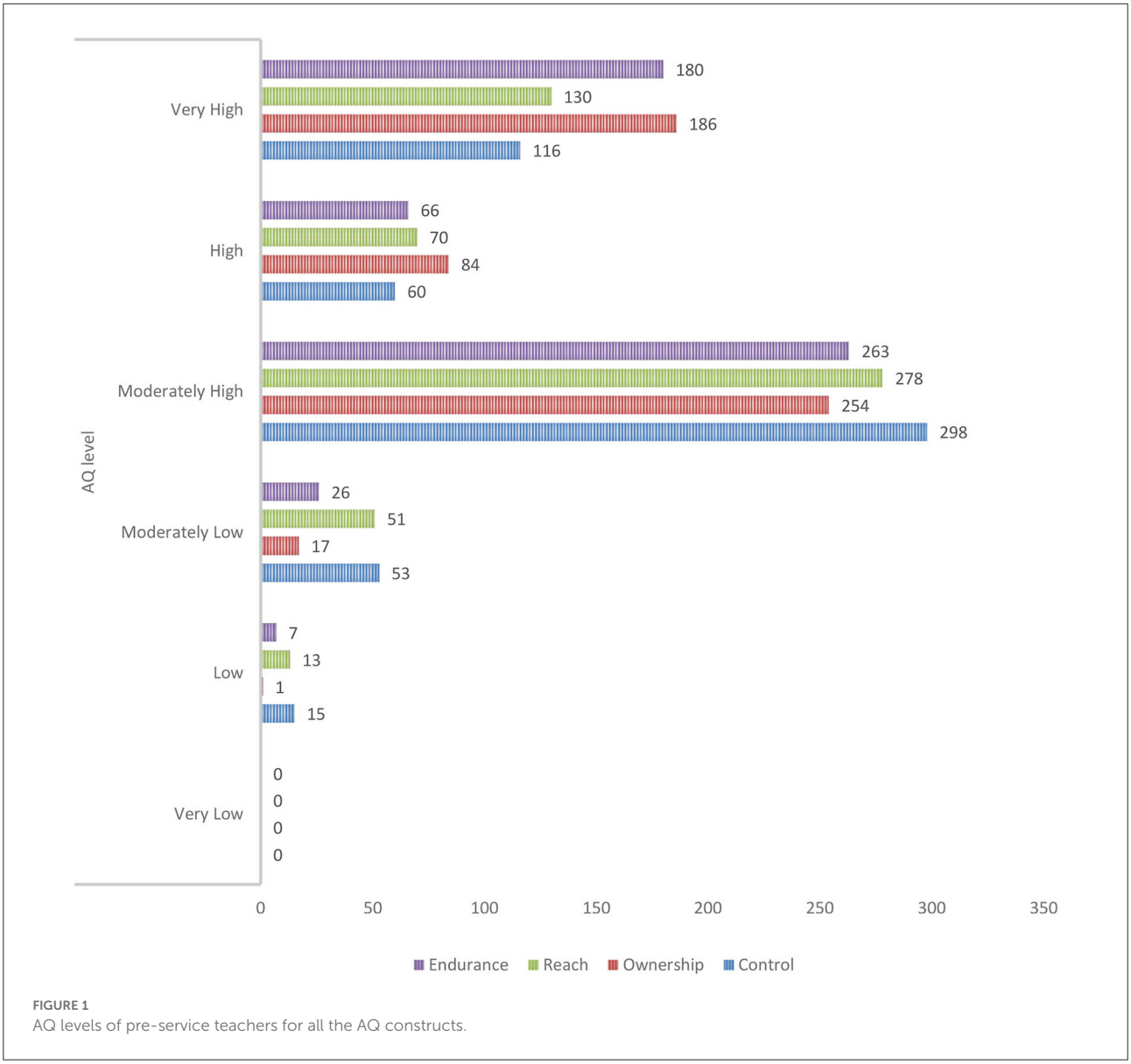

FIGURE 1
AQ levels of pre-service teachers for all the AQ constructs.

(67.97), PSV (67.92), MATE (68.99) and RBT (67.26) are all below the overall index score of the control construct (71.5). The ownership construct show PRA with the highest score (84.72), while PJK recorded the lowest score (score 73.26). Meanwhile, five fields of studies show a score below the overall score of the ownership construct (77.10): TESL (74.70), PKHAS (75.42), PSV (73.67), PJK (73.26), and RBT (75.48). The findings for the reach construct show SN with the highest score (80.21), while PSV recorded the lowest score (70.31). Nonetheless, TESL (70.81), PSV (70.31), MATE (73.14), PJK (70.88), and RBT (71.49) recorded a score below the overall score of the reach construct (73.20). For endurance, SN recorded the highest score with 83.33, while PSV recorded the lowest score with 69.25. However, six fields of study are below the overall index score of the endurance construct (77.30) namely TESL (75.30), PKHAS (77.16), PSV (69.25), PJK (74.72), and RBT (75.56). Based on constructs, the PSV, TESL and RBT respondents AQ index are below average. However, the index of BA, BM, PMZ, PRA, PI, and SEJ respondents were more than average. Figure 5 shows that the highest overall index of AQ was SN, followed by SEJ and PRA. The bottom rank were PSV, TESL and RBT.

Discussion

The findings have shown that the overall AQ level of pre-service teachers is moderately high. Two constructs (endurance and ownership) are at a high level, while the other two constructs

TABLE 9 Crosstab between AQ levels and constructs ($n = 542$).

AQ Construct	AQ Level					
	Very high	High	Moderately high	Moderately low	Low	Very low
Control	116 (21.4%)	60 (11.1%)	298 (55.0%)	53 (9.8%)	15 (2.8%)	0 (0%)
Ownership	186 (34.3%)	84 (15.5%)	254 (46.9%)	17 (3.1%)	1 (0.2%)	0 (0%)
Reach	130 (33.2%)	70 (12.2%)	278 (48.5%)	51 (4.8%)	13 (1.3%)	0 (0%)
Endurance	180 (33.2%)	66 (12.2%)	263 (48.5%)	26 (4.8%)	7 (1.3%)	0 (0%)

TABLE 10 Overall AQ index scores.

Construct	Score	Level	Level
Control	71.5		Moderately high
Ownership	77.1		High
Reach	73.2		Moderately high
Endurance	77.3		High
Pre-service teacher AQ index score	74.8		Moderately high

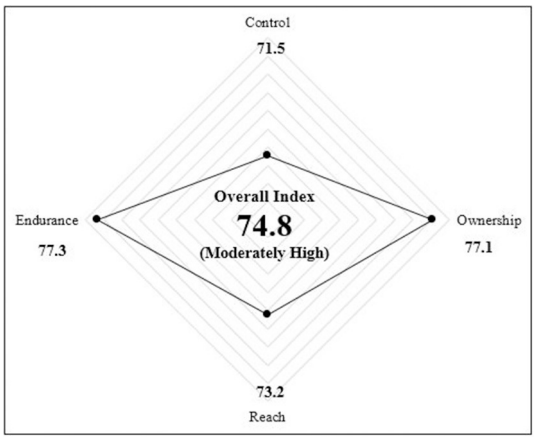

FIGURE 2
Overall AQ index score.

(reach and control) are at a moderately high level. The AQ construct that recorded the highest score is endurance, followed by the ownership, reach, and control constructs. This shows that the pre-service teachers have good self-endurance and are willing to work hard despite the difficult and challenging tasks; besides, the pre-service teachers can also easily establish good relations with the school and students. Sing et al. (47) stated that the self-esteem, motivation, fighting spirit, creativity, sincerity, positive attitude, optimism, and good emotional health are all characteristics of someone with high AQ.

In Malaysia, the are almost no research of AQ on the pre-service teacher including the index development for that purpose. The research exist only for technical students from the study that showing moderate AQ findings (48, 49). However, Indonesia was different when most of the recent research of AQ are focusing on pre-service mathematics teacher. These past researches conducted not only limited during their internship, but also conducted at the end or after their internship. The findings from (25) had analyzed the profile of High School students with high Adversity Quotient (AQ) in learning mathematics show that students with high AQ able to face the learning of mathematics in various materials and with different models of learning. Study by (20) also proven that AQ gives positive influence to the development of mathematical understanding ability of pre-service mathematics teacher with the influence of 57.3 percent. Result from (21) mentioned that AQ gives a positive impact on the development of mathematical argumentation ability of pre-service mathematics teacher, with the effect of 60.2 percent. Furthermore, the ability of mathematical argumentation of pre-service mathematics teacher is more developed on AQ of climber. This revealed that AQ had a potential to helps the teachers and students improving the session for teaching and learning for mathematics.

The pre-service teachers were able to obtain a moderately high AQ score owing to their self-improvement training. The

TABLE 11 AQ index values of practicum pre-service teachers by gender.

Gender	*n*	Control	Ownership	Reach	Endurance	AQ	Level
Male	176	74.36	77.53	74.90	78.37	76.29	
Female	366	70.19	76.90	72.39	76.86	74.09	

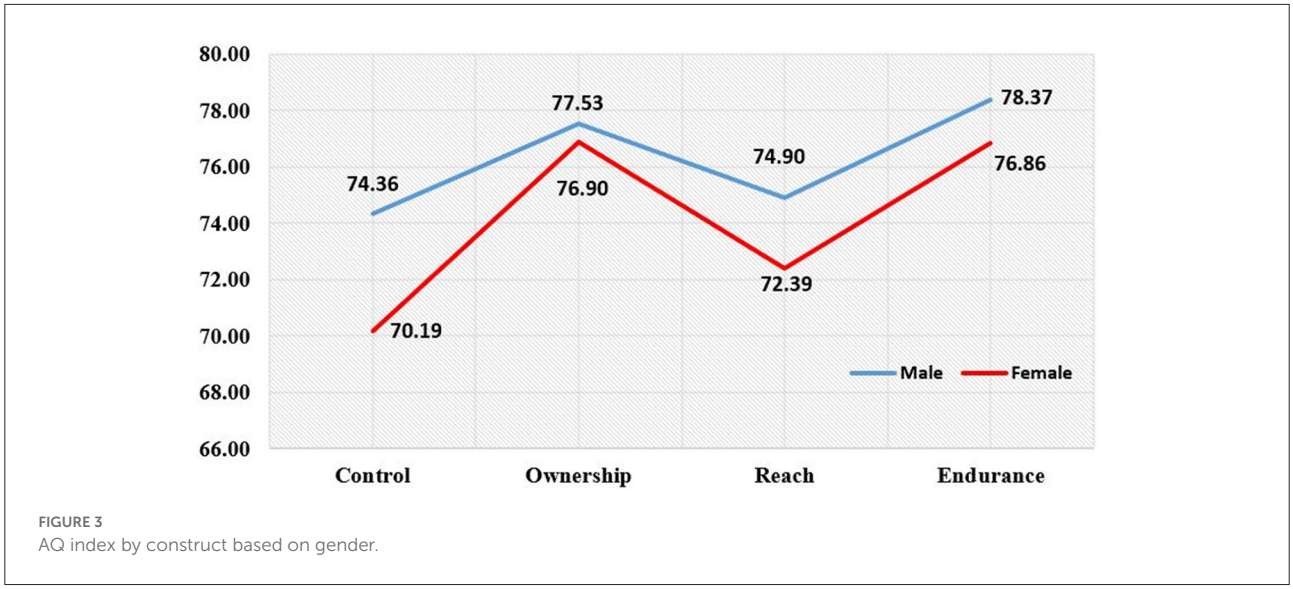

FIGURE 3
AQ index by construct based on gender.

Bina Insan Guru Program (Teachers' Human Development Programme), which is compulsory for all pre-service teachers includes an element of AQ, namely intelligence in facing challenges. Other factors that may contribute to the high AQ level of pre-service teachers also involve curriculum and co-curricular aspects. Various approaches and strategies of student-centered learning have allowed pre-service teachers to be cooperative and collaborative among themselves. In terms of co-curriculum, activities such as camping, outdoor education, clubs, associations, and uniformed units also provide opportunities for pre-service teachers to hone their leadership, resilience, and motivational characteristics. The pre-service teachers' involvement in these programs and activities has successfully inculcated the qualities of self-awareness, self-control, motivation, and social skills among them and subsequently managed to increase their AQ levels. Yazon (50) agreed and found that pre teachers should continue to do what they enjoy and love because success is much easier when you are passionate about what you are doing, regardless of whether you have done it yourself. It is critical to cultivate a passion for something or to focus on doing what you enjoy.

Hema and Gupta (51) stated that teachers should have the resilience to face student challenges at school. Teachers need to build good relationships with other fellow teachers, school staff, parents, and society. Thus, educational institutions must produce human resources and potential educators who are knowledgeable, competent, able to think and solve problems, and have a high AQ in facing challenges. A high AQ score can not only reduce negative emotions but also reduce boredom and despair. The findings of this study are in line with the resiliency theory by Grotberg (52) where a person who can rise from pain is deemed successful and able to control emotions well. From the point of view of AQ constructs, a person with the ability to control challenges in learning is resilient and not easy to admit defeat. If the pre-service teachers are able to think well, they will understand the root causes of challenges and subsequently find solutions (53).

AQ index of pre-service teachers based on gender

The findings have shown differences in AQ levels between male pre-service teachers and female pre-service teachers where the males have higher AQ levels than the females. These findings are in line with previous studies such as Hema and Gupta (51) that examines pre-service teachers, the AQ levels of male pre-service teachers were higher than female students from the problem-solving aspect. The findings were also supported by Ahmad Zamri and Syed Mohamad (49) in their studies involving

TABLE 12 AQ index values of practicum pre-service teachers by semester of study.

Semester	*n*	Control	Ownership	Reach	Endurance	AQ	Level
Six	291	71.13	77.22	72.58	76.58	74.38	
Eight	251	71.95	76.98	73.94	78.24	75.28	

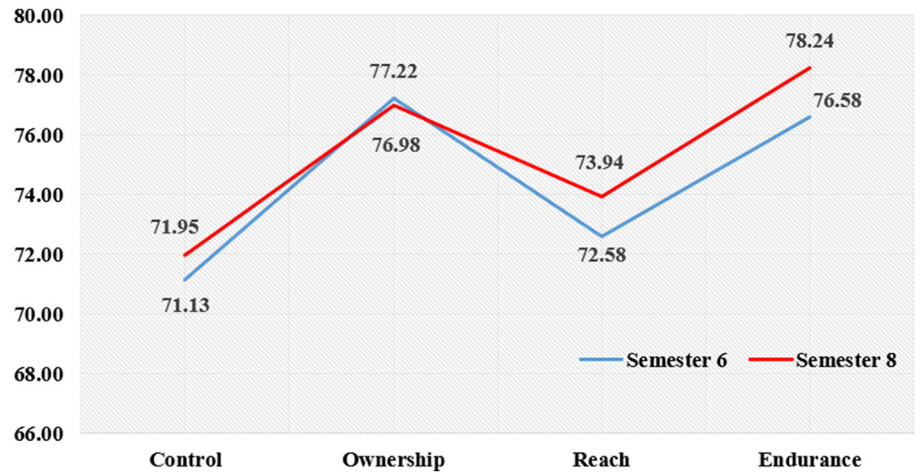

FIGURE 4
AQ index by construct based on semester of study.

USM students, which found that male students were more resilient than female students. The findings are also supported by the contemporary theory, which portrays men as competitors and committed to a task, especially from an employment point of view. On the other hand, females are more dominant in terms of empathy, particularly interpersonal.

However, the findings reported by (48, 54) show otherwise. The AQ level of female students was higher than that of male students and the female students were also more motivated and concerned in carrying out their responsibilities than male students. This finding was supported by Wiwin and Latifah (55) who examined students in Aceh, Indonesia and showed that female students were more responsible and good at controlling challenging situations. Female students were also good at organizing assignments; ultimately, their difficulties can be overcome well. Meanwhile, Ahmad Zamri and Syed Mohamad (49) in the context of USM specifically found that female students are competent in management and have better control than men. Overall, the findings of this study have shown that the AQ levels of male pre-service teachers are higher than female pre-service teachers in all constructs (control, ownership, reach, and endurance). This is strengthened by the aggressive, assertive, prominent, competitive, dominant, coercive, and more independent male nature. Meanwhile, female nature is said to be gentle, affectionate, patient, and dependent on others (56). Kiger (57) revealed that these differences are important in showing how men and women respond to difficulties. Women are more likely to blame themselves when they encounter failure and assume that the failure will last forever. On the other hand, men are more likely to characterize failure as something temporary (58, 59).

AQ index of pre-service teachers based on semester of study

The findings have shown differences in AQ levels between sixth semester pre-service teachers and eighth semester pre-service teachers. The eighth semester pre-service teachers have higher AQ levels than the sixth semester pre-service teachers, and the eighth semester pre-service teachers also recorded higher scores than the sixth semester pre-service teachers in the control, reach, and endurance constructs. However, the score for the reach construct was found to be declining by the final semester.

The findings of this study are in line with a study conducted by Huijuan (38) which found that final year students have higher AQ levels. This is because the students are more mature and have faced challenges before. Likewise, Macasaet (39) found similar findings where senior students recorded high AQ levels and were

TABLE 13 AQ profile of pre-service teachers based on field of study.

Field	*n*	Control	Ownership	Reach	Endurance	AQ index	Level
BA	45	73.84	80.49	74.03	81.06	77.35	
BM	52	72.16	78.55	74.43	79.38	76.13	
TESL	109	67.97	74.70	70.81	75.30	72.19	
PMZ	30	73.75	78.80	75.94	78.50	76.75	
PRA	9	73.38	84.72	74.83	82.78	78.93	
PI	68	75.34	79.73	75.11	79.01	77.30	
PKHAS	74	73.34	75.42	73.29	77.16	74.80	
PSV	20	67.92	73.67	70.31	69.25	70.29	
SEJ	7	75.46	81.68	79.51	81.53	79.55	
MATE	25	68.99	78.67	73.14	77.40	74.55	
PJK	36	72.34	73.26	70.88	74.72	72.80	
RBT	49	67.26	75.48	71.49	75.56	72.45	
SN	18	76.74	81.51	80.21	83.33	80.45	

Arabic (BA), Malay Language (BM), Teaching English as A Second Language (TESL), Music Education (PMZ), Early Childhood Education (PRA), Islamic Education (PI), Special Education (PKHAS), Visual Arts Education (PSV), History (SEJ), Mathematics (MATE), Physical Education (PJK), Design and Technology (RBT), and Science (SN).

better than junior students. However, these findings contradict past studies that demonstrated higher AQ levels of new students than final year students (49, 60). Meanwhile, Mohd Effendi's (48) study in the context of polytechnic students found that first-year students have higher AQ levels than second- and third-year students. First-year students tend to have more challenges in the transition to a new environment from secondary education to higher education. They also tend to face various challenges such as adaptation to the new atmosphere, communication, self-reliance, and financial affairs (12). The study by Shen (59) involves two groups of teachers, i.e., senior and new teachers in Taiwan, where new teachers were found to have higher AQ levels than senior teachers. This is due to the enthusiasm of new teachers who have just been involved in education compared to senior teachers who are becoming less enthusiastic because they have been in the field for a long time (12).

The current study shows that the AQ levels of the eighth semester pre-service teachers are higher than the sixth semester group. These results show an increase in AQ as age increases, which means that AQ can be improved through experience (12). This is because the eighth semester pre-service teachers are more mature in facing the challenges of conducting practicum training in schools. Furthermore, this is their second practicum series. They first gained the experience of becoming teachers in schools and became more and more aware of all the challenges and obstacles (61). On the other hand, this is their first experience of practicum practice in schools for the sixth semester group. Those who are in the eighth semester could control and manage stress as well as be able to solve the problems encountered due to their training experience (62).

Theoretically, the findings of this study are in line with the CORE model by Stoltz (12) in which a person's response pattern to a challenge or difficulty is the result of repeated learning. An individual will learn from repeated failures and subsequently respond to those failures; eventually, this becomes a pattern of individual reactions (12, 63). These findings are also supported by Macaseat's (39), which explains that a person's age affects how they control difficulties. Young pre-service teachers (semester six) have less ability than those who are more mature (semester eight) in handling emotions. Young pre-service teachers also have fewer effective strategies to overcome this weakness because younger individuals do not have much life experience, are independent, and have less developed personal identities than those who are older (12).

AQ index of pre-service teachers based on field of study

In terms of field of study, the findings have shown that SN recorded a very high AQ score, while PSV recorded the lowest AQ level. This clearly shows that all fields of study have different levels of AQ.

The findings of this study are in line with the findings of Cura and Gozum (64), which show the differences in AQ levels among fields of study. The study program that recorded

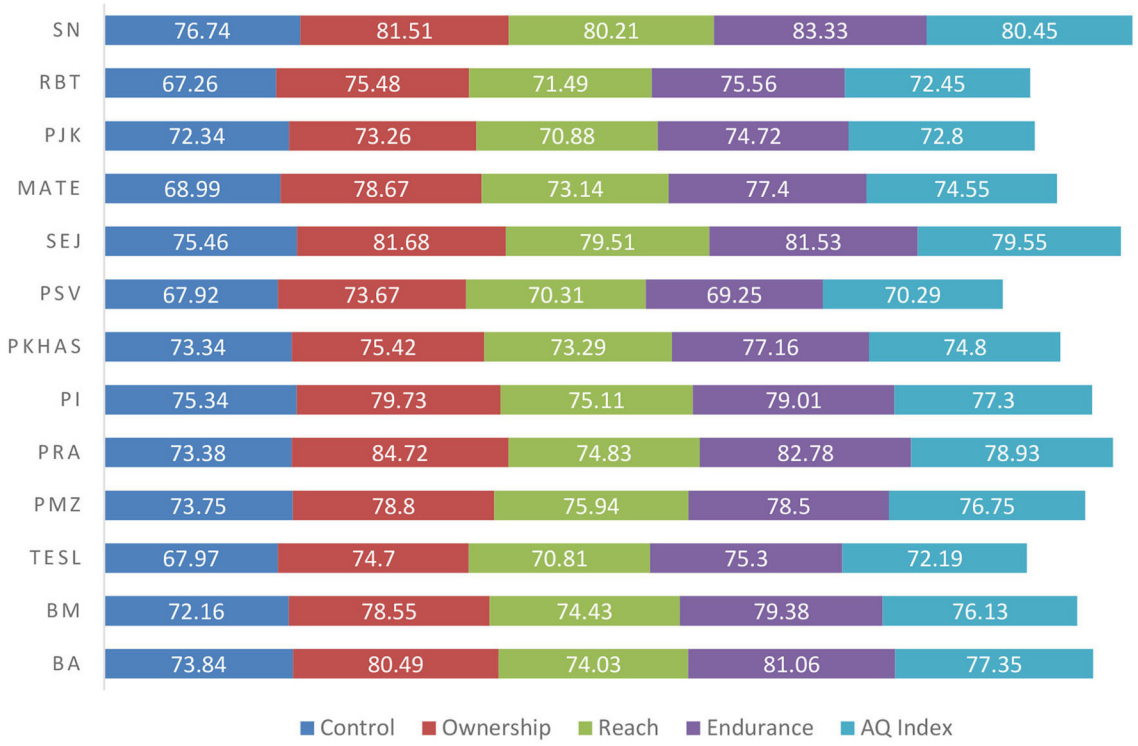

FIGURE 5
AQ index comparison of pre-service teachers based on field of study. Arabic (BA), Malay Language (BM), Teaching English as A Second Language (TESL), Music Education (PMZ), Early Childhood Education (PRA), Islamic Education (PI), Special Education (PKHAS), Visual Arts Education (PSV), History (SEJ), Mathematics (MATE), Physical Education (PJK), Design and Technology (RBT), and Science (SN).

the highest AQ is Computer Engineering, while Computer Studies Major in Information Technology recorded the lowest AQ level. The findings also support the study by Huijuan (38), which showed differences in the AQ levels of students in Nursing, Psychology, Media Communication, and Business Administration programs. The study also found that students from the Psychology program recorded a high AQ level and students in the Nursing program recorded the lowest AQ level. The same goes for the findings reported by Yazon and Manaig (61) on the AQ levels of 126 students in the Philippines, in which science and mathematics students recorded high AQ levels compared to other fields of study.

Studies related to AQ levels based on the field of study in the context of education are very rare because, despite the different fields, the challenges that students receive are not extensively different (53). However, the findings of this study prove the opposite where science pre-service teachers showed higher AQ levels and dominated the constructs of control, reach, and endurance compared to other fields of study. This is evidenced by Halpern et al. (65), which found that students in the field of science have a high level of intelligence compared to students in the field of literature. This is because Science students have a more realistic nature as they are guided by theory, physical, and proof. Science students are also analytical, rational-minded, and have logical nature. On the other hand, literature students are more creative, imaginative, and emotional (31). Furthermore, in the classroom, science pre-service teachers encourage students to develop questions that contribute to an output to avoid unproductive discussions (66).

As for the ownership construct, PRA pre-service teachers were found to achieve a very high level compared to other fields. This is because PRA pre-service teachers are trained to educate children aged 4–6 years in terms of the children's preparation before entering real schools (67). This role is assumed by PRA pre-service teachers to ensure that PRA students master basic education; thus, the teachers are more responsible and ready to face any challenges. Besides, 2–6 year-olds tend to be influenced by their surroundings such as parents, friends, and teachers (67). To ensure the success of these preschoolers, PRA pre-service teachers are more optimistic and do not give up easily. This is in line with the Theory of Optimism by Seligman (68, 69), which states that optimistic individuals will be more successful than pessimistic individuals.

In conclusion, empirical evidence related to AQ differences in terms of field of study is very useful in understanding the AQ patterns of pre-service teachers. Any fields of study that

comprise teachers with low AQ levels are certainly not able to highlight quality work. This is because the teachers cannot afford to turn challenges into success. Furthermore, pre-service teachers who recorded low AQ levels in terms of field of study should also be given more attention, for example, by giving more exposure to AQ aspects through activities such as lectures, workshops, group activities, and even training approaches. The pre-service teachers should also be guided to practice AQ in daily life since AQ is the main determinant in the formation of high-quality teachers (12).

Limitations to the study

Due to practical constraints, this paper cannot provide a comprehensive review of certain aspects due to limitations. First, the data were initiated only from the Institute of Teacher Education (IPG) in the Central Zone, Malaysia and the results may not be fully valid for other teacher education training and zones. Second, the data were only collected from self-reported questionnaires; hence, this study should implement a variety of approaches such as a qualitative or mixed-method. Thirdly, the AQ Index only for the pre-service teachers and cannot be generalized to other samples. Finally, the AQ scores were only distinguished by gender, semester of study, and field of study. Thus, more research on this topic needs to be undertaken other than this demographic scope for a better understanding of AQ.

Conclusions

This article aims to develop the Adversity Quotient (AQ) index of pre-service teachers in the Institute of Teacher Education (IPG). The index shows that the AQ of pre-service teachers is at a moderately high level. Specifically, the highest score entails the construct of endurance, followed by ownership, reach, and control. The findings of this study have also shown that the AQ index of male pre-service teachers is higher than that of females. In addition, pre-service teachers in the final semester have a higher AQ index than pre-service teachers of earlier semesters. Science (SN) pre-service teachers also recorded very high AQ index scores, while Visual Arts Education (PSV) recorded the lowest AQ level. In summary, these results had a good psychometric assessment using the Rasch model.

The findings of this study have several important implications for future practice such as theoretical implications for the CORE model with the development of CORE conceptualization in the context of pre-service teachers. In addition, the items developed in this study are based on challenges in the context of IPG pre-service teachers and were adapted to the CORE model. There are also implications for IPG as the findings of this study have given ideas to change the direction of the program to improve the AQ intelligence of pre-service teachers in all courses, workshops, and lectures. The same goes for the implications of the study for the Ministry of Education Malaysia as a government body that is directly involved in drafting the education curriculum to consider the intelligence element of AQ in the new teacher training curriculum in IPG. Another important practical implication in terms of measurement is that the construction of the AQ index in this study has the potential to strengthen the screening process of teacher selection to strengthen the existing psychometric test findings.

The scope of this study was limited to certain area such as the sample only covered IPG and the Central Zone only. The challenges also restricted to 59 challenges were listed with eight constructs. Future studies will have recommended some ideas in order to cater this limitation. First, the sample of the study should be expanded to the context of pre-service teachers in the IPG of other zones such as the Southern, Northern, Eastern, and Borneo Zones rather than only the Central Zone. In addition, further studies can be conducted on pre-service teachers at Public Universities (UA) and Private Higher Educational Institutions (IPTS). Institutional differences are determined by different challenges compared to IPGs; thus, more new findings will be found by future researchers. Besides, further studies can be done qualitatively as well as by using a mixed-method rather than using questionnaires alone. Further exploration can also be done to catalyze ideas for the intervention process to strengthen the AQ of IPG pre-service teachers more effectively.

Data availability statement

The original contributions presented in this study are included in the article/Supplementary material, further inquiries can be directed to the corresponding author.

Ethics statement

The studies involving human participants were reviewed and approved by Bahagian Perancangan dan Penyelidikan Dasar Pendidikan (Education Planning and Research Division), Ministry of Education Malaysia. Written informed consent for participation was not required for this study in accordance with the national legislation and the institutional requirements.

Author contributions

RMA and MEEMM: conceptualization, validation, resources, and data curation. RMA: methodology, software, formal analysis, investigation, writing—original draft preparation, and project administration. MEEMM: writing—review and editing, visualization, supervision, and funding

acquisition. Both authors have read and agreed to the published version of the manuscript.

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Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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Supplementary material

The Supplementary Material for this article can be found online at: https://www.frontiersin.org/articles/10.3389/fpubh.2022.940323/full#supplementary-material

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EDITED BY
Yuka Kotozaki,
Iwate Medical University, Japan

REVIEWED BY
Wilson Abreu,
University of Porto, Portugal
Catalina Sau Man Ng,
The Education University of Hong Kong, Hong Kong SAR, China

*CORRESPONDENCE
Naqi Dahamat Azam
naqiuddin@upm.edu.my

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Job stress and depression among Malaysian anti-drug professionals: The moderating role of job-related coping strategies

Noradilah Md Nordin[1], Naqi Dahamat Azam[2]*, Mohd Roslan Rosnon[3] and Mansor Abu Talib[4]

[1]Centre for Human Sciences, Universiti Malaysia Pahang, Kuantan, Malaysia, [2]Department of Human Development and Family Studies, Faculty of Human Ecology, Universiti Putra Malaysia, Serdang, Malaysia, [3]Department of Social and Development Sciences, Faculty of Human Ecology, Universiti Putra Malaysia, Serdang, Malaysia, [4]Faculty of Social Science and Liberal Arts, UCSI University, Kuala Lumpur, Malaysia

Depression can cause negative consequences to workers' health and social functioning, such as poor work productivity, mental disorders, and suicide. Existing studies have argued that job stress is closely related to depression in many professions. Yet, information on how coping strategies play a significant role in the relationships among Malaysian anti-drug professionals is still scarce. Thus, the aim of this study was to examine to what extent coping strategies moderate the relationship between job stress and depression among Malaysian anti-drug professionals. A total of 3,356 National Antidrug Agency (NADA) officers aged between 21 and 59 years completed online self-report measures of depression, job stress, and job-related control coping and avoidant coping behaviors. The results showed that job stress was strongly correlated with depression, and both coping strategies were found to significantly moderate the correlations. The correlations between stress and depression were stronger among participants who had higher levels of avoidant coping or those who had lower levels of control coping. To conclude, this study highlights the importance of considering job stress and coping behaviors to understand anti-drug professionals' mental health during this challenging COVID-19 pandemic.

KEYWORDS

mental health problem, depression, control coping, avoidant coping, Malaysia

Introduction

Depression is a critical mental health issue that has attracted much attention among Malaysians in recent years. It is regarded as the leading psychological cause of suicidality and suicidal ideation in Malaysia (1–3). Moreover, depression can have negative consequences for individual physical, social, and emotional functioning. Physically, depressed people usually have problems with insomnia, constant tiredness, loss of appetite, and substance use (4–6). Also, they often avoid social interaction, which

increases loneliness and social isolation (7–9). Regarding emotions, depressed people tend to experience low moods, such as persistent feeling of sadness (10–12).

Much effort has been devoted to understand depression and its underlying factors among different age groups in Malaysia. For instance, research has identified family background, lifestyle factors, bullying experiences, sleeping problems, and self-esteem as main risk factors of depression in young age groups, such as school and university students (13–15). Meanwhile, in adult working populations, some major contributors to depression are high job demands and poor working conditions (16, 17). While job stress has been long identified as closely linked to depression globally (18, 19), this association is less evident in Malaysia.

Job stress refers to the physical and emotional (negative) outcomes that result from a worker's inability to conform to the job demands and requirements (20, 21). Commonly, law enforcement personnel such as policemen and correctional officers are more likely to experience higher job stress than other occupational groups (22, 23). Furthermore, evidence shows that intensive job stress experienced by law enforcement personnel can lead to depression (24–26). Yet, thus far, no study in Malaysia has investigated the relationship between job stress and depression among law enforcement personnel.

Coping is also an important predictor of depression (27). It refers to physical and mental efforts used to deal with stressful situations (28). Latack (29) suggested two strategies that can be applied to cope with job stress, namely control and avoidant coping. Control coping refers to a problem-focused strategy meant to address the root causes of a stressful situation in a healthy way. This strategy involves altering a stressor or one's reaction to the stressor. Meanwhile, avoidant coping is a passive coping strategy in which individuals rarely make efforts to change stressful situation (30). Among the common strategies used for avoidant coping are ignoring the stressor and withdrawing from the stressful situation. Although avoidant coping might be a good 'short-term' solution, unsolved problems can potentially elicit more conflicts and distress in interpersonal relationships and possibly other functioning, thus maintaining depression in the long run (31). Furthermore, previous studies have suggested that individuals' preferences for coping strategies can have an impact on psychological disorders, such as depression. Individuals who employs control coping strategies are able to actively and constructively address their stressors, which can lessen the likelihood of depression (32, 33). However, individuals who prefer to avoid solving problems may tend to be depressed, due to their ineffectiveness in dealing with the stressors (31, 34).

Thus far, enormous efforts have been devoted to understand the relationship between stress and depression and how preferences for coping strategies differ in that relationship. Yet, less attention has been paid on this topic in Malaysian law enforcement agencies, particularly the National Antidrug Agency (NADA). As the name implies, NADA is a Malaysian government agency that functions primarily to curb drug and substance abuse through prevention, treatment, and rehabilitation (35). Yet, despite NADA achieving the highest recovery rate of drug addicts in 2018, the nature of the organization's operation is undeniably involving high risk activities. For instance, NADA officers are exposed to violence and infectious diseases carried by illicit drug users who are aggressive (36, 37). Existing studies have shown that professionals who work in the community are at risk of developing psychological distress such as depression and post-traumatic stress syndrome when experiencing intense stressors at work (38, 39). Thus, coping strategies are essential to protect these professionals' mental health well-being and improve their job performance (40).

Therefore, the aim of this study was to examine the relationships between job stress, coping strategies, and depression among NADA officers. Regarding this, it was expected that job stress and avoidant coping would be related to more depression, and control coping would be related to less depression. Also, this study investigated any moderating effects of control and avoidant coping strategies on the relationship between job stress and depression among the participants. Due to this, it was expected that job stress would be related to higher levels of depression, particularly in participants who used less control coping and more avoidant coping.

Methodology

Study design, setting, and sample population

This study used a correlational cross-sectional research design in all zones of NADA (i.e., East and West Malaysia states). Due to the movement control order imposed in Malaysia during the COVID-19 outbreak, data were collected through an online Google Form survey. Prior to the data collection, ethical approval was granted by the Ethics Committee of Universiti Putra Malaysia. Also, permission was given by the management team of NADA to conduct this study, and informed consents were obtained from all participants. The NADA's Research Division was tasked to send the link to the online survey to the NADA staff's work email addresses. By using convenience sampling, a total of 3,356 NADA officers aged between 21 and 59 years (68.2% men; $m_{age} = 37.92$ years, $SD_{age} = 7.01$ years) participated in this study. The participants represented 57.4% of the total number of NADA employees ($N = 5,838$).

Research tools

Socio-demographic questionnaire

The socio-demographic questionnaire asked about participants' sex, race, age, marital status, socioeconomic status (i.e., educational levels and monthly income), and years of service in the anti-drug profession.

Patient health questionnaire (PHQ)

The Malay version of the *Patient Health Questionnaire* [PHQ-9; (41)] is a 9-item, self-reported questionnaire that assesses the severity of depressive symptoms. Some examples of the items are "*Little interest or pleasure in doing things*" and "*Thoughts that you would be better off dead or of hurting yourself in some way.*" The participants were asked to rate their frequencies on each item on a Likert-type scale (0 = *not at all*, 1 = *several days*, 2 = *more than half the days*, 3 = *nearly every day*). The high score indicates high levels of depression.

Job-related tension index (JRTI)

The Malay version of *Job-Related Tension Index* (42, 43) is a 15-item self-reported questionnaire that measures participants' job stress. A few examples of the items "*Not knowing just what the people you work with expect of you*" and "*Feeling that your job tends to interfere with your family life*." All items were rated on a 5-point Likert scale (from 1 = *never* to 5 = *rather often*). A high score indicates an individual's high job stress level.

Coping with job stress

Coping with Job Stress (29) is a 28-item self-reported questionnaire that assesses two different coping behaviors, namely, control coping and avoidant coping. An example of a control coping item is "*Try to see this situation as an opportunity to learn and develop new skills*," and an example of an avoidant-coping item is "*Separate myself as much as possible from the people who created this situation*." The participants were asked to rate their response on each item with a 5-point scale (from 1 = *hardly ever do this* to 5 = *almost always do this*).

Recently, no Malay-translated version was available for Coping With Job Stress. Therefore, the questionnaire was translated from English into Malay (i.e., the national language of Malaysia), and it was back-translated by an independent bilingual translator. We compared the back-translated version with the original to check for language consistency, and any inconsistencies were resolved through discussion. We tested all questionnaires in a pilot study ($n = 74$) and minor amendments were made prior to conducting the actual study.

Table 1 presents the psychometric properties of all measures. Overall, the internal consistency was adequate ($0.84 < \alpha < 0.92$).

Statistical analyses

First, we performed descriptive analyses on each study variable. Second, we tested the relationships between job stress, control coping, avoidant coping, and depression using Pearson's correlation analysis. Third, we conducted two separate hierarchical linear regression analyses to examine the moderating role of coping strategies in any relationship between job stress and depression. In each analysis, the controlled variable (age) was entered in the first step (Model 1), the independent variables (job stress) and moderating variables (control coping, avoidant coping) in the second step (Model 2), and the interaction variables (job stress × control coping, job stress × avoidant coping) in the third step (Model 3). All analyses were conducted using IBM SPSS version 26 (44).

Missing data analysis

Prior to data analysis, a missing value analysis was conducted to determine the proportion and pattern of missing data in our study. The results of Little's MCAR test ($\chi^2 = 4.339$, $DF = 5$, $p = 0.503$) indicated missing completely at random. Considering the small amount of missing data (0.07% incomplete cases and 0.01% unfilled values), we performed a complete case analysis (*list-wise deletion*) for all further analyses.

Results

Socio-demographic characteristics of the study participants

A total of 3,356 anti-drug professionals were selected as participants in the study. The majority of the participants were men (69.1%), Malays (88.4%), aged between 31 and 40 years (61.0%), and married (87.2%). Regarding socioeconomic status, the majority had educational levels of high schools or diplomas (79.9%) and an income range between RM2001 and RM3000 (50.1%). Also, 63.6% of participants had worked as an anti-drug officer for 11–20 years.

Descriptive characteristics and levels of job stress, coping behaviors, and depression

Table 1 presents the descriptive characteristics of each study variable. Based on the findings, more than half of the

TABLE 1 Psychometric properties of the questionnaires for depression, job stress, control coping and avoidant coping ($n = 3356$).

	n (%)	*n* items	Range	Cronbach's α	Total	M (SD)		*t*
						Men ($n = 2320$)	Women ($n = 1036$)	
Depression		9	0–3	0.87	8.43 (5.55)	8.52 (5.73)	8.24 (5.14)	1.38
Severed	149 (4.4)							
Moderately severed	336 (10.0)							
Moderate	658 (19.6)							
Mild	1339 (40.0)							
Minimal	869 (26.0)							
Job stress		15	1–3	0.94	2.53 (0.88)	2.54 (0.91)	2.50 (0.83)	1.16
High	1628 (48.6)							
Low	1723 (51.4)							
Coping strategies								
Control		17	1–5	0.92	3.96 (0.62)	3.97 (0.64)	4.00 (0.58)	−1.36
High	1723 (51.2)							
Low	1633 (48.7)							
Avoidant		11	1–5	0.84	2.88 (0.72)	2.89 (0.74)	2.86 (0.66)	1.04
High	1764 (52.6)							
Low	1592 (47.4)							

*$p < 0.001$.

participants reported low levels of stress but higher levels of control coping and avoidant coping. Also, the majority of the participants experienced mild and minimal levels of depression. Furthermore, our preliminary analysis showed gender similarities in job stress and depression levels, as well as the frequency with which both coping behaviors were used.

Relationships between job stress, coping strategies, and depression

Table 2 shows the results of the Pearson's bivariate correlations of job stress, control coping, avoidant coping, and depression. The results showed that depression was positively related to job stress and avoidant coping, but negatively related to control coping. Furthermore, job stress was related to less control coping and more avoidant coping. Also, control coping was positively related to avoidant coping.

TABLE 2 Pearson's correlation coefficients of work stress and job coping strategies (control, avoidant) on depression ($n = 3356$).

	Depression	Stress	Control coping	Avoidant coping
Depression	-			
Stress	0.65***	-		
Control coping	−0.10***	−0.10***	-	
Avoidant coping	0.39***	0.39***	0.09***	-

***$p > 0.001$.

Control coping as the moderator

Table 3 depicts the results of the hierarchical regression analysis with depression as the dependent variable, job stress as an independent variable, and avoidant coping as a moderating variable. It was shown that younger participants reported more depression (Model 1). Moreover, higher levels of control coping were related to less depression, yet job stress and avoidant coping were related to more depression (Model 2). Furthermore, control coping interacted with the levels of job stress (Model 3).

As shown in Figure 1, higher levels of job stress were related to depression in participants with any degree of control over coping. Yet, the effects were more pronounced in participants with lower levels of control coping. Supplementary Table 1 presents the results of a hierarchical regression analysis in greater detail.

Avoidant coping as the moderator

Table 4 depicts the results of the hierarchical regression analysis with depression as the dependent variable, job stress as an independent variable, and avoidant coping as a moderating

variable. It was shown that younger participants reported more depression (Model 1), and higher levels of stress predicted more depression (Model 2). Moreover, avoidant coping interacted with the levels of job stress (Model 3).

As shown in Figure 2, higher levels of job stress were related to depression in participants with any degree of avoidant coping. Yet, the effects were more pronounced among participants with higher levels of avoidant coping. Supplementary Table 2 presents the results of a hierarchical regression analysis in greater detail.

Discussion

The contribution of job stress and coping strategies to mental health issues, such as depression, has long since been studied. Understanding these relationships is indeed important and necessary to develop preventive strategies against depression in working populations. Yet, fewer studies have been conducted on the effect of different degrees of coping strategies on the relationships between job stress and depression, with far fewer studies available in East Asia. This study was focused on this.

TABLE 3 Regression analysis showing age, stress and control coping as predictors of depression ($n = 3,356$).

Predictor	Depression				
	B	β	*SE B*	*P*	$R^2/\Delta R^2$
Model 1					0.01/0.01*
Age	−0.07	−0.10	0.01	0.000	
Model 2					0.43/ 0.42*
Stress	4.05	0.64	0.08	0.000	
Control	−0.55	−0.06	0.12	0.000	
Model 3					0.43 /0.00*
Stress × Control	−0.45	−0.32	0.12	0.000	

*$p < 0.001$.
β = standardized regression coefficients; SE, Standard Error; P, significant value; Δ R^2 = change in R^2 value.

TABLE 4 Regression analysis showing age, stress, and avoidant coping as predictors of depression ($n = 3356$).

Predictor	Depression				
	B	β	*SE B*	*P*	$R^2/\Delta R^2$
Model 1					0.01/0.01*
Age	−0.07	−0.10	0.01	0.000	
Model 2					0.43/0.42*
Stress	3.75	0.60	0.09	0.000	
Avoidant	0.83	0.11	0.12	0.000	
Model 3					0.44/0.00*
Stress x Avoidant	0.47	0.34	0.09	0.000	

*$p < 0.001$.
β = standardized regression coefficients; SE, Standard Error; P = significant value; Δ R^2 = change in R^2 value.

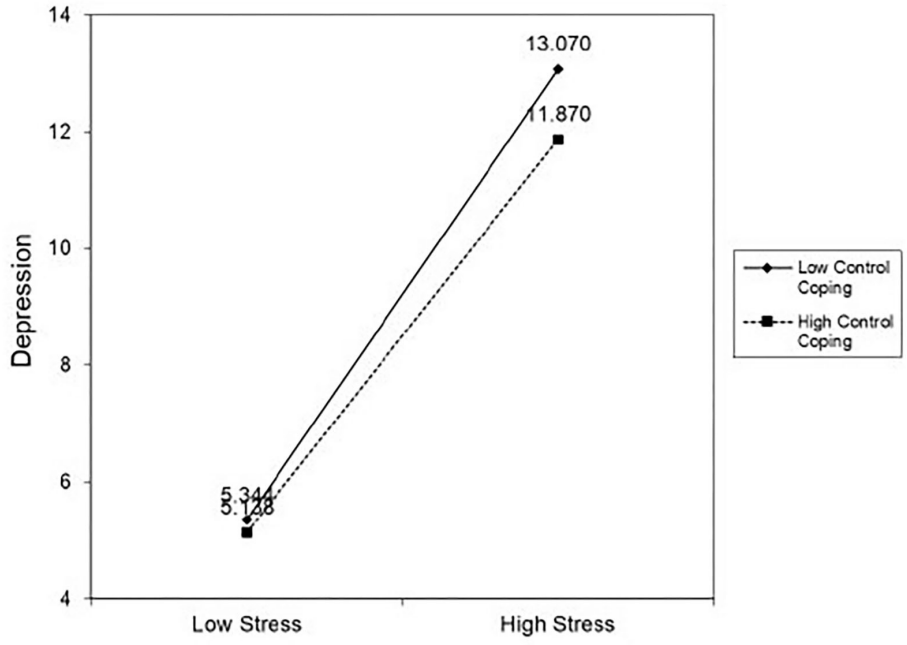

FIGURE 1
The moderating effect of control coping on the relationships between job stress and depression.

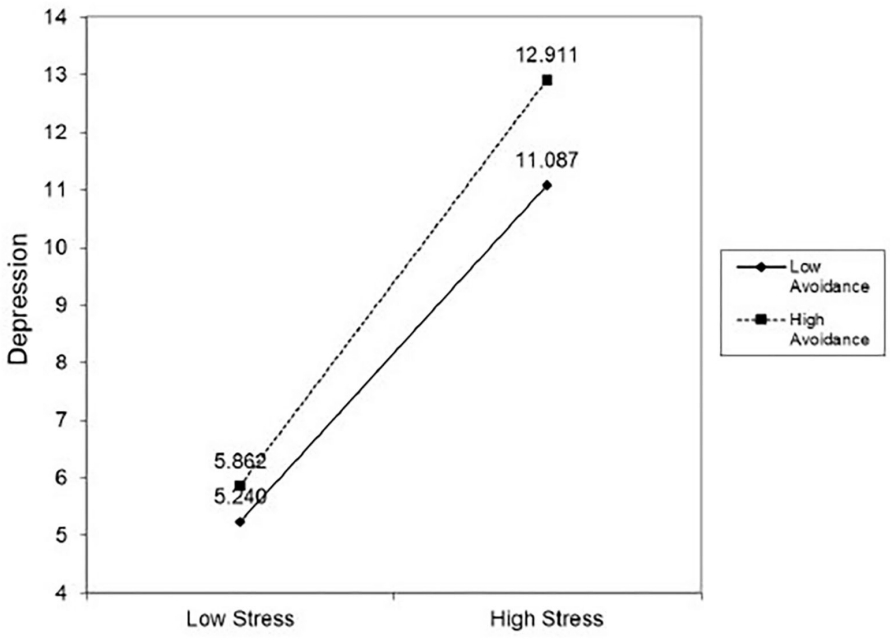

FIGURE 2
The moderating effect of avoidant coping on the relationships between job stress and depression.

In general, the findings from this study share many similarities with prior studies. First, as expected, job stress was related to more depression in anti-drug professionals. This finding supports the idea that job stress is a prominent factor of depression, which is now being witnessed in anti-drug professionals in Malaysia (24–31, 33–35, 38, 39). Indeed, considering the job nature of anti-drug professionals, which includes multiple responsibilities (i.e., enforcement, treatment, medication, and rehabilitation service) and contains occupational health risks (e.g., aggressive clients, infectious diseases among clients), it is understandable that the job itself poses a risk to their mental health well-being.

Also, in line with prior studies, control coping was related to less depression and stress, while avoidant coping was related to more depression and stress (31–34). These findings have strengthened the idea that control coping plays a better role as a buffer to psychological disorders than avoidant coping in anti-drug professionals. Indeed, by being active and positive in addressing problems at work, an individual can maintain good relationships and avoid conflicts with co-workers, thus reducing the chances of developing mental health problems (45). Meanwhile, ignoring and distancing self from stressful situations, which characterized avoidance strategies, did not help in solving problems, but also created more opportunities for stress and depression (46).

Furthermore, the expectations regarding the moderating effects of coping strategies were also met. As expected, the results showed that stress was related to more depression in anti-drug professionals who had lower levels of control coping and higher levels of avoidant coping. Certainly, individuals with poor control coping are more likely to experience anxiety, impulsiveness, and insecurity, but they are less likely to experience well-being (47, 48). Together, these negative properties of the self and avoidant coping strategies seem to not protect individuals from depression when intense stress is experienced.

Yet, unexpectedly and intriguingly, it was also found that anti-drug professionals who had higher levels of control coping and lower levels of avoidant coping also experienced depression when their stress levels were high. Commonly, both high-control coping and low-avoidant coping can be regarded as the properties of an adaptive and problem-focused approach to coping, which lead to better psychological outcomes (49, 50). Thus, it can be speculated that despite any preference for using coping strategies, depression cannot be prevented when the intensity of job stress is high.

Conclusion

This study is an important step toward understanding the relationships between job stress and depression in Malaysian anti-drug professionals by taking into account individuals' various degrees of coping strategies. In this study, it was

found that job stress was a crucial predictor of depression, regardless of what coping strategies were used. Still, control coping has good potential as a protective factor against depression in anti-drug professionals. While this study might carry some limitations (i.e., no causal-effect explained, used a self-report questionnaire only, and involved a single agency), its findings highlight the need to provide clinical supervision in correctional settings, which in this case, to assist anti-drug professionals in improving their attitudes, behaviors, and practices and achieve mental health well-being (51). Nevertheless, it is noteworthy to draw attention to these important aspects as a focus for the Malaysian government to formulate preventive initiatives for mental health issues in law enforcement agencies.

Data availability statement

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

Ethics statement

The studies involving human participants were reviewed and approved by Ethics Committee of Universiti Putra Malaysia. The participants provided their written informed consent to participate in this study.

Author contributions

ND and MA contributed to the conception and design of the study. ND, NN, MR, and MA collected the data, organized the database, performed the statistical analysis, and wrote sections of the manuscript. All authors contributed to the manuscript revision and read and approved the submitted version.

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Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Publisher's note

Supplementary material

The Supplementary Material for this article can be found online at: https://www.frontiersin.org/articles/10.3389/fpsyt.2022.1020947/full#supplementary-material

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Wulf Rössler,
Charité Universitätsmedizin
Berlin, Germany

REVIEWED BY
Hwee San Lim,
Universiti Sains Malaysia
(USM), Malaysia
Mohammed Jashimuddin,
University of Chittagong, Bangladesh
Abdus Subhan Mollick,
Khulna University, Bangladesh

*CORRESPONDENCE
Guek-Nee Ke
g.n.ke@hw.ac.uk

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Influence of mangrove forests on subjective and psychological wellbeing of coastal communities: Case studies in Malaysia and Indonesia

Guek-Nee Ke[1]*, I. Ketut Aria Pria Utama[2], Thomas Wagner[3], Andrew K. Sweetman[3], Aziz Arshad[4], Tapan Kumar Nath[5], Jing Yi Neoh[1], Lutfi Surya Muchamad[2] and Djoko Santoso Abi Suroso[6]

[1]Department of Psychology, School of Social Sciences, Heriot-Watt University Malaysia, Putrajaya, Malaysia, [2]Department of Naval Architecture, Institute Teknologi Sepuluh Nopember, Surabaya, Indonesia, [3]The Lyell Centre, Heriot-Watt University, Edinburgh, United Kingdom, [4]Department of Aquaculture, Faculty of Agriculture, Universiti Putra Malaysia, Serdang, Malaysia, [5]School of Environment and Geographical Sciences, University of Nottingham Malaysia, Semenyih, Malaysia, [6]Bandung Institute of Technology, Bandung, Indonesia

Mangrove forests possess multiple functions for the environment and society through their valuable ecosystem services. Along with this, the mangrove forests have large and diverse social values, in combination contributing to the health and wellbeing of the surrounding communities. This study aims (i) to assess the benefits of mangrove forests and their impact on subjective and psychological wellbeing of coastal communities and (ii) to understand the challenges coastal communities face that limit sustainable wellbeing. We have used a mixed methodological approach, combining workshop, interview, and survey, to obtain qualitative and quantitative information from two coastal communities in Malaysia and Indonesia. For quantitative data, 67 participants from both coastal communities participated using a pre-tested structured questionnaire. To obtain opinions from key informants in Malaysia and Indonesia, we organized two stakeholders' workshops and community interviews. When merging these interviews and workshops, we identified the following three themes related to the perception of mangrove forest benefits: (1) the advantage of living in a natural countryside; (2) the natural resources supporting employment, income, and family security; and (3) the increase in subjective and psychological wellbeing. The mean score of wellbeing for Indonesian participants (28.6) was slightly higher than that for Malaysian participants (26.2) and was significant. Overall, the respondents felt happy because the combination of job security and leisure activities supports feeling content and satisfied. The analyses also suggest that the combination of exposure to coastal environments and stress reduction promotes good mental health; however, diagnostic health data are lacking. The lower score of mental wellbeing in Malaysia is attributed to respondents involved in risky fishing activities and local regions with excessive tourism. The findings from this study imply that coastal mangrove forest management plays an important role in the living conditions of coastal communities and their subjective

and psychological wellbeing. Hence, restoration and sustainability of mangrove ecosystem are important.

KEYWORDS

mangrove ecosystems, socio-economic, psychological wellbeing, coastal communities, subjective wellbeing

Introduction

Mangrove forests possess multiple functions for the environment and society through their valuable ecosystem services, including provisioning, regulating, habitat, and cultural services. These unique forests bordering tropical coastlines worldwide (1–3) have high significance in terms of economy and ecological functions, for example, through provision of storm and tsunami protection for communities who live in coastal areas (4–7). The wide range of ecosystem services provided by mangrove forests have large and diverse social values, in combination contributing to the health and wellbeing of the surrounding communities (3, 8–12). The social value of mangroves is closely associated with deeply held historical, communal, ethical, religious, and spiritual attributes, which are considered as sources of subjective wellbeing (13).

Subjective wellbeing is a multidimensional construct capturing basic human psychological needs, such as security, materials supporting a satisfactory life, health, and successful social relationships (14). It is known as an umbrella that includes individual emotional responses, domain satisfactions, and global judgments of life satisfaction (15, 16). More specifically, subjective wellbeing refers to peoples' opinion and feelings of their surrounding natural environment that impact satisfaction on life and happiness (17, 18), which is considered a key indicator defining quality of life (19). Along with subjective wellbeing, the intrinsic values (e.g., aesthetic, moral, and cultural values) of ecosystem services and the interactions between human and nature have a bearing upon psychological wellbeing of community people (13, 20, 21). It is evidence that direct and indirect contact with nature improves peoples' emotion, reduces stress, makes them feel more alive and cooperative, and thus improves psychological wellbeing of people (22, 23). Various studies have shown [e.g., (24, 25)] that forest-based activities such as forest walk and viewing scenic beauty have positive impacts on mental health, including stress, anxiety, depression, negative emotions, and quality of life.

There has been substantial research on the linkages between subjective wellbeing and nature in many countries, particularly in western nations, including Australia, East Asia, European countries, and North America (26, 27). More specifically, within the mangrove forest context, subjective wellbeing refers to a measure that assesses the relationship of individuals with the forest. Such studies are, however, very limited in Southeast Asia like Indonesia and Malaysia (28). Current understanding emphasizes that understanding subjective wellbeing related to ecosystems services is crucial for balancing a good life while supporting sustainable development (29), and hence, researchers have suggested to include the notion of subjective wellbeing in natural resources management (27). Maintaining and promoting a congenial relationship between forest ecosystem services and subjective wellbeing is an important aspect of regional sustainable development and hence is considered essential (30–32). A comprehension of subjective wellbeing may help to address forest management problems commonly faced by policymakers (28).

To the best of our knowledge, no previous studies on subjective wellbeing effects of forests or nature specifically explored the impact of mangrove forests on psychological wellbeing. As mentioned above, having these research gaps, this study aimed (i) to assess benefits of mangrove forests and their impact on subjective and psychological wellbeing of coastal communities and (ii) to understand the challenges toward sustainable wellbeing of coastal communities. Data for this study were collected from two coastal communities in Malaysia and Indonesia. We approach subjective wellbeing as an assessment based on personal judgments of general happiness or satisfaction (33) and psychological wellbeing indicating the positive functioning of individuals in relation to life satisfaction (34).

A conceptual framework of subjective and psychological wellbeing and mangrove forests

Research to date has partly tested the benefits of mangrove ecosystem on subjective and psychological wellbeing of coastal communities. We assumed that mangroves through their direct (e.g., timber, firewood, fish, etc.) and indirect (e.g., protection from storms and flood, etc.) benefits influence both subjective and psychological wellbeing of coastal communities (Figure 1). In this study, SWB is comprised of two components, namely, feeling happy and satisfaction with life (15, 35). Satisfaction with life evaluates how the environment, income, livelihood, and work–life balance

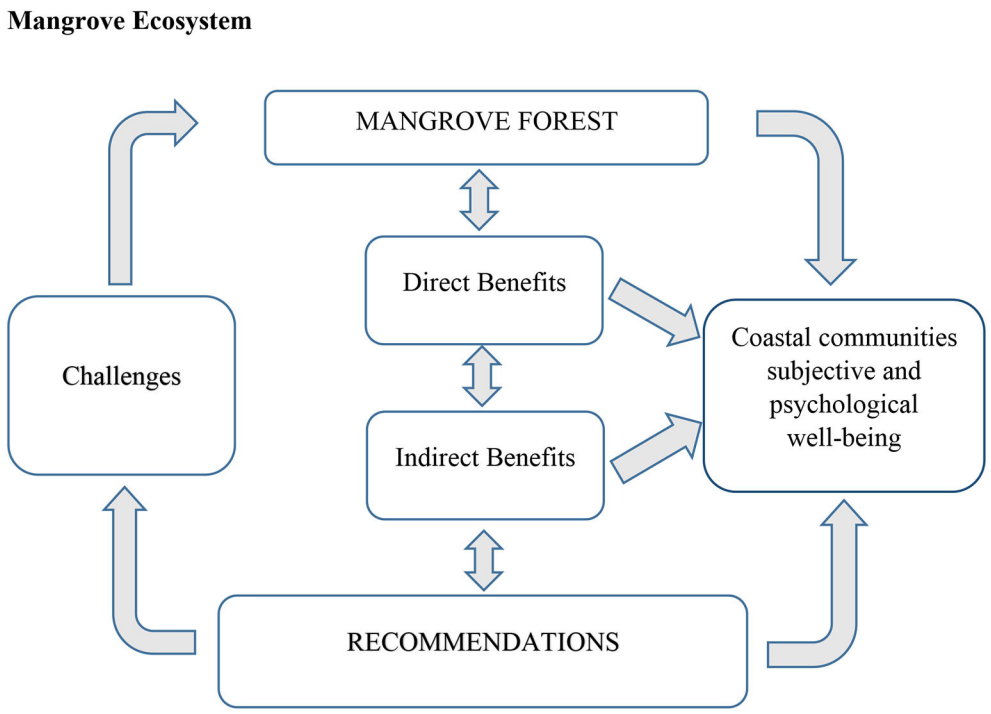

FIGURE 1
A conceptual framework showing possible relationships between mangrove forest systems and wellbeing of coastal communities.

impact the subjective wellbeing of people (36–38). Different from that, psychological wellbeing of local people combines feeling confident, relaxed, cheerful, optimistic about future, and close to other people, all linked to their connectivity to mangrove forests (39–41). Mangrove ecosystems are subject to many challenges (e.g., degrade the ecosystem), which need action toward sustainability and improved management. In this study, we collect new information on the relationship between mangrove forests and local peoples' wellbeing and anticipate that they can support recommendations for sustainable forests management to the benefits of the coastal communities.

Study areas

Two mangrove sites were selected based on the richness of the mangrove ecosystem in the two Southeast Asia countries of Malaysia and Indonesia.

Matang Mangrove Forest Reserve (MMFR) is located in the north-west coast of the Peninsular of Malaysia (4°51′7.14″N−100°38′48.50″E). The Perak State Forestry Department manages MMFR covering about 40,466 ha and still considered as the best managed mangrove forest in the world (42). MMFR management includes a healthy charcoal industry (43, 44) with Matang being responsible for 70% of international charcoal export from Malaysia in year 2013 (45). The second important commodity is tourism and education, including bird watching, forest, and biodiversity research (22, 46). These activities have improved the economic condition of local communities in the MMFR area, supported by strict management (47). Data for this study were collected from deliberately selected two villages, namely Kampung Baru Kuala Sepetang and Kampung Menteri, in MMFR.

Mangrove Wonorejo Surabaya (MWS) is a protected mangrove area in Surabaya, Indonesia (7°18′76″S−112°48′922″ E to 7°18′328″ S−112°50′691″E). MWS covers ∼700 ha and is managed by the Department of Food Security and Agriculture of the City of Surabaya Government and declared as a conservation area by the City Major of Surabaya under Surabaya City Regional Regulation No. 3, 2007 (48, 49). The mangrove ecosystems in Wonorejo are managed to increase human welfare, in sectors such as education, conservation, and rehabilitation (50). Eco-tourism in MWS attracts both local and outside visitors, which directly or indirectly develop and upgrade the welfare of local communities living in and around mangrove forests (51–54), through broad opportunities for economic development (55, 56). Data for this study were collected from Pamurbaya in MWS.

Methods

This study adopted qualitative and quantitative methodologies to collect data.

Qualitative study

We initiated two qualitative approaches, namely, stakeholder workshop and key informant interviews.

Stakeholder workshops

Researchers organized 2 full-day stakeholder workshops at MMFR and MWS in February 2020. The aim of the workshops was to understand the challenges and opportunities of mangrove forests management in both study sites. Representatives (23 in MMFR and 21 in MWS) from 22 organizations joined in the workshops, including: the Department of Forestry, Department of Fisheries, Perak Fishermen's Association, Fisheries Research Institute Malaysia, Malaysian Nature Society of Perak Branch, Maritime Institute of Malaysia, Malaysian Wood Industries Association, Wetlands International Malaysia, Forest Research Institute Malaysia, Department of Survey and Mapping (Perak), Regional Planning and Development Agency (East Java and Surabaya), Fishery and Marine Department of East Java, communities leaders, NGOs, universities, local administrations, and others.

Key informant interviews

Key informant interviews are qualitative in-depth interviews with a wide range of people who have first-hand knowledge about the coastal communities. We conducted 67 interviews with the coastal communities (e.g., community leaders, forest rangers, business owners, fisherman, charcoal factory workers, and related stakeholders) at both sites.

Quantitative study

Quantitative data on socio-demographic characteristics and subjective and psychological wellbeing were collected from the respondents. We used a purposeful structured questionnaire for collecting quantitative data on subjective wellbeing of two core components to explore the relationship between experiences and reactions toward the mangrove ecosystem of coastal communities and their subjective wellbeing. For psychological wellbeing, we followed the Warwick–Edinburgh Mental Wellbeing Scale (SWEMWBS), which is being widely used to understand psychological wellbeing of community people (39–41, 57).

Through the community leaders, we interviewed 67 respondents (40 in MMFR and 27 in MWS) who agreed to participate. All interviews were conducted through phone due to mobility restrictions during COVID-19 pandemic. As English is not the first language of the respondents, the questions were initially developed in English and then translated to Malay, the main language used by the local communities in Matang, Malaysia, and Surabaya, Indonesia.

Ethical approval

Ethical approval was obtained from the research ethics committee of the School of Social Sciences Ethics Committee, Heriot-Watt University. In addition, we secured respondents' verbal consent for participation and audio-recording for this study. All respondents remain anonymous in this study.

Data analysis

All qualitative data from the interview transcripts were transcribed and translated into English for data analysis. We used the inductive approach of thematic analysis introduced by Braun and Clarke (58), which describes patterns across qualitative data by identifying, analyzing, and reporting themes within data. The respondents' responses were coded, and codes that had similar emerging patterns were grouped together to form a theme or sub-theme. The data were examined for differences and similarities both within and across themes.

For quantitative data, SWEMWBS scores from respondents were calculated to give a mean score within and between the population sample from Malaysia and Indonesia, respectively. Mean scores for MMFR and MWS were compared according to the score categorization suggested by Warwick Medical School (59, 60). Descriptive attributes (frequency, percentage, and mean) were reported for socio-demographic and psychological wellbeing responses. We conducted the Chi-squared test to find out association between socio-demographic characteristics (age and education) and responses on benefits of mangrove forests.

Results and discussion

Socio-demographic characteristics of respondents

Table 1 shows the socio-demographic characteristics of the respondents, separated for Malaysia and Indonesia. In both study sites, male respondents were higher (57.5 and 66.7% in MMFR and MWS, respectively). A majority of respondents in both sites obtained high school education. In terms of occupation, fishing-related employment dominated in MMFR, whereas the majority of the respondents in MWS were

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TABLE 1 Socio-demographic characteristics of respondents.

Variable	MMFR		MWS	
	Frequency	Percentage	Frequency	Percentage
Gender				
Female	17	42.5	9	33.3
Male	23	57.5	18	66.7
Age (years) range				
18–30	2	5	10	37.1
31–45	20	50	8	29.6
>45	18	45	9	33.3
Education				
No formal education	3	7.5	–	–
Elementary school	11	27.5	4	14.8
Middle school	15	37.5	6	22.2
High school	10	25	14	51.9
College	1	2.5	3	11.1
Profession				
Community leader	–	–	1	3.7
Fisherman	14	32.6	3	10.8
Food and beverages	–	–	11	39.3
Eco-tourism	4	9.3	11	39.3
Business	2	4.7	1	3.6
Unemployed	4	9.3	–	–
Other (services, house keeper, housewife, odd jobs)	15	34.9	1	3.6
Factory worker	1	2.3	–	–
Supplier	1	2.3	–	–
Forest ranger	1	2.3	–	–
Public servant	1	2.3	–	–
Monthly income range based on USD (Indonesia)				
>268 (Very high)			13	48.2
193–268 (High)			7	25.9
115–192 (Standard)			6	22.2
<115 (Low)			1	3.7
Monthly income range based on USD (Malaysia)				
>2,484	1	2.5		
1,126–2,483	2	5		
<258–1,125	37	92.5		

involved in ecotourism. The monthly household income of the respondents in MWS ranged from USD115 to USD268, which was by far exceeded at MMFR USD258–USD2484.

Respondents' perception on benefits of mangrove forests

Respondents in both MMFR and MWS reported several direct and indirect benefits from mangrove forests (Table 2). In MMFR, most of the respondents stated that mangrove forests are the source (direct benefits) of fish and charcoal (19.8%) and other sea food products (18.5%). For respondents in MWS, mangrove forests are important for running ecotourism activities (65.1%), followed by fish (32.6%). Respondents in both sites also reported several indirect benefits, including protection from storm, flood, and strong waves, soil and riverbank erosion prevention, natural beauty, and carbon sequestration (Table 2).

The thematic analysis of qualitative data revealed the following three themes: (1) the advantage of living in a natural countryside; (2) the natural resources supporting employment,

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TABLE 2 The frequency distribution of benefits from mangroves in MMFR and MWS multiple responses.

Benefits	MMFR		MWS		Mean of MMFR and MWS
Direct benefits	**Frequency**	**%**	**Frequency**	**%**	
Timber	11	13.6	–	–	8.9
Pole	3	3.7	–	–	2.4
Fish	16	19.8	14	32.6	24.2
Water	2	2.5	–	–	1.6
Wild food	1	1.2	–	–	0.8
Tourism	8	9.9	28	65.1	29.0
Firewood	5	6.2	–	–	4.0
Charcoal	16	19.8	1	2.3	13.7
Other seafood product	15	18.5	–	–	12.1
Other non-timber forest products	4	4.9	–	–	3.2
Indirect benefits					
Protection from storms	28	25.2	15	22.7	24.3
Protection of riverbank	12	10.8	–	–	6.8
Flood protection	19	17.1	8	12.1	15.3
Improve fertility of agricultural land	1	0.9	–	–	0.6
Biodiversity conservation	4	3.6	6	9.1	5.7
Carbon sequestration	16	14.4	8	12.1	13.6
Space for spiritual functions	1	0.9	–	–	0.6
Natural beauty	18	16.2	15	22.7	18.6
Protection from strong waves and tsunami	12	10.8	4	6.1	9
Protect the beach from soil erosion	-	-	10	15.2	5.7

income and family security; and (3) the increase in subjective and psychological wellbeing. Below, we outline some features of these three themes:

Theme 1: The advantage of living in a natural countryside

> Respondent-013:"*I feel that it is more relaxing here because places like fishing village are always more relaxed.*" Furthermore, respondent-015: "*Since we are living in the countryside, the pace of living here is slower, not like in the city where the pace of living is faster.*"

This may illustrate the more laid-back lifestyle in MMFR compared with urban areas that leads to carefree spirit among local communities. Meanwhile, respondent-006 attributed the relaxed and carefree spirit among local communities to the improving economic situation in MMFR: "*I think you can see changes, changes from the economy in one family.*"

Theme 2: The natural resources supporting employment, income, and family security

Natural resources such as wood for charcoal and fisheries have provided support for the livelihood of local communities. Charcoal production has created economic opportunities for small businesses and job opportunities in factory. Many respondents sell charcoal and other products made from charcoal, such as wood vinegar for a living. Mangrove forests in MMFR provide a breeding ground for fisheries which actively contribute to the abundant fisheries resources. For example, shrimp is one of the main fisheries catch in Kuala Sepetang.

> Respondents commented that "*we supply it (shrimp) to the wet market*" and "*it is only here and the nearby areas.*"

Local communities can secure basic needs for their daily life due to the improving economic situation in Matang. Most of the respondents showed satisfaction of their current earnings that can be mainly attributed the satisfaction toward being able to support their livelihood.

> For instances, respondents commented that "*we are fine with current income sources, it's sufficient for villagers like us*" and "*It is enough for our spending.*" With Kuala Sepetang being located in the countryside,
>
> Respondent-015 mentioned that "i*t is sufficient to support a living in countryside but not enough for a living at the city.*"

Mangrove forests are the natural habitat for many species that are important to keep the food cycle in the ecosystem (61) and hence provide income sources to coastal communities round the year. The positive perception of the local community

in MMFR and MWS on mangrove ecosystems may be associated with many benefits provided by the forests itself.

Themes 3: The increase in subjective and psychological wellbeing

Respondents in MWS also mentioned that they felt happy because there are job security and leisure activities which provide an environment which supports a comfortable lifestyle.

> Respondent-026 commented that her husband enjoyed this place as her husband loved fishing. Another respondent-021 also revealed: "*Tourism activities provide jobs for many of the local people in this area. We feel so happy because these jobs can make our economic status get better.*"

Mangroves contribute to the tourism industry with various activities to offer, including nature education center, place for bird or fireflies watching and river cruises (62). Eco-tourism in mangrove areas provides large opportunities for jobs and small business to improve livelihoods of coastal communities (7, 51, 53, 54) as well as economic development of surrounding areas (52, 55, 56).

Subjective and psychological wellbeing

We investigated two main variables, namely, satisfaction with life and work and feeling happy, to assess the subjective wellbeing of respondents. We asked four questions related to satisfaction with life and work. The results show that more than 70% of the respondents were satisfied with their life and work in coastal areas (Table 3). Iqbal (3) reported that mangroves provide several important sources of income to coastal communities in Bangladesh and so local people are happy and satisfied with living in mangrove areas. Moreover, Jones et al. (63) found that people living near a protected area have higher subjective wellbeing level.

The results of psychological wellbeing of respondents due to the presence of mangrove forests showed that the mean scores of SWEMWBS for Indonesian respondents (mean = 28.6, SD = 3.14) are higher than those for Malaysian respondents (mean = 26.29, SD = 4.37). A non-parametric (Mann–Whitney) test was conducted to examine the differences between mean scores for Malaysian and Indonesian respondents to accommodate for the unequal number of participants in both study areas. The analysis shows that the differences between mean scores of SWEMWBS for Indonesia and Malaysia were significant ($U = 748.00$, $z = 2.67$, $p < 0.05$).

Following SWEMWBS, the scores were categorized into high, average, and low mental wellbeing using the following cut-off points: high mental wellbeing (mean score 28–35), average mental wellbeing (20–27), and low mental wellbeing (7–19). Figure 2 illustrates the breakdown of SWEMWBS score categorization within each study site. Among Malaysian respondents, 33% reported having high mental wellbeing and 65% having average mental wellbeing. As for Indonesian respondents, 70% belonged to the high mental wellbeing category. However, we are cautious to draw a conclusion that Indonesian respondents were enjoying a high level of mental wellbeing because the number of interview respondents was small.

This outcome of mental wellbeing is associated with the neighborhood mangrove environment in which coastal communities of Matang and Wonorejo live. White et al. (64, 65) suggested that the association of exposure to coastal environments and stress reduction may promote good mental health. Grabowska-Chenczke et al. (23) commented that nature relatedness is a basic psychological need, which is strongly connected to affective and cognitive aspects of human wellbeing. Furthermore, environmental aspects of a coastal area may be described as an attractive, quiet, and peaceful settings, supporting high levels of mental wellbeing (66). In addition, a well-managed mangrove forest could bring psychological benefits in terms of identity, belonging, and self-esteem (67) of coastal communities, which is clearly seen in MMFR and MWS. Stakeholder efforts in conserving the mangrove forest and promoting ecotourism may further increase the connectivity between MMFR and MWS, and local communities.

The lower score of mental wellbeing in MMFR is attributed to the involvement of respondents in risky fishing activities. Fishing is known to be dangerous, at times, and can be exposed to multiple risks, including weather and sea conditions (12, 68). In addition, intense and prolonged working activity associated with fishing can cause fatigue where such hazardous working conditions become the stress factors in life (69). The association of health-related risks may develop unfavorable outcomes which in turn can increase the impact of psychological stress experienced (69). In contrary to MMFR, MWS has been declared as a conservation area by the City of Surabaya in 2007. Hence, the main industry sector of coastal communities of MWS, ecotourism, is still in its early phase with potential to grow and diversify. The management of MWS has been keeping up with efforts in restoring the mangrove area bringing in more paying visitors to support MWS and local communities (48, 70).

Challenges and suggestions for improvement

Representatives in the workshops held in both study sites identified several challenges that may jeopardize the benefits of mangrove forests. They also suggested various mitigation measures toward sustainable management of mangrove forests and enhancement of community development. Participants expressed that MMFR was well managed specifically in terms of timber production for charcoal. Despite having good

TABLE 3 Respondents' opinion on SWB of the benefits of mangrove forests in MMFR and MWS.

Variable	MMER		MWS		Both sites (%)
	Frequency (Yes answer)	%	Frequency (Yes answer)	%	
Satisfaction with life and work					
Are benefits of MMFR/MWS important to your livelihood?	29	73	27	100	87
Are you currently satisfied with your income?	35	87	26	96	92
Are you currently satisfied with your occupation?	16	40	27	100	70
Do you feel that your livelihood would be affected if you do not obtain benefits from mangrove forests?	40	100	27	100	100
Feeling happy					
Are you happy living in coastal areas and benefiting from mangrove forests?	24	60	22	81	71

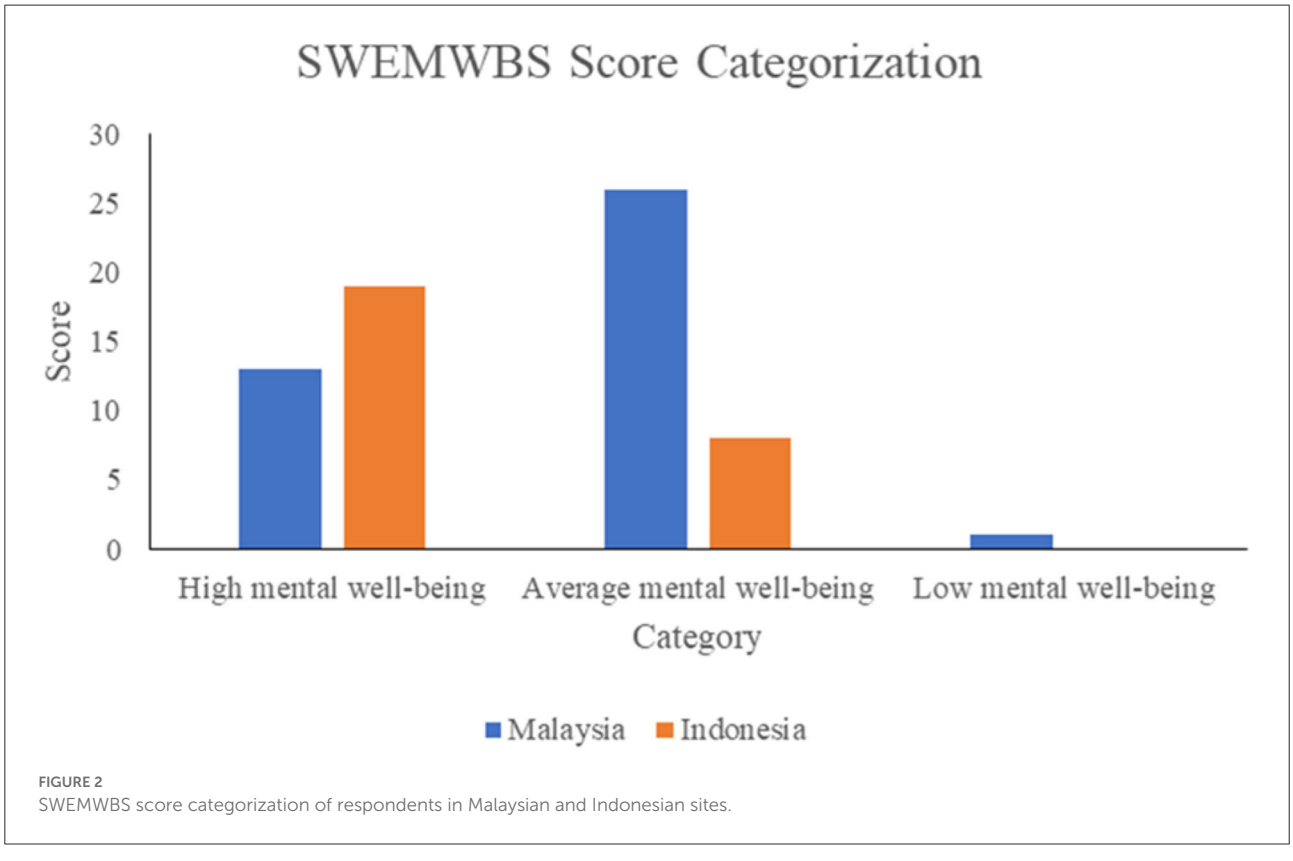

FIGURE 2
SWEMWBS score categorization of respondents in Malaysian and Indonesian sites.

management plans, one of the main concerns regarding the MMFR management plans shared by the participants was risk of infrastructure development and expansion of urbanization in forest areas along with incidences of illegal logging, forest degradation, and funding constraints for forest rehabilitation (Table 4). Representatives also worried about

TABLE 4 Challenges of MMFR and MWS identified by workshops participants in Malaysia and Indonesia.

Challenges	Suggestions for improvement
MMFR	
1. Development and urbanization	1. Create inter-agencies collaboration and have a public engagement before the development of policies
2. Illegal logging and forest degradation	2. Planning of land use and proper monitoring by state and local government
3. Risk of forest degazettement	3. Strengthen local community association and their participation in forest management
4. Funding constraints for forest rehabilitation	4. Enforcement toward reducing single-use plastic
5. Lack of direct engagement from local communities in forest management	5. Community engagement in waste management
6. River pollution and lack of awareness in waste management among local communities	6. Create more job opportunities (more products)
7. Erosion of riverbanks	7. Create a National Mangrove Forest Conservation Day
8. Arrival of high volume of tourists causing discomfort to local communities	
9. Migration from Matang to other places to look for alternative income	
MWS	
1. Smaller area of MWS and not well known to people	1. Strengthen bonding between government agencies, companies, and local communities
2. Less awareness among local people about mangrove resources and conservation	2. Specialized the agency for appropriate management of MWS resources
3. Lack of funding to maintain/improve the MWS area	3. Provide visitor guide and information
4. Lack of community engagement	4. Install barriers around the mangrove area to protect from rubbish
5. Single agency to manage all resources in MWS	5. Conduct routine monitoring and cleaning the area
6. Educational issue	6. Limitation of food sellers, food place and provide rubbish bins
7. Rubbish and organic waste	7. Create community-based environment awareness and conservation programme

MMFR in favor of development and land use changes. They also highlighted waste management issues, for instance, open dump of garbage into the river and sea, and lack of garbage bin that were available for the local communities and tourists. Participants shared that waste was generated by the villages nearby, and socio-economic activities such as ecotourism, charcoal production, and fisheries were not properly handled by the local communities and authorities. They also reported that community people were not involved with the forestry department to plan/conduct forest management activities. In order to mitigate these challenges, participants suggested several measures (Table 4), which the MMFR authority can consider for further improvement in the management of mangrove forests.

Participants in the Indonesian workshop reported that MWS is a newly declared mangrove forest reserve, and all resources were being managed by a single government agency, the "Food and Agriculture Agency." Being a new forest reserve, local people were not very much aware about resource conservation, and they were not involved in the management. Participants identified limited funding opportunities for MWS management. They also reported river pollution and lack of educational resources for visitors and local guides as challenges. They suggest various measures for mitigating these issues. Table 4 also shows that there are few common challenges in both mangroves such as lack of funding, community engagement in forest management, and river pollution.

Practical implications

Mangrove forests have many benefits for coastal communities of the MMFR and MWS in terms of socio-economic opportunities which directly or indirectly impact the subjective and mental wellbeing of coastal communities. Respondents from both study areas identified the development of the tourism sector as one of the primary economic opportunities for local communities with the creation of diverse job opportunities in tourism, accommodation, and catering. Albeit the main income opportunity in MMFR is related to charcoal industries,

other opportunities have been identified, including tourism and fisheries. In MWS, the opportunities stemmed from tourism industries where participants worked as staff and food sellers. However, the coastal communities in MMFR and MWS are also aware of challenges that could possess threats to their wellbeing and livelihoods, driven by declining yields for fisheries over the years, rubbish pollution, inconsistencies in the rehabilitation programme for the mangrove forest, and a general lack of mangrove management staff.

Conclusion

Respondents from both regions have high to average mental wellbeing based on SWEMWBS scores. This outcome shows that the benefits provided by mangrove ecosystems lead to stress reduction when economy resources and job opportunity are secure, and a good mental health of local communities. The difference in the SWEMWBS mean scores between both study sites is rather small among the participants and likely attributed to differences in the nature of industry in the coastal communities (MMFR: charcoal and fisheries industries, MWS: tourism activity and food/restaurant industries). Thus, proper mangrove forest management plays an important role in safeguarding and developing subjective and psychological wellbeing of coastal communities through ensuring the availability of long-term benefits provided by mangrove forests and co-ownership/active engagement in future development plans and implementation.

Study limitations and future research

One of the main limitations of this study was a small number of interviews, which might affect the generalization of results. Future research may focus on having a larger number of interviews to provide a statistically reliable analysis. Our research only assessed the respondents' perception on benefits and did not quantify the benefits. Adding an economic valuation of ecosystem services would provide a more complete evaluation of mangrove ecosystem services, requiring further studies. In addition, the association between coastal communities' subjective and psychological wellbeing, and the mangrove ecosystem are under study. Such a relationship is pertinent for coastal communities to improve and sustain contentment and life satisfaction. Hence, this study warrants stakeholders and scholars to explore factors that associate for better wellbeing of coastal communities.

Data availability statement

The original contributions presented in the study are included in the article/supplementary material, further inquiries can be directed to the corresponding authors.

Ethics statement

The studies involving human participants were reviewed and approved by the Heriot-Watt University, Social Sciences Ethics Committee. The patients/participants provided their written informed consent to participate in this study.

Author contributions

G-NK, IU, TW, AS, AA, and TN conceived of the idea and apply for research funding. G-NK, IU, TW, AS, AA, TN, JN, and LM developed the workshop and interview materials. G-NK, IU, JN, and LM performed data collection and data analysis. All authors discussed the results and contributed to the final manuscript.

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Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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Hironobu Fujiwara,
Kyoto University Hospital, Japan

REVIEWED BY
Mahlagha Dehghan,
Kerman University of Medical Sciences, Iran
Xin Wu,
Xinxiang Medical University, China

*CORRESPONDENCE
Marhani Midin
marhani@ppukm.ukm.edu.my

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Excessive smartphone use and its correlations with social anxiety and quality of life among medical students in a public university in Malaysia: A cross-sectional study

Hajar Mohd Salleh Sahimi[1], Mohd Hafiz Norzan[2], Nik Ruzyanei Nik Jaafar[1], Shalisah Sharip[1], Ammar Ashraf[1], Kamaleshini Shanmugam[1], Nur Shahirah Bistamam[1], Najat Emir Mohammad Arrif[1], Saathish Kumar[1] and Marhani Midin[1]*

[1]Department of Psychiatry, Faculty of Medicine, Universiti Kebangsaan Malaysia, Cheras, Malaysia, [2]Department of Psychiatry, Kuala Lumpur Hospital, Kuala Lumpur, Malaysia

Introduction: Smartphone usage has significantly increased in the last decade among young adults has significantly increased in the last decade. While its benefits are undeniable, its negative implications are increasingly emerging. Studies are needed to investigate the effects of excessive smartphone use on a young person's life. This study aimed to determine the prevalence of excessive smartphone use among medical students and its relations with social anxiety, self-esteem, and quality of life.

Methods: A cross-sectional study was conducted among medical students from Universiti Kebangsaan Malaysia (UKM) in UKM Medical Center. A total of 273 students have consented to participate and completed self-reported questionnaires encompassing sociodemographic information, the Short Version Smartphone Addiction Scale (SAS-SV), the Social Interaction Anxiety Scale (SIAS), the World Health Organization Quality of Life (WHOQOL-BREF) and the Rosenberg Self-esteem Scale (RSES). Sociodemographic data, SIAS score, WHOQOL-BREF score and the Rosenberg Self-esteem Scale score were treated as independent variables. Smartphone addiction Scale score was treated as the dependent variable. Bivariate analysis was used to explore the relationship between independent and dependent variables using the Fisher exact test, Pearson Chi-Square and Pearson correlation coefficient. Multiple linear regression analysis was used to analyze the variables with a p-value of < 0.05 from the Pearson correlation coefficient test.

Results: The percentage of excessive smarphone use among UKM medical students is 48%. The bivariate analysis showed that excessive smartphone use has a small but significant positive correlation with social anxiety ($r = 0.173$, $p = 0.004$) and negative correlations with physical health ($r = -0.133$, $p = 0.028$), psychological wellbeing ($r = -0.135$, $p = 0.026$), social relationships

($r = -0.232$, $p = 0.001$), environment ($r = -0.260$, $p = 0.001$) and self-esteem ($r = -0.128$, $p = 0.035$). In the multiple regression analysis, a better environment predicted a reduced risk for smartphone addiction ($\beta = -0.233$, $p = 0.013$).

Conclusion: Almost half of the students were found to have smartphone overdependence. Excessive smartphone use has shown a significant relationship with an increased risk for social anxiety, reduction in self-esteem, and quality of life among medical students. A closer look into the possible intervention is needed in the future to curb the negative effects arising from excessive smartphone use.

KEYWORDS

social phobia, medical student, smartphone dependence, quality of life, self esteem

Introduction

The usage of smartphones has significantly increased during the last decade, particularly among young adults. In Malaysia, smartphone usage in 2021 was approximately 98.7%, a slight increase from 98.2% in 2020 (1). If utilized correctly, smartphones offer many important functions that extend beyond their traditional purpose as communication devices. These functions act as mediums to enhance one's quality of life (2) and help to boost individual self-improvement (such as minimizing depressive symptoms) (3). In the clinical setting, smartphone-based interventions such as online psychotherapy have effectively treated psychological conditions (such as depression), improved quality of life, and reduced stress levels (4). Other than that, certain smartphone apps may help to save lives during emergencies. Several such examples are apps that offer guides on cardiopulmonary resuscitation (CPR) for the general public (5), diagnose skin cancer (6), detect road traffic accidents, or provide smart rescue systems (7).

Nonetheless, with smartphones' growing necessity in our daily activities, social and psychological problems have risen due to their overuse. A clear obstacle to a systematic investigation into this issue is the lack of a clear definition of a "smartphone addiction", and the unavailability of its diagnosis in the International classification of disease 11 (ICD-11) (8) or Diagnostic and Statistical Manual 5 (DSM-5) (9). Most studies have assumed that it is an addictive behavior, even though there is still active discussion on whether excessive smartphone use is part of a continuum of addictive behaviors (10). To most researchers, excessive smartphone use has been considered a form of technological addiction (11), which has been defined as a behavioral addiction that involves interaction between a human and a machine that is non-chemical (12, 13). This present study also utilizes the same concept – that is, smartphone addiction is a type of behavioral addiction – when constructing its smartphone measurements. Furthermore, a study in the past has shown that smartphone addiction exhibits several similar aspects to substance-related dependence including a) compulsive behavior, b) withdrawal, c) tolerance, and d) functional impairment (11). Besides that, the prevalence of smartphone addiction varies from country to country where past research has found the levels to be 26.6% in Korea (14), 26.8% in India (15), 9.3% in Tehran (16), and 16.9% in Switzerland (17). In Malaysia, a recent study found a much higher prevalence rate of 40.6% (18).

For this paper, the term "excessive smartphone use" (ESU) will be used due to the lack of a clear and established clinical diagnostic definition. ESU is a complex and multifactorial condition. A theory that explains this condition is the "Object Attachment Theory" (19) which originated from the Attachment Theory by Bowlby (20). Object Attachment Theory describes the bonding relationship between humans and inanimate objects such as smartphones. Individuals who are attached to their smartphones perceive the object as a surrogate for comfort and security (19). Losing access to smartphones might then cause intense discomfort or nomophobia for these individuals (21). Attachment to smartphones is not merely driven by the need to connect with other people (22). Instead, individuals might be using their smartphones for other non-social purposes such as watching movies, playing games, or reading the news. Smartphones are easily accessible and portable and are not only used for online internet consumption, but also offline activities such as telecommunication (phone calls), taking pictures, or playing games. In contrast, internet addiction is more specific to problematic compulsive use and consumption of content on the internet. Therefore, smartphone use is different from traditional internet use *via* desktop computers, due to the former's ability to be used anywhere and at any time (23). In addition, constantly checking smartphones and feeling fearful when not holding one are among the other distinguishing factors between the two addictions mentioned above. For this reason, the scope of this current study shall be limited to investigating "excessive smartphone use" instead of "internet addiction".

Various studies have found that ESU correlates with impaired psychological wellbeing, such as depression, anxiety,

and stress (15, 24). Some studies conducted within the Malaysian context have arrived at the same conclusion as well (18, 25). Furthermore, ESU is associated with other psychological conditions such as obsessive-compulsive disorder (OCD) (26), attention deficit hyperactivity disorder (ADHD) (27), and insomnia (28). Moreover, more and more recent research has demonstrated a higher relationship between social anxiety and ESU (29, 30).

Social anxiety or social phobia is a condition characterized by marked fear of being scrutinized or humiliated by others (31). Social anxiety causes difficulties in in-person communication with others. Whether individuals with social anxiety use mobile devices more than others or vice versa, remains a question. Interactions using smartphones are relatively less anxiety-provoking than physical, face-to-face meetings. However, it may cause individuals to be more vulnerable to the excessive use of smartphones (29). Furthermore, a positive correlation has been found between anxiety and smartphone usage among university students (32). Specifically, a positive correlation has been most profound between ESU and social phobia (29), a finding that echoes the discovery made in another study (33).

Looking at the relationship between ESU and social anxiety in terms of social interaction, it seems that those who have ESU reported a higher association with loneliness and shyness relative to those who do not (34–36). Smartphones are regarded as important social devices, where *via* their usage, one may construct an extensive social network, build a self-image, and feel connected with the rest of the world (37). Nonetheless, research concerning the interaction model between social interaction and ESU is still in its infancy. Individuals with a fear of "real-life" social interaction may be more prone to using smartphones to communicate. Similarly, individuals experiencing ESU may be too occupied with their gadgets and consequently distance themselves from interacting with people in real life. A study showed that interaction anxiety significantly affects ESU (38). Meanwhile, another study demonstrated that social skills (social expressivity skills) predicted ESU and that the latter can be a mediating factor between social skills and psychological wellbeing (39). Moreover, social anxiety and reduced self-efficacy have also been shown to mediate ESU (38). Besides that, another study suggested that social anxiety plays a mediating role between poor self-esteem and ESU (40), while cognitive-emotional regulations mediated the relationship between social anxiety and ESU (41).

Smartphone use has generally been affecting an individual's quality of life. A healthy engagement in online activities may give pleasure in life and add to its overall quality. However, problematic use of these gadgets may lead to a neglect of other useful tasks and responsibilities that would inevitably impair a person's quality of life. According to the World Health Organization (WHO), quality of life consists of four domains: physical health; psychological wellbeing; social relationships; and the environment (42). Studies have shown that ESU is negatively correlated with the quality of life (43), while the former predicts the latter (44). Moreover, there is currently a debate about the interaction between ESU and self-esteem levels. One large-scale study conducted in Norway reported that the addictive use of social media is linked to low self-esteem (38, 45), a finding that has been replicated in several other studies (46, 47). Self-esteem was also revealed to be the mediator between the effect of social media addiction and life satisfaction (48), where a high level of self-esteem is found to be a protective factor against ESU (49). On top of that, looking at the available evidence, previous studies showed that social anxiety might lead to ESU (29, 50). In another study, mobile phone addiction might be mediated by poor self-esteem (40) and cognitive-emotional regulation (41), effectively leading to poor quality of life (42). However, further studies are still needed to confirm these findings.

Medical students are among those with a high rate of smartphone use (18). The students often use smartphones to obtain study materials, make notes, or search for answers for their assignments (51). This tendency to rely on smartphones might put them in the risk group for excessive use of the device. In Malaysia, studies on ESU are still lacking, which is not in line with the high rate of smartphone use observed in the nation. It is a concern that smartphone use, especially when it is excessive, may result in negative implications for young adults. Having these concerns as aspirations, this study aims to determine the rate of ESU and the potential risk factors associated with it among medical students at the Universiti Kebangsaan Malaysia Medical Center (UKMMC).

Methods

This study is cross-sectional in design and involves 1st- and 4th-year medical students at UKMMC. Data collection was conducted using convenience sampling, where year 1 and 4 students who are present on campus during the data collection period were approached after classes. The year-1 students represent those undergoing pre-clinical rotations, while the year-4 students represent those undergoing clinical rotations. The sample size of this study was determined using a manual sample size calculation formula for the prevalence study (52) based on the method by Haug et al. (17), who conducted a similar study on students in Switzerland. The sample size calculation was per the following formula:

$$n = (Z1 - \alpha)^2 \ [P(1 - P)/D2]$$

where,

$Z1\text{-}\alpha = Z0.95 = 1.96$ (for a confidence interval of 95%, Z = 1.96; normal distribution table).

P (Prevalence) = 0.17, was taken from the prevalence of smartphone addiction in a study among students in Switzerland (17).

D (Absolute precision required) = 5% = 0.05.

Therefore, $n = 1.962\ [0.17(1–0.17)/0.052] = 217$. The final estimation of the sample size required is estimated to be a minimum of 260 students (217 + 43 = 260, where 43 represents an a priori provision of 20% non-responders).

Data collection

The data collection process was conducted between 15th June 2018–30th June 2018. Briefing on the purpose and nature of the study, as well as the inclusion and exclusion criteria, were delivered to the sampled students before the interview. The inclusion criteria were twofold: (1) the participant must be a year-1 or year-4 undergraduate medical student at UKM; and (2) the participant must consent to voluntarily take part in this research. The exclusion criterion was a participant who does not give his/her consent. Those who fulfilled the criteria were given a set of self-report questionnaires and written consent. The participants were asked to complete the questionnaires that consist of questions regarding their socio-demography, the short version of the Smartphone Addiction Scale (SAS-SV) (53), the Social Interaction Anxiety Scale (SIAS) (54), WHO Quality of Life-BREF (WHOQOL-BREF) (42), and Rosenberg Self-esteem Scale (RSES). The authors were present at each briefing to help and clarify any doubts about the questionnaires. All participants were assured of the study's confidentiality. The time needed to complete the questionnaires ranged from 20 to 30 min for each student. The students were informed that professional help is available if they need further consultation.

Written permission and approval to conduct the study were obtained from the Research and Ethics Committee, Faculty of Medicine, Universiti Kebangsaan Malaysia (Project Code: FF-2018-243).

Study instruments

The sociodemographic questionnaire

This is a self-reported questionnaire that includes questions on respondents' age, ethnicity, religion, year of study, place of origin (urban/rural), parents' living status, parents' marital status, parents' household income, existing medical condition, and existing psychiatric condition.

The short version smartphone addiction scale

The first Smartphone Addiction Scale (SAS) questionnaire was developed and validated by Kwon et al. (55). The original version consisted of 33 questions with a 6-point Likert scale ranging from 1: strongly disagree and 6: strongly agree. All six questions represent six factors being measured. The factors are; 1) daily-life disturbance; 2) positive anticipation; 3) withdrawal; 4) cyberspace-oriented relationship; 5) overuse; and 6) tolerance. The internal consistency and concurrent validity of SAS were verified, with a Cronbach's alpha of 0.967.

A shorter version of SAS was created and validated again in the same year by Kwon et al. (53). The shorter version of the SAS (or SAS-SV) consists of only 10 questions. This version of the psychometric test showed good internal consistency and concurrent validity with Cronbach's alpha of 0.911. The SAS-SV was significantly correlated with the original version of SAS and other similar scales, such as the Smartphone Addiction Proneness Scale (SAPS) and The Korean Self-reporting Internet Addiction Short-form Scale (KS-Scale). The ROC analysis results showed an area under the curve (AUC) value of 0.963 (0.888–1.000), with a cut-off value of 31 for males and 33 for females. The same cut-off values were used in this study. Based on the above discussion, it may be said that the SAS-SV showed good reliability and validity for the assessment of smartphone addiction (53). A validation study of the Malay-translated version of the SAS-SV was conducted by Ching SM et al. among medical students in Malaysia. This version has also demonstrated good internal consistency and concurrent validity with a Cronbach's alpha value of 0.94 (56). We used the validated English version of the SAS-SV, as medical students in Malaysia generally have a good mastery of and proficiency in the English language. The Cronbach's alpha for our current study sample for SAS-SV is 0.86.

Social interaction anxiety scale

The Social Interaction Anxiety Scale (SIAS) is a self-report scale that measures the anxiety experienced by a person during social interactions with others. This scale was first developed and validated by Mattick and Clarke (54). The scale contains 20 items where the respondent rates how much each item relates to them using a 5-point Likert scale, ranging from 0 points (Not at all characteristic of me), 1 point (Slightly characteristic of me), 2 points (Moderately characteristic of me), 3 points (Very characteristic of me), 4 points (Extremely characteristic of me). The first validation study revealed that SIAS has a good internal consistency (Cronbach's $\alpha = 0.94$) and test-retest reliability (Cronbach's $\alpha = 0.92$) (54).

In terms of its discriminant validity, SIAS has been compared to other scales that measure social anxiety, such as the Social Phobia Scale (SPS) and the Social Phobia & Anxiety Inventory (SPAI) by Peters (57). The SIAS was significantly correlated with SPS & SPAI, suggesting that they have a similar construct. However, SIAS does not differentiate between social anxiety and other types of anxiety disorders (57). To interpret the SIAS scores, Peters defined the cut-off score as 36 for probable social anxiety with a sensitivity of 0.93, specificity of 0.60, a positive predictive value (PPV) of 0.84, and a negative predictive value (NPV) of 0.78 (57). To the best of our knowledge, there is no specific psychometric study of SIAS performed in the Malaysian setting. There were studies in Malaysia that utilized the SIAS questionnaire but

the authors (58, 59) did not conduct any psychometric studies to complement the main study. The Cronbach's alpha for our current study sample for SIAS is 0.89.

WHOQOL-BREF

The WHO's definition of Quality of Life (QoL) is "An individual's perceptions of their position in life in the context of the culture and value systems in which they live and about their goals, expectations, standards, and concerns" (42). WHOQOL is a questionnaire developed by WHO to assess the level of QoL of a person. The shorter version of WHOQOL (or WHOQOL-BREF) was introduced to improve the original questionnaire's practicality and has been tested in 20 field centers across 18 countries. Moreover, the latter is now available in 19 languages (60).

The WHOQOL-BREF consists of 26 items (a significant reduction in comparison to the 100 items contained within the original WHOQOL). In total 24 of these items are divided into four domains: physical; psychological wellbeing; social relationship; and environmental. The remaining two items represent the person's perception of their overall QoL and general health. A 5-points Likert scale is used for the questionnaire's scoring. The total raw score for each of the four WHOQOL-BREF domains can be obtained by summing the item scores and converting them to a scale ranging from 0 to 100 using the formula below:

$$\begin{aligned}\text{Transformed Scale} &= (\text{Actual raw score} \\ &- \text{lowest possible raw score}) \\ &\times 100 \text{ possible raw score range}\end{aligned}$$

The original WHOQOL (U.S version) has an acceptable internal consistency with Cronbach's alpha of 0.82–0.95 across its domains (61). Meanwhile, the WHOQOL-BREF has a high correlation level with the WHOQOL-100, registering a Cronbach's alpha of 0.89 (62). According to the WHOQOL-BREF manual, higher scores indicate a higher QoL and vice versa. To ease interpretations, Hawthorne et al. set a reference point for the scores. Their results showed that the general levels for the WHOQOL-BREF domains were 73.5 (SD = 18.1) for the Physical Health domain, 70.6 (SD = 14.0) for the Psychological wellbeing domain, 71.5 (SD = 18.2) for the Social Relationships domain, and 75.1 (SD = 13.0) for the Environment domain (63). WHOQOL-BREF has been translated into Malay and validated in the local Malaysian setting in a psychometric study of the Malay Version-WHOQOL-BREF by Hasanah et al. This study showed that WHOQOL-BREF has a good internal consistency (Cronbach alpha of 0.89), good test-retest reliability (ICC of 0.75), good construct validity (based on Exploratory Factor Analysis), and good discriminant validity when applied to the local context (64). The Cronbach's alpha for our current study sample for WHOQOL-BREF is 0.92.

Rosenberg self-esteem scale

This is a self-rated scale developed by Rosenberg to measure the level of self-esteem among high school students (65). It utilizes the 4-points Likert scale ranging from 1 = Strongly Agree to 4 = Strongly Disagree. Regarding its reliability, the Rosenberg Self-Esteem Scale (RSES) demonstrates a Guttman Scale Coefficient of Reproducibility of 0.92, indicating excellent internal consistency. This scale's test-retest reliability over 2 weeks reveals correlations of 0.85 and 0.88, signifying excellent stability. A validation study on a Malay-translated version of the RSES revealed that, overall, the Malay version of the scale (m-RSES) is a valid and reliable tool with a Cronbach's alpha of 0.8 (66). For interpretation purposes, scores between 15 and 25 are interpreted as the respondents having a normal self-esteem range, while scores below 15 suggest low self-esteem. The Cronbach's alpha for our current study sample for RSES is 0.88.

Statistical analysis

The collected data were keyed into the Statistical Package for Social Sciences (SPSS) software version 21. The completed Smartphone Addiction Scale (SAS), Social Interaction Anxiety Scale (SIAS), WHOQOL-BREF, and Rosenberg Self-Esteem Scale (RSES) questionnaires were scored according to their respective manuals or based on reviews of the literature. The calculated scores were then keyed into SPSS. Descriptive analyses were performed on the sociodemographic variables. Sociodemographic data, Social Interaction Anxiety Scale score, WHOQOL-BREF score, and the Rosenberg Self-esteem Scale score were treated as independent variables, while the Smartphone Addiction Scale score was treated as the dependent variable. Bivariate analysis was used to explore the relationship between the independent and dependent variables using the Fisher's exact test, Pearson Chi-Square analysis, and Pearson correlation coefficient. Furthermore, a multiple linear regression analysis was used to analyze the variables with a p-value of < 0.05 from the Pearson correlation coefficient test to control for confounders. Smartphone addiction was then analyzed as categorical data (using validated cut-off points) for comparison with sociodemographic data (using Fisher's exact test and Pearson chi-square test). On top of that, smartphone addiction's continuous data was used for correlation and regression analysis.

Results

A total of 367 eligible medical students from year-1 and year-4 groups were approached to be recruited into this study as participants. However, 94 of them did not give their consent, thus excluding them from the final sample (Figure 1). The remaining students who consented were able to complete

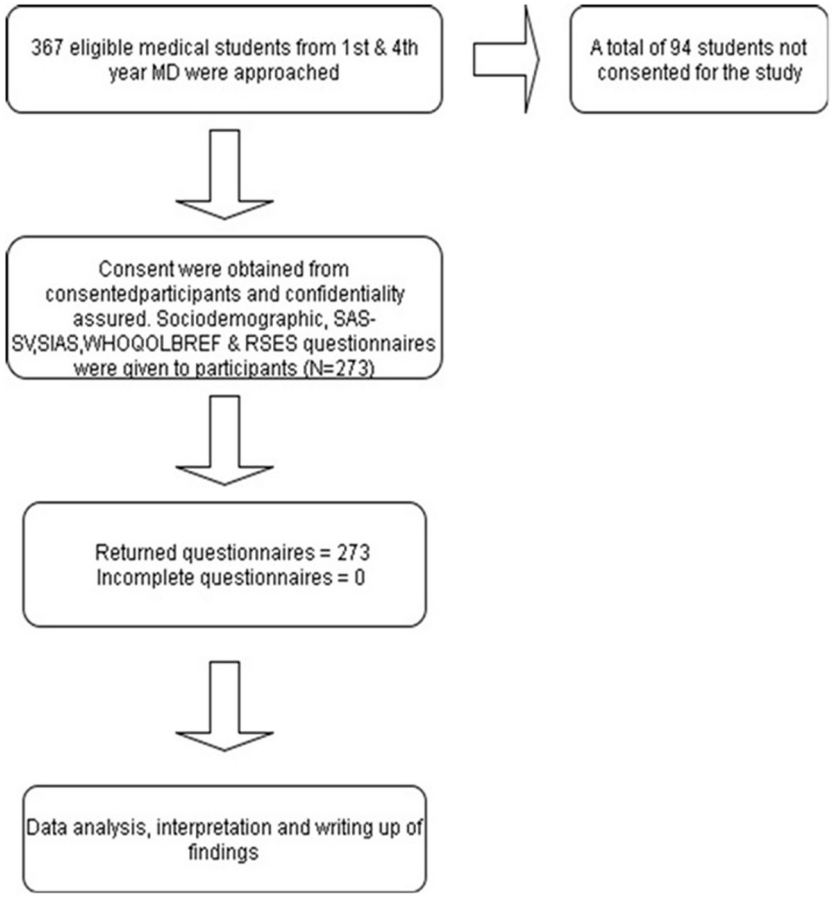

FIGURE 1
Flow diagram of study participants.

all questionnaires given to them. The total number of final respondents who participated and were included in the analysis was 273 students.

From the sociodemographic data, male students from both batches represent 30.7% (84 students) of the sample, while female students represent 69.2% (189 students). In terms of ethnicity, Malays made up most of the study sample, with 169 students (61.9%), followed by Indians (n = 48, 17.6%), Chinese (n = 44, 16.1%), and others (n = 12, 4.4%). The most predominant religion was Islam, with 184 followers (67.4%) followed sequentially by Buddhism (n = 38, 13.9%), Hinduism (n = 32, 11.7%), Christianity (n = 16, 5.8%), and others (n = 3, 1.1%). With regards to the place of origin, 214 students came from urban areas (78.4%) while the remaining 59 students (21.6%) came from rural areas. Moreover, regarding the parents' living status, a total of 25 students (9.16%) have lost their fathers, while three students (1.1%) have lost their mothers. In terms of parental marital status, 245 (89.7%) were in marriage, 10 (3.66%) were divorced, and 18 (6.6%) were widowed. Lastly, 31 students (11.4%) had an existing medical condition, and only 7 of them (2.56%) had an existing psychiatric condition or illness.

The rate of ESU among UKM medical students as measured using the SAS-SV was 48.4% (n = 132) (Table 1). From this, 32.6% of them (n = 43) are male and 67.4% (n = 89) are female. These figures were calculated based on the cutoff point of 31 score points for boys and 33 score points for girls (55).

Additionally, Fisher's exact test and Pearson Chi-Square were conducted to investigate whether there are statistically significant differences in sociodemographic information between the group of smartphone and non-smartphone addicts. The final result showed that there was a statistically significant difference in terms of religious beliefs between the smartphone addicts vis-à-vis the non-addicts with p = 0.026 ($p < 0.05$). The other factors do not seem to be different across the two above groups.

From the analysis, it may be determined that ESU was positively correlated with the domains of social anxiety (r = 0.173). This correlation was highly statistically significant (p = 0.004) (Table 2). Furthermore, ESU was negatively

TABLE 1 Sociodemographic information vs. excessive smartphone use.

		No excessive smartphone use		Excessive smartphone use		*p*-value
		Count	%	Count	%	
Gender	Male	41	29.10%	43	32.60%	0.531**
	Female	100	70.90%	89	67.40%	
Ethnicity	Malay	81	57.40%	88	66.70%	0.388*
	Chinese	24	17.00%	20	15.20%	
	Indian	28	19.90%	20	15.20%	
	Others	8	5.70%	4	3.00%	
Religion	Islam	86	61.00%	98	74.20%	0.026*
	Buddha	21	14.90%	17	12.90%	
	Christian	13	9.20%	3	2.30%	
	Hindu	18	12.80%	14	10.60%	
	Others	3	2.10%	0	0.00%	
Year of MD	1st year	59	41.80%	65	49.20%	0.220**
	4th year	82	58.20%	67	50.80%	
Place of origin	Urban	107	75.90%	107	81.10%	0.229**
	Rural	34	24.10%	25	18.90%	
Father's living status	Yes	124	87.90%	124	93.90%	0.086**
	No	17	12.10%	8	6.10%	
Mother's living status	Yes	138	97.90%	132	100.00%	0.248*
	No	3	2.10%	0	0.00%	
Parents' marital status	Married	123	87.20%	122	92.40%	0.359*
	Divorced	6	4.30%	4	3.00%	
	Widowed	12	8.50%	6	4.50%	
Parents' household income	<RM1000	13	9.20%	13	9.80%	0.580**
	RM1000-RM4999	59	41.80%	46	34.80%	
	RM5000-RM10000	42	29.80%	40	30.30%	
	>RM10000	27	19.10%	33	25.00%	
Existing medical condition	Yes	13	9.20%	18	13.60%	0.250**
	No	128	90.80%	114	86.40%	
Existing psychiatric condition	Yes	3	2.10%	4	3.00%	0.715*
	No	138	97.90%	128	97.00%	

*Fisher exact test. **Pearson chi-square. "Smartphone addition" and "No Excessive smartphone use" are categorized based on cut-off points of the SAS-SV (31 for males, and 33 for females).

correlated with all domains of quality of life as measured by WHOQOL-BREF with $r = -0.133$ for physical health, $r = -0.135$ for psychological wellbeing, $r = -0.232$ for social relationships, and $r = -0.260$ for the environment. Moreover, the relationship was statistically significant ($p < 0.05$) for physical health and psychological wellbeing and was highly significant ($p < 0.01$) for social relationships and environment. On top of that, ESU was also found to exhibit a statistically significant negative correlation with self-esteem ($r = -0.128$).

In Table 3, all the statistically significant variables from Table 2 were included in the regression analysis to estimate the relationship between the variables with ESU. In Table 4, the significant variable from sociodemographic data – religion – was incorporated into a model with all existing variables from Table 3 for further analysis. From results in Tables 3, 4, only WHOQOL-BREF (environment) & religion emerged as significant predictors of ESU out of independent variables that were computed in the regression model. The result from Table 3 showed that an increase of one point score in the WHOQOL-BREF environment domain will lead to a reduction in the ESU score by 0.248 ($p = 0.009$). Meanwhile, the results from Table 4 reveal that being Muslim is statistically significantly associated with an increased score for ESU by 0.595 ($p = 0.027$). And again, an increase of 1 point in the WHOQOL-BREF environment domain score is statistically significantly associated with the reduction of ESU score by 0.233 ($p = 0.013$) in Table 4.

Discussion

This study was designed to identify the prevalence of ESU among UKM medical students and its relationship with social anxiety, quality of life, and self-esteem. Studies investigating the relationship between ESU and the above factors are still lacking, and to the best of our knowledge, have yet to be conducted in the local Malaysian context.

The rate of ESU in this study for both male and female students – as measured by the Short-version Smartphone Addiction Scale (SAS-SV) – is around 48%. This rate is similar to a local study (40.6%) (18). However, it is much higher than the rates recorded in similar studies using SAS-SV conducted in Korea, Switzerland, and universities in Iran, with 26.61% (14), 16.9% (17), and 9.3% (16) prevalence rates, respectively. A possible explanation for the high prevalence rate recorded in the current study is that the percentage of smartphone ownership in Malaysia is high (78% in 2018). Smartphones are also the most popular device for Malaysians to access the Internet (94.6%), according to statistics provided by the Malaysian Communications And Multimedia Commission (MCMC) in 2018 (67). The discrepancy between the findings in this study and two previous studies must be interpreted cautiously, due to the differences in terms of region and socio-cultural background of the studied populations.

In this study, the bivariate analysis yields a significant positive correlation between ESU with risk for social anxiety ($r = 0.173$, $p = 0.004$). This is consistent with findings from previous studies that demonstrated a higher strength of association between ESU and social anxiety (23, 26, 31). In the regression analysis, although the result was not statistically significant, there is a positive correlation between ESU and social anxiety. This non-statistically significant association in the regression analysis could be due to inadequate sample size. In other words, when other variables are factored into the equation, the relationship becomes weaker and non-significant. Another possible explanation is that perhaps medical students may have a lower threshold for social anxiety. Apart from a study that showed the prevalence rate of social anxiety among medical students can be as high as 59.5% (68), one cohort study conducted in a medical college in Turkey (with frequent follow-ups in 5-years intervals) revealed that the level of social anxiety among medical students reduces year-by-year, probably due to the positive effect of medical education (69). Three other studies also found that the prevalence of social anxiety among medical students is low (9.6, 18.7, and 21.8%, respectively) (70–72). In this study, the prevalence of social anxiety among medical students measured using SIAS is 20.14% ($n = 55$).

The relatively lower rate of anxiety among medical students compared to other students may be due to their higher psychological resilience. Psychological or mental resilience is defined as the ability to successfully and quickly cope with a crisis and to return to pre-crisis status (73). A study on the resilience between nursing and medical students has found that the level of resilience is higher among the latter (74). In the local context, the level of resilience among medical students in Malaysian public universities was reported to be moderately high, as measured by

TABLE 2 Correlations study excessive smartphone use vs. factors.

		Excessive smartphone use	
		Coefficient	**Significant**
Social interaction anxiety scale (SIAS)	S.I.A.S Total	0.173**	0.004
WHOQOL - BREF	Physical health (Domain 1)	−0.133*	0.028
	Psychological wellbeing (Domain 2)	−0.135*	0.026
	Social relationships (Domain 3)	−0.232**	0.001
	Environment (Domain 4)	−0.260**	0.001
Rosenberg self-esteem scale (RSES)	R.S.E.S total	−0.128*	0.035

*Correlation is significant at the 0.05 level (2-tailed). **Correlation is significant at the 0.01 level (2-tailed).

TABLE 3 Regression analysis for relationship between variables and smartphone addiction.

Model	**Unstandardized coefficients**		**Standardized coefficients**	**t**	**Sig.**
	B	**Std. Error**	**Beta**		
S.I.A.S score	0.003	0.003	0.079	1.122	0.263
WHOQOL BREF (Physical health domain score)	0.000	0.004	−0.003	−0.034	0.973
WHOQOL BREF (Psychological wellbeing domain score)	0.005	0.004	0.114	1.242	0.215
WHOQOL BREF (Social relationships domain score)	−0.003	0.002	−0.123	−1.537	0.125
WHOQOL BREF (Environment domain score)	−0.011	0.004	−0.248	−2.626	0.009
Rosenberg self-esteem scale score	0.007	0.008	0.069	0.86	0.391

TABLE 4 Regression analysis for relationship between variables including religion with smartphone addiction.

Model	Unstandardized coefficients		Standardized coefficients	t	Sig.
	B	Std. Error	Beta		
S.I.A.S total	0.002	0.003	0.043	0.601	0.548
WHOQOL BREF (Physical health domain score)	−0.002	0.004	−0.045	−0.549	0.584
WHOQOL BREF (Psychological wellbeing domain score)	0.005	0.004	0.113	1.25	0.212
WHOQOL BREF (Social relationships domain score)	−0.004	0.002	−0.144	−1.808	0.072
WHOQOL BREF (Environment domain score)	−0.01	0.004	−0.233	−2.5	0.013
Rosenberg self-esteem scale score	0.007	0.008	0.066	0.826	0.410
Religion Islam	0.634	0.285	0.595	2.223	0.027
Religion Buddha	0.553	0.293	0.383	1.889	0.060
Religion Christian	0.312	0.306	0.146	1.02	0.309
Religion Hindu	0.51	0.293	0.328	1.743	0.083

the Brief Resilience Scale (BRS) (75). A higher level of resilience has been associated with the reduction in risk for stress and anxiety as revealed in the study by Hjemdal et al. ($r = -0.34$, $p < 0.001$) and Rios-Risquez et al. ($r = -0.62$, $p < 0.01$) (75, 76).

Another possible explanation for the small association between ESU and social anxiety may be due to the different types of activities available on smartphones. People with social anxiety may prefer to engage in offline to online activities using smartphones. Elhai et al. reported that "non-social" features of smartphones are more related to anxiety as compared to "social" ones (50). This includes activities like news consumption, entertainment, and relaxation. This preference to use "non-social" content in smartphones is based on the Social Avoidance and Safety Behavior Theory (77–79).

There is a notion that excessive use or being addicted to a smartphone can negatively affect a person's quality of life (QoL). A part of the results of this study seems to support that view. Based on the bivariate (correlation) analysis, it appears that those with a higher risk for ESU will have a small but significant negative implication in several areas, such as physical & psychological health, social relationship, and the environment domains. In this study, excessive usage of smartphones has been shown to affect our physical health in several ways. This finding is similar to a recent study (43). Besides that, two studies showed that with an increase in time spent using smartphones or browsing the Internet, the rate or frequency of physical activity is significantly reduced (80, 81). Too much screening time using smartphones may also affect students' sleep duration and quality (82, 83). Moreover, physical issues such as neck disability may also occur among addicted smartphone users due to frequent neck flexion posture (84, 85).

Other parts of the psychological wellbeing constructs consist of positive and negative emotions and self-esteem, which may be jeopardized among smartphone addicts. Self-esteem has been shown to be directly and indirectly related to ESU (45, 48), a view that has been supported by the results of this study (Table 2). From the regression analysis (Tables 3, 4), the association between psychological wellbeing and self-esteem to ESU is negative. However, these associations are not statistically significant to be clinically meaningful. This can be attributed to the fact that in this sample of students, the purpose of smartphone usage is to enhance the students' profiles and obtain good feedback *via* social media (i.e., Facebook, and Instagram). Therefore, the usage of smartphones in this regard may boost students' self-esteem levels. This is largely similar to the findings made by Valkenburg et al. (86). Other factors such as peer relationships and a sense of belonging might explain the relationship between self-esteem and ESU. Past research reported that there is a mediating role played by self-esteem between student-student relationships and ESU (49).

As social beings, humans need to interact socially with others as part of their effort to maintain stable psychological wellbeing. Nowadays, people are more preoccupied with their phones instead of having the usual face-to-face social interaction. In this study, the correlation and regression analysis show that excessive use of a smartphone can impact social relationships in a negative way (Table 2: $r = -0.232$, $p = 0.001$, Table 4: $\beta = -0.144$, $p = 0.072$) albeit the relationship is not statistically significant. This is largely supported by other past studies. An experimental social study revealed that the presence of a smartphone negatively affects the quality of a conversation (87). In another study on a group of students ($n = 768$), the outcome demonstrated that the student-student relationship was negatively associated with ESU (49). A possible explanation for the non-significance of the social domain's regression analysis is the usage of smartphones in facilitating long-distance relationships. As the study participants were mostly staying in university-provided hostels, they may utilize video conferencing applications and platforms in their smartphones to preserve long-distance social interactions with their families.

Furthermore, the environment domain (as measured by WHOQOL-BREF) consistently displays a significant negative relationship with ESU across the different analyses conducted. Among the facets incorporated within this domain are financial status and home environment. Brown et al. found that the duration of smartphone usage among undergraduate students from low-income families was higher than those from higher-income families (88). This disparity may be due to a lack of other resources (i.e., PC or tablets) for low-income students to access the Internet. Prolonged usage of the Internet (*via* a smartphone) has been identified as one of the risk factors for ESU (89). Parents from families with lower economic status might not have the time and capacity to monitor their children's smartphone use (90). Another possible explanation for the significant negative relationship is respondents who are not satisfied with their living space or physical environment – for example, those living in a crowded home environment – might turn to ESU to escape from the uncomfortable living situation. Moreover, they may also do so to avoid reality by going into a virtual "ideal world". For the home environment facet, a study discovered a significant positive correlation between daily work-home interference (WHI) and level of daily exhaustion, which is stronger for intensive smartphone users ($z = 1.91$, $p < 0.05$) (84, 91). WHI refers to the negative association between work and home domains (92).

Additionally, among the other results of this study is the significant association between an individual's belief system with the risk of ESU. This result needs to be interpreted cautiously as all religions – including Islam – generally promote healthy living. In this study, the sample students are predominantly Muslim, a fact that may influence the findings. In a report released by Pew Research Center, statistics show that the percentage of smartphone ownership has significantly increased in Muslim-majority countries like Lebanon and Jordan by 25–28% between 2015 to 2017 (93). A local study on Muslim university students has found that the majority of them are social media network users, which has affected their religious practice in daily life (94). With the abundance of religious information available, Malaysian Muslims spent nearly double the time accessing religious content online as compared to print media (95).

Looking at ESU from a slightly different angle, Parent et al. (19) suggested that researchers need to discuss the role of attachment dimensions to understand adults' relationship with their smartphones. According to Bowlby et al. (96), the attachment with an object is theorized to develop in tandem with the flourishing of the attachment dimension in infancy and remained throughout the life course. Studies looking at attachment styles among medical students showed around 48.8% (97) to 51.3% (98) students with secure attachment. Our current study does not investigate the different attachment styles of the participants. However, this provides an avenue for further research in this domain.

There are limitations to this study. Firstly, the sample size of 273 might not be enough for a good statistical analysis. Secondly, this study was conducted on a specific population (medical students), making the generalizability of the interpretation of its results to other populations to be limited. Furthermore, this study did not look into specific activities during the use of smartphones – like gaming, internet use, or social media. These activities represent another aspect to be explored in future studies. The small sample size and the sample heterogeneity in this study also did not allow Bonferroni corrections to be administered.

Conclusion

This study offers insight into excessive smartphone use and its effects on Malaysian medical students. ESU is prevalent among UKM medical students regardless of their gender. Our study suggests that there is a significant positive correlation between ESU and social anxiety. We also discovered negative correlations between ESU and quality of life in various domains. Despite the limitations, we believe that this study may contribute to the development of new knowledge, particularly on the effects of smartphones on people's daily lives. Hopefully, this knowledge will help to guide users to maximize the potential of a smartphone to enrich their lives while averting the pitfalls. Further studies on smartphone use are necessary to explore how and under what conditions would smartphone use – despite being excessive – still be beneficial to users. The studies may also explore what other conditions would smartphone use be considered harmful.

Data availability statement

The original contributions presented in the study are included in the article/supplementary material, further inquiries can be directed to the corresponding author/s.

Ethics statement

The studies involving human participants were reviewed and approved by Research and Ethics Committee, Faculty of Medicine, Universiti Kebangsaan Malaysia (Project Code: FF-2018-243). The patients/participants provided their written informed consent to participate in this study.

Author contributions

MM, SS, and NN contributed to conception and design of the study. AA, KS, NB, NM, and SK collected and organized the database. MN performed the statistical analysis. HM, AA,

KS, NB, NM, SK, MM, NN, and SS wrote sections of the manuscript. All authors contributed to manuscript revision, read, and approved the submitted version.

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Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Publisher's note

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EDITED BY
Mansor Abu Talib,
USCI University, Malaysia

REVIEWED BY
Darshan Singh Darshan Singh,
Universiti Sains Malaysia (USM), Malaysia
Nadia Rania,
University of Genoa, Italy

*CORRESPONDENCE
Suzaily Wahab
suzaily@ppukm.ukm.edu.my

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Association between childhood trauma, intimate partner violence, and perceived parental competence among women abusing amphetamine-type stimulant

Suzaily Wahab[1]*, Rubini Sivarajah[2], Amirul Danial Azmi[1], Norliza Chemi[2] and Raynuha Mahadevan[1]

[1]Department of Psychiatry, Universiti Kebangsaan Malaysia Medical Centre, Bandar Tun Razak, Malaysia, [2]Department of Psychiatry, Hospital Kajang, Bandar Kajang, Selangor, Malaysia

Introduction: This cross-sectional study examines the correlation between childhood trauma, intimate partner violence (IPV), and parenting self-efficacy among women who reported using amphetamine-type stimulants (ATS) in an institutional drug rehabilitation center.

Methods: A total of 106 participants were recruited by purposive sampling, of which 88 were mothers. Questionnaires were used to collect sociodemographic data and study variables.

Results: Most of these women had experienced emotional abuse, sexual abuse, and physical neglect in their childhood. IPV assessments revealed that 70.5% ($n = 74$) and 30.5% ($n = 32$) had experienced physical and sexual violence, respectively. In terms of parenting competency, they scored 79.5% for self-efficacy and 54.4% for parenting satisfaction. Childhood emotional abuse significantly increases the odds of individuals experiencing sexual violence by 20.9%.

Discussion: We found that childhood trauma and IPV did not have a significant relationship with parenting efficacy. Conversely, childhood emotional abuse and physical abuse were negatively correlated to parenting satisfaction. It is imperative that any form of childhood abuse be recognized and stopped early to reduce the harm it brings to women later in life.

KEYWORDS

child abuse, amphetamine type stimulant (ATS), domestic violence, women's health, parental competency

Introduction

There is considerable concern about the increase in substance use globally. It was reported that about 269 million people worldwide used recreational drugs in 2018, a 30% increase from 2009. According to the latest World Drug Report, more than 35 million people have been affected by drug use disorders (1). In the Malaysian context, the rise of substance use and the associated manifestation with criminality, particularly

among women, has reached a concerning level. The National Anti-Drug Agency (NADA) documented that the total number of people who used drugs (PWUD) caught was 20,643 in the year 2020, with 95.3% men and 4.7% women. Although the number of women involved in drug abuse is smaller than that of men, there has been a considerable increase from 580 women per case in 2010 to 974 women per case in 2020, which was an almost 2-fold increase within the past decade (2, 3).

In Malaysia, the predominant substance used was amphetamine-type stimulants (ATS), with 65.2% of PWUD caught using ATS, compared with 30.9% of opiates and 2.6% of cannabis in 2020 (2). Kelantan et al. states were reported to have the highest involvement in drug abuse when compared with other states in Malaysia (4). There also appeared to be a difference in addiction trends among women with regard to the type of substance used. Women in Malaysia were reported to use methamphetamine (MA) and heroin compared with other countries in America and Europe, where pharmaceutical prescription drugs are the most commonly used drugs (5). MA is also the most used illicit substance currently, and it is widely used by vulnerable populations of women around the world. These include sex workers, homeless women, psychiatric patients, sexual minorities, and pregnant women. MA is a synthetic psychostimulant with a high risk of developing addiction. Its stimulant effects include increased wakefulness, focus, and euphoria. However, with chronic use, the side effects manifested from this drug are debilitating, including depression, psychotic episodes, paranoia, aggression, and violence. Women with MA use disorder are at a significantly higher risk of perpetrating and being victims of violence. These effects are particularly worrying as MA use affects pregnant mothers, specifically causing small for gestational age and low birth weight (6).

Various studies have explored the risk factors that lead to substance use. Childhood trauma and violent victimization were reported as the most common risk factors. Childhood trauma refers to various types of maltreatment experienced by children younger than 18 years (7). Child maltreatment refers to physical and emotional mistreatment, sexual abuse, neglect, negligent treatment of children, and their commercial or other forms of exploitation (8). These maltreatments are suggested to trigger the use of the substance as a coping strategy to alleviate the pain of being maltreated or indirectly by causing a criminal lifestyle that mediates contact with substance use (8). A local study by Wahab et al. (9) reported that peer and sibling victimization was positively correlated with lifetime use of illicit substances. It was also reported that young women with a history of childhood sexual abuse were more likely to have psychiatric comorbidities, such as depression (10). Moreover, childhood trauma and psychiatric comorbidities were also reported among women who use MA (6).

Intimate partner violence (IPV) is a pattern of violence, abuse, or intimidation used to control or maintain power over a partner in an intimate relationship. An intimate partner is described as a romantic or sexual partner and includes spouses, boyfriends, girlfriends, and people with whom they dated, were seeing, or "hooked up" (11). IPV varies in frequency and severity, ranging from one episode that might or might not have a lasting impact to chronic and severe episodes for years. Various forms of IPV include physical, emotional, psychological, sexual, social, and financial abuse. The following findings were reported in the study by Smith et al. (12):

- About one in four women experienced contact sexual violence, physical violence, and/or stalking by an intimate partner and reported an IPV-related impact during their lifetime.
- Regarding specific subtypes of IPV, about 18.3% of women experienced contact sexual violence, 30.6% experienced physical violence (21.4% experienced severe physical violence), and 10.4% experienced stalking during their lifetime.
- An estimated 71%, or nearly 31.0 million, reported being victims of contact sexual violence, physical violence, and/or stalking by an intimate partner. They first experienced these or other forms of violence by that partner before the age of 25 years, and one in four female victims (25.8% or about 11.3 million victims) first experienced IPV before the age of 18 years.
- In Malaysia, the prevalence of IPV ranges between 4.9 and 35.9%, with psychological and emotional abuse being the most prevalent form of IPV (13).

There is ample evidence to suggest a close relationship between IPV and substance use. IPV is commonly reported by female MA users and is considered a warning sign of more severe forms of violence by male users (6). The history of sexual abuse of women in substance use treatment ranges from 30 to 75%, leading many to suggest sexual trauma as a key contributor to women's drug abuse (14). Studies have shown that MA use is closely associated with various forms of violence and aggression, including IPV (15). A similar trend was reported in a local study where women abusing drugs and having a history of childhood trauma were significantly associated with experiencing emotional and physical violence during pregnancy (16). Over the last decade, researchers have examined the mechanisms by which childhood abuse can lead to adulthood IPV (17). According to the social learning theory, children raised in a violent home will see aggression as an effective response to conflict because of observational learning, modeling, and direct behavioral conditioning. As a result, children who are exposed to violence in their early life are more likely to re-experience or replicate violence in their adult interpersonal relationships (18). Childhood trauma is also associated with an earlier onset of initiating MA. Emotional abuse and physical abuse are reported to be predictive factors to the earlier age of MA initiation among

dependents (19). The impact of childhood trauma is correlated not only with the age of onset but also with the severity of dependence (20).

Pregnancy facilitates a life change in which women begin to plan for their child's birth and cultivate a maternal function, but parenting self-efficacy factors for women with substance use have been studied infrequently. Previous studies have shown that higher levels of social support and family empowerment were related to increased parenting self-efficacy among mothers using illicit substances, especially during their vulnerable period. Studies have shown that social networks and family support have reduced stress, allowing a more fluid shift to motherhood (21). A previous study has shown duality in the experience of motherhood among some women using substances. On the one hand, there were some idealized views of motherhood, and some built a more adapted version of the good mother model to fit their reality. This model refers to what we call "the deviant good mother" model (22). In the idealized view of motherhood, women consider motherhood to fulfill their emotional needs or heal those wounds, mainly in their relationships with their mothers. Some women with drug use disorders confess to repeating the unhealthy parenting patterns they witnessed during their childhood, but they are willing to improve their parenting methods now. Changing these habits and raising their children in a different way can help them see themselves as distinct from their parents, as doing what is necessary for their children, and thus redeeming parts of their maternal identity (22).

On the other hand, some seemed to adjust their conception of motherhood so as not to contradict this lifestyle. These women expressed their vision of motherhood and tried to prove that they could be "good mothers" just like others. These mothers may be trying to justify themselves or compensate for their deviant behavior.

In Malaysia, the number of drug treatment and rehabilitation program centers for women is limited compared with that for men. According to the World Drug Survey, this is due to a lack of evidence-based treatment and recovery services for women. Most substance-related studies have excluded women because it is believed that women are biologically more complex than men and that women are too preoccupied with caring for their children to engage in studies. However, it is important to remember that women face unique issues regarding substance use with regard to pregnancy and child-rearing capacity. As the predominant caregiver, women play an important role in parenting children. Thus, violent behaviors resulting from MA use may be detrimental to the ability to carry out parental roles and may have an everlasting effect on their children. Thus, understanding a woman's needs concerning past, childhood, sexual, and other types of violence; mental illness; and parenting is critical.

This study aims to investigate the association between childhood trauma and IPV and perceived parent self-efficacy among women with amphetamine-type stimulants (ATS) use disorder. This study has clinical value in identifying and examining associations with amphetamine-type stimulants and allows for further research on ways to mitigate these effects on drug usage.

Method

Study design and setting

This cross-sectional study was conducted from December 2020 to March 2021 on consenting women with substance use disorder undergoing rehabilitation in a substance rehabilitation center. This rehabilitation center was chosen because it is the only center accepting women with substance use disorders. Data were gathered through a video conferencing platform. Women in this rehabilitation center came from other states, such as Johor and Penang, but the majority of them was from the East Coast. There are two ways to be admitted to the center: by a court order or on a voluntary basis, and they are expected to stay for a maximum of 2 years. Upon completion of their rehabilitation, the participants are allowed to return to the community and will undergo surveillance by their respective district NADA. During their stay at the rehabilitation center, the participants were not allowed to access any type of substance whatsoever. Their children were not permitted to accompany them to the rehabilitation center. However, if they give birth during their stay, they are allowed to have their child with them. Clients can communicate with their children and spouses through letters, phone calls, and family visits.

Data collection

The study population consisted of women enrolled in a rehabilitation center during this period. The study employed purposive sampling in which all the clients in the rehabilitation center were screened using the inclusion and exclusion criteria. This method was employed to have a larger sample size and more reliable results. The inclusion criteria were all women aged between 18 and 65 years, all those who were able to communicate and understand in either Bahasa Malaysia or English, women with a history of ATS use and able to read and write fluently in Bahasa Malaysia, and all those who were able to give informed and written consent. The clients who met these criteria were then informed and invited to participate in this study to which they could participate and withdraw at any time during the study. The participation in the study was on a voluntary basis.

Given the current social distancing practice, data were collected using online interview sessions and Google Forms. The participants were interviewed through an online video

conference tool using the rehabilitation center facilities and in a private room to ensure their privacy. The researcher explained the study information and the objectives during the interview conducted in an online format. The online form included the study information, objectives, inclusion and exclusion criteria, and a consent form to which the clients would have to click on "yes" before being able to proceed with the self-rated questionnaires. Each individual was given a set of five questionnaires, whereby three of them were self-reported, and the other two were interviewer-rated. The participants used Google Forms to complete self-reported questionnaires, which were (1) social demographics, (2) Childhood Trauma Questionnaire Short Form (CTQ-SF), and (3) Parenting Sense of Competence Scale (PSOC). The interviewer-rated questionnaires used were the Mini International Neuropsychiatric Interview (MINI) 6.0 Malay version, and the Women's Health and Life Experiences Questionnaire was given to the participants in an online interview. Each participant was provided 30–45 min to answer a set of questionnaires. Confidentiality was guaranteed for all participants. The participants were encouraged to seek assistance while answering the self-reported questionnaires. An officer was briefed regarding the questionnaire to assist these women. This study obtained ethical approval from the Medical Ethics Committee of the institution and National Medical Research Register.

Study instruments

Before this study began, permission from the original authors for the questionnaires MINI 6.0, CTQ-SF, Women's Health and Life Experiences Questionnaire, and PSOC was obtained.

Patient clinical-demographic questionnaire

This questionnaire collects information from each participant about age, ethnicity, religion, marital status, level of education, previous employment status, whether they had children, household income, and health-related variables.

MINI 6.0 Malay version

MINI 6.0 was only used to diagnose participants with substance use disorder (SUD). The latest English version of MINI 7.2, designed as a brief structured interview on the major psychiatric disorders in DSM-5 to diagnose SUD, requires two or more questions from the J2 section to be coded as yes. The MINI 6.0 Malay version was shown to have a reliable and valid psychometric property (23). This is a brief structured interview on the major psychiatric disorders in DSM-IV. For a diagnosis of current substance dependence, it is needed to have three or more answers in section J2 coding yes. This study adopted the MINI 6.0 Malay version because it is more suitable for the population setting (24). However, the authors also ensured that the participants fulfilled the DSM 5 criteria for substance use disorder.

CTQ-SF

The instrument was designed to include 25 items (25) to measure traumatic experiences during childhood. The instrument contains 25 items divided into the following five domains: physical, emotional, and sexual abuse, and physical and emotional neglect domain. An additional three-item minimization/denial scale was included to measure any underreporting of maltreatment. This instrument uses a five-point Likert scale to measure the response with the following scales: 1 = never, 2 = rarely, 3 = sometimes, 4 = often, and 5 = very often. The sum of the item score for each scale is used to compute the clinical score, with higher scores indicating a more severe experience of childhood maltreatment. This study attempts to translate the questionnaire into a Bahasa Malaysia version. Forward and expert panel translation was done by a language and healthcare expert. The translated questionnaire was pretested among 30 healthcare staff in the institute medical center to ensure that the wording of the questions was correct and that they understood the questionnaire. The internal consistency of this translated CTQ was 0.62.

Women's health and life experiences questionnaire Malay version

The Women's Health and Life Experiences Questionnaire was obtained from the WHO multi-country study on women's health and domestic violence against women. This questionnaire measures domestic violence prevalence, health implications, and risk factors. It consists of 20 specific items that measure four types of IPV act, such as controlling behaviors, emotional violence, physical violence, and sexual violence (26). Section 7 of this questionnaire measures physical and sexual violence. Answering yes to any of the questions on physical and sexual violence corresponds to having experienced physical and/or sexual violence. The Malay version of the WHO Women's Health and Life Experiences Questionnaire is a valid and reliable measure of women's health and experiences of IPV in Malaysia with a Cronbach's alpha value of 0.767–0.858 for all domains (27).

PSOC

The PSOC is a valid and reliable tool developed by Gibaud–Wallston and Wandersman (28). The PSOC is a 17-item scale with two domains measuring parenting self-esteem. Each item is rated on a six-point Likert scale ranging from

strongly agree to strongly disagree, with nine items falling under the satisfaction domain and seven items under the efficacy domain. The satisfaction domain examines mothers' anxiety, motivation, and frustration, while the efficacy domain measures mothers' perception of competence, capability levels, and problem-solving abilities in their parental role (29, 30). This study attempts to translate the questionnaire into a Bahasa Malaysia version. Forward and expert panel translation was done by a language and healthcare expert. The translated questionnaire underwent expert testing on 30 healthcare staff in the institute medical center. All participants understood the translated parenting sense of competence scale, and the internal consistency was 0.6.

Statistical analysis

In the descriptive analysis, mean with standard deviation or median with interquartile was used to present continuous data, depending on the normality. In addition, the frequency with percentage was used to present categorical variables. For inferential analysis, an independent *t*-test, Mann–Whitney U test, chi-square test, Pearson correlation, or Spearman ranked correlation was used to determine significant differences between childhood trauma and IPV and parenting competency among women in a rehabilitation center. Considering regression, a simple logistic was used to determine the association between independent variables with binary outcomes. On the other hand, linear regression was used to check the relationship between all independent variables and continuous outcome variables (31). In this study, the independent variable is childhood trauma, the mediating variable is IPV, and the outcome is parenting competency. These statistical tests were performed on International Business Machines Corporation's Statistical Package for the Social Sciences (SPSS) version 22.

Results

Respondents' sociodemographic characteristics

There were 128 women in the rehabilitation center, of which 22 were not included in this study as they did not meet the inclusion and exclusion criteria (two of them were younger than 18 years, and 20 still had some withdrawal symptoms). The normality test results showed that age, childhood trauma (minimization/denial), and parenting sense of competence scale (both parental efficacy and satisfaction domains) were normally distributed. Hence, a mean with standard deviation was used to present those variables, whereas the others were presented as median with interquartile range. In Table 1, the mean age

TABLE 1 Sociodemographic characteristics, health profiles, childhood trauma, intimate partner violence, and types of substance used variables among women with substance use in a rehabilitation center ($n = 106$).

Variables	Median (IQR)/ Mean (SD)	*n* (%)
Age	33.5 (7.13)[1]	
Ethnicity		
Malay		98 (92.5)
Chinese		1 (0.9)
Indian		1 (0.9)
Others		6 (5.7)
Marital status		
Widowed/Single		49 (46.2)
mum/Divorced/Process		21 (19.8)
of divorcing		
Single		36 (34.0)
Married		
Children		
No		18 (17.0)
Yes		88 (83.0)
Education level		
Diploma/Degree		8 (7.5)
Secondary		93 (87.7)
Primary		5 (4.7)
Job		
Jobless/others		26 (24.5)
Part-time		4 (3.8)
Full-time		76 (71.7)
Stay		
City		77 (72.6)
Outside city		29 (27.4)
Household income (monthly)		
<RM2,000		74 (69.8)
RM2,001–RM5,000		27 (25.5)
RM5,001–RM10,000		4 (3.8)
>RM10,000		1 (0.9)
History with general illness		
No		79 (74.5)
Yes		27 (25.5)
History of mental illness		
Anxiety		1 (0.9)
Depression		9 (8.5)
Psychosis/Schizophrenia		1 (0.9)
No mental illness		95 (89.6)
Psychiatry treatment		
No		97 (91.5)
Yes		9 (8.5)
History of attempted suicide		
No		94 (88.7)

(Continued)

TABLE 1 (Continued)

Variables	Median (IQR)/ Mean (SD)	*n* (%)
Yes		12 (11.3)
History of family members who used substances		
No		55 (51.9)
Yes		51 (48.1)
Known persons who used substances		
Spouse		40 (37.7)
Friends		57 (53.8)
Others		9 (8.5)
Childhood trauma		
Emotional abuse	11.0 (5.0)[b]	
Physical abuse	9.0 (2.0)[b]	
Sexual abuse	13.0 (0.0)[b]	
Emotional neglect	6.0 (5.0)[b]	
Physical neglect	14.0 (3.0)[b]	
Minimization/Denial	1.5 (0.99)[a]	
Physical violence (*n* = 105)		
No		31 (29.5)
Yes		74 (70.5)
Sexual violence (*n* = 105)		
No		73 (69.5)
Yes		32 (30.5)
Mostly used substance		
Hallucinogen		1 (0.9)
Cocaine		1 (0.9)
Narcotic		12 (11.3)
Stimulant (Including Amphetamine)		92 (86.8)
Substance used in the past 12 months		
Stimulants		104 (98.1)
Other substances		2 (1.9)
Substance dependency (current)		
No		0
Yes		106 (100.0)

IQR, interquartile range; SD, standard deviation.
[a] = mean (SD); [b] = median (IQR).

of the 106 participants was 33.5 (SD = 7.13) years. A total of 92.5% (n = 98) of the participants were Malay, and 46.2% (n = 49) of them were widowed, single mothers, divorced, or in the process of divorcing, and about 83% (n = 88) of them had children. Regarding education and employment, 87.7% (n = 93) completed secondary education, and 71.7% (n = 76) had a full-time job. Most participants resided in the city with a monthly household income of below RM 2,000. Regarding the health-related profile, 25.5% (n = 27) of them had a history of general illness. All participants were diagnosed with substance use disorder, 10% (n = 11) were diagnosed with anxiety, depression, or psychosis/schizophrenia, and 8.5% (n = 9) of these women had received psychiatry treatment before. About 11% (n = 12) of them had an episode of attempted suicide. About half, 48.1% (n = 51), of the participants had family members who used substances. In addition, 53.8% (n = 57) of the participants had friends who used substances, followed by their spouse at 37.7% (n = 40) and others at 8.5% (n = 9).

Respondents' history of violence

Regarding childhood trauma, emotional abuse, sexual abuse, and physical neglect were most frequently answered. During adulthood, 70.5% (n = 74) of the respondents experienced physical violence by their intimate partner, and conversely, 30.5% (n = 32) of them encountered sexual violence from their partner.

Respondents' drug use history

All of the study participants used a type of stimulant before. A series of substance-related items in the MINI 6.0 Malay version instrument indicated that more than 90% of the participants fulfilled the criteria for substance use, ultimately resulting in all individuals being clinically diagnosed with current substance dependency or use disorder.

Association between childhood trauma and IPV

Tables 2, 3 illustrate the relationship between childhood trauma domains and IPV (physical and sexual). A Mann–Whitney U test showed that individuals with sexual violence tend to have a higher median score in emotional abuse during childhood than the participants without experiencing sexual violence. The median score showed significance at a 0.05 level. A simple logistic regression showed that every increment of one unit of emotional abuse score significantly increases the odds of individuals experiencing sexual violence by 20.9% (95% CI: 1.044, 1.401). Also, an independent test deduced that women who suffered from physical violence had a significantly lower minimization/denial score than their counterparts (p = 0.04). However, a simple logistic regression showed no significant association between minimization and denial score with physical violence in adulthood, as the p-value was more than 0.05 (0.055). Other childhood trauma domains, such as physical abuse, sexual abuse, emotional neglect, and physical neglect, were not significantly associated with intimate partner physical and sexual violence.

TABLE 2 Association between childhood trauma and intimate partner violence ($n = 105$).

Childhood trauma	Intimate partner violence (physical violence)		U /t statistic *p*	Intimate partner violence (sexual violence)		U-statistic *p*
	No	Yes		No	Yes	
Emotional abuse	11.0	12.0	960.000[a]	11.0	12.5	812.000[a]
Median (IQR)	(4.0)	(5.0)	0.178	(4.0)	(4.0)	0.011*
Physical abuse	9.0	9.0	1084.000[a]	9.0	10.0	1068.500[a]
Median (IQR)	(2.0)	(2.0)	0.637	(2.0)	(2.0)	0.461
Sexual abuse	13.0	13.0	1062.500[a]	13.0	13.0	1163.000[a]
Median (IQR)	(0.0)	(0.0)	0.466	(0.0)	(1.0)	0.966
Emotional neglect	6.0	6.0	970.000[a]	6.0	7.0	1015.500[a]
Median (IQR)	(2.0)	(6.0)	0.195	(4.0)	(7.0)	0.269
Physical neglect	13.0	14.0	977.000[a]	13.0	14.0	1045.000[a]
Median (IQR)	(3.0)	(3.0)	0.211	(3.0)	(3.0)	0.370
Minimization/Denial	1.8	1.4	2.095[b]	1.6	1.5	0.361[b]
Mean (SD)	(0.86)	(1.01)	0.040*	(0.97)	(1.02)	0.719

U, Mann–Whitney U-test; t, independent t-test; IQR, interquartile range; SD, standard deviation; [a] = U statistic; [b] = t-statistic.
* = p-value significance at the 0.05 level.

TABLE 3 Simple logistic regression on childhood trauma subdomains in association with physical and sexual violence.

Childhood trauma	Physical violence (yes)		Sexual violence (yes)	
	OR (95% CI)	*p*	OR (95% CI)	*p*
Emotional abuse	1.085 (0.929, 1.267)	0.305	1.209 (1.044, 1.401)	0.011*
Physical abuse	1.052 (0.895, 1.237)	0.540	1.037 (0.898, 1.197)	0.625
Sexual abuse	1.045 (0.826, 1.321)	0.715	0.874 (0.682, 1.120)	0.288
Emotional neglect	1.096 (0.972, 1.236)	0.134	1.055 (0.956, 1.163)	0.287
Physical neglect	1.138 (0.902, 1.436)	0.275	1.020 (0.823, 1.265)	0.853
Minimization/Denial	0.639 (0.405, 1.010)	0.055	0.924 (0.604, 1.414)	0.716

OR, odds ratio; CI, confidence interval; *p-value significance at the 0.05 level.

Respondents' parenting sense of competency

We also investigated the parenting sense of competency from 87 (1 with missing data) participants with children, as shown in Table 1. The mean of the participants' perceived parenting efficacy was 33.3 (0.95, CI 31.7–34.9), and the mean score for parental satisfaction was 29.1 (SD = 5.14). In the parental satisfaction domain, five items, namely, items 3, 5, 8, 9, and 14, had an unexpectedly high proportion (62.5–88.7%) of the participants who agreed to those negative statements. Item 3 focuses on individual accomplishment, item 5 looks into self-perception on being a good mother, and item 8 assesses the difficulty in being a parent by not knowing whether their actions are good or bad. The remaining two items were items 9 and 14, focusing on valuing self as a worthless mother and motivation to be a good mother.

Correlation between PSOC with childhood trauma and IPV

Tables 4, 5 show the relationship between the PSOC score with childhood trauma domains and IPV, respectively. The correlation analysis in Table 4 shows that emotional neglect was negatively correlated with parents' perceived efficacy (ρ: −0.308, $p < 0.01$). On the other hand, emotional abuse (ρ: −0.286, $p < 0.01$) and physical abuse (ρ: −0.267, $p < 0.05$) during childhood were both negatively correlated with satisfaction. Among the 87 individuals with IPV, mothers who had encountered sexual violence scored the highest for perceived parenting efficacy (mean = 35.0, SD = 6.31) but lowest for the parenting satisfaction score (mean = 28.5, SD = 4.84). However, the independent t-test showed no statistical mean difference in parenting efficacy and satisfaction scale between those with or without IPV, as shown in Table 5.

TABLE 4 Correlation between childhood trauma with parenting competence scale domains (efficacy and satisfaction).

Childhood trauma	Efficacy	Satisfaction
Emotional abuse[b]	−0.031	−0.286**
Physical abuse[b]	−0.030	−0.267*
Sexual abuse[b]	−0.146	−0.021
Emotional neglect[b]	−0.308**	−0.177
Physical neglect[b]	0.042	−0.049
Minimization/Denial[a]	0.139	0.015

[a], Pearson correlation coefficient; [b], Spearman ranked correlation coefficient; *$p < 0.05$; **$p < 0.01$.

TABLE 5 Mean difference parenting efficacy and satisfaction stratified by physical and sexual violence.

Intimate partner violence	Efficacy mean (SD)	Satisfaction mean (SD)
Physical		
No	33.8 (7.51)	29.0 (5.00)
Yes	33.1 (7.28)	29.1 (5.23)
Sexual		
No	32.5 (7.65)	29.3 (5.29)
Yes	35.0 (6.31)	28.5 (4.84)

SD, standard deviation; *$p < 0.05$.

Multiple and simple linear regression, as shown in Table 6, showed that both childhood trauma and IPV did not have a significant relationship with the efficacy scale. Conversely, two childhood trauma domains were related to parental satisfaction, notably emotional abuse and physical abuse. For every unit increase in emotional abuse, parental satisfaction decreases by 0.482 unit (95% CI: −0.859, −0.105, $p = 0.013$). In the physical abuse domain, every unit increment significantly reduced the parental satisfaction score by 0.518 unit (95% CI: −0.870, −0.166, $p = 0.004$). After accounting for other domains in the childhood trauma questionnaire and IPV, the only factor that remained significantly associated with parenting satisfaction was physical abuse (adjusted B: −0.439; 95% CI: −0.863, −0.014; $p = 0.043$). Emotional abuse was no longer associated with parenting satisfaction following the adjustment (adjusted B: −0.225; 95% CI: −0.769, 0.320; $p = 0.414$).

Discussion

This study focused on the history of childhood trauma, IPV, and perceived parenting competency among women in a substance rehabilitation center. This study reports a Malay-predominant sample (92.5%). This is reflective of the substance use population locally, where Malays make up the bulk of PWUD at 82.5% (4). The mean age of the study population is 33.5. Looking at the type of substance used, we found that all these women used ATS before. This is consistent with another study survey conducted in Malaysia looking at the pattern of substance use in Malaysia, with the most commonly used drug across the lifetime being ATS (32). We also discovered that 69.8% of these women came from low-income families, with a monthly income of less than RM 2,000, resulting in a rise in the use of cheaper drugs such as MA tablets compared with other drugs in Malaysia (33). Another possible reason why women use ATS can be explained due to its properties, including elevating mood, boosting energy, and increasing sexual desire, which help them cope with the daily demands and struggles of motherhood. A previous study on MA use among sex workers revealed that amphetamine is a popular option among women because it helps them work longer hours while still increasing their sexual desire, thus enabling them to generate a better income (34).

The study findings reveal that emotional abuse and physical neglect were the two highest childhood traumas experienced, which were reported by 66 and 39.6% of the participants, respectively. A local study conducted among male drug addicts in rehabilitation centers found that emotional abuse and physical abuse were the most reported, which were reported by 50.5 and 38% of the participants, respectively (35). This trend was similar to that reported in other studies on childhood maltreatment, where the most common forms of abuse were emotional abuse and neglect (36, 37). When exploring violence with an intimate partner, 70.5% of these women experienced physical violence from their intimate partner, and 30.5% encountered sexual violence from their partner. A relatively high number of women have undergone at least one form of abuse in their entire relationship with men, either in their previous or current relationship. This finding is similar to those of previous studies reporting that intimate partner abuse is especially high among women with a drug use disorder (15, 38). In another study, IPV was identified in 47–90% of reproductive-age women with a substance use disorder, compared with 1–20% in non-substance use populations (39). It would be possible to say that a majority of these abused women use the substance as a coping mechanism for the trauma they experienced, as discussed by Gezinski et al. (40). Similarly, Hobkirk et al. (41) reported that post-traumatic stress disorder and MA use as a coping strategy were significant mediators for MA addiction among women with a history of IPV.

Previous studies have reported that all childhood traumas are linked with IPV. Particularly, emotional abuse, neglect, and childhood sexual trauma were more emphasized to be important contributors to being victimized by intimate partners as adults, regardless of sexual or physical abuse (37, 42, 43). This study similarly found that women who were sexually victimized by their partners had a higher score in childhood emotional abuse compared with the other domains of childhood trauma than the women who have not experienced sexual violence. This can

TABLE 6 Simple and multiple linear regression analyses on relationship between childhood trauma domains and intimate partner violence with parental satisfaction.

Risk factors	Satisfaction		Satisfaction	
	B (95% CI)	*p*	Adjusted B (95%CI)	*p*
Childhood trauma				
Emotional abuse	−0.482 (−0.859, −0.105)	0.013*	−0.225 (−0.769,0.320)	0.414
Physical abuse	−0.518 (−0.870, −0.166)	0.004**	−0.439 (−0.863, −0.014)	0.043*
Sexual abuse	−0.265 (−0.824, 0.294)	0.348	0.035 (−0.562, 0.632)	0.908
Emotional neglect	−0.218 (−0.476, 0.040)	0.096	−0.209 (−0.619, 0.201)	0.314
Physical neglect	−0.136 (−0.720, 0.448)	0.645	0.210 (−0.416, 0.836)	0.506
Minimization/denial	0.076 (−1.021, 1.173)	0.891	−0.934 (−2.342,0.473)	0.190
Intimate partner violence				
Physical violence				
No				
Yes	0.082 (−2.324, 2.488)	0.946	0.231 (−2.274, 2.736)	0.855
Sexual violence				
No				
Yes	−0.781 (−3.156, 1.593)	0.515	−0.390 (−2.905, 2.124)	0.758

B, regression coefficient; CI, confidence interval.
*$p < 0.05$; **$p < 0.01$.

be understood that emotional abuse in childhood can increase insecure attachment and thus further affect the development of interpersonal and emotional control, making victims more susceptible to re-victimization (42). Similarly, like previous research, it is not surprising that this study found that emotional abuse during childhood is the most common type of abuse that is positively correlated with the occurrence of sexual violence.

Women with children were also assessed for their perception of their parenting abilities. Previous research suggested that parents with a history of trauma have been found to hold more negative views about themselves than their perceived capability to parent a child (36, 44, 45). The findings of this study similarly revealed that parents with a history of childhood maltreatment were negatively correlated with perceived parental competency. Unlike other studies that showed the significance of childhood sexual abuse with lower perceived parenting competence (36, 46), only emotional neglect and emotional abuse and physical abuse were reported as significant in this study. Nonetheless, the findings of this study are line with the study by Baiverlin et al. (45) and Barrett (47), where no difference was found in perceived competence among mothers with and without childhood sexual abuse.

Regarding the components of childhood trauma and parenting competence, there was a significant negative correlation between childhood emotional abuse and physical abuse (non-sexual) with parenting sense of satisfaction. This finding was consistent with that of other research reporting that childhood physical and emotional abuse, neglect, observing domestic violence in childhood, or living apart from one or both parents during childhood was associated with parenting stress (36). Mothers who were sexually abused in childhood provided less positive structure and lower satisfaction (48). A study found that sexually abused mothers were more likely to have psychiatric comorbidities, such as depression and substance use disorder (49), which may play a role in the development of their self-esteem and thus lead to a negative perception of themselves.

Another factor that could contribute to their lack of perceived competence is that parents with a history of childhood trauma are more likely to experience stressors related to lower socioeconomic status (50). These socioeconomic gaps would directly affect parenting capacity and the ability to provide basic needs of children, rather than "parental skills deficiency" within parents (51). However, this was not shown in this study, where no significant correlation between the mothers' socioeconomic status and their perception of parental competency was found. On top of that, experiencing IPV is also an indicator of lower self-competency among adolescent mothers (52). In this study, many respondents answered that having low self-perception of being a good mother, failing at accomplishing in life, being unsure if they were doing an excellent job of parenting, and feeling worthless as a mother may indicate a lower perceived self-competency. This could be largely affected by similar factors explained earlier, such as substance use disorder, other psychiatric comorbidities, and the history of childhood trauma faced by these women (21, 36, 45).

ATS use should not be overlooked when accounting for violent perpetration and victimization. There is a significant difference between the prevalence of IPV among women with ATS use disorder compared with the national average. In this study, about 70 and 30% of these women, compared with the national average of 5 and 1.7%, had experienced physical and sexual violence, respectively (53). A recent study has noted

that the prevalence of IPV in Malaysia widely varies, ranging between 4.9 and 35.9% (13). This was further reported in a longitudinal study by Foulds et al. (54), which claimed that MA use is an independent risk factor that raises the risk of violence involved in the general population (54). A similar trend can be seen in perceived parental competence, where MA use may play a role in how these women view themselves as parents. Parents involved with MA showed higher stress and perceived depression in their role as parents. This, coupled with a perception of highly demanding children, leads to the perception of a lack of competency in raising their children (55).

This study has several limitations. First, the sample size of this study was relatively small. It would also be better if the participants included women using ATS out-of-treatment centers. The cross-sectional nature of the data does not allow inferences regarding the causation of the relationship between childhood trauma, IPV, and parenting competency among the population of the study. The study results also relied on retrospective data of childhood trauma and IPV, which may be subject to recall and reporting bias. These data can also be confounded by many factors such as underreporting based on concerns of stigmatization, and the duration, amount, and frequency of drug use, which were not addressed in this study. Many other mediating factors may contribute to re-victimization such as emotional dysregulation, coping skills, and reduced sexual refusal assertiveness, which were not investigated by this study (56).

Furthermore, this study used self-reported data. This may be inaccurate as such data are often underreported. This study also did not explore other psychiatric comorbidities that may have contributed to the occurrence of IPV/substance use such as depression, personality disorders, and attention deficit hyperactive disorder. Further studies should also examine the difference between IPV and mental health problems between ATS-only users and ATS polydrug users. Another limitation of this study is that women were only viewed from the angle as victims and not as perpetrators of IPV, which may be important as ATS use increases the risk of aggression.

Furthermore, the study participants were predominantly from a single ethnic group. Thus, differences in religion, culture, language, and nationality could not be ascertained. This is because the majority of the rehabilitation center inmates were of Malay ethnicity, which is also the leading ethnic group in Malaysia involved with drugs.

Both childhood abuse and IPV play an important role in the perceived parenting competency of women. In addition, these two are also linked to intergenerational transmission of violence. Therefore, it is of great importance for individuals to recognize the risk factors that may predispose them or their loved ones to any form of abuse. We would also like to implore rehabilitation centers for women to include parenting, social, and resiliency skills lessons. These lessons should also include behavior management, juridical education on abuse, and steps for applying for victim assistance (57). To reduce current gaps in responses to violence against women, it is recommended to establish guidelines on responding to domestic violence and child abuse at the primary healthcare level. This is to facilitate primary healthcare providers in recognizing clinical evidence of abuse and equip them with skills to handle such cases. This is especially true given that the prevalence of IPV against women attending primary care clinics was 22% (58).

Conclusion

Violence against women in the family and society is a key obstacle to the development of society. Given the large number of women with a history of childhood trauma and IPV, recognizing the patterns of violence and parenting competency is crucial to understand the indirect effect of trauma across multiple generations. This study also highlights the importance of non-sexual childhood trauma for being recognized as a predictor of re-victimization.

As trauma and abuse can be intergenerational, we recommend exploring the role of women as perpetrators of IPV and child abuse and how their use of drugs could potentially exacerbate violence. Other than that, it is equally important to investigate the protective roles that women can play to break the cycle of violence.

Data availability statement

The datasets presented in this article are not readily available because the dataset is protected as per the agreement made with the rehabilitation center. Requests to access the datasets should be directed to suzaily@ppukm.ukm.edu.my.

Ethics statement

The studies involving human participants were reviewed and approved by the Universiti Kebangsaan Malaysia Ethics Committee and the National Medical Research Register. The patients/participants provided their written informed consent to participate in this study.

Author contributions

SW: conceptualization, project administration, supervision, funding acquisition, and writing—review and editing. RS:

data curation, formal analysis, investigation, methodology, and writing—original draft. AA: formal analysis, methodology, and writing—review and editing. NC: supervision and writing—review and editing. RM: supervision and writing—review and editing. All authors contributed to the article and approved the submitted version.

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Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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Mansor Abu Talib,
UCSI University, Malaysia

REVIEWED BY
Mathew Coleman,
The University of Western Australia, Australia
Philip Osteen,
The University of Utah, United States

*CORRESPONDENCE
Lai Fong Chan
✉ laifchan@ppukm.ukm.edu.my

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Effectiveness of online advanced C.A.R.E suicide prevention gatekeeper training program among healthcare lecturers and workers in national university of Malaysia: A pilot study

Amran Fadzrul Roslan[1], Kai Shuen Pheh[2], Raynuha Mahadevan[3], Siti Mariam Bujang[4], Ponnusamy Subramaniam[5], Hanieza Fadzlina Yahya[3] and Lai Fong Chan[1]*

[1]Department of Psychiatry, Faculty of Medicine, National University of Malaysia (UKM), Kuala Lumpur, Malaysia, [2]Department of Psychology and Counselling, Faculty of Arts and Social Sciences, Tunku Abdul Rahman University, Kampar, Malaysia, [3]Department of Psychiatry, Hospital Canselor Tuanku Muhriz, National University of Malaysia (UKM), Kuala Lumpur, Malaysia, [4]Department of Medical Education, Faculty of Medicine, National University of Malaysia (UKM), Kuala Lumpur, Malaysia, [5]Unit of Health Psychology, Faculty of Health Sciences, National University of Malaysia (UKM), Kuala Lumpur, Malaysia

Background: Suicide is a major cause of death among adolescents and young adults, especially students. This is particularly true for healthcare students with a higher risk and more access to lethal means. Thus, it is vital for healthcare educators who have regular contact with these healthcare students to be trained as gatekeepers in preventing suicide. Evidence of the effectiveness of such gatekeeper training, mainly using an online module, is lacking predominantly in Malaysia. This study aims to investigate the effectiveness of an online gatekeeper suicide prevention training program that is conducted for healthcare lecturers.

Methods: A single-arm interventional pre-and post-pilot study was conducted on a sample of healthcare lecturers and workers who are involved in supervising healthcare students. A purposive sampling technique was used to recruit 50 healthcare educators in Malaysia. The program was conducted by trained facilitators and 31 participants completed a locally validated self-rated questionnaire to measure their self-efficacy and declarative knowledge in preventing suicide; immediately before and after the intervention.

Results: Significant improvement was seen in the overall outcome following the intervention, mostly in the self-efficacy domain. No significant improvement was seen in the domain of declarative knowledge possibly due to ceiling effects; an already high baseline knowledge about suicide among healthcare workers. This is an exception in a single item that assesses a common misperception in assessing suicide risk where significant improvement was seen following the program.

Conclusion: The online Advanced C.A.R.E. Suicide Prevention Gatekeeper Training Program is promising in the short-term overall improvement in suicide prevention, primarily in self-efficacy.

KEYWORDS

suicide prevention, gatekeeper training, effectiveness study, online intervention, healthcare

Introduction

There were 703,000 suicide cases each year and it has been the fourth leading cause of death for 15–29 years old globally (1) and the Malaysian National Suicide Registry (NSRM) dated from 2007 to 2009 has reported that the highest suicide rate is within this age group (2–4). A more recent study has shown a suicide prevalence of 6–8 per 100,000 population per year in Malaysia (5). Being school leavers put them at high risk of suicide (6–10) and it has also been reported that they are the group with the highest risk to have mental health problems (11). Furthermore, these students, especially Malaysian healthcare students (12) are less likely to seek professional help when depressed (13–15) or having suicidal thoughts.

In Malaysia, it is estimated that 5 deaths by suicide occur every day (16). From a global and cultural lens, studies have shown that religion can be a protective factor against suicide, especially among Muslims (17, 18). It is interesting to note that the average suicide rate in Malaysia is the second highest in comparison to other countries with predominantly Muslim populations in the Middle East and Indonesia (16). According to Lew et al. the heterogeneity of Malaysia's religion and ethnicity might influence the suicide rate whereby Malaysia has the lowest percentage of Muslims (61.3%) compared to other Muslim-majority countries (16). In addition, Malaysian students population are an at-risk population for suicidal behavior (10). More studies on the suicide rate in other countries have found a higher suicide rate among healthcare workers and healthcare students compared to other professions (12, 19–22) due to multiple factors. This has also been reflected in a Malaysian study. It was estimated that 11% of healthcare workers including healthcare students are reported to have suicidal ideation, particularly those in the early phase of their careers (23). As suicide is preventable, multiple suicide prevention measures have been developed including gatekeeper training. It aims to increase the chances of individuals at risk of suicide being approached, connected with, and referred for help and support (15, 24, 25). It has been found that almost half of suicide victims have communicated their intentions before the act (26, 27) but failure in judging their intentions at that time will lead to misunderstanding and closure of communication (28) that will eventually lead to suicide. Gatekeepers in suicide prevention refer to "individuals in a community who have face-to-face contact with large numbers of community members as part of their usual routine" (29). Having gatekeepers at education centers also promotes hope and wellbeing among college students (30, 31), signaling to them that help is within their reach. Without proper training, it can be difficult to detect someone with active suicidal thoughts as the thoughts may be present even without apparent symptoms (32, 33).

As part of suicide prevention measures, the WHO has long been recommending that school staff should undergo training (34) to qualify them to be a gatekeeper. This task is usually appointed to the teachers (35), who are the closest to those students during the school period. Appointable teaching staff gatekeepers include university lecturers or academic supervisors especially those in healthcare education (25, 33). Many forms of gatekeeper training may increase knowledge and self-efficacy on suicide prevention (36), enhancing trainee gatekeepers' confidence in talking about suicide (7, 15, 37). A study shows that this training outcome may be effective for at least a month (38) or even longer in self-efficacy in preventing suicide (39).

C.A.R.E Suicide Prevention Gatekeeper Training Program (40, 41) is a program designed to train individuals who are potentially exposed to those with suicidal thoughts. It has four core principles in handling cases related to suicidal thoughts. It can be easily memorized with the acronym CARE which stands for (i) Catch the signs; (ii) Acknowledging emotional pain; (iii) Risk formulation; and (iv) Encourage collaborative care. The program has shown its effectiveness in enhancing the awareness of warning signs and building up the confidence of gatekeepers in engaging and handling individuals with suicidal crises (40, 41). The program was then modified, improved, and introduced as Advanced C.A.R.E Suicide Prevention Gatekeeper Training Program (AdCARE). It implements Safety Planning Intervention (42), Ask Suicide-Screening Questions (ASQ) (43), and suicide postvention (44). These programs are novel and valuable tools for gatekeepers in preventing suicide (45, 46). Due to the recent pandemic situation of COVID-19, the program was converted into a 3-h online module to ensure safety for both the participant and the research team. This shift leads to logistic advantages in improving accessibility and better cost-effectiveness.

Our study aims to assess the effects of the online module of AdCARE (Online AdCARE) on healthcare lecturers and workers from various healthcare fields who supervise healthcare students. We hypothesize that the Online AdCARE gatekeeper training program would significantly improve the study participants' knowledge, attitude, and practice in terms of suicide prevention literacy.

Materials and methods

Study design

This was a single-arm pre-and post-test interventional study.

Study site

In this study, we defined healthcare personnel as those who provide services to patients either directly or indirectly (47, 48). Healthcare personnel comprises various departments within the National University of Malaysia (UKM). At UKM, healthcare

students were supervised by the lecturers. Some of the students especially those doing practical duty were being supervised by non-lecturers such as clinicians. Thus, we selected the participants among the lecturers from healthcare faculties in UKM including the Faculty of Medicine, Faculty of Dentistry, Faculty of Pharmacy, and Faculty of Health Sciences. We also included healthcare workers from Hospital Canselor Tuanku Muhriz, Kuala Lumpur, UKM who were involved in supervising healthcare students.

Sampling and recruitment

Program details were broadcasted through networks of the research team and UKM lecturers *via* emails, instant messaging applications (e.g., WhatsApp and Telegram), social media channels (e.g., Facebook and Twitter), telephone calls, and face-to-face meetings. Digital posters and digital announcements through the UKM system were also utilized to improve recruitment. Digitalized forms were used for recruitment and questionnaires in light of the current pandemic situation.

Inclusion criteria for samples were: (i) All healthcare lecturers and workers from the study site with experience in performing supervision of healthcare students, (ii) had no suicidal thoughts or plans within the past 2 weeks, and (iii) no bereavement of suicide in the past 6 months. The latter two criteria were included for safety considerations, as they might be more vulnerable to experiencing emotional difficulties (49–51), especially with the intense exposure to suicide-related content during the program. Samples were screened through a self-report questionnaire during the invitation and they are provided with relevant help-seeking resources.

We excluded those who were involved in the previous Advanced C.A.R.E. Suicide Prevention AdCARE-Q Validation study (52) and those without experience in supervising healthcare students as part of their duty. We also excluded those who did not complete the Online AdCARE program.

Based on G*POWER Program V3.1 calculation, with power at 0.8 and α level at 0.05, and calculated effect size from a previous study (41) at 0.6775, the minimum sample size calculated was 20 and after considering a 20% attrition rate, the total required to sample for this study is 25 participants. A purposive sampling technique was applied to include all lecturers and healthcare workers from the study sites. An information sheet containing the purpose and explanation of the study was given to all participants and before the study entry, participants provided their informed consent.

Demographic information on sex, age, race, department, years of experience in supervising healthcare students, previous exposure to suicide cases, and previous exposure to suicide intervention programs was collected.

Instruments and program implementation

AdCARE-Q

Advanced C.A.R.E. Suicide Prevention Gatekeeper Training Questionnaire (AdCARE-Q) was meant to assess knowledge gains from gatekeeper training that is adapted from Terpstra et al. (37). This is a self-administered, 15-item questionnaire on a five-point Likert scale (see Appendix, **Supplementary Digital Content 1**). Items from B1 to B4 and D1 until D5 were measured for Self-Efficacy (SE) while items from C1 until C6 were measured for Declarative Knowledge (DK) of suicide prevention. SE was defined as perceived knowledge about suicide prevention and confidence in the ability and willingness to execute suicide prevention measures. Meanwhile, DK stands for tested knowledge of warning signs and risk factors for suicide and appropriate referrals. Higher scores correspond to higher levels of awareness and attitudes toward suicide prevention. AdCARE-Q has recently been validated among medical lecturers and specialists to measure their suicide prevention training gains for gatekeepers (52). There were no significant differences across the professions of specialist doctors and medical lecturers.

Online AdCARE

Seven Facilitators including the research team with psychiatric backgrounds, consisting of a psychiatrist, medical officers, clinical psychologists, and a counselor attended a half-day online session of Training of Trainers for the Online AdCARE program a few weeks before the intervention was held. The program was then held for participants who have been separated into two groups according to their preferred date. The research team led the Online AdCARE program. A total of 20-min of role-play session was held in individual break-up rooms consisting of 1 facilitator to 5 participants in each group. AdCARE-Q was distributed to the participant to be answered individually just before (Pre) and right after (Post) the program.

Statistical analyses

We used IBM SPSS software, version 26.0. Participant demographics were analyzed using the exploratory data analysis by describing frequency (percentage), and mean (standard deviation. For non-normalized data, the median (interquartile range) was used. The effectiveness of the study was analyzed using paired *t*-tests for items in B1–B5 and D1–D5, SE domain, and overall effectiveness. Meanwhile, items in the C1–C6 and DK domains were analyzed using the Wilcoxon Signed-Rank test. Further analysis such as Multiple linear regression was used to check for potential confounders in an overall score change.

Results

Fifty participants (mean age = 44.1 years; SD = 7.4) registered for online AdCARE; eighteen participants volunteered to join the program on 26th April 2022 (Group A) while other participants volunteered to join on 20th May 2022 (Group B). A total of nineteen participants were excluded from the study. There was no control group in this study and there were no significant differences in the sociodemographic description in those two groups (**Table 1**).

Eight percent (n = 4) of the participants were unable to attend Online AdCARE due to unforeseen circumstances. Intriguingly, twenty-two percent (n = 11) of participants were excluded as they were not from our study site. Another four percent (n = 2) of the participants were also excluded for not having any experience in supervising healthcare students. Forty-two percent (n = 13) of the study respondents were supervising healthcare students while primarily working in HCTM and sixty-two percent (n = 19) of them were non-clinicians who do not usually work directly with patients and are aware of HCTM standard operating procedures in handling

TABLE 1 Sociodemographic description of participants in the study (N = 31).

Variable	Group A (N = 17)		Group B (N = 14)		P-value
	N	%	N	%	
Gender					
Male	6	35.3	2	14.3	0.24[ii]
Female	11	64.7	12	85.7	
Race					
Malay	13	76.5	12	85.7	1.00[ii]
Chinese	3	17.6	2	14.3	
Indian	1	5.9	0	0	
Age[a]					*0.51[ii]
19–49 years old	12	70.6	8	57.1	0.48[ii]
50–65 years old	5	29.4	6	42.9	
Organization					
HCTM	8	47.1	5	35.7	0.053[ii]
Faculty of medicine UKM	9	52.9	7	50.0	
Faculty of health sciences UKM	0	0	2	14.3	
Clinician[b]					
Yes	7	41.2	5	35.7	1.00[i]
No	10	58.8	9	64.3	
Lecturer/mentor[c]					
Yes	16	94.1	10	71.4	0.15[ii]
No	1	5.9	4	28.6	
Department					
Anesthesiology	1	5.9	1	7.1	0.91[ii]
Anatomy	1	5.9	1	7.1	
Biochemistry	1	5.9	1	7.1	
Clinical child psychology	0	0	1	7.1	
Emergency	1	5.9	0	0	
Entomology	0	0	1	7.1	
Health education	0	0	1	7.1	
Medical education	1	5.9	0	0	
Medical entomology	1	5.9	0	0	
Microbiology and immunology	1	5.9	0	0	
Neuroscience	1	5.9	0	0	
Nursing	0	0	2	14.3	
Obstetrics and gynecology	1	5.9	0	0	
Otorhinolaryngology	1	5.9	0	0	
Pediatric surgery	1	5.9	0	0	
Pathology	1	5.9	1	7.1	
Pharmacist	0	0	1	7.1	
Pharmacology	2	11.8	3	21.4	
Physiology	1	5.9	0	0	
Public health	0	0	1	7.1	
Surgery	2	11.8	0	0	
Experience in mentoring (years)					*0.48[ii]
10 years or less	11	64.7	8	57.1	0.72[i]
11 years or more	6	35.3	6	42.9	
Previous experience with student(s) who have had suicidal attempts?					
Yes	3	17.6	3	21.4	1.00[ii]
No	14	82.4	11	78.6	
Previous exposure to suicide prevention program					
Yes	1	5.9	0	0	1.00[ii]
No	16	94.1	14	100	

[a]Classified based on Franssen et al. (75).
[b]Clinician: working directly with patients (participants from anesthesiology, clinical child psychology, emergency, obstetrics and gynecology, pediatric surgery, nurses).
[c]Lecturer/mentor: primarily working as lecturer/mentor (specialist doctors-lecturer, lecturers).
*Comparison as continuous variables.
[i]Chi-square test.
[ii]Fisher's exact test.

patients with suicidal risk. Participants included in the study have an average of almost 10 years (mean = 9.9 years; SD = 6.5) of supervising healthcare students. Nineteen percent (n = 6) of them reported having encountered students with suicidal thoughts, or attempted suicide. However, only 1 of them was exposed to a suicide prevention program.

Using Chi-Square and Fisher's Exact tests, it was found that there were no significant differences for all categorical demographic variables between group A and group B. During the program, there were no dropouts. However, four percent (n = 2) were excluded from the study as they did not complete AdCARE-Q for an undisclosed reason (Figure 1).

Descriptive analysis of the pre-test AdCARE-Q on the samples showed a high baseline score in most of items of DK; C1 (pre-Mdn = 4.0, post-Mdn = 5.0); C2 (pre-Mdn = 4.0, post-Mdn = 5.0); C3 (pre-Mdn = 5.0, post-Mdn = 5.0); C4 (pre-Mdn = 5.0, post-Mdn = 5.0); C5 (pre-Mdn = 4.0, post-Mdn = 5.0); and thus, the statistical analysis in Declarative Knowledge (DK) domain improvement following online AdCARE was not significant. This is not true for item C6 which asked for participants' agreement to the statement "People who express their suicidal ideation will not attempt suicide." It is because there was a significant improvement for this item ($p < 0.05$) following online AdCARE. However, it is quite difficult to obtain the significance as the statistical measurement used for the data that is not normally distributed was in Median (Mdn) and Interquartile Range (IQR); C6 (pre-Mdn = 4.0, IQR = 1; post-Mdn = 4.0, IQR = 1). For all other items, there were significant improvements seen item B1–B4 ($p < 0.001$), D1–D5 ($p < 0.001$), Self-Efficacy (SE) domain ($p < 0.001$), and overall scores ($p < 0.05$) following online AdCARE (Table 2).

Other factors that may affect the outcome are such as being in a different group, age, gender, either being a clinician or a lecturer, years of experience as a student supervisor, previous exposure to students

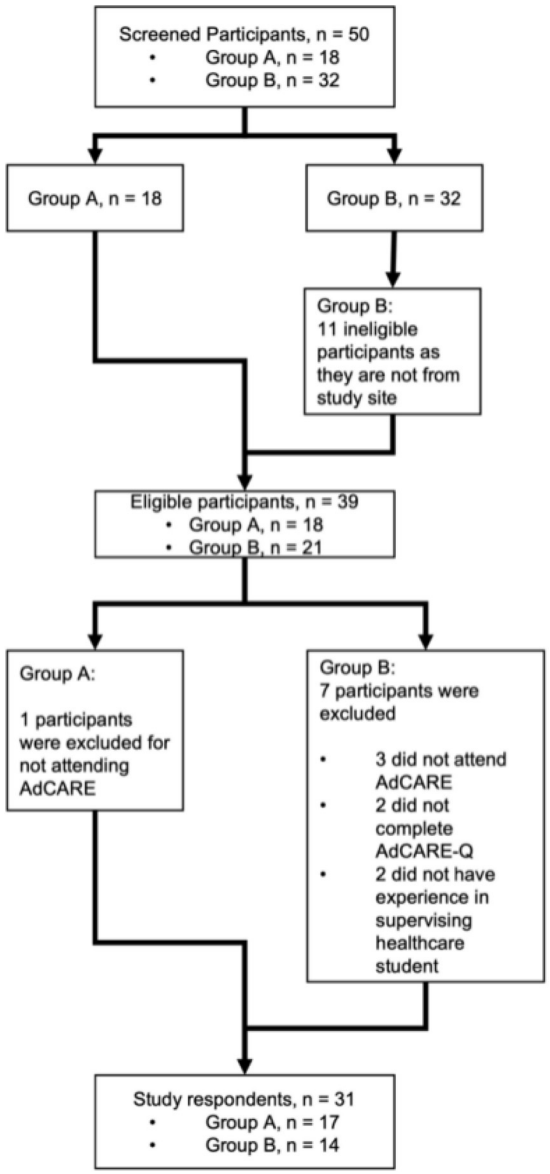

FIGURE 1
Study flowchart.

with suicidal thoughts or attempts, and previous exposure to suicide prevention programs have been included in the regression analysis result shown that the factors were not significant as confounders to the overall outcome of the study (**Table 3**).

Discussion

This intervention study involved a sample of healthcare workers and lecturers in UKM to evaluate the effectiveness of an online gatekeeper suicide prevention training program among healthcare lecturers. Analysis of each individual item (53) in AdCARE-Q has helped us to have a better understanding of the outcome of this program which will allow us to have a targeted approach to improve suicide literacy in the future. The study outcome has shown that Online AdCARE effectively improves participants' overall improvement in preventing suicide, especially in the Self-Efficacy (SE) domain. However, a lack of significant improvement following Online AdCARE in the domain of Declarative Knowledge (DK) was possibly due to ceiling effects; an already high baseline score within the domain among the participants.

The outcome for the SE domain was more encouraging. The baseline scores were relatively low as most participants agreed that they were hesitant to ask a person whether they are suicidal and were not confident in engaging with those who are suicidal. Lack of awareness of available resources in preventing suicide or steps to be taken in arranging appropriate help for those in need before the program is also a possible factor that may explain the relatively low baseline scores in this domain. This signifies the importance of having a suicide prevention gatekeeper training program among healthcare lecturers to effectively raise awareness and self-efficacy in dealing with suicidal cases due to their pivotal position in preventing suicide among healthcare students. Furthermore, this study has also shown that Online AdCARE is also beneficial for all healthcare workers even for those who were not mental health professionals as the program may empower those in improving their self-efficacy in suicide prevention by building their capacity as front liners to be able to identify and navigate help-seeking pathways. This program would be a beneficial continuing medical education (CME) topic in healthcare in the future (54) for its applicable lessons to their field of work (55), ease of technology (56), and short duration (57) that might be more feasible to be implemented in the real-world working environment. It is to reduce practical and logistic barriers such as time constraints within a high-pressure working environment in healthcare systems.

Our study findings are also supported by other studies where healthcare workers, even with reasonable literacy in suicide prevention, participants did not report feeling competent and confident enough in making suicide risk assessments (58–60). It is critical for participants to be able to provide appropriate clinical management of suicidal behavior other than being equipped with the knowledge of suicide prevention alone (61–63).

Incorporating role-plays, comprehensive feedback, and personalized suggestion is another factor in the significant improvement of attending Online AdCARE (64). This is consistent with another study, that has shown the added value of these hands-on experiences as the key factor that results in the significant improvement of the SE domain especially in endorsing a positive attitude, making a suicide risk assessment, developing treatment plans, and establishing rapport (65). A meta-analysis study on simulation learning such as role-play has also concluded that while an already skilled participant benefits from reflection phases during a simulation, a less skilled participant would benefit by learning through examples (66). As mentioned by Kolb (67), learning is a social experience and requires reflection. Furthermore, Online AdCARE is relevant to our participants in their scope of duty. With the increasing suicide trend especially among young adults, the need to acquire skills as gatekeepers in suicide prevention has facilitated their learning experience (68).

Further studies done locally has also shown benefit in simulation learning (69, 70) especially in learning a complex skill (71) such as engaging someone with suicidal thought. Trainers have reported a better understanding and recommend such a method as a tool to increase learners' proficiency (72). Furthermore, this is in line with the new industrial revolution of Education 4.0 where simulation learning can empower learners to be competent, eventually leading to better patient safety (73).

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TABLE 2 Participants' pre-and post-online AdCARE scores.

No.	Question items	Pre-AdCARE scores		Post-AdCARE scores		Intervention effect		
		Mean (median)	SD (IQR)	Mean (median)	SD (IQR)	T (Z)	*df*	*P*-value
Self-efficacy (SE)		21.81	6.49	34.74	3.50	14.144	30	** < 0.001
B1	Knowledge on suicide prevention	2.3	0.9	4.0	0.5	11.806	30	** < 0.001
B2	Warning signs of suicide	2.5	0.7	4.0	0.5	12.473	30	** < 0.001
B3	Communicating with someone who is suicidal	2.0	1.0	4.0	1.0	13.096	30	** < 0.001
B4	How to arrange help for a suicidal person	2.1	0.8	3.9	0.5	14.301	30	** < 0.001
D1	I have confidence in my abilities to recognize warning signs of suicide in people	2.6	1.0	3.9	0.6	9.059	30	** < 0.001
D2	I hesitate to ask a person whether they are suicidal	2.7	1.1	3.4	1.1	3.691	30	** < 0.001
D3	I have confidence in my abilities to arrange for help for someone who is suicidal	2.6	1.0	4.0	0.8	6.840	30	** < 0.001
D4	I am confident in discussing about safety planning with someone who is suicidal	2.5	1.1	3.9	0.6	6.477	30	** < 0.001
D5	I know where to seek resources for postvention services	2.3	0.9	4.0	0.5	11.898	30	** < 0.001
Declarative knowledge (DK)		(26.0)	(4)	(27.0)	(5)	(−1.568)	30	0.117
C1	Depression is a potential suicide risk	(4.0)	(1)	(5.0)	(1)	(−0.696)	30	0.486
C2	People who are suicidal may not see a way out of their problems	(4.0)	(1)	(5.0)	(1)	(−0.206)	30	0.837
C3	A person who shows warning signs of suicide should be referred to a healthcare provider	(5.0)	(1)	(5.0)	(1)	(−0.758)	30	0.448
C4	Crisis helplines should be offered to a suicidal person	(5.0)	(1)	(5.0)	(1)	(−0.082)	30	0.934
C5	Farewell messages or asking for forgiveness unexpectedly are warning signs of suicide	(4.0)	(1)	(5.0)	(1)	(−1.345)	30	0.179
C6	People who express their suicidal ideation will not attempt suicide	(4.0)	(1)	(4.0)	(1)	(−2.336)	30	* < 0.05
Total scores (overall)[a]		47.55	7.36	60.71	6.51	8.58	30	** < 0.001

*$p < 0.05$. **$p < 0.001$. [a]Total scores (overall): total score change (post–pre).

Throughout the program, Online AdCARE adhered to the principle of safe messaging while facilitators intermittently checked on participants' current emotional states for discussing suicide may be distressing to some individuals. The program also applied the standard of moderation in responsible suicide reporting by Duncan and Luce (53, 74). It suggests the practice of safe information by not including sensitive graphical details while practicing the proper use of tone and language when discussing suicide. Online AdCARE also included pathways in organizing help for a suicidal person within both general and local contexts following the standard of operating procedure in Malaysia, UKM, and HCTM. Finally, participants were also reminded of having postvention which is crucial to mitigate the negative effects of exposure to suicide (33, 44). All of these further improved participants' SE in preventing suicide, especially for items in D3–D5 and B4.

One unanticipated finding is that the outcome of the program was not affected by any of the confounders where there were no significant differences even if the participants were clinicians or experienced mentors. This could mean that Online AdCARE would be beneficial in creating awareness and improving SE in suicide prevention for all healthcare workers regardless of their role and experience in supervising students. Excluded participants who were not from the study site showed interest in the program. They are healthcare workers who were interested in joining the program for its benefit in suicide prevention as they saw the recruitment poster on social media platforms. They were allowed to join the program but were not included in the study. By using the online method, Online AdCARE would also potentially lead to better outreach, feasibility, and lesser cost in providing an effective suicide prevention gatekeeper training program.

TABLE 3 Multiple linear regressions for potential confounders.

Variables	Unstandardized Coefficients[a], B	95% CI	*P*-value
Age	0.739	−8.28 to 9.76	0.87
Gender	1.49	−9.90 to 7.01	0.73
Being a clinician	−4.31	−13.57 to 4.95	0.34
Being a mentor	−6.5	−19.64 to 6.64	0.32
Experience in mentoring (years)	2.32	−5.63 to 10.26	0.55
Previous experience with student(s) who have had suicidal attempts	−1.47	−10.79 to 7.85	0.75
Previous exposure to suicide prevention program	−2.36	−23.05 to 18.33	0.82

[a]Total score change, defined as the total score of post-intervention minus pre-intervention.

Limitations

Despite the encouraging findings, this study is vulnerable to type II error due to the relatively small sample size. Our non-randomized sampling may lead to potential selection bias. There is also a lack of a control group that may provide a better understanding of the effectiveness of Online AdCARE. The self-rated questionnaire is also prone to cause bias from self-selection and may not reflect the true score of the participants. As mentioned in a previous study, health professionals tend to overestimate their self-assessment of competence (39). Furthermore, this study does not assess the long-term effectiveness of Online AdCARE due to the time constraint that we have in this study.

Our recommendation for future studies is that the study should utilize randomized sampling with a bigger sample size and a control group. An interviewer-rated questionnaire can also be developed to limit bias and better understand participants' SE and DK. Other than that, it would also be beneficial to see the longitudinal effect of Online AdCARE on the participants after a few months of the intervention.

On top of that, we did not look into possible behavioral outcomes following Online AdCARE in this study. We recommend future studies look into these behavioral outcomes (29) objectively such as looking for a reduction in suicidal behavior in the community or an increase in referrals of suicide-related cases to hospitals.

Conclusion

This study has shown that Online AdCARE is instrumental in improving self-efficacy of suicide prevention among its participants. This program has the potential to be expanded to a broader population of healthcare workers in low-and-middle income settings as it includes building capacity on hands-on skills as a gatekeeper while providing resources on postvention to participants. However, further investigations warrant a more rigorous study design, including a larger sample size, a control group, randomization, and a longer follow-up period to ascertain its effectiveness in the general healthcare population.

Data availability statement

The original contributions presented in this study are included in the article/**Supplementary material**, further inquiries can be directed to the corresponding author.

Ethics statement

The studies involving human participants were reviewed and approved by the Secretariat of Research and Innovation, Faculty of Medicine, National University of Malaysia. The patients/participants provided their written informed consent to participate in this study.

Author contributions

LC and AR conceptualized and designed the study. LC, KP, PS, RM, SB, and HY supervised the data collection by AR. LC, AR, KP, and PS analyzed the data. AR drafted the manuscript. All authors reviewed and approved the final draft for submission.

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Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Publisher's note

Supplementary material

The Supplementary Material for this article can be found online at: https://www.frontiersin.org/articles/10.3389/fpsyt.2023.1009754/full#supplementary-material

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EDITED BY
Kit-Aun Tan,
Universiti Putra Malaysia, Malaysia

REVIEWED BY
Jude Uzoma Ohaeri,
University of Nigeria, Nsukka, Nigeria
Sibylle Schwab,
University of Wollongong, Australia

*CORRESPONDENCE
Mustafa M. Amin
✉ mustafa.mahmud@usu.ac.id

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Validity and reliability of the Indonesian version of the Scale for the Assessment of Negative Symptoms

Mustafa M. Amin[1]*, Elmeida Effendy[1], Vita Camellia[1], Munawir Saragih[1], Ahmad Kamil[2] and Rusly Harsono[3]

[1]Department of Psychiatry, Faculty of Medicine, Universitas Sumatera Utara, Medan, Indonesia, [2]Department of Mechanical Engineering, Faculty of Engineering, Universitas Sumatera Utara, Medan, Indonesia, [3]Pediatric Critical Care Medicine, School of Medicine, Stanford University, Stanford, CA, United States

Background: Negative symptoms have long been conceptualized as a core aspect of schizophrenia. Despite widespread recognition of the status of these symptoms as independent dimensions of schizophrenia, they are sometimes difficult to distinguish from depression or cognitive impairment. Therefore, objective assessment of schizophrenia symptoms is critical by obtaining a valid and reliable Indonesian version of the SANS instrument. This study aimed to determine the content validity, concurrent, internal consistency reliability, inter-rater, cut-off value, sensitivity, and specificity of the SANS instrument.

Methods: This is a diagnostic study using the cross-sectional method to determine the relationship between the SANS and PANSS instruments on the negative symptom subscale. It was located at the Prof. Dr. M. Ildrem Mental Hospital of North Sumatera Province.

Results: Of the 400 subjects, 67.5% were males, and the median age of the subjects was 37 years (18–45). The results of the content validity test were good (mean I-CVI=1.00), and the concurrent validity test comparing the SANS and PANSS instruments on the negative symptom subscale obtained significant results ($p < 0.001$) with a strong correlation ($r = 0.763$). Additionally, the consistency reliability test had a very high internal score (Cronbach alpha = 0.969), the overall inter-rater reliability test was "very good" (ICC = 0.985), and the cut-off value was 10.5 with sensitivity and specificity values of 72.9 and 77.9%, respectively.

Conclusion: The Indonesian version of the SANS instrument is valid and reliable for measuring negative symptoms in people with schizophrenia in Indonesia.

KEYWORDS

schizophrenia, SANS, validity, reliability, negative symptoms

1. Introduction

Schizophrenia is a mental disorder characterized by positive symptoms comprising delusions, hallucinations, and disorganized speech, negative symptoms, including flat affect, avolition, speech, and language poverty, social withdrawal, and cognitive deficits covering attention deficit, and impaired executive function (1). In 2013, it was included in the top 25 diseases that are the main causes of disability worldwide. The lifetime prevalence was relatively low (median 4.0 per 1,000 people), and the worldwide prevalence ranges from 2.6 to 6.7 per 1,000 people (2). The basic health data (RISKESDAS) in 2018, conducted by the Ministry of Health of the Republic of Indonesia (KEMENKES RI), found that the prevalence of schizophrenia was 7.0 per 1,000 households. This was significantly increased compared to the prevalence of schizophrenia according to RISKESDAS in 2013, which was 1.7 per 1,000 households. The highest prevalence of RISKESDAS 2018 was in Bali and Yogyakarta at 11.0 and 10.7 per 1,000 households, respectively (3).

Negative symptoms have long been conceptualized as a core aspect of schizophrenia. Despite widespread recognition of these symptoms as an independent dimension of schizophrenia, they are sometimes difficult to distinguish from depression or cognitive impairment. Additionally, the pathogenetic mechanisms remain unknown, available treatments' effectiveness was far from satisfactory, and these symptoms were considered difficult to assess reliably. Furthermore, the main function of negative symptoms in the patient's functional outcome was often overlooked or unknown (4–6).

Several scales and instruments have been proposed and developed to facilitate screening for schizophrenia. These instruments reflect different understandings of how the complication can be well defined and classified according to its symptoms. The scale developed for schizophrenia mainly focuses on assessing a patient through positive and negative symptoms. The *Positive and Negative Syndrome Scale* (PANSS), the *Scale for Assessment of Positive Symptoms* (SAPS), and the *Scale for the Assessment of Negative Symptoms* (SANS) have been developed to assess symptoms of schizophrenia objectively. Because this scale is sensitive to changes in symptoms, it is considered the "gold standard" in studies for the treatment of schizophrenia (4, 6).

Nancy Andreasen developed the SANS in 1982 to assess five common domains of negative symptoms, including alogia, flat affect, avolition-apathy, anhedonia-asociality, and decreased attention. This scale has high interrater reliability globally (0.838) and good overall internal consistency of the items (Cronbach's = 0.885). Therefore, the SANS is a valid and reliable scale to measure the development of predominantly negative symptoms in schizophrenic patients (7).

Many studies have validated SANS into several versions in different countries. Previous studies conducted by Philips et al. validated SANS and measured the validity and reliability of the Chinese version of the SAPS and SANS. In this study, the overall score of the Chinese version of the SANS had high inter-rater reliability (0.93), test-retest reliability (0.88), and good overall internal consistency of the items (Cronbach = 0.96) (8). Meanwhile, the studies conducted by Norman et al., which compared the interrater reliability of SAPS, SANS, and PANSS, found that the global score of SANS interrater reliability was lower than the original journal score (0.68) (9). The study in Thailand conducted by Thammanard Charernboon in 2019 obtained a good overall internal consistency score of items (Cronbach's = 0.95) (10).

SANS is one of the most widely used negative symptom instruments in clinical trials and practice. This instrument was developed specifically to assess negative symptoms in schizophrenia and has been translated into many languages. However, a study on the validity and reliability of the Indonesian version of the SANS has never been conducted. Therefore, it is necessary to obtain a valid and reliable version of the Indonesian SANS instrument.

2. Methods

This was a diagnostic study using the cross-sectional method to determine the relationship between the SANS and PANSS instruments on the negative symptom subscale. The location was at the Inpatient Unit of the Mental Hospital of North Sumatera Province. This was a referral mental hospital for North Sumatera Province with 400 beds, and the implementation was conducted within 4 months. Subsequently, the non-probability purposive sampling type was used in this study.

The inclusion criteria were schizophrenic patients hospitalized and diagnosed based on the International Classification of Disease and Related Health Problems 10th edition (ICD-10) criteria, aged 18–45 years. Additionally, this study had the following exclusion criteria: having a general medical condition that can affect the subject's psychotic condition and a history of other psychiatric disorders.

A sample size is suggested according to the following scale, 50 subjects (very poor), 100 subjects (poor), 200 subjects (enough), 300 subjects (good), 500 subjects (very good), and 1,000 subjects or more (excellent) (11). A large sample was better than a small one, and it was recommended that many sample sizes be used (11). The minimum sample size needed was 400 subjects, and a scale with a sample size of 400 is considered good.

This study began with study preparation, including asking permission to translate and testing the validity and reliability of SANS to Nancy Andreas through electronic mail (e-mail). The next step was to obtain a research permit from the Head of the Department of Psychiatry, Faculty of Medicine, the Universitas

Sumatera Utara before conducting the process of cross-cultural adaptation. This process aimed to achieve different language versions of the English instrument conceptually equivalent in each of the target countries/cultures. Therefore, the instrument should be natural and acceptable and practiced similarly. The focus was on cross-cultural and conceptual, not linguistic/literal equivalence. An excellent method to achieve this goal was to use forward and backward translations. The process used adaptations recommended by the Institute for Work and Health (IWH) as follows: (12, 13) Stage I was translation (forward translation). It required at least two translators to translate the instrument from the original to the target language. Both translators were bilingual, whose target language was their mother tongue (the translator's first language). The first translator should be a health professional familiar with the terminology in the instrument to be translated. The second translator should not understand the concept and have no medical background.

Furthermore, Stage II was a synthesis of two translations involving a third person who acted as a mediator in discussing the differences to produce one translation (12). Stage III was backward translation, where results from previous translations were translated back into the original language. This was conducted to ensure the accuracy of the translated version. Like the first stage, two bilingual translators were required, with the original language being their mother tongue. They also should not understand the concept or had a medical background (12). This stage was also conducted by two translators who are British citizens with an English language expert certificate. They were domiciled in Medan, North Sumatera, as English teachers in a private course institution in Medan, Indonesia. Finally, Stage IV was performed by requesting the expert committee review to obtain a cross-cultural translation of the instrument. The objective was to identify non-conforming translation concepts and any discrepancies between forward translation and a previously existing version of a measurement scale. The expert committee may question some words or phrases and suggest alternative translations. Experts should be provided with any material according to previous translations. The number of experts on the panel may vary but should include original translators and health professionals with experience in instrument development and translation (12, 13). At this stage, three expert committees, including EE, MA, and VC, were involved in checking the translation results. The results were collected and suggested improvements were consulted with B.L. to obtain the final result of the SANS translation in Indonesian.

This study was conducted using the final result of the Indonesian version of the SANS translation. After receiving detailed explanations, subjects who met the inclusion criteria filled out a written informed consent form. When it was impossible to fill out the consent form, the consent of the subject's family was obtained. Then, the diagnosis of schizophrenia was made using the ICD-10 diagnostic criteria. Next, the exclusion of other psychiatric disorders was assessed using the Mini International Neuropsychiatric Interview Version ICD-10 (MINI ICD-10). Before the examination, the assessor was trained or equalized the perception of items on the measurement scale and then examined with SANS and the Indonesian version of the negative scale PANSS with the help of a psychiatrist assessor at Prof. Dr. M. Ildrem Psychiatric Hospital Medan, North Sumatera. The negative scale SANS and PANSS questionnaire data were obtained before analyzing and processing.

Data were collected, tabulated, and statistically processed. The validity test was assessed by qualitative assessment of each instrument item by three experts in psychiatry. In the concurrent validity test, the Pearson correlation test was performed when the data distribution was normal; otherwise, the Spearman correlation test was performed to find the correlation coefficient between the numerical variables (SANS) and the negative symptom subscale of PANSS. The reliability test was measured by the internal consistency reliability of each statement item by calculating Cronbach's alpha and inter-rater reliability by the intra-class correlation coefficient (ICC). This study used the *Statistical Package for Social Science* (SPSS) program to process the data. Additionally, it received approval from the Research Ethics Committee at the University of North Sumatera with letter number 209/KEP/USU/2021.

3. Results

Demographic characteristics analyzed were age, gender, last education, employment status, marital status, ethnicity, Body Mass Index (BMI), duration of schizophrenia, and the onset of illness. The age, BMI, duration of illness, and disease onset were numerical scale variables. The Kolmogorov–Smirnov analysis was the normality test because there were more than 50 subjects. The mean and standard deviation presented when the data was normally distributed; otherwise, it presented in median and percentile. Gender, latest education, employment status, marital status, and ethnicity were categorical variables presented in a frequency distribution.

Table 1 showed the demographic characteristics of the subjects. Age was presented in the median value (minimum-maximum) because the data were not normally distributed, using the Kolmogorov–Smirnov test, with a median of 37 years (18–45). Most of the subjects, 270 samples (67.5%), were males. The highest education level was at the high school level with 156 samples (37%), and the highest employment status was the non-working group with 364 samples (91%). Furthermore, the marital status of 247 samples (61.8%) was unmarried, while the most predominant ethnic group was Batak with 261 samples (65.2%). The median value of BMI is 22.00, with a minimum and maximum value of 12.10 and 29.60, respectively. The duration of illness had a median of 9 years with a minimum and maximum

TABLE 1 Demographic characteristics.

Variable	People with schizophrenia ($n = 400$)
Age (median)	37,00 (18,00–45,00)
Gender	
Male	270 (67.5%)
Female	130 (32.5%)
Education	
Elementary school	109 (27.2%)
Junior high school	79 (19.8%)
Senior high school	156 (39%)
Bachelor	56 (14%)
Job status	
Working	36 (9%)
Not work	364 (91%)
Marital status	
Married	153 (38.2%)
Single	247 (61.8%)
Ethnic group	
Batak	261 (65.2%)
Java	74 (18.5%)
Minang	20 (5%)
Malay	18 (4.5%)
Chinese	27 (6.8%)
BMI (median)	22.00 (12.10–29.60)
Duration of illness (median)	9.00 (2.00–20.00)
Disorder onset (median)	27.00 (15.00–37.00)

Categorical variables are represented by n (%), normally distributed numerical variables are represented by the mean ± standard deviation, non-normally distributed numerical variables are represented by the median value (minimum value-maximum value).

value of 2 and 20 years, respectively. At the onset of illness, the median was 27 years with a minimum and maximum of 15 and 37 years, respectively.

Content validity was accessed using a quantitative approach through an assessment of the measuring instrument conducted by several experts called the panel, who understand and explore the construct of the instrument assessed. Three experts conducted the validity of the SANS instrument and assessed each item using four value scales. This included a value of 4 when the item was very relevant, a value of 3 when the item was relevant, a value of 2 that was somewhat relevant but should be improved, and a value of 1 when the item was not relevant. The conformity assessment can be repeated (14).

Content Validity Ratio (CVR) was used to measure the agreement between raters/experts on the importance of certain instrument items. Content Validity Ratio (CVR) was calculated by the formula $(n_e - N/2)/(N/2)$, where n_e was the number of experts who answered "quite relevant" and "very relevant," namely scores 3 and 4, and N was the number of experts. I-CVI is the number of experts rated "fairly relevant" and "very relevant," divided by the number of experts who participated in the assessment. The I-CVI score for good content validity was at least 0.78 for six experts or more and a score of 1.00 for three to five experts (14).

Table 2 showed the I-CVI value is 1.00 for each question item, and the value of S-CVI/UA obtained was 1.00, which indicated the instrument's content validity was good. The results of the CVR of each item were good, namely 1.00, and the value of S-CVI /Ave = (1.00 + 1.00 + 1.00)/3 = 1.00 (14).

The concurrent validity test compared the Indonesian version of the scale for assessing negative symptoms (SANS) scores with a standard gold instrument. This study used the Indonesian PANSS negative symptom subscale (PANSS-NS) instrument. The normality test used was the Kolmogorov–Smirnov test because the number of participants was more than 50, and both results were $p < 0.001$. First, it was concluded that the data distribution was not normal, then the $\log_{10}$ function continued to normalize the data distribution and obtain a fixed result of $p < 0.001$. However, the data distribution was still abnormal with the assumption of linearity based on the scatter graph (spread). Therefore, the relationship between linear variables was obtained before conducting the Spearman correlation test.

Table 3 obtained a p-value < 0.001, indicating that the correlation between the SANS and PANSS-NS scores was significant. Furthermore, the Spearman correlation value of 0.763 indicated a strong positive correlation.

Table 4 showed the internal consistency reliability of the Indonesian version of the SANS instrument and the Chronbach alpha of 0.969, which was ideal as it is >0.7. Table 5 illustrated that all questions have a corrected item-total item correlation more significant than the minimum correlation coefficient, which was considered valid (0.3). Subsequently, 25 questions were valid and had reliability of 0.969 (Cronbach alpha).

The reliability of the SANS instrument was measured using an inter-rater reliability design. This approach was preferred over test-retest because the assessment depended on observations of patient behavior compared to self-reports and subjective complaints. Primarily, it determined how well two or more independent observers or raters will agree on some aspect of the patient's behavior. Furthermore, the test-retest design provides an additional source of variance, such as changes in patient behavior over time, giving rise to an undesirable source of variance. This did not allow a net assessment of variance between rater observations. Furthermore, the inter-rater reliability design was preferred

TABLE 2 Assessment of the agreement on the validity of the contents of the Indonesian version of the SANS instrument.

Item	Expert 1	Expert 2	Expert 3	Number in agreement	ItemI-CVI	CVR
1	4	4	4	3	3/3 = 1.00	1.00
2	4	4	4	3	3/3 = 1.00	1.00
3	4	4	4	3	3/3 = 1.00	1.00
4	4	4	4	3	3/3 = 1.00	1.00
5	3	3	3	3	3/3 = 1.00	1.00
6	4	4	4	3	3/3 = 1.00	1.00
7	3	4	3	3	3/3 = 1.00	1.00
8	3	3	4	3	3/3 = 1.00	1.00
9	3	3	3	3	3/3 = 1.00	1.00
10	4	3	3	3	3/3 = 1.00	1.00
11	3	4	3	3	3/3 = 1.00	1.00
12	4	4	4	3	3/3 = 1.00	1.00
13	3	3	3	3	3/3 = 1.00	1.00
14	4	4	4	3	3/3 = 1.00	1.00
15	4	3	4	3	3/3 = 1.00	1.00
16	3	4	3	3	3/3 = 1.00	1.00
17	4	4	4	3	3/3 = 1.00	1.00
18	4	4	4	3	3/3 = 1.00	1.00
19	4	4	4	3	3/3 = 1.00	1.00
20	4	4	4	3	3/3 = 1.00	1.00
21	4	4	4	3	3/3 = 1.00	1.00
22	4	4	4	3	3/3 = 1.00	1.00
23	4	4	4	3	3/3 = 1.00	1.00
24	4	3	4	3	3/3 = 1.00	1.00
25	4	4	4	3	3/3 = 1.00	1.00
$\sum$	25	25	25			
Proportion relevant	1	1	1	Mean I-CVI = 1.00		
Mean expert proportion = 1.00						
S-CVI/UA (scale-level content validity index, universal agreement calculation method) = 25/25 = 1.00						
S-CVI/Ave = (1.00 + 1.00 + 1.00)/3 = 1.00						

because assessing the observed variance was the main objective (7).

Inter-rater (equivalence) measurement test on the SANS instrument used the ICC. In examining the reliability, the rule of thumb should involve a minimum of 30 samples assessed by a minimum of 3 raters (15). A total of 50 samples and 3 raters were assigned, and each instrument item on the inter-rater was measured using the ICC. This was achieved with a two-way mixed-effects model, single rater type, and absolute agreement provisions (15, 16).

TABLE 3 Concurrent validity with Spearman correlation between SANS and PANSS-NS.

Variable	Subjects (n = 400)	r value	p-Value
SANS	11.00 (2.00–92.00)	0.763	<0.001
PANSS-NS	9.50 (7.00–37.00)		

Table 6 showed that the ICC of all items obtained inter-rater reliability of 0.985. When the 95% confidence interval (CI 95%) of the ICC estimate was in the range of 0.974–0.991, then

the reliability could be considered "very good." The global assessment of each domain found that if the highest ICC was in the "flattening and blunting of effect" domain with a value of 0.881 and a CI 95% in the range of 0.819–0.926, then reliability could be considered "good" to "very good." Meanwhile, the lowest domain was in the "anhedonia-asocial" domain with a value of 0.830 and CI 95% in the range of 0.746–0.893; therefore, reliability could be considered "good." The highest ICC was found in "Indifference during mental status examination" domain with a value of 0.970 and CI 95% in the range of 0.952–0.982 to consider the reliability "very good." The lowest item was "Indifference at work or school" domain with a score of 0.701 and a CI 95% in the range of 0.545–0.814; therefore, the reliability could be considered "sufficient" to "good" (15, 16).

The receiver operating characteristic (ROC) and (AUC) were inseparable methods. The ROC method results from a trade-off between the sensitivity and specificity values at various alternative intersection points presented in the graph. The AUC was the result of the region generated from the ROC curve.

In Figure 1, SANS had a good diagnostic value because the curve was far from the 50% line and was in the 100% line. The AUC value obtained from the ROC method was 86.0% (95% 81.7%−90.2%), $p < 0.001$. Furthermore, the hypothesis test compared the AUC obtained by the index to the AUC of 50%, with a p-value of <0.05, which indicated that the AUC

TABLE 4 Reliability statistics.

Cronbach's alpha	No. of items
0.969	25

TABLE 5 Internal consistency of the Indonesian version of SANS.

	Scale mean if item deleted	Scale variance if item deleted	Corrected item-total correlation	Cronbach's alpha if item deleted
Q1	16.06	384.595	0.598	0.969
Q2	17.10	374.018	0.711	0.968
Q3	16.67	378.573	0.602	0.969
Q4	16.80	381.943	0.528	0.970
Q5	17.25	371.276	0.769	0.968
Q6	16.95	379.837	0.578	0.969
Q7	17.16	369.283	0.804	0.967
Q8	16.91	372.536	0.823	0.967
Q9	17.15	367.373	0.840	0.967
Q10	17.23	373.302	0.806	0.967
Q11	17.32	371.464	0.805	0.967
Q12	17.25	366.061	0.860	0.967
Q13	17.22	367.503	0.875	0.967
Q14	17.58	377.047	0.876	0.967
Q15	17.45	381.602	0.711	0.968
Q16	17.34	369.492	0.850	0.967
Q17	17.47	373.874	0.877	0.967
Q18	17.40	378.275	0.742	0.968
Q19	16.81	372.687	0.673	0.969
Q20	17.01	377.677	0.637	0.969
Q21	17.35	377.507	0.721	0.968
Q22	17.36	375.824	0.883	0.967
Q23	17.45	374.504	0.839	0.967
Q24	16.64	390.457	0.352	0.971
Q25	17.31	377.298	0.811	0.967

TABLE 6 Inter-rater reliability of Indonesian version of SANS.

No.	Item	Intra-class correlation	95% CI
	Flattening and blunting of effect		
Q1	Stable facial expressions	0.890	0.832–0.932
Q2	Reduced spontaneous movement	0.893	0.781–0.944
Q3	Rarely expressive behavior	0.767	0.597–0.867
Q4	Poor eye contact	0.862	0.790–0.914
Q5	Inability to respond to affective	0.906	0.853–0.942
Q6	Inappropriate affect	0.910	0.862–0.945
Q7	Decreased intonation	0.847	0.767–0.905
Q8	Global affect flattening assessment	0.881	0.819–0.926
	Alogia		
Q9	Low conversation	0.821	0.598–0.912
Q10	Low conversation content	0.828	0.741–0.892
Q11	Blocking of thought	0.852	0.743–0.915
Q12	Improved latent response	0.883	0.765–0.938
Q13	Global alogia assessment	0.837	0.621–0.921
	Avolition—apathy		
Q14	Care and hygiene	0.794	0.696–0.869
Q15	Diligence at work or school	0.701	0.545–0.814
Q16	Lack of physical energy (physical anergia)	0.878	0.768–0.934
Q17	Global avolition—apathy assessment	0.857	0.783–0.911
	Anhedonia—asocial		
Q18	Recreational interests and activities	0.821	0.733–0.887
Q19	Sexual activity	0.851	0.775–0.907
Q20	The ability to feel intimacy and closeness	0.764	0.645–0.842
Q21	Relationships with friends and neighbors	0.898	0.844–0.937
Q22	Global anhedonia—asocial assessment	0.830	0.746–0.893
	Concern		
Q23	Social indifference	0.870	0.755–0.930
Q24	Indifference during mental status examination	0.970	0.952–0.982
Q25	Global care assessment	0.876	0.804–0.924
	Combined score	0.985	0.974–0.991

value of the SANS instrument was significantly different from that of 50%. However, the AUC value was satisfactory because it was more significant than the expected minimum value.

Figure 2 presented a sensitivity and specificity curve. The optimal intersection point was the value at which the sensitivity and specificity curves intersect. This could be determined by drawing a vertical line from the intersection point between points 5 and 6.

Table 7 presented the optimal cut-off point between 5 and 6, where the value of 5 was $\geq$10.5 with sensitivity and specificity of 72.9 and 77.9%, respectively. The value of point 6 was $\geq$11.5 with 69.9 and 89.1% sensitivity and specificity, respectively. Therefore, it was concluded that the cut-off point that showed negative symptoms had a total SANS score of 10.5.

The AUC score of 86.0% was good, meaning that when a negative symptom score was used to assess the symptoms in

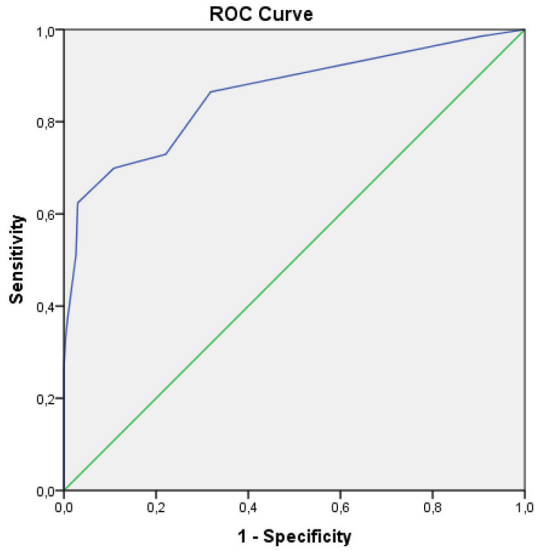

FIGURE 1
ROC curve.

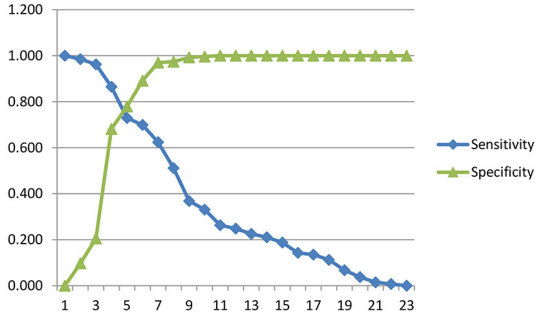

FIGURE 2
Sensitivity and specificity curve.

100 subjects, the examination will give the correct conclusion for 86 people.

4. Discussion

Obtaining a valid and accurate Indonesian version of the SANS instrument is crucial for objective assessment of schizophrenia symptoms. As mentioned before, the purpose of this study was to establish the SANS instrument's content validity, concurrent, internal consistency reliability, inter-rater, cut-off value, sensitivity and specificity. The subjects were people with schizophrenia aged 18–45 years to minimize bias due to secondary negative symptoms caused by non-schizophrenic diseases or a degenerative process (17). Demographic characteristics showed that most subjects were male (67.5%), and in terms of age, the median was 37 years with a minimum and maximum of 18 years and 45 years, respectively. The study by Charlson et al. with the title Global Epidemiology and Burden of Schizophrenia reported data on the prevalence of schizophrenia globally. The global prevalence was ∼70.8% for 25–54 years, highest in the 40s and decreasing in the older age group (2). The median duration of illness was 9 years with a minimum and maximum of 2 and 20 years, respectively. Moreover, the median disease onset was 27.00 years with a minimum and maximum of 15.00 and 37.00 years, respectively. There was no specific age-associated with schizophrenia because this condition can occur at any age. Almost all schizophrenia disorders begin with a prodromal stage and impact the social conditions of each sufferer. The onset is mainly at 15–25 years in males and 15–30 years in females (2).

Three experts conducted the content validity test to find the values of I-CVI, S-CVI, CVR, S-CVI/UA, and S-CVI/Ave. Table 2 explained that the I-CVI and CVR values obtained are 1.00 for each question item with a mean I-CVI value of 1.00. Under the I-CVI requirements of the content validity test, using less than five experts can be considered "good" or "very relevant" when the I-CVI value is 1.00. The S-CVI/Ave obtained was 1.00, indicating that the content validity of this instrument is good because the minimum value of S-CVI/Ave is 0.90. Therefore, the content validity test shows that the questions on the Indonesian version of the SANS instrument have relevance to the construction of negative symptoms in people with schizophrenia (14). The study conducted by Charernboon validated SANS in Thai obtained content validity results with a mean I-CVI value of 0.94. This result is consistent with this study, which has a mean I-CVI of 1.00, where it is concluded that both have good content validity (10).

The concurrent validity test used the Spearman correlation test to determine the correlation between the Indonesian version of the SANS and the standard gold instrument. This study used the negative symptom subscale PANSS instrument, and the SPSS calculation obtained an r value = 0.76 with a p-value of <0.001, as shown in Table 3. It indicated a strong significant correlation between the SANS and PANSS scores on the negative symptom subscale with a positive correlation between the two instruments. Therefore, when the Indonesian version of the SANS score gets high results, the negative symptom subscale PANSS score will also give high results. However, there are varying results from previous studies regarding this validity value. In 1991, Philips et al. measured the validity and reliability of the Chinese version of the SAPS and SANS. They obtained a significant correlation between the SANS score and the Brief Psychiatric Rating Scale (BPRS) score ($p < 0.001$) at admission and discharge from the hospital, with positive correlation results and weak to moderate correlation strength ($r = 0.17$–0.46).

Furthermore, Thammanard in Thailand found a significant correlation between SANS scores and the Addenbrooke's Cognitive Examination (ACE; $p = 0.002$) with a negative

TABLE 7 The sensitivity and specificity values of various alternative intersection points.

No	Variable	Cut-off	Sensitivity	Specificity	AUC	95% CI
1		6.00	1.000	0.000		
2		7.50	0.985	0.097		
3		8.50	0.962	0.206		
4		9.50	0.865	0.682		
5	SANS	10.50	0.729	0.779	86.0	81.7–90.2
6		11.50	0.699	0.891		
7		12.50	0.624	0.970		
8		13.50	0.511	0.974		
9		14.50	0.368	0.993		
10		15.50	0.331	0.996		
11		16.50	0.263	1.000		
12		21.00	0.248	1.000		
13		25.50	0.226	1.000		
14		26.50	0.211	1.000		
15		27.50	0.188	1.000		
16		28.50	0.143	1.000		
17		29.50	0.135	1.000		
18		30.50	0.113	1.000		
19		31.50	0.068	1.000		
20		32.50	0.038	1.000		
21		33.50	0.015	1.000		
22		35.50	0.008	1.000		
23		38.00	0.000	1.000		

correlation and moderate correlation strength ($r = -0.48$). The difference in the results obtained is possible because of an ethnocentric bias, differences in the gold standard instruments used, and the tests conducted (7, 8, 10). Philips et al. described this ethnocentric bias as items in the initial version of the SANS instrument written using Western concepts. Subsequently, the selection of items for the final version was based on the studies using subjects from Western countries; hence, using this instrument in the group or other ethnicities who are not English speakers is often problematic, and their validity is questionable. Ideally, health status instruments should be developed independently in each culture and then cross-culturally. However, studies in developing countries rarely have the resources needed. The urgent need for clinical and sociocultural measures in non-Western cultures has led to the widespread use of Western translation instruments. However, careful back-translation of a reliable and valid instrument in the West does not result in a reliable and valid instrument in non-Western cultures following the variation in this study and several others. The clinical usefulness of a translated instrument depends on the scientific rigor evaluated and revised in the target culture (8).

Cronbach's alpha value for the Indonesian version of SANS was 0.969, with the interpretation that the internal consistency value of this instrument is very high. However, Cronbach's alpha coefficient is often used to assess internal consistency, even though there is no common agreement regarding its interpretation. For example, several studies have determined that Cronbach's alpha of >0.7 is ideal, but a value close to 0.6 is satisfactory (18). Classification of Cronbach's alpha comprises very low (≤0.3), low (>0.3–≤0.6), moderate (>0.6–0.75), high (>0.75–≤0.9), and very high (>0.9) (19). The high internal consistency in the Indonesian version of SANS is in line with the findings of previous studies conducted by Andreasen, the creator of this instrument, and obtained a high internal consistency score of the overall SANS items (Cronbach's alpha = 0.885). Additionally, Philips et al. measured the validity and reliability of the Chinese version of the SAPS and SANS,

where the overall score of the Chinese version of the SANS had a very high internal consistency (Cronbach's alpha = 0.96). Additionally, the SANS validation study in Thailand conducted by Thammanard obtained a very high overall internal consistency score of items (Cronbach's alpha = 0.95). This supports the suggestion of several previous studies that the negative symptom construct is more homogeneous than the positive one (7, 8, 10). The corrected item-total correlation value of the Indonesian version of SANS is above the minimum correlation coefficient considered valid, which is 0.3. Therefore, 25 assessment items on the SANS instrument are deemed valid.

In Table 6, the intraclass correlation coefficient (ICC) of all items shows inter-rater reliability of 0.985. If the 95% confidence interval (CI 95%) of the ICC estimate is in the range of 0.974–0.991, then the reliability level can be considered "very good." In the global assessment in each domain and per item, the SANS instrument has a fairly good to a very good level (ICC values between 0.545–0.970). This study is in line with Andreasen, who obtained an overall ICC value of 0.92 (very good) and a value per item and per domain, which had a good to a very good level of reliability (ICC values between 0.701–0.926). Meanwhile, Philips et al. obtained a very good ICC value of the overall items (ICC = 0.93) and a value per item and per domain that had a good to very good reliability (ICC values between 0.85–0.95). In 1996, Norman et al. compared the inter-rater reliability of SAPS, SANS, and PANSS and reported slightly different results, namely, the ICC value of the whole item was 0.68 (medium), and the value per item and domain had the reliability of bad to good (ICC value between 0.28–0.74).

The AUC value obtained from the ROC method was 86.0% (95% 81.7%−90.2%), $p < 0.001$. Test the hypothesis to compare the AUC obtained by the index to the AUC value of 50%, with a p-value of <0.05, which indicates that the AUC value of the SANS score is significantly different from that of 50%. Interpretation of AUC with a statistical approach concluded that it has a good power of diagnostic value (>80%−90%). The size of the AUC area will show the validity of the conclusions given by a diagnostic instrument for clinical purposes. The AUC of 86.0% is a good value, meaning that when a negative symptom score is used to diagnose the negative symptoms from 100 subjects, then the right conclusion can be obtained about 86 people. Sensitivity is the ability of an instrument to show positive results in a genuinely positive population, while specificity is the ability of an instrument to show negative results in a genuinely negative population (20).

In Figure 2, the optimal cut-off point is between 5 and 6. In point 5, the value was ≥10.5, with sensitivity and specificity values of 72.9 and 77.9%, respectively. Meanwhile, point 6 was ≥11.5 with 69.9 and 89.1% sensitivity and specificity values, respectively. There is a consideration to prioritize a higher sensitivity value than the specificity value. Therefore, it can be concluded that the cut-off point that shows the negative symptoms is a total SANS score of ≥10.5, with a sensitivity of 72.9% and a specificity of 77.9%. Sensitivity of 72.9% signifies that in 100 people with negative symptoms, SANS gives correct results in 73 people. In comparison, the specificity of 77.9% means that SANS gives correct results in 100 people without negative symptoms in 78 people.

This study has implemented the content and concurrent validity test, internal consistency, and inter-rater reliability test. Additionally, this study obtained good AUC values with the ROC method, cut-off values, and sensitivity and specificity values of the Indonesian version of the SANS instrument. Contrarily, the limitation of this study was that it used non-probability sampling method and was only conducted in one particular area or place due to the current pandemic conditions.

5. Conclusion

This study showed that the content validity test was good (mean I-CVI = 1.00), and the concurrent validity test that compared the SANS and PANSS instruments on the negative symptom subscale obtained significant results ($p < 0.001$), with a strong correlation ($r = 0.763$). Furthermore, the reliability test for internal consistency was very high (Cronbach alpha = 0.969), the overall item inter-rater reliability test was "very good" (ICC = 0.985), and the cut-off value was 10.5 with a sensitivity and specificity of 72.9 and 77.9%, respectively. In conclusion, the Indonesian version of the SANS instrument is valid and reliable for measuring negative symptoms in people with schizophrenia.

Data availability statement

The datasets presented in this study can be found in online repositories. The names of the repository/repositories and accession number(s) can be found in the article/supplementary material.

Ethics statement

The studies involving human participants were reviewed and approved by Study Ethics Committee at the Universitas Sumatera Utara. The patients/participants provided their written informed consent to participate in this study.

Author contributions

MA, EE, VC, and MS were involved and contributed equally to the study. RH and AK conducted forward translation.

All authors contributed to the article and approved the submitted version.

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Dedication

We would like to express our deep condolences to our beloved teacher Bahagia Loebis that passed away after the study finished.

Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Publisher's note

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EDITED BY
Wan Nor Arifin,
Universiti Sains Malaysia Health Campus, Malaysia

REVIEWED BY
Mahlagha Dehghan,
Kerman University of Medical Sciences, Iran
Sarita Sood,
University of Jammu, India

*CORRESPONDENCE
Luke Sy-Cherng Woon
✉ lukewoon@ukm.edu.my

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Psychometric properties of the Malay-version beck anxiety inventory among adolescent students in Malaysia

Nur Husna Ismail[1], Nik Ruzyanei Nik Jaafar[1], Luke Sy-Cherng Woon[1]*, Manisah Mohd Ali[2], Rahima Dahlan[3] and Aimi Nur Athira Putri Baharuddin[1]

[1]Department of Psychiatry, Faculty of Medicine, Universiti Kebangsaan Malaysia, Kuala Lumpur, Malaysia, [2]Faculty of Social Science and Humanities, Center for Research in Psychology and Human Wellbeing, Universiti Kebangsaan Malaysia, Bangi, Selangor, Malaysia, [3]Department of Psychiatry, Faculty of Medicine and Health Sciences, Universiti Putra Malaysia, Serdang, Selangor, Malaysia

Background: The Beck Anxiety Inventory (BAI) is a common tool for screening anxiety symptoms. In Malaysia, the Malay-version 21-item BAI has been previously validated in the Malaysian adult population. However, information regarding its reliability and validity among adolescents below 18 years old is still lacking. The objective of this study is to investigate the psychometric properties of the Malay-version BAI in this population.

Methods: The Malay versions of the BAI and the Depression, Anxiety, and Stress Scale (DASS) were administered among a sample of lower secondary school students (n = 329, age range: 13–14 years) in Selangor, Malaysia. Cronbach's alpha value for the internal consistency of the Malay-version BAI was determined. The correlation coefficient between the BAI score and DASS anxiety subscale score was calculated to examine convergent validity. The factor structure of the Malay-version BAI was identified by exploratory factor analysis (EFA) using principal axis factoring.

Results: The study included 329 respondents, who were predominantly female (58.7%) and Malay (79.9%). The mean Malay-version BAI score was 14.46 (SD = 12.39). The Malay-version BAI showed a high level of internal consistency (Cronbach's alpha = 0.948) and convergent validity with the DASS anxiety subscale score ($r = 0.80$, $p < 0.001$). The EFA suggested a one-factor solution, with the factor loading of all items on the single factor ranging between 0.48 and 0.81.

Conclusion: The Malay-version BAI demonstrated good psychometric properties. It can be a valid and reliable screening instrument for anxiety among Malaysian adolescents.

KEYWORDS

adolescents, anxiety, factor analysis, psychometric, screening, Malaysia, validation study

Introduction

Anxiety disorders are among the most common mental health issues in the adolescent population. Surveys showed many adolescents experienced anxiety and required treatment for anxiety disorder (1). According to the World Mental Health Surveys, only 41.3% of the global population meeting the criteria for an anxiety disorder thought they needed care (2). Anxiety disorders among adolescents also cause an increased risk for suicidal behavior (3). In a study by Windarwati et al. (4) among 869 high school adolescents, 72.7% of teens experienced anxiety in the mild to very severe categories. The study also showed a significant relationship between

suicidal ideation with anxiety in adolescents. The Malaysian National Health and Morbidity Survey (NHMS) (5) reveals that the mental health condition of adolescents is increasingly worrisome, with many teenagers aged 13 to 17 years old found to be suffering from mental health problems. One in five people experienced depression (18.3%), two in five people suffered from anxiety symptoms (39.7%), and about one-tenth experienced stress (9.6%). There was also an increasing trend for the prevalence of suicidal ideation to 10% compared to 7.9% in 2012.

In Malaysia, a study that looked at the trends of mental health problems among children and adolescents based on three population-based surveys by Ahmad et al. (6) found that the prevalence of mental health problems among children and adolescents aged 5 through 15 years showed an increasing trend from 19.4% in 2006 and 20% in 2011. Studies were also conducted among young adolescents aged 13 to 17 whereby at this stage they experienced physical and/or emotional changes, and depression was one of the most common mental health problems that could occur among them.

Adolescents with anxiety problems experience considerable impact on their learning such as loss of interest in learning and personality changes such as lethargy, low self-confidence or lack of self-esteem. According to Nguyen et al. (7), 19.4% of students in secondary school with low self-esteem were detected at a prevalence of related to anxiety, depression, educational stress, and suicidal ideation. Hamid et al. (8) reported a moderate level of depression, anxiety, and stress level for a total of 270 teenage students. The authors suggested that those who suffered from depression, anxiety, and stress problems to be given clinical attention and mitigated before becoming worse among students.

According to Hein et al. (9) the most utilized method for evaluating the presence of anxiety is by self-reporting questionnaires. This method is easy to administer because respondents would only have to answer a list of related questions found in the inventory provided. Among the questionnaires to measure anxiety is Beck's Anxiety Inventory (BAI). BAI, created by Aaron T. Beck and colleagues, is a self-report inventory consisting of 21 items that measure the severity of anxiety among adults and adolescents. Since items in BAI describe emotional, physiological, and cognitive symptoms of anxiety but not depression, it can discriminate anxiety from depression. Even though the instrument was initially applied in the age range of 17–80 years old, it has also been used in peer-reviewed studies with younger adolescents aged 12 and older (10).

Two early studies examined the use of the BAI among adolescents. The study by Kumar et al. (11) in an adolescent psychiatric inpatient sample (aged 12–17 years) in Philadelphia, United States found that the BAI displayed a high level of internal consistency (Cronbach's alpha = 0.91). In another study by Steer et al. (12) among 105 outpatients aged between 13 and 17 years at the same center, the BAI again demonstrated excellent internal consistency, with a Cronbach's alpha value of 0.92. In a separate study among adolescent inpatients, the BAI also displayed high internal consistency (Cronbach's alpha = 0.94) and convergent validity with the Revised Children's Manifest Anxiety Scale (13).

Various factor structures of BAI have been found. Beck et al. (14) and Hewitt and Norton (15) supported similar two-factor models corresponding to cognitive and somatic dimensions of anxiety. These factors showed good internal consistency and test-retest reliability. Subsequently, Beck and Steer (16) identified four factors in the BAI reflecting subjective, neurophysiological, autonomic, and panic components of anxiety. Borden et al. (17) preferred a five-factor solution consisting of subjective fear, somatic nervousness, neurophysiological, muscular/motoric, and respiration. Specifically, for adolescent populations, both Kumar et al. (11) and Steer et al. (12) favored a two-factor solution, representing subjective and somatic symptoms of anxiety, respectively.

Mukhtar and Zulkefly (18) investigated the factor structure, reliability, and validity of the Malay-version BAI among Malaysian adults with a large sample of study participants (n = 1,090) with an age range of 18 years to 63 years. In their exploratory factor analysis, they found a three-factor solution (subjective anxiety, autonomic, and neurophysiology) for the BAI, which accounted for 48.01% of the total variance. The BAI also demonstrated good internal consistency (Cronbach alpha coefficient = 0.91).

Previous studies have demonstrated the original BAI as a reliable and valid screening instrument for anxiety symptoms across different demographic sections, including among adolescents. It has been successfully translated into the Malay version, which has also shown good psychometric properties. However, the validity and reliability of the Malay version BAI have yet to be examined among Malaysian adolescents. Furthermore, the BAI has displayed various factor structures in different populations. Therefore, in this study, we aimed to examine the psychometric properties of the Malay version of BAI (Malay-BAI) among adolescents in Malaysia.

Methods

Study design

This study was a part of a larger research project that aimed to explore the role of social-emotional learning in improving mental wellbeing among Malaysian adolescents. The current study was conducted to support the development and validation of the learning module. It was a cross-sectional survey of lower secondary school students. Four schools were selected in the state of Selangor, Malaysia. Convenience sampling was carried out to select the schools and recruited the participants in this study.

Participants

The inclusion criteria were as follows: (1) first-year and second-year secondary school students aged 13 and 14 years old; (2) students of government day schools; (3) provided informed consent; (4) able to comprehend the Malay language questionnaires. Students who underwent psychiatric/ psychological treatment were excluded from this study. This was ascertained by a simple screening question i.e. "Have you received psychiatric/ psychological treatment in the past?" in the demographic section of the questionnaire with 2 options, "Yes" or "No." Using a subject-to-item ratio of 1:10 (19, 20), the minimum sample size required for the validation of the Malay version BAI was 210.

Instruments

The questionnaire used in this study contained three sections: demographic data, the Malay-BAI, and the Malay version Depression,

Anxiety, and Stress Scale (Malay-DASS). The questionnaire was administered in the Malay language as Malay is the national language of Malaysia. Therefore, all students in Malaysian public secondary schools, including those from minority ethnic groups such as Chinese and Indians, possess basic proficiency in the language, which allowed the universal application of the Malay-language questionnaire in this study. Nevertheless, in a multi-ethnic country like Malaysia, methods of socio-culture adaptation should be considered particularly in adapting health status measures like BAI as highlighted by Beaton et al. (21).

Demographic data

Participants filled up a demographic data sheet that covered information on the personal background of participants (age, gender, race, and year of study) and their parents (parent occupation, parent academic achievement, total parental income, and marital status).

Malay-version beck anxiety inventory

The measure contains 21 items on anxiety symptoms. The symptoms were rated on a four-point scale. Scores range from 0 to 63. A total score of 0 to 7 is considered minimal anxiety in range, 8–15 is mild anxiety, 16–25 is moderate anxiety, and 26–63 is severe anxiety (22, 23). Mukhtar and Zulkefly (18) first validated the Malay-version BAI for the Malaysian adult population using back-translating procedures by a team of content and linguistic experts whereby in the process, any word ambiguity and colloquial differences were resolved for the overall suitability.

Malay version of the depression anxiety stress scale

The instrument contains 21 items with three self-report scales designed to measure the emotional states of depression, anxiety, and stress. It was validated in the Malaysian population with Cronbach's alpha coefficients of 0.75 (depression), 0.74 (anxiety), and 0.79 (stress) by (24). The scale ranges from "did not apply to me at all" (0) to "applied to me very much, or most of the time" (3). Subjects responded to the items and the sub-score of the anxiety component was used to compare with the BAI. The summed score of the DASS anxiety sub-scale (items 2, 4, 7, 9, 15, 19, 20) was used in this study.

Study procedure

After obtaining informed consent from the parents of study participants, the researchers received the contact information of the students from the school counselors from each school involved in this survey. The researchers then distributed the link to the online survey form containing the demographic data section, Malay-BAI, and Malay-DASS to the participants *via* email and text messages. Data collection was performed through live video conferencing in five sessions to assist participants in answering the questionnaires. Data collection lasted from August until October 2021 during the pandemic COVID-19. It took approximately 30 to 45 min in total to complete the data collection process. This duration included time to brief the participants about the study procedure, explain how to answer the questions, and wait for the participants to submit the questionnaire. The actual time needed by the participants to answer the questionnaire was approximately 10 to 20 min.

Ethics approval

Ethics approval was obtained from the Research Ethics Committee of The National University of Malaysia (Approval No.: UKM PPI/111/8/JEP-2021-182).

Statistical analysis

In this study, the Statistical Package for the Social Sciences (IBM-SPSS®) version 26.0 software was used for data analyses. Data were checked for completeness. The normality of continuous data was checked using the Kolmogorov-Smirnov test. Descriptive statistics were generated for the sociodemographic variables and the scores of the Malay-BAI and the Malay-DASS anxiety subscales, using numbers and percentages for categorical variables, and medians and interquartile ranges for the non-normally distributed continuous variables. Cronbach's alpha was calculated for the internal consistency of the Malay-version BAI. Spearman's correlation coefficient between the BAI score and the DASS anxiety subscale score was calculated to examine convergent validity. The factor structure of the Malay-version BAI was identified by exploratory factor analysis (EFA) using principal axis factoring. All 21 items of the BAI were subjected to the analysis. The Kaiser-Meyer-Olkin (KMO) test was used to verify sampling adequacy for the analysis, while Bartlett's test was used to check the suitability of the correlation structure for factor analysis. A parallel analysis was conducted to determine the number of factors to retain, using an online parallel analysis engine to generate random eigenvalues (25).

Results

Descriptive statistics

A total of 329 participants responded to this study. Demographic characteristics are shown in Table 1. The age was between 13 years old (48.3%) and 14 years old (51.7%); 58.7% ($n = 193$) were female and 41.3% ($n = 136$) were male. Malays formed the majority (61.7%). The median score for the Malay-BAI was 11.0 (IQR = 16.5), while the median score for the Malay-DASS anxiety sub-score was 5.0 (IQR = 6.5).

Internal consistency and convergent validity

The 21-item Malay-BAI displayed excellent internal consistency with a calculated Cronbach's alpha value of 0.95. The Spearmen's correlation coefficient between the Malay-DASS anxiety subscale and Malay-BAI indicated a strong positive correlation (Spearman's Rho = 0.80) between the two measures, which was statistically significant ($p < 0.001$). This statistically significant strong relationship between the Malay-BAI score and the Malay-DASS anxiety subscale score demonstrated convergent validity between these two measurements of the same construct, namely anxiety symptoms among the study

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TABLE 1 Socio-demographic of 329 respondents.

Variable	No. of respondents	%
Age (year)		
13	159	48.3
14	170	51.7
Gender		
Male	136	41.3
Female	193	58.7
Race		
Malay	263	79.9
Chinese	8	2.4
Indian	56	17.0
Other	2	0.6
Year of study (lower secondary)		
First year	159	48.3
Second year	170	51.7

participants. Meanwhile, the Malay-BAI score also displayed a significant correlation with both the Malay-DASS depression subscale (Spearman's Rho = 0.72, $p < 0.001$) and stress subscale (Spearman's Rho = 0.75, $p < 0.001$), but with slightly lower values for the correlation coefficients.

Exploratory factor analysis

The results of the KMO measure of sampling adequacy (=0.959) and Bartlett's Test of Sphericity ($p < 0.001$) indicated that the data was suitable for factorial analysis (26). Inspection of the correlation matrix revealed no evidence of multicollinearity as none of the bivariate correlation coefficients were > 0.80 (27). Furthermore, all items had a measure of sampling adequacy of above 0.80, which provided a good indication that the items were appropriate for inclusion in the factor analysis (26). Using the parallel analysis approach, the eigenvalues computed from the data were compared against randomly generated eigenvalues. In the comparison, only the first eigenvalue based on the original data (10.546) was greater than the random eigenvalue (1.478), while the second eigenvalue (1.334) was already smaller than the next random eigenvalue (1.391). Thus, the number of eigenvalues was one (28). This suggested a one-factor solution to the Malay-BAI. Since there was only a single factor, no rotation was performed. As shown in Table 2, the factor loadings of all BAI items on the single factor ranged from the lowest of 0.48 (Item 19, "Faint / lightheaded") to the highest of 0.81 (Item 11, "Nervous"). Meanwhile, the range of value for communality was between 0.36 (Item 16, "Fear of dying") and 0.72 (Item 3, "Wobbliness in legs" and Item 5, "Fear of worst happening").

TABLE 2 Factor loading and communality for the single-factor solution for the 21-item BAI ($N = 329$).

		Factor loading	
		1	Communality
1.	Rasa kebas *Numbness or tingling*	0.61	0.52
2.	Rasa panas *Feeling hot*	0.63	0.55
3.	Jalan terhuyung hayang *Wobbliness in legs*	0.71	0.72
4.	Sukar untuk bertenang/relaks *Unable to relax*	0.73	0.59
5.	Takut sesuatu yang buruk akan berlaku *Fear of worst happening*	0.79	0.72
6.	Kepala pusing atau berat *Dizzy or lightheaded*	0.79	0.70
7.	Debaran jantung meningkat *Heart pounding/racing*	0.77	0.65
8.	Rasa tidak stabil/tidak stabil *Unsteady*	0.73	0.63
9.	Cemas *Terrified or afraid*	0.79	0.67
10.	Rasa amat takut *Nervous*	0.81	0.70.
11.	Rasa tercekik *Feeling of choking*	0.69	0.61
12.	Tangan ketar *Handstrembling*	0.72	0.52
13.	Rasa bergoyang *Shaky / unsteady*	0.78	0.70
14.	Takut akan hilang kawalan *Fear of losing control*	0.72	0.53
15.	Sesak nafas *Difficulty in breathing*	0.68	0.54
16.	Takut seperti ingin mati *Fear of dying*	0.51	0.36
17.	Takut *Scared*	0.80	0.71
18.	Perut tidak selesa *Indigestion*	0.78	0.68
19.	Pengsan *Faint / lightheaded*	0.48	0.54
20.	Muka menjadi kemerahan *Face flushed*	0.57	0.61
21.	Berpeluh bukan kerana panas *Hot/cold sweats*	0.68	0.64

Discussion

The purpose of this study was to investigate the psychometric properties of the Malay version of the BAI among Malaysian adolescent students. In this study sample, the Malay-BAI has demonstrated excellent internal consistency with a Cronbach's of 0.95 and displayed good convergent validity with the anxiety subscale of the Malay-DASS. The EFA suggested a single-factor structure for the Malay-BAI.

The median score for the Malay-BAI in this study was 11.0 (IQR = 16.5). In a study by Osman et al. (10) in an adolescent inpatient sample, the mean BAI score was 15.5 (SD = 12.7). This was comparable to the mean BAI score (15.7, SD = 14.8) reported by Jolly et al. (13) in another study among adolescent inpatients. Similarly, the mean BAI score in an outpatient adolescent study was 16.0 (SD = 12.6) (12). The average BAI score in the current study was lower likely due to the community sample involved in contrast to the clinical samples in the cited studies. When compared with the finding from the validation study of the Persian version of the BAI among adolescents (mean = 8.0, SD = 6.9), our sample indicated a higher average level of

anxiety (29). Unfortunately, the average BAI score for Malaysian adults in the community is unavailable for comparison, as the only known study utilizing the Malay-BAI (18) did not report the value.

Concurring with previous research on the use of the BAI among adolescents, our study found that the BAI displayed excellent internal consistency when administered to Malaysian adolescents. The Cronbach alpha value (0.95) in the current study was better than the earlier validation of the Malay-BAI among adults (0.91) (18). Moreover, the Malay-BAI has shown very good convergent validity with the anxiety subscale of the Malay-version DASS scale, an instrument that has been validated in adolescents (30). These findings suggest that the Malay translation of the BAI, which was originally intended for use among adult respondents, can be reliably administered to younger adolescents. There was no indication that the language and content of the instrument were hard for the study participants to comprehend and respond to appropriately.

The single-factor model of the BAI identified in this study is different from most of the factor structures of the BAI found in the existing literature. Various two-factor, four-factor, and five-factor models have been reported (11, 12, 14–17). The Malaysian adult study on the Malay-BAI proposed a 3-factor structure (subjective anxiety, autonomic, and neurophysiology factors) (18). The study by Osman et al. (10) among adolescent inpatients initially identified a four-factor solution. Nevertheless, their final analysis supported a single-factor structure, similar to the current study. The different factor models of the BAI could probably be explained by the heterogeneity of the study population, differences in culture and language between Malaysia and western countries, and different understanding of anxiety symptoms between adults and adolescents. Even so, the unidimensional model of the Malay-BAI in this study does support its use as a measure of anxiety as a unitary construct among adolescents.

There were several limitations to this study. Since no diagnostic interview for clinical anxiety disorders was included, no reference standard could be used to determine the concurrent validity, sensitivity, and specificity of the Malay-BAI. Likewise, the cut-off score for clinical anxiety using the Malay-BAI could not be decided in this sample by building a ROC curve. As this study included non-Malay participants to be representative of Malaysia's diverse cultures, another possible study limitation was the lack of cross-cultural adaptation. Subtle cultural differences might necessitate further adaptations before the Malay-BAI is administered to individuals of different ethnic backgrounds despite the common understanding of the Malay language, to ensure content validity across cultures. This could be considered in future research. The generalizability of the study findings to entire Malaysia might also be limited by the convenience sampling method and sampling in the highly urbanized Selangor state alone. Nonetheless, the demographic profile of our study sample contained a good mix of both genders and the main ethnic groups in the country, thus allowing wider application of the study results to the Malaysian adolescent population to some extent. Despite these limitations, to the authors' knowledge, the present study is the first to investigate the psychometric properties of the Malay-BAI in the range age below 18 years. Future research should strive to further address the need for valid and reliable identification of Malaysian adolescents with anxiety, including but not limited to a confirmatory factor analysis to further verify the factor structure of the Malay-BAI.

Conclusion

The Malay version of BAI has demonstrated excellent internal consistency and convergent validity when employed among Malaysian adolescents. It also appeared to measure anxiety as a single dimension in this sample. Findings from this study suggest that the Malay-version BAI can be a suitable instrument to screen for anxiety in this population.

Data availability statement

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

Ethics statement

The studies involving human participants were reviewed and approved by Research Ethics Committee of The National University of Malaysia (Approval No.: UKM PPI/111/8/JEP-2021-182). Written informed consent to participate in this study was provided by the participants' legal guardian/next of kin.

Author contributions

NI, NN, and LW: conceptualization and methodology. NI and AB: data curation. NI and LW: formal analysis. NI: project administration, resources, and writing-original draft. LW, NN, MM, and RD: supervision. NN: validation. LW and NN: writing-review and editing. All authors have read agreed to the published version of the manuscript.

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Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Publisher's note

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EDITED BY
Shian-Ling Keng,
Monash University Malaysia, Malaysia

REVIEWED BY
Snehil Gupta,
All India Institute of Medical Sciences Bhopal, India
Jeffrey Gamble,
National Changhua University of Education, Taiwan

*CORRESPONDENCE
Aini Marina Ma'rof
ainimarina@upm.edu.my

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A systematic review and meta-analysis of interventions to decrease cyberbullying perpetration and victimization: An in-depth analysis within the Asia Pacific region

Ida Khairina Kamaruddin[1], Aini Marina Ma'rof[1]*, Ahmad Iqmer Nashriq Mohd Nazan[2] and Habibah Ab Jalil[1]

[1]Faculty of Educational Studies, Universiti Putra Malaysia, Serdang, Malaysia, [2]Faculty of Medicine and Health Sciences, Universiti Putra Malaysia, Serdang, Malaysia

Background: Cyberbullying perpetration and victimization are prevalent issues in adolescent development and are a rising public health concern. Numerous interventions have been developed and implemented to decrease cyberbullying perpetration and victimization. Through an updated systematic review and meta-analysis, this study aimed to tackle a significant gap in the cyberbullying literature by addressing the need to empirically determine the effectiveness of programs with non-school-aged samples with a specific focus on studies conducted within the Asia-Pacific region.

Methods: A systematic literature review was conducted to identify intervention research to reduce cyberbullying perpetration and victimization published from January 1995 to February 2022. Ten electronic databases—Cambridge Journal Online, EBSCOHOST, ERIC, IEEE XPLORE, Oxford Journal Online, ProQuest Dissertations and Theses, PubMed (Medline), Science Direct, Scopus, Springerlink—and a subsequent manual search were conducted. Detailed information was extracted, including the summary data that could be used to estimate effect sizes. The studies' methodological quality was assessed using the Effective Public Health Practice Project (EPHPP) quality assessment tool.

Findings: Eleven studies were included in the review of the 2,540 studies identified through databases, and 114 additional records were discovered through citation searching. Only four studies were included in the meta-analysis, exploring game-based, skill-building, school-based, and whole-school interventions. The first meta-analysis pooled estimates from these four studies that assessed cyberbullying perpetration frequency using continuous data post-intervention. These studies reported data from 3,273 participants (intervention n = 1,802 and control n = 1,471). A small but not statistically significant improvement favoring the intervention group from pre- to post-intervention was shown by the pooled effect size, −0.04 (95% CI [−0.10,0.03], Z = 1.11, P = 0.27). The second meta-analysis included two qualified studies investigating cyberbullying victimization frequency using continuous data at post-intervention among 2,954 participants (intervention n = 1,623 and control n = 1,331). A very small but non-significant effect favoring the intervention group was discovered.

Conclusion: This research primarily highlights that the endeavor for cyberbullying intervention is still developing in the Asia-Pacific region, currently involving a limited set of stakeholders, settings, and delivery modes. Overall, meta-analyses of cyberbullying interventions conducted in the Asia Pacific found no significant effects in reducing cyberbullying perpetration and victimization.

KEYWORDS

cyberbullying perpetration, cyberbullying victimization, intervention, systematic review and meta-analysis, Asia-Pacific

1. Introduction

Surveys have revealed that 93% of teenagers owned smartphones and mobile devices were used by more than 90% of them to access online information before the COVID-19 outbreak (1). Technology will remain an essential part of their lives throughout the pandemic as well as after it (2). This heavy reliance on technology has resulted in an increase in cyberbullying. Cyberbullying perpetration is the act of sending, posting, or sharing negative, harmful, false, or mean content about someone else through various forms of digital technology (3). Cyberbullying has affected ∼14–21% of youths over the past decade (either as a victim, a bully, or a bully-victim) (4–6). According to research conducted in the US, ∼15% of students have experienced or perpetrated cyberbullying in the past 30 days (7). In other countries varying prevalence rates were reported, such as Australia at 5.0% and Canada at 23.8% (8). It appears that cyberbullying increased during the epidemic, perhaps due to students' intensive use of technology (9).

Over the past 15 years, 50 studies have evaluated the effectiveness of cyberbullying interventions, as reported in a comprehensive systematic review and meta-analysis by Polanin et al. (2). They extracted 320 total effect sizes from these primary studies, covering over 45,000 participants and several continents. Overall, it is estimated that the programs included in the synthesis could reduce cyberbullying perpetration by 76% and cyberbullying victimization by 73%. Among these studies, the skill-building component was included in almost 80% of the programs, and many others used curricula and prepared materials, psychoeducation, or multimedia. The modality varies greatly among interventions that were found to be effective at reducing cyberbullying perpetration and victimization. For example, online instruction was used in the Non-cadiamointrappola program in Italy (10) to deliver content and create interactive experiences for students that extend beyond the classroom. Skills for Life (11) is another illustration of an effective intervention program that builds on rational-emotive behavior therapy and social learning theory to improve social, emotional, and moral skills. This program was integrated into the schools' curriculum in the Netherlands for two academic years, using techniques like role-playing, discussion, and modeling with video extracts. As previously found with other social-emotional learning programs, this intervention can have a positive impact on many health outcomes, particularly for disadvantaged students. Such research findings would provide important insight into cyberbullying issues for future researchers, program developers, educators, and policymakers.

Although most cyberbullying studies have been conducted in the US and Western countries, the burden Malaysia and many other Asia Pacific countries face are comparable to that experienced by Americans or Europeans. In a global survey by IPSOS, Malaysia ranks third after South Africa and Peru, with 34% reporting knowing a child who has been cyberbullied (12). According to this report, the majority of cyberbullying among children in the Asia Pacific region is perpetrated by a victim's classmate or known individuals. Social networking sites are the most common source of cyberbullying for children in Asia Pacific countries (53%), followed by online messaging (48%) and mobile devices (46%). Consistent with 2019 data from UNICEF (13) on young people in 30 countries, this report also found that 33% of parents are aware of a child being cyberbullied in their community. This report significantly revealed that parents around the world, including those in the Asia Pacific region, are reporting an increase in the prevalence of cyberbullying among their children.

1.1. Rationale/Significance of research

Understanding the implications of research on cyberbullying for prevention and intervention programs is crucial for relevant government bodies seeking to deter those aggressive behaviors. Empirical findings on cyberbullying interventions can help policymakers and professionals understand precisely how to combat the negative cyber-bully/victim impact. Thus, the current study aimed to identify scholarly efforts across contexts necessary to advance anti-bullying programs, especially in the Asia Pacific region. Essential for the continual progress of program development, the results of this study will be helpful to professionals across various disciplines to be better informed of not only what is happening globally but regionally and locally, as well as to have more meaningful and extensive empirical findings to sample and make decisions from.

With the growing incidence of cyberbullying around the world, researchers, practitioners, and politicians are collaborating to eradicate this particularly damaging type of violence. Due to the severe consequences and rising prevalence of cyberbullying worldwide, this trend has drawn more and more attention. However, few studies on cyberbullying have been conducted in Asia Pacific nations, compared to the number of studies conducted in Western nations. This is especially evident in a recent global systematic review by Zhu et al. (14), who found only thirteen studies (out of 63) since 2015 examining cyberbullying among children and adolescents in Asia Pacific countries. China has the highest prevalence of cyberbullying perpetration (46%), as reported by Lin (15), while research from Canada (16) and South Korea (17) found that these

nations had the lowest prevalences of cyberbullying perpetration (8 and 6%). Spain had the highest prevalence of victims of cyberbullying (58%) (18), followed by Malaysia (52%) (19), Israel (45%) (20), and China (45%) (21). The countries with the lowest reported victim rates were Canada (14%) (16) and South Korea (15%) (17). With the growing incidence of cyberbullying worldwide, researchers, practitioners, and politicians should collaborate to eradicate this particularly damaging type of violence. Even though children and youth are using electronic media more frequently than ever, cyberbullying is still an understudied problem in the Asia-Pacific region, where it is likely to be an equally important issue.

In light of the emerging evidence, researchers have attempted to synthesize the literature available regarding the effects of anti-cyberbullying programs. Existing interventions either specifically target cyberbullying or generally address it in bullying or school violence prevention programs. The existing reviews differ from this current review by being out of date (22) or lacking the use of modern meta-analytic techniques (23). In addition, several researchers have conducted reviews on cyberbullying programs' effects. However, these reviews synthesized correlation or prevalence effect sizes and therefore do not provide evidence of program effectiveness (7, 24–27). The most comprehensive and up-to-date review using advanced meta-analytical techniques was conducted by Polanin et al. (2). However, the study falls short of highlighting the specific components of interventions that are effective, especially the effectiveness of programs with non-school-aged samples with a specific focus on studies conducted within the Asia-Pacific region. A summary of all these reviews can be found in **Table 1**.

Studying the effectiveness of available cyberbullying interventions in the context of the Asia-Pacific framework is pertinent, where pressure based on collectivistic ideals and rigid cultural scripts for social interactions remains strong among the majority of Asia-Pacific countries as compared to Western cultures (28). Group-focused values and behaviors emphasizing on maintaining group relations, social conformity, and avoiding interpersonal conflict can plausibly influence cyberbullying behaviors in this region bidirectionally. Strong social norms can lead to lower tolerance for deviant behaviors among group members, resulting in lower involvement in bullying incidences compared to Western countries (29, 30). However, strong social norms and collectivistic values may also lead to high conformity to group behaviors and could impact the prevalence and severity of cyberbullying behaviors within the Asia-Pacific region. Collectivistic adolescents may be more likely to cyberbully others as a way of conforming to the group norm or for penalizing someone who does not adhere to such collectivistic ideals (31).

Factors such as gender socialization experience, parent-child relationships, and cultural norms in most Asia-Pacific countries also differ from the West and have been implicated to influence cyberbullying incidences in this region (30). These socio-cultural factors have also been known to vary somewhat even among the countries (32, 33). These unique contributing factors highlight the unique mechanisms through which cyberbullying operates which in turn may lead to unique ways on how cyberbullying interventions are developed and implemented in this region compared to the West.

Given the wide-ranging and pervasive problems caused by cyberbullying, the extensive resources devoted to it, and the lack of a comprehensive and up-to-date meta-analytic review of programs to prevent it within the Asia Pacific literature, an updated systematic review and meta-analysis synthesizing the effects of programs on cyberbullying perpetration or victimization outcomes is warranted.

1.2. Objectives

This study seeks to comprehensively analyze studies examining interventions' effects on cyberbullying perpetration and victimization outcomes. Despite a number of extensive systematic reviews and meta-analyses [e.g., (2, 34, 35)], we consider it is vital to resynthesize the various primary research findings to provide a concrete and appropriate response to cyber violence in policy and practice, particularly in Asia Pacific region. To address the research gap within the Asia-Pacific region on online user rights and protection concerning cyberbullying victims and perpetrators, this study aimed to provide further valuable empirical evidence by extending the work of the most recent large-scale systematic review and meta-analysis study on interventions to decrease cyberbullying perpetration and victimization (2, 36) by expanding the age-range beyond school-aged settings. Specifically, this research sought to conduct an updated systematic review on intervention effects to decrease cyberbullying perpetration and victimization by considering literature within the Asia-Pacific region, which was not the focus covered by previous credible reviews.

2. Methods

This systematic review and meta-analysis study was carried out following PRISMA 2020 guidelines to support quality and dependability (37).

2.1. Data collection

2.1.1. Inclusion/Exclusion criteria

Population: We expanded eligible studies beyond the K-12 age group [i.e., Kindergarten (5–6-year-olds) until upper secondary six and equivalent (17–18-year-olds)] to include non-school children.

Intervention Studies. Studies on interventions designed to reduce cyberbullying perpetration and victimization were included in this review, regardless of the type of intervention. This gave us a wide range of studies to draw from, including those focusing on direct interventions, as well as those exploring broader violence prevention initiatives and anti-bullying programs.

Comparison Group. For the study to be considered for the review, it was required to contain a comparison group that met specific eligibility criteria. The comparison group could have been composed of individuals who did not receive any form of intervention, those who underwent treatment as per usual practice, or those who received a treatment that was either minimal or demonstrated to be ineffective. The comparison group was necessary to provide a point of reference for evaluating the effectiveness of the intervention being studied. Without such a group, it would be difficult to draw any meaningful conclusions about the efficacy of the intervention in question.

Research Design. We included randomized controlled trials, quasi-experimental studies, and studies that may have assigned groups in a randomized or non-randomized way to conditions without any exclusion based on the level of assignment.

TABLE 1 Summary of previous systematic reviews and meta-analysis on cyberbullying.

References	Total studies			Year of publication	Objectives	Findings
	Identified	SR*	MA**			
Mishna et al. (22)	3,029	3	–	2003–2006	To systematically review the effectiveness of cyber abuse interventions in increasing Internet safety knowledge and decreasing risky online behavior.	Participation in cyber abuse prevention and intervention strategies is associated with an increase in Internet safety knowledge.
Gaffney et al. (23)	3,994	24	18	2012–2018	To evaluate the effectiveness of cyberbullying intervention and prevention programs implemented with school-age children.	Anti-cyberbullying programs can reduce cyberbullying perpetration by approximately 10–15% and cyberbullying victimization by approximately 14%.
Gardella et al. (24)	9,312	12	9	2009–2014	To quantitatively synthesize relationships between Peer cyber-victimization (PCV) and educational outcomes.	PCV is associated with higher school attendance problems and academic achievement problems.
Guo (25)	479	77	77	2004–2013	To determine the target factors predicting individuals' perpetration and victimization in cyberbullying.	A prior history of bullying others offline and committing problem behaviors were the two strongest predictors of cyberbullying perpetration. Long-term psychological problems and previous offline victimization were significant predictors of cyberbullying victimization.
Marciano et al. (26)	3,613	56	56	2007–2017	To conduct a meta-analysis quantitatively summarizing exclusively longitudinal studies on the causes and consequences of cyberbullying perpetration (CP) and victimization (CV).	CP and CV have significant effects on internalizing problems, externalizing problem behaviors, and peer relations. CV has a greater impact on older adolescents and females whereas older men are more likely to be cyberbullies.
Modecki et al. (7)	1,951	80	80	2006–2013	To conduct a thorough review of the literature and identify studies that reported corresponding prevalence rates for cyber and traditional bullying and/or aggression in adolescents.	The prevalence of cyberbullying was lower than that of traditional bullying, and the two were highly correlated.
Zych et al. (27)	1,545	66	–	2007–2015	To conduct a systematic review of systematic reviews and meta-analyses of research about bullying and cyberbullying.	Anti-bullying interventions might be effective in reducing bullying, although the effect sizes are small and depend on the components of the programs.
Polanin et al. (2)	11,588	50	50	2004–2019	To conduct a systematic review and meta-analysis that synthesized the effects of school-based programs on cyberbullying perpetration or victimization outcomes.	The effectiveness of the prevention programs was found for both perpetration and victimization of cyberbullying, with a slightly higher effect size for perpetration over victimization.

*Systematic review, **meta-analysis.

Primary Outcome Measures. This review included studies that assessed cyberbullying perpetration or victimization as the primary outcome measure and did not exclude those that utilized a broader program to prevent violence or bullying instead of a specific cyberbullying intervention. This procedure and the reasoning behind it have been explained by Polanin et al. (38). The exclusion of certain studies was found to alter significant conclusions in their meta-analysis. Another rationale for this is previous meta-analytic studies' finding that the perpetration and victimization of conventional bullying and cyberbullying are connected (26).

Time range. Although cyberbullying-related terms started appearing in literature around 2003, studies published since 1995 were also included to ensure comprehensive coverage of research.

Publication Status. To minimize publication bias, we searched for relevant information on cyberbullying, including published and unpublished research reports and available data sets (39) with cyberbullying perpetration and victimization measures.

Language. Publications must be in English or Bahasa Melayu, regardless of the country of origin, were included in our review.

2.2. Literature search and screening

We employed multiple methods to identify qualifying studies, including electronic bibliographic searches and forward and backward reference harvesting. Our search included published and unpublished works within the traditional and gray literature. We used tailored search terms for each database and the following online databases available through our University's library services: Cambridge Journal Online, EBSCOhost, ERIC, IEEE XPLORE, Oxford Journal Online, ProQuest Dissertations and Theses, PubMed (Medline), Science Direct, Scopus, and SpringerLink. The literature search summary is included in **Supplementary Data Sheet 1**, and detailed records are presented in **Supplementary Data Sheet 4**. We finalized the search key terms (see **Supplementary Data Sheet 3**) and applied those to several search strategies for each database.

2.3. PRISMA flowchart

2.3.1. Abstract screening

We employed a comprehensive approach to review the numerous studies located during this round of research (as outlined in 2 and 36). All members of the review team assessed the abstracts. We developed a screening guide for abstracts (see **Supplementary material**) and utilized the free Rayyan software (40) for web-based abstract screening.

2.3.2. Full-article retrieval

To prepare for the next screening stage, the team members retrieved the complete article PDFs of the previously screened titles and abstracts.

2.3.3. Full-article screening

The team carried out a thorough screening process for eligibility by entering responses into a designated tool, followed by review and validation by the principal investigator and lead statistician, and after a training session, a pilot screening was conducted.

2.3.4. Data Extraction

We created a codebook to document all data that was extracted from each study. The data comprised demographics of the sample, characteristics of the intervention and comparison conditions, and summary statistics useful for effect size estimation. An Excel-based relational database was designed to structure the information. To maintain accuracy and consistency, coders used dedicated coding screens in Excel for each category of extracted data.

2.4. Data analysis

We conducted separate analyses for each outcome variable category: (1) cyberbullying perpetration and (2) cyberbullying victimization. The characteristics of the studies included in the analysis were documented, including the publication status, the target of the program, the type of research design, and geographical location. We also planned to perform a sub-analysis looking further into the potential differentiated effects of gender, randomized controlled trial vs. non-randomized control trial designs, whether or not the studies were theory-based or non-theory-based, and geographical locations with a specific focus on Asia-Pacific regions, and studies that also covers the age-range beyond K-12.

2.4.1. Meta-analyses

We analyzed two primary outcome variables using meta-analytic models, with separate analyses using a random-effects model and robust variance estimation method (41). The random-effects model considered both within-study and between-study variations, making it suitable for studies with diverse populations and designs. The robust variance estimation method was used to estimate standard errors of effect size estimates and to adjust for potential biases due to small sample sizes or heterogeneity. Each effect size estimate was weighted by its inverse variance to calculate the average effect size (42). The model assigned greater importance to effect sizes with smaller variances, resulting in a more accurate estimation of the overall effect size.

Our original plan, which followed the preceding step, involved conducting two confirmatory meta-regression analyses to investigate the potential predictors contributing to cyberbullying perpetration and victimization. Our meta-regression approach would involve incorporating several pertinent variables. These variables would encompass the type of effect size, the objectives of the intervention, the native country of the study participants, the timing of the follow-up measurement, as well as the percentage of male participants and individuals from ethnic minority groups. Sub-analyses were also planned to examine potential moderating effects of gender, study design, theory-based or non-theory-based, geographical location, and age range. Sub-analyses would be conducted to evaluate the potential moderating effects of gender, comparing randomized controlled trial study designs vs. non-randomized control trial designs, whether or not the studies were theory-based or non-theory-based, taking geographical locations of subjects into consideration, and expanding the age range beyond school-aged settings.

2.4.2. Exploratory analysis

Ultimately, we performed an exploratory analysis aimed at assessing the overall effect size of the specified interventions that were identified during our review process.

3. Findings

3.1. Search outcomes

In this review, we identified all publications that reported the effectiveness of cyberbullying interventions after 1995 based on the PRISMA guidelines. Countries included were Australia, Brunei, Myanmar (Burma), Cambodia, China, Fiji, Indonesia, Japan, Kiribati, Laos, Malaysia, Marshall Islands, Micronesia, Mongolia, Nauru, New Zealand, North Korea, Palau, Papua New Guinea, Philippines, Samoa, Singapore, Solomon Islands, South Korea, Taiwan, Thailand, Timor-Leste, Tonga, Tuvalu, Vanuatu, and Vietnam. The search yielded 2,540 studies, with 114 additional records identified through citation searching (n = 113) and websites (n = 1). After removing duplicates and records based on their titles, 976 records were left for abstract screening. A total of 903 abstracts were excluded for failing to meet one or more inclusion criteria during this screening process. The remaining 73 studies were reviewed as full text (see **Table 2** and **Supplementary Data Sheet 5**). Of these, 63 more studies were excluded, leaving 11 relevant records (ten *via* database and one *via* other methods) to be included in this review. We evaluated four studies further through meta-analysis. A PRISMA Flow Diagram can be found in **Figure 1**, which details the full results of our search, screening process, and reasons for the exclusion of studies.

3.2. Study characteristics

Table 2 provides an overview of the studies that were included. Study design (RCT, c-RCT, and quasi), intervention components (e.g., digital exhibition and cyberbullying prevention course), target

TABLE 2 Summary of studies included in the systematic review.

References	Study design	Intervention components	Target group	Implementation methods	Activities	Primary outcome	Quality of study (A-F)
Tapingkae et al. (48)	Quasi-design	Formative assessment-based contextual digital gaming approach as the in-class learning activity to teach digital citizenship	*N* = 115; 12—14-year-old students in Thailand	Digital game-based learning	Gaming scenario	Digital citizenship behaviors Online harassment victimization Online harassment perpetration Learning motivation Learning perception	SB: 1 D: 1 C: 1 B: 2 DCM: 1 W&DO: 1 Global rating: **High quality**
Leung et al. (49)	RCT	Attitudes about cyberbullying behavior and increase their awareness of cyberbullying	*N* = 137; 19–28-year-old college students in Hong Kong	Skill-building	Role-play activity, video, group discussion, self-reflection writing task	Awareness of cyberbullying Attitude toward cyberbullying	SB: 1 D: 1 C: 1 B: 2 DCM: 1 W&DO: 2 Global rating: **High quality**
Liau et al. (45)	Quasi-design	Hands-on digital exhibition involving peer-mentoring and a transmedia adventure storytelling mode within a multisystemic approach	*N* = 440; 8–11-year-old elementary school students in Singapore	School-based intervention	Peer mentoring, digital exhibition	Attitudes toward risky online behaviors Cyberbullying and offline meeting Mentees' perceptions of their mentors Mentors' perceptions of their mentoring experience	SB: 2 D: 2 C: 3 B: 2 DCM: 1 W&DO: 1 Global rating: **Moderate**
Cross et al. (47)	c-RCT	Whole-school and student-level resources and training	*N* = 3,382; 13-year-old secondary school students in Perth, Australia	A whole-school program to enhance the capacity of school staff, students, and families to respond effectively to reduce cyberbullying behavior	Socio-ecological program assisting staff in implementing strategies related to their school's organizational context	Cyberbullying victimization and perpetration behavior	SB: 1 D: 1 C: 1 B: 2 DCM: 1 W&DO: 1 Global rating: **High quality**
Lee et al. (67)	Quasi-design	WebQuest cyberbullying prevention course	*N* = 61; Junior high school students in Taiwan	Cyberbullying prevention WebQuest course	A set of student-centered and exploration-oriented learning activities presented in a webpage layout	Knowledge about cyberbullying Attitude toward cyberbullying Cyberbullying intentions	SB: 1 D: 2 C: 1 B: 2 DCM: 1 W&DO: 1 Global rating: **High quality**
Ng et al. (44)	RCT	Brief mindfulness practice as an intervention on the relationship between cyberbullying and depressive symptoms	*N* = 82; 19–28-year-old young adults in Malaysia	Brief mindfulness practice (STOP)	Video	Cyberbullying victimization Mindfulness level	SB: 3 D: 1 C: 3 B: 1 DCM: 1 W&DO: 2 Global rating: **Low quality**

(Continued)

group (sample's size, age, and country where the study was conducted), implementation methods (e.g., school-based and game-based), activities related to the various program elements (e.g., gaming scenario, role-play, and video), primary outcomes (e.g., cyberbullying victimization and perpetration behavior), and quality of the study (low, moderate, and high) were extracted from each study. The primary outcomes were reported using self-report data in each study, but the measures used to record them varied. Out of the 11 studies reviewed, there were three randomized controlled trials (RCTs), three cluster randomized controlled trials (c-RCTs), and five quasi-experiments. These studies were published between 2013 and 2022. The sample's age range was 8 to 29 years old, and the number of participants ranged from 12 to 3,769. Almost all of the studies (9 out of 11) focused on school-aged children, with only two studies conducted on non-school children (aged 19 to 28 years). Study participants covered in this review were strictly enrolled from the Asia-Pacific countries. Specifically, the studies included were conducted in Australia (n = 3), Hong Kong (n = 2), Thailand (n = 1), Singapore (n = 1), China (n = 1), Taiwan (n = 1), Indonesia (n = 1), and Malaysia (n = 1). Intervention programs in

TABLE 2 (Continued)

References	Study design	Intervention components	Target group	Implementation methods	Activities	Primary outcome	Quality of study (A-F)
Cross et al. (47)	c-RCT	Individualized training and resources to support students' transition and reduce bullying	*N* = 3,769; Aged 13 secondary school students in Perth, Australia	Friendly schools whole-school curriculum modules	Training and coaching support	Victimization and perpetration Loneliness Safety Mental wellbeing	SB: 1 D: 1 C: 1 B: 2 DCM: 1 W&DO: 1 Global rating: **High quality**
Cross et al. (47)	c-RCT	Multidimensional school-based programs with strategies targeting all levels of the school community	*N* = 3,382; Aged 13 secondary school students in Perth, Australia	Cyber Friendly Schools Project (CFSP) whole-school curriculum modules	Teaching and learning resources and a website resource	Cyberbullying victimization and perpetration behavior	SB: 1 D: 1 C: 1 B: 2 DCM: 1 W&DO: 1 Global rating: **High quality**
Peng et al. (65)	Quasi-design	Educational intervention based on the knowledge-attitude-practice model	*N* = 328; Junior high school students in Shantou, China	Raising students' awareness of school bullying through educational intervention	Bullying-themed class meetings, distributing bullying educational leaflets at school and playing anti-bullying videos in class	Awareness of bullying and acceptance of school anti-bullying education Peer victimization and bullying Cyber victimization and cyberbullying	SB: 1 D: 2 C: 1 B: 2 DCM: 1 W&DO: 1 Global rating: **High quality**
Wiretna et al. (46)	Quasi-design	Solution-focused brief counseling (SFBC) to reduce student online aggression behavior	*N* = 12; High school students with high online aggression in Yogyakarta, Indonesia	Counseling	Counselee finding solutions to the counseling process	Online aggression	SB: 3 D: 2 C: 1 B: 2 DCM: 1 W&DO: 1 Global rating: **Moderate**
Leung et al. (49)	RCT	E-course on cyberbullying	*N* = 144; 19–23-year-old undergraduate students in Hong Kong	Anti-cyberbullying online classes	Interactive course materials, including computer-simulated scenarios, popular Internet incidents, and role-play games	Time spent on social media Past involvement in CB Awareness of CB Intention to help CB victims Perceived behavioral control about helping CB victims Self-efficacy to combat CB Likelihood of behavioral intervention in CB	SB: 1 D: 1 C: 1 B: 2 DCM: 1 W&DO: 1 Global rating: **High quality**

these eleven studies took anywhere between 1 day and 3 years to fully implement.

3.3. Study quality assessment

The methodological quality of the studies is presented in the final column of **Table 2**, which was completed using the Effective Public Health Practice Project checklist (EPHPP, (43) tool. At this stage, two reviewers discussed with each other to reach a consensus in case of disagreements on study quality or data extraction. Based on the EPHPP Quality Assessment Tool and its dictionary guidelines, the included studies were rated on a scale of 1 (strong), 2 (moderate), or 3 (weak) for each category accordingly. These categories include selection bias (SB), study design (D), confounders (C), blinding (B), data collection method (DCM), withdrawal and dropouts (W&DO), and overall quality (global rating). A global rating of low, moderate, and high was determined by averaging these six categories' rankings. Studies without any weak ratings across all categories were rated as having a strong level of quality in their final global rating. Studies of a moderately strong quality have one category rated as weak, while those rated as qualitatively weak have a weak rating in two or more categories. The subcategory "data collection method" (DCM) was rated as strong in all studies, while the subcategory "withdrawal and

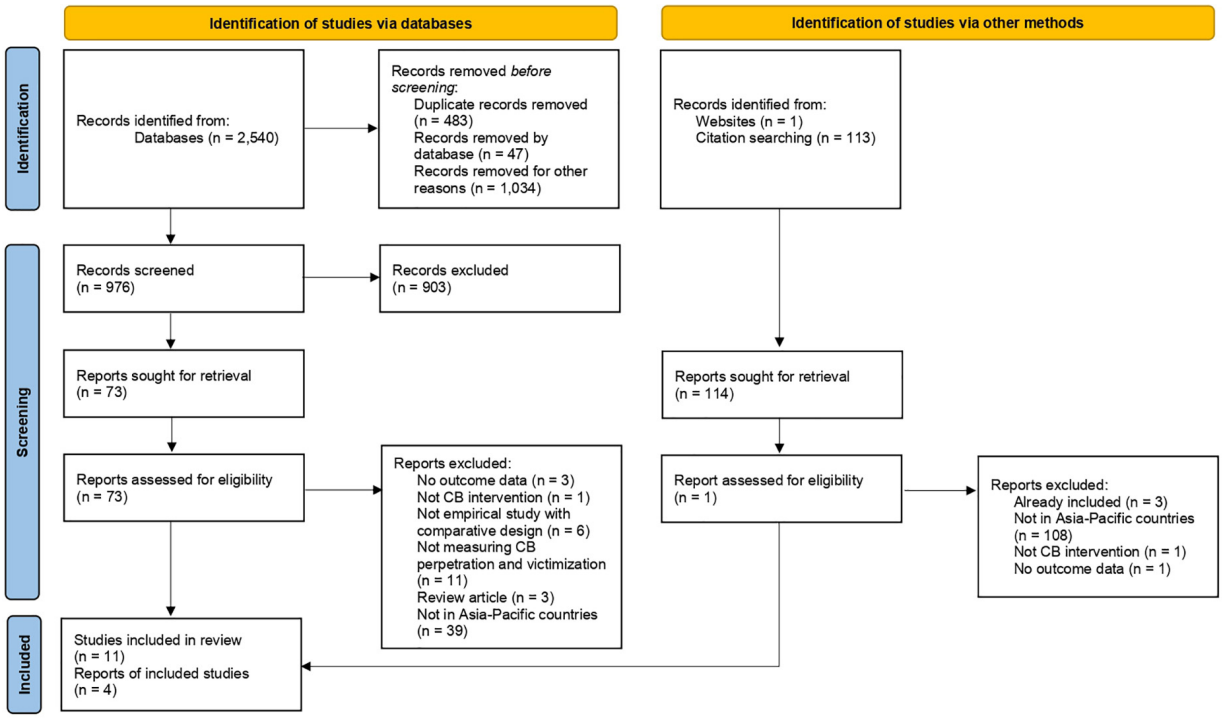

FIGURE 1
PRISMA 2020 flow diagram.

dropouts" (W&DO) had only two studies evaluated as moderate, and the subcategory "design" (D) had four studies evaluated as moderate. Six ($n = 6$) of the included studies were well-designed RCTs and c-RCTs, which provided detailed descriptions of the methods used and were assessed to be at low risk of bias. The two weakest subcategories were the "selection bias" (SB) and "confounders" (C), with one study evaluated as moderate and two studies evaluated as weak for both. Finally, except for one study evaluated as strong (44), the risk of bias was deemed moderate under the "blinding" (B) subcategory for all studies due to the absence of explicit information detailing the assignment of study participants to delivery strategies. Reports of study participants' different characteristics at baseline were noted in all studies, which could minimize potentially additional sources of bias. For global rating, eight studies were classified as "high quality," while two others were rated as "moderate" (45, 46). Only one study (44) was considered to have "low quality" and could not be considered for inclusion in the meta-analysis.

3.4. Studies included in meta-analysis

Four out of the eleven studies reviewed qualified for meta-analyses. Among the four studies eligible for inclusion, there was one c-RCT study (47), two quasi-experiments (45, 48), and one RCT (49). Study participants were mainly from secondary schools (47, 48), elementary schools (45), and college students (49). In terms of the percentage of girls participating, Leung et al. (49) included 76%, and Liau et al. (45) had 48%, while the other two studies did not mention gender explicitly. A school-based intervention was developed and implemented in Singapore and Australia by Liau et al. (45) and Cross et al. (47), respectively. Meanwhile, Tapingkae et al. (48) implemented a digital game-based learning intervention in Thailand, while Leung et al. (49) developed a skill-building intervention in Hong Kong. A range of intervention techniques was used in these four studies, including training, role-playing, group discussions, gaming scenarios, and peer mentoring. Various lengths of time were allotted for the program, ranging from 1 day to three school years. Other than Cross et al. (47), who did not provide information on the duration of the intervention session, the rest of the studies reported sessions between 30 and 45 min. Detailed study characteristics are presented in **Table 2** (studies included in the meta-analysis are highlighted in gray), and their summary statistics are shown in **Table 3**.

3.5. Meta-analysis results

In this review, we considered that any amount of statistical heterogeneity would be acceptable, and any estimates of the average effect of intervention were worth reporting. Statistical heterogeneity of the included studies was explored using the I^2 statistics, while we assessed the risk of bias based on the EPHPP criteria. We used ReviewManager (RevMan 5.4) built-in variance correction to calculate 95% confidence intervals to reflect the uncertainty in heterogeneity estimates. Analysis was also carried out using the random effects option within the RevMan program to report odds ratios.

We conducted two separate meta-analyses and a synthesis of effect sizes following their consistency in the types of interventions, study designs, and outcome variables. The first meta-analysis pooled estimates from four studies ($n = 4$) that assessed cyberbullying perpetration frequency using continuous data post-intervention.

TABLE 3 Summary statistics of cyberbullying interventions on cyberbullying perpetration.

References	Experimental *M* (*SD*)	Control *M* (*SD*)	Interpretation of the outcome
Liau et al. (45)	0.20 (0.44) 136	0.23 (0.49) 101	The higher the score, the higher the agreement with the online risk behavior (ORB)
Cross et al. (47)	0.03 (0.22) 1,538	0.03 (0.25) 1,246	The higher the score, the higher the cyberbullying experience
Tapingkae et al. (48)	0.14 (0.26) 60	0.26 (0.36) 55	The higher the score, the higher the online harassment perpetration behavior
Leung et al. (49)	2.13 (0.85) 68	2.27 (0.85) 69	The higher the score, the higher the positive attitude toward cyberbullying

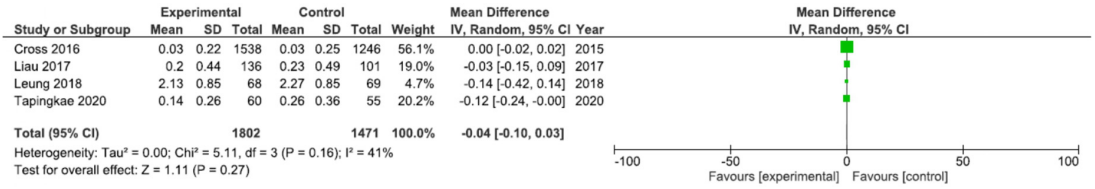

FIGURE 2
Forest plot of cyberbullying perpetration frequency at post-intervention among four included studies reporting continuous data.

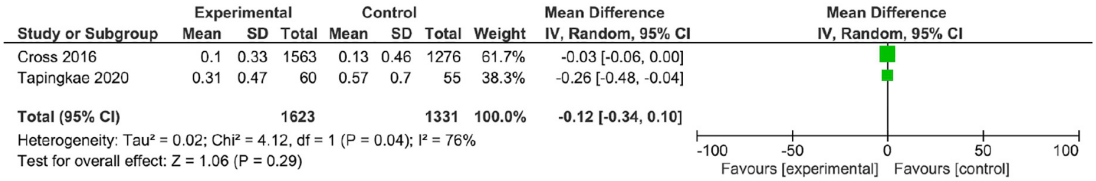

FIGURE 3
Forest plot of cyberbullying victimization frequency at post-intervention among two included studies reporting continuous data.

These studies reported data from 3,273 participants (intervention n = 1,802 and control n = 1,471). We found low heterogeneity between the studies $Tau^2 = 0.00$ ($\chi^2 = 5.11$, $df = 3$, $P = 0.16$)and $I^2 = 41\%$. Our findings found that the resulting pooled effect size was -0.04 (95% $CI[-0.10, 0.03]$, $Z = 1.11$, $P = 0.27$), indicating a small but non-significant improvement favoring the intervention group from pre-intervention to post-intervention (see Figure 2).

The second meta-analysis included two studies investigating cyberbullying victimization frequency using continuous data at post-intervention among 2,954 participants (intervention n = 1,623 and control n = 1,331). We found a very small, but no significant effect, favoring the intervention group ($MD = -0.12$, 95% $CI[-0.34, 0.10]$, $Z = 1.06$, $P = 0.29$) with significant substantial heterogeneity ($I^2 = 76\%$, $P = .04$) (see Figure 3). This substantial variability appeared due to the small number of studies included in the analysis rather than sampling error (50).

Subgroup analyses for study design, theory application, and intervention setting were not performed, given the nature of the studies included in the meta-analyses. A minimum of two studies are required to conduct any subgroup assessments; however, only Cross et al. (47) adopted the randomized controlled trial study design, while Leung et al. (49) was the only study conducted outside the school setting focusing on college students instead. Cross et al. (47) was also the sole study that implemented a theory-based intervention. Nonetheless, it is worth noting that Liau et al. (45) utilized the Theory of Planned Behavior to measure their primary outcome (i.e., attitude), but that same theory was not part of the cyber wellness intervention development.

4. Discussion

This study identified published literature on cyberbullying intervention aimed at reducing cyberbullying perpetration and cyberbullying victimization. Even though there are limitations due to the small number of available studies, we believe this report addresses a critical gap in the cyberbullying literature by demonstrating the current state of cyberbullying interventions in the Asia-Pacific region. The present meta-analysis showed, on average, a small but non-significant reduction in cyberbullying perpetration and victimization. The small cumulative effect observed in this study could be attributed to the short intervention period of the included studies (i.e., in the range of 1 day up to three school years). A review of evaluation research on bullying suggested that intervention should last up to 2 years before substantial change can be seen in the outcomes being assessed (51), as the frequency of reported cyberbullying behavior might have been low within a period of one or two school semesters (possibly three to four events within the 10–12 weeks period) (47). Hence, the room to shift the frequency or severity was limited. Additionally, despite being universal programs, whole-school programs appear to be less effective at combating bullying

perpetrators, perhaps because only 10–20% of students are involved in bullying behaviors (52).

This is the first study to investigate the effectiveness of cyberbullying interventions in Asia-Pacific countries. This research primarily highlights that the endeavor for cyberbullying intervention is still developing in the Asia-Pacific region, currently involving a limited set of stakeholders, settings, and delivery modes. The low heterogeneity in our meta-analysis of cyberbullying perpetration suggested that the studies, target populations, and interventions were most likely highly comparable. Overall, meta-analyses of cyberbullying interventions conducted in the Asia Pacific found no significant effects in reducing cyberbullying perpetration and victimization.

4.1. Future research

With the nature of the world wide web or internet transformation and the addition of new technologies such as virtual reality, little is known regarding the nature of people's interaction and its evolution with these technological advancements. With ever-increasing channels for interaction, it is critical to understand its impact on young people, who are also the fastest adopters of new ways of interaction and technology. For example, online interaction has now evolved into online virtual spaces, i.e., the metaverse (53). With the world facing many challenges from the 2020 pandemic, online education has also become a norm, further legitimizing our youths' increased screen time (54, 55). However, the overall impact of a significant increase in screen time usage has yet to be thoroughly studied and reported in academic literature. The interventions suggested by the studies in this report seem to view and address the problem of cyberbullying as static. Given the extensive use of the Internet and social media by children and youths, research should address the dynamic nature of these social-online interactions, as various forms of bullying continue to evolve and expand in tandem with the number of ways and mediums of social interaction. Future studies should address cyberbullying as a continuously evolving problem and find ways to address this dynamic problem coupled with the ever-increasing pace of technology. In order to understand cyberbullying more thoroughly, future studies must also investigate the new ways in which humans interact as well as the technologies that enable it.

Educational institutions should embed cyber awareness and media literacy in existing subjects, taught implicitly throughout classroom practices. Teachers should integrate media literacy into their instructional strategies rather than teaching it as a separate subject. This effort increases exposure, models multiple uses for media literacy in various contexts, and reduces the need for extra subjects in already packed schedules. For these reasons, it is more effective to integrate media literacy education than to treat it as an isolated subject (56). Future studies are therefore recommended to design interventions that indirectly target cyber awareness and media literacy in existing classroom instruction.

The studies reviewed in this report also lack guidance from essential theories (i.e., developmental, organizational, socio-emotional, socio-cultural, social-cognition, peer response, dominance, and humiliation theories). This caveat resulted in non-significant and smaller effect sizes, limiting the findings' application in the real world. For example, the studies covering interventions in Asia-Pacific regions did not target the area of participants' socio-emotional skills explicitly. However, extensive empirical evidence in the academic literature has highlighted the critical role that socio-emotional skills play in cyberbullying perpetration and cyber victimization (57–60). Positive social and emotional development is pertinent as this critical part of the human developmental process influences a child's self-confidence, empathy, ability to develop meaningful and lasting friendships and partnerships, and a sense of importance and value to those around the child. When children reach adolescence, changes in their brains, emotions, and bodies prime them to take on more complex social roles. A healthy socio-emotional development help adolescents have deeper conversations and better express and manage their emotions, whereas poor development in this domain will result in vice versa. Hence, developers of cyberbullying interventions should focus on theory-driven research designs, especially ones informed by the socio-emotional theory, before interventions are put into operational use.

It is also essential for future intervention-based researchers to appreciate the methodological strengths and limitations of systematic review and meta-analysis in planning, implementing, and evaluating high-quality research. This design of well-conducted, high-quality RCTs is the most robust method of synthesizing available data and is thus regarded as having the highest level of evidence (61). Finding the researched interventions that have, on average, made the most significant difference in effect size can be made with the help of systematic review and meta-analysis, both of which can provide essential insights into the current state of knowledge. Many practical guides are available that outline how to systematically and objectively conduct a meta-analysis in intervention research (62, 63). Although many challenges are associated with this design, including time-consuming screening and a thorough understanding of statistics, this methodology is more valuable than any single study contributing to the analysis because it can address the study size limitations, include a variety of populations, and allow for the evaluation of new hypotheses (64). Additionally, this research design allows for the integration of all evidence and the development of a coherent picture of the interventions' effectiveness across theories, contexts, topics, ages, and intervention approaches (65). Hence, future intervention developers, practitioners, and policymakers should use a systematic review and meta-analysis to help them decide whether or not the intervention in question is empirically effective.

We cannot address cyberbullying by targeting only the subjects alone and expecting interventions to cause behavioral changes. Interventions must be designed and implemented systemically to address the challenge that cyberbullying poses. Hence, ensuring the engagement of all stakeholders, particularly field-level practitioners, is critical in identifying, prioritizing, and planning measures for intervention effectiveness. It is crucial to emphasize that addressing this issue is not just the responsibility of schools. Families, those who engage with young people, and the wider society must all have a role in preventing and reducing the harm caused by all types of bullying, including those that occur outside school hours. Strategies designed with a single-focus treatment, such as peer support programs (45), fail to address the problem holistically. Therefore, future studies must design interventions that involve all relevant stakeholders, including subjects, parents, policymakers, schools, and communities seeking participation and boosting their motivation, ability, and self-efficacy

to prevent cyberbullying and management as a part of a holistic strategy that addresses cyberbullying as a shared responsibility.

4.2. Limitation

One of the significant limitations of this study is that not all eligible studies meet the rigorous criteria for inclusion in the meta-analysis. For example, although the study by Peng et al. (66) was rated as "high quality" based on the EPHPP checklist, further reviews revealed that the outcome of this study was presented as dichotomous data rather than continuous data (as used by the other four studies included in the meta-analysis), making analysis impossible. This limited number of studies prevented us from further determining the effect sizes of these interventions by doing subgroup analyses on gender, study designs, theoreticality, and intervention locations and broadening the age range literature search beyond non-school contexts. We could not conduct meta-regression analyses to estimate the effect of these covariates on cyberbullying behavior since the number of studies investigating these subgroups was small.

5. Conclusion

There is a critical need to establish all the previous recommendations with the most effective intervention design and structure to improve cyberbullying behaviors. Moving forward, researchers and practitioners in future studies should focus their educational efforts and investments better on interventions with theoretical grounding that can be implemented systemically. To combat cyberbullying effectively, researchers should devise theory-driven interventions, especially those based on socioemotional theories. The Collaborative for Academic, Social, and Emotional Learning (CASEL) framework highlights one such example of a systemic approach to implementing socio-emotional skills into students' overall educational experiences that could lead to improved outcomes of decreasing bullying instances. Instead of limiting interventions to a single lesson or activity, socio-emotional learning (SEL) is integrated across key settings where students live and learn: classrooms, schools, homes, and communities. A systemic approach also ensures that school district and state policies, resources, and actions align together to support SEL. National policies at the macro level fundamentally play a role in creating ripe conditions for supportive environments and rich learning experiences. In essence, more high-quality research is required to identify the most effective cyberbullying interventions for youth by holistically involving all essential stakeholders.

Data availability statement

The data utilized in this review are derived from previously published studies and are available upon request from the corresponding author.

Author contributions

AMM contributed to the study's conception and design. IK developed the search strategy, performed literature searches, quality assessments, and data extraction. AM conducted the statistical analyses, validation, and interpretation of data. AMM and IK contributed to manuscript preparation. All authors reviewed the manuscript and approved the submitted version.

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Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Publisher's note

Supplementary material

The Supplementary Material for this article can be found online at: https://www.frontiersin.org/articles/10.3389/fpsyt.2023.1014258/full#supplementary-material

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EDITED BY
Wulf Rössler,
Charité Universitätsmedizin Berlin, Germany

REVIEWED BY
S. Maria Awaluddin,
Ministry of Health, Malaysia
Ahmad Izzat Ahmad Tajjudin,
Islamic Science University of Malaysia, Malaysia

*CORRESPONDENCE
Marhani Midin
✉ marhani@ppukm.ukm.edu.my

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Exploring Malaysian parents' and teachers' cultural conceptualization of adolescent social and emotional competencies: A qualitative formative study

Nur Hazwani Abd Hadi[1], Marhani Midin[1]*, Seng Fah Tong[2], Lai Fong Chan[1], Hajar Mohd Salleh Sahimi[1], Abdul Rahman Ahmad Badayai[3] and Norsinar Adilun[1]

[1]Department of Psychiatry, Faculty of Medicine, National University of Malaysia, Kuala Lumpur, Malaysia, [2]Department of Family Medicine, Faculty of Medicine, National University of Malaysia, Kuala Lumpur, Malaysia, [3]Centre for Research in Psychology and Human Well-Being (PsiTra), Faculty of Social Sciences and Humanities, National University of Malaysia, Kuala Lumpur, Malaysia

Introduction: Global implementation of social and emotional learning (SEL) has been suggested to incorporate a systematic cultural adaptation process which relies on ground-up empirical data of a target cultural group in tailoring a culturally sensitive SEL intervention. Preliminary formative studies among local parents and educators were done to explore the conceptualization of social and emotional competencies (SECs) in various cultural settings, such as the continent of Africa and among the indigenous and refugee groups. Unfortunately, little scholarship has been devoted to studying the SEL adaptation process in Southeast Asian regions. This formative study aimed to explore Malaysian parents' and teachers' cultural conceptualization of adolescent SECs.

Methods: This qualitative study interviewed 12 Malaysian parents and 10 Malaysian teachers comprising of Malay (82%), Chinese (9%) and Indian (9%) races in an online focus group discussion. Sampling is purposive to parents of adolescents and teachers at secondary school only. Data were analyzed thematically to determine the culturally sensitive SEL constructs for Malaysian adolescents.

Results: All themes and sub-themes of SEC regarded as crucial for Malaysian adolescents are aligned with CASEL's five domains of competencies. Our findings extended the conceptualization of subskills under CASEL's relationship skills and responsible decision-making domains, which reflect Asian cultural values. The main themes of social competency: (a) preserving interpersonal relationships, (b) utilizing intrapersonal skills, and (c) communicating effectively, are shared with the established CASEL constructs. However, the underlying subthemes denote the unique cultural manifestation of social competency in Malaysia. Two of the emotional competency themes represent the established CASEL constructs: (a) practicing self-regulation, (b) demonstrating help-seeking behavior, and the other two themes signify Asian values: (c) upholding altruism, and (d) maintaining cultural display rules.

Discussions: This formative study revealed the habitual use of experiential and expressive suppressions as adaptive emotion regulation strategies in Malaysian collectivist culture and offered a potential alternative emotion regulation pathway

suitable for Malaysian adolescents. It also informed the feasibility of implementing SEL modules developed based on the CASEL framework in Malaysia and suggested two key lessons to enhance the cultural sensitivity of SEL in Malaysia: effective, respectful communication and expressive writing.

KEYWORDS

social-emotional learning, cultural conceptualization, adolescents, Malaysia, emotional suppression

1. Introduction

Social and emotional learning (SEL) is an umbrella term referring to a systematic process of educating intrapersonal, interpersonal, and cognitive competencies that help students navigate their feelings, thoughts, and actions to thrive in school, work, and life (1, 2). Research has shown the effectiveness of kindred approaches of SEL in improving students' academic outcomes, positive wellbeing, and prosocial behaviors (3–5). Due to its effectiveness in nurturing holistic students through healthy social and emotional development, SEL has become the zeitgeist of current education. Unfortunately, SEL constructs are foundationally developed in Western, Educated, Industrialized, Rich, and Democratic (WEIRD) contexts (6, 7). Emerging research stresses the need to adapt SEL according to sociocultural background due to the evidence that shows differential effects of SEL intervention on children based on sociocultural factors. For instance, SEL curriculums aimed to reduce internalizing problems that have been found to be effective with children from a particular cultural background but not with others (8).

The global implementation of SEL across countries with different cultural backgrounds presents two concerning issues. First, SEL intervention research begins with the aim of documenting efficacy for broader and diverse populations without focusing on the fundamental process of tailoring the intervention to specific cultural needs (8, 9). SEL adaptation research has been suggested to move beyond descriptive analyses based on the demographic distribution of participants. Merely including participants from broader cultural groups does not necessarily imply the adaptability of the intervention to a particular cultural population. Second, most available research on SEL adaptation only reported surface-level modifications to the program materials, which involve language translation, duration, visual aids, and examples relevant to a particular cultural context (10).

A relatively new direction in improving the effectiveness of SEL intervention for diverse cultural populations is to rely on ground-up empirical data specific to the target cultural group. This involves establishing formative research to explore the target population's cultural beliefs, norms, and values, which will inform the weight and the nature of modifications needed to tailor a culturally sensitive SEL intervention. SEL implementation in other countries should move toward a systematic cultural adaptation process, whereby studying the cultural beliefs and values comes first before implementing SEL intervention and further generalizing its adaptability to a particular cultural context (8, 11). Cultural adaptation is defined as "a systematic and thoughtful process of incorporating culture into evidence-based interventions" (12). This practice has been found to increase the effectiveness of intervention among the culturally distinct population by grounding the intervention practices in the lived experience of the target community (13). To date, various frameworks of cultural adaptation have been established as guidance to ensure the fidelity of intervention while insuring optimal cultural appropriateness (14–16). In each model, the process of cultural adaption is fundamentally started from the ground up by gathering information about the target community and assessing the community's cultural beliefs, norms, and values (13, 17).

In the burgeoning effort to culturally adapt SEL intervention from the ground up, researchers have studied the conceptualizations of social and emotional competencies (SECs) from the perspectives of local caregivers and educators (18–21). This emic approach in exploring the cultural beliefs, norms, and values pertaining to SEC is crucial before implementing SEL in a non-WEIRD context. According to Bronfenbrenner's Ecological System theory, home and school comprise the microsystem that directly influences children's social and emotional development (22). In this sense, parents' and teachers' conscious and unconscious beliefs regarding important domains of SEC represent the cultural model that shapes children's development through specific parenting and teaching practices, emotional socialization, and values being imposed (23). Studying the cultural model that governs the conceptualization of SEC in a particular context discards assumptions about the valuable skills needed for children and students to succeed in a particular culture.

In order to implement SEL effectively in a new cultural context, the process of cultural adaptation is essential because the gist of SEL, which is to nurture SECs, is significantly influenced by cultural norms and values. Matsumoto et al. proposed that different cultural practices demonstrate different common strategies to manage and regulate emotions. Collectivist countries with a cultural orientation of social embeddedness, harmony, and hierarchy tend to use suppression more, whereas individualist countries that valued autonomy and egalitarianism tend to use suppression less and reappraisal more (24, 25). Another study suggested that the consequences of emotional suppression are culture-specific. Americans holding Western-Europe individualist values experienced more negative emotions due to habitual suppression compared to those with Asian collectivist values (26). Consistent results found in a cross-country study assessing the effect of emotional suppression to life satisfaction among American

and Hong Kong Chinese. American participants reported lower satisfaction in the high-suppression condition, but no difference was found between the high-suppression and the control condition among the Chinese. This indicates that the use of emotional suppression only undermines the life satisfaction of those who hold individualist values and not collectivist ones (27). A study of emotion regulation (ER) among pre-schoolers found that American children are more expressive of their negative emotions in the disappointing gift paradigm compared to the Chinese and Japanese children who display neutral response through expressive suppression. This may be due to the different socialization of emotional expression across cultures (28). Therefore, individuals' cultures and values are known to impose norms regarding ER styles (29) and thus influence the understanding and belief toward elements of SECs. Hence, this is why SEL practice warrants cultural adaptation when being implemented in other culturally distinct populations.

Currently, the ground-up approach in SEL adaptation research among the non-WEIRD contexts has studied the refugees (18) and indigenous societies (19), conflict-affected regions (20), and the continent of Africa (21). Unfortunately, formative research to inform the cultural adaptation of SEL in Southeast Asian countries is still lacking. To date, Singapore is the only country that has systematically studied SEL constructs from the ground up and documented an SEL framework that is adapted to Asian collectivist culture (30, 31). However, Singapore itself is an educated, industrialized, rich, and democratic country, except it is not Western. SEL adaptation research from Singapore is not sufficient in representing the non-WEIRD context of the Southeast Asia regions. A country like Malaysia represents the non-WEIRD context for its developing, middle-income state and offers a unique setting due to its collectivist and multicultural population. In Malaysia, educating holistic students has long been the core aspiration of the National Education Philosophy (32). Unfortunately, this aspiration has yet to be reflected in the current state of education. As a developing country, the Malaysian Education Blueprint mainly focuses on preparing globally competitive students by empowering the science, technology, engineering, and mathematics (STEM) academic curriculums, resulting in academic- and exam-oriented students (33). This quality alone is insufficient to ensure Malaysian students thrive in the challenges of the current volatility, uncertainty, complexity, and ambiguity (VUCA) world (34, 35).

This current study pursues a research question of what are Malaysian parents' and teachers' cultural conceptualization of adolescent SECs? This formative research addresses the scarcity of SEL adaptation research in the Southeast Asian regions representing a non-WEIRD context. Malaysian parents and teachers were interviewed to investigate their beliefs regarding crucial domains and skills for students to be considered socially and emotionally competent in Malaysia. The findings were thematically analyzed to determine what skills are valued and endorsed by Malaysian culture as necessary for students' success. In order to inform theory and practices of further efforts in SEL adaptation in Malaysia, we compare our findings of culturally sensitive SEL constructs with the existing, well-established Collaborative for Academic, Social, and Emotional Learning (CASEL) framework (3, 36).

2. Method

2.1. Study context

This study is part of an extensive research project on implementing and adapting a culturally sensitive SEL framework for Malaysian adolescents in secondary schools. While many WEIRD countries begin SEL curriculums early and continue through higher education, we have two critical rationales for focusing on Malaysian adolescents only as a start. First, due to its exploratory phase, the adolescent is the ideal age group from which we can gather qualitative formative insight to better inform our framework development that suits the Malaysian school culture and students' needs. Second, the rising mental health disorder among Malaysian adolescents needs to be urgently addressed by nurturing their SECs to enhance protective factors in navigating life stressors.

This study is part of a bigger research on developing a Malaysian SEL framework. In this research, our research group conducted two formative studies simultaneously: the adolescent study, and the parents and teachers study (this current study). While the adolescent study explored Malaysian adolescents' social and emotional needs, this study explored Malaysian parents' and teachers' perspectives on what constitutes crucial SECs for adolescents to succeed holistically. The scope of this current study was to explore the conceptualization of SEC from Malaysian cultural perspectives as a ground-up approach to determine the culturally sensitive SEL constructs for Malaysian adolescents.

2.2. Procedure

A poster detailing our inclusion criteria for participants was produced, along with some brief information about the topic and medium of discussion. The poster was distributed through WhatsApp and Telegram groups, social media platforms, emails, and word-of-mouth by all the researchers involved. In addition, we engaged with some public schools in Malaysia to recruit secondary school teachers. Participants registered their interest by filling up the online registration Google form provided through the QR code on the poster. In the online form, participants were instructed to read the research information sheet and fill up the consent form survey before they were able to submit their online registration. Registered participants were then contacted to set an appointment for their online focus group session. Reminders and Zoom links were sent to participants a day before the appointment to improve efficiency.

In each session, participants were briefed regarding the research topic, consent, and online focus group rules and technicalities. The ground rules include respecting everyone's opinions and speaking one at a time, and the confidentiality of participants' identity and data was reserved only for analysis purpose by the research team. Participants were informed about the focus of the discussion, which is to explore what constitutes important SEC for Malaysian adolescents to succeed holistically. However, they were not briefed in detail on SEL

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specifically before the interview. Each focus group discussion was video recorded with consent from all participants. Groups that had only Malay participants were interviewed in Malay, while groups that had Chinese or Indian participants agreed to be interviewed in English as per request by participants. Only researchers of this research have the accessibility to participants' data for analysis purposes. All participants were given the honorarium of RM100 for their time and input shared in the interview. Ethical approval to conduct this research was obtained from the Research Ethics Committee of the National University of Malaysia on 20 April 2021. Approval to interview the secondary school teachers was obtained from the Malaysian Educational Research Information System (ERAS) on 2 August 2021.

2.3. Participants

The sampling of participants was purposive to some inclusion criteria: (i) participants are parents who have at least one adolescent child in secondary schools or teachers who teach secondary school students only and (ii) participants must incorporate all groups of socioeconomic status in Malaysia, and the total household income classified as B40 (RM4,851 and below), M40 (RM4,851–RM10,970), and T20 (RM10,970 and above). This is a standardized income classification that has been used formally in Malaysia (37). After a few focus group discussion sessions involving predominantly Malay parents and teachers, we added another inclusion criterion: (iii) participants must incorporate other races in Malaysia, such as Chinese and Indian, to better inform our analysis. Since parents and teachers are more informed about adolescents' social and emotional needs as compared to adults without adolescent children, the latter group was not involved in the sample. The descriptive statistics of the participants are summarized in Table 1.

A total of 15 parents and 18 teachers registered their interest to participate in this research through the Google form; however, only 12 parents and 10 teachers were interviewed in the online focus groups due to unreachable contact numbers or participants' unavailability to attend the focus group appointment. Two of the unavailable teachers withdrew on the day of the focus group appointment without prior notice; hence, the focus group was left with three instead of four participants. We purposely chose to conduct mini focus groups involving three to four participants in a group. We had three focus groups among the parents and three focus groups among the teachers. Mini-focus groups were considered ideal with the online setting of our focus group discussion. The nature of virtual meetings suffers the drawback of online/Zoom fatigue (38). With mini-focus groups, the duration of the whole session was maintained below 2 h, approximately around 100 min. Moreover, in that optimum time, we were able to gain in-depth and detailed insight from each of our small number of participants. We grouped parents and teachers separately to maximize the discussion dynamic focusing on specific home and school settings. The participants were grouped based on their available dates to attend the focus group session.

TABLE 1 Descriptive statistics of participants.

	n	%
Parents	12	54.5
Teachers	10	45.5
Parents' SES		
B40	3	25.0
M40	6	50.0
T20	3	25.0
Teachers' SES		
B40	2	20.0
M40	5	50.0
T20	3	30.0
Parents' gender		
Female	8	66.7
Male	4	33.3
Teachers' gender		
Female	7	70.0
Male	3	30.0
Parents' race		
Malay	12	100.0
Chinese	-	
Indian	-	
Teachers' race		
Malay	6	60.0
Chinese	2	20.0
Indian	2	20.0

2.4. Data collection

Our focus group discussions were done online through Zoom meetings due to the COVID-19 pandemic movement restriction order in Malaysia. Based on our experience, the online interview is an effective method to gather qualitative data since participants felt more comfortable sharing their input in the comfort of their homes without the added pressure of being in a foreign setting of a face-to-face group discussion with new people. This supports existing findings that suggest online interviews and promote greater engagement from research participants (39). The interview was moderated by the first author and supported by another experienced researcher to ensure the discussions were aligned with the research aim. The whole process of data collection lasted for 8 months, from June 2021 to January 2022.

The interview question guide was designed by the moderator with the supervision of other researchers. The interview guide was first tested with the researcher's family members and acquaintances who fit the research inclusion criteria to inform further improvisation process. Due to the unfamiliar concept of SEC among Malaysian parents and teachers, questions addressing

social and emotional qualities need to be asked separately to allow deeper introspection and retrospection of both interpersonal and intrapersonal skills valued within the Malaysian cultural context. Parents and teachers were asked about *"what qualities a socially competent student/child would have?," "what qualities an emotionally competent student/child would have?,"* and *"what skills are needed for a student/child to be successful holistically (mentally, physically, spiritually)?."* These open-ended questions allow for the exploration of conceptual meanings of SECs according to Malaysian norms and cultures. Follow-up questions were asked for participants to expand their answers with specific examples and contexts where the qualities were portrayed by their students/children. The co-construction of meanings was enhanced by asking other participants whether they agreed or disagreed with the qualities articulated to add more nuances toward particular answers.

2.5. Data analysis

The focus group discussions were transcribed verbatim by research assistants and checked for accuracy by the first author. In the transcription, participants were relabeled according to their relationship with adolescents (parents or teachers) and a number (e.g., Parent #1). Malay verbatim quoted in this study was translated to English for reporting purposes. Language translation accuracy was cross-checked by another first-language Malay-speaking and second-language English-speaking research assistant.

Data analysis was aided by using NVivo (released in March 2020) as data management software. Our analysis was entirely inductive due to the exploratory nature of this current study. The inductive thematic analysis was guided by Braun and Clarke's six-step approach for reflexive thematic analysis, which involves (i) familiarization of the interview transcript, (ii) coding of data, (iii) generating themes, (iv) reviewing themes, (v) defining and naming themes, and (vi) writing up a report (40). The findings of SEC were separately analyzed. The first author coded data with frequent discussion with other researchers as peer review for interpretation of the text. The coding was guided by the research aim and question and subsequently categorized into themes and subthemes. The process of categorizing was reviewed during discussions to organize findings into different but connected abstract levels between themes and subthemes.

We found remarkable similarities between parents and teachers in their perspectives on SECs; thus, they were combined during the analysis. No specific theme emerged that solely represents a particular gender, SES, or race, indicating that the conceptualization of SEC in the Malaysian context was uniformly shared despite demographic background. This study utilized data saturation points to determine the sample size of participants, which is a standard approach for qualitative research (41). Data saturation was achieved when there was no longer new additional finding or theme identified in our analysis. The themes and subthemes were discovered and saturated after the third parents' focus groups and second teachers' focus groups. We added another focus group consisting of non-Malay teachers to confirm our analyses and themes among other races in Malaysia, making altogether 12 parents and 10 teachers interviewed. The themes and subthemes discovered from our inductive thematic analysis were then compared with the established CASEL framework to provide insight into how similar or distinct the Malaysian conceptualization of SEC is from the CASEL constructs.

3. Result

Malaysian parents' and teachers' views of SEC are not entirely distinct from the established CASEL framework. All themes and subthemes of SEC regarded as crucial for Malaysian adolescents are aligned with CASEL's five core domains of competencies, namely, self-awareness, self-management, social awareness, relationship skills, and responsible decision-making. As in the CASEL framework, there are specific subskills that made up the competency for each domain. Our findings indicate the presence of unique cultural manifestations of subskills under the domain of relationship skills and responsible decision-making.

Each of our themes/subthemes is found to match with one of the five CASEL competency domains according to the established definition of the domains. Some of the themes/subthemes reflect the standard subskills under CASEL domains, while others are additional subskills that reflect Asian cultural values. These additional subskills extended the conceptualization of CASEL domains of competencies that are unique to Malaysian culture. Table 4 categorizes the themes and subthemes of SEC according to their parallel definition of CASEL domains and differentiates findings that belong to standard CASEL subskills with the extended subskills related to Asian values. The formal definition of each CASEL domain is included as a reference (36).

Our analyses of social competency yielded the following three overarching themes: (a) preserving interpersonal relationships, (b) utilizing intrapersonal skills, and (c) communicating effectively. Some underlying subthemes denote different displays of Asian cultural manifestations of social competency. Table 2 summarizes the main themes and subthemes of social competency based on Malaysian parents' and teachers' perspectives. Emotional competency can be described with four overarching themes. Two of the themes are aligned with the CASEL subskills: (a) practicing self-regulation and (b) demonstrating help-seeking behavior, while the other two themes are rooted in Asian values: (c) upholding altruism and (d) maintaining cultural display rules. Table 3 summarizes the main themes and subthemes of emotional competency based on Malaysian parents' and teachers' perspectives.

3.1. Social competency

3.1.1. CASEL subskill

3.1.1.1. Preserving interpersonal relationships

The ability of adolescents to establish and maintain relationships with others is an indicator of their social competence. Parents and teachers highlighted some crucial practices in preserving relationships, including both that enhance connection and limiting it, suggesting that balance in a relationship is essential to attain social competence. Practices that boost interpersonal relationships are demonstrating empathy and being socially

TABLE 2 Cultural conceptualization of social competency based on Malaysian parents' and teachers' perspectives.

Social competency			
	Theme 1: preserving interpersonal relationships	**Theme 2:** utilizing intrapersonal skills	**Theme 3:** communicating effectively
CASEL subskills	**Sub-themes:** - (i) Having empathy ii) Being socially engaged iii) Establishing healthy social boundaries	**Sub-themes:** - i) Employing cognitive flexibility	**Sub-themes:** - i) Conveying appropriate content
Subskills related to Asian values		ii) Containing emotional dissatisfaction	ii) Embracing Asian communication etiquette

TABLE 3 Cultural conceptualization of emotional competency based on Malaysian parents' and teachers' perspectives.

Emotional competency				
CASEL subskills	**Theme 1:** practicing self-regulation **Sub-themes:** - i) Emotional awareness ii) Pause behavior iii) Emotional control	**Theme 2:** demonstrating help-seeking behavior		
Subskills related to Asian values			**Theme 3:** upholding altruism	**Theme 4:** maintaining cultural display rules

engaged, whereas practice that limits particular social influence is maintaining healthy social boundaries.

3.1.1.1.1. Having empathy

Empathy is one of the fundamental skills being taught in the established SEL practices, which lies under the domain of social awareness in the CASEL framework. There is even an SEL curriculum focusing on empathy as the main competency. Malaysian parents and teachers also recognize the importance of empathy as an essential quality of social competence. Participants described two types of empathy aligned with Goleman's remark of cognitive empathy and compassionate empathy (42). Practicing empathy improves adolescents' cognitive thinking in understanding the social world by applying perspective-taking:

> *"So basically, about social competence, yeah, I think it lies in our children's ability to see the external world from their own perspectives and also able to appreciate others' perspectives as well"* (Parent #7).

From the participants' description, empathy does not just improve their social cognition; it also refines the adolescents' emotions and attitudes toward other people, which reflect compassionate empathy:

> *"When our children have empathy, they will naturally greet other people from any walk of life and help others without needing us to push them much. They will naturally feel that they want to help and contribute"* (Parent #12).

A teacher also mentioned that showing empathy would enhance bonding and connection in relationships which builds up their social competence:

> *"Yes, empathy.. Empathy will make you closer. The relationship will be closer. You can connect well with other people"* (Teacher #4).

3.1.1.1.2. Being socially engaged

The ability to initiate and develop social engagement with other people is also one of the qualities that reflect social competence. This ability has been mentioned as the loss of common sense due to the advancement of technology. Hence, developing social engagement is emphasized as a competency that needs to be taught to Malaysian adolescents. Adolescents who put the effort to be socially engaged by interacting with other people and being physically present are considered to have high social competence. Developing positive relationships through social engagement falls under the relationship skills in the CASEL domain. Teachers reported that adolescents' social competency could be seen in their engagement in social environments like the classroom by responding to the learning experiences:

> *"They are able to participate actively, okay.. They are verbal, they are active… they are not quiet in the class. They manage to contribute actively to the class discussion… The attitude that shows their presence in class"* (Teacher #10).

Participants also mentioned that social competency is declining among adolescents nowadays due to the increased usage of gadgets and technology. Adolescents' behavior of being quiet was attributed to the use of gadgets and perceived as a lack of effort to engage with other people:

> *"Adolescents nowadays are very quiet, even in school. They are in their own world. Maybe with advances in technology. Even though I'm teaching the best class, the first class, I notice they are*

> *very quiet in class. They won't speak anything unless you push them and ask questions"* (Teacher #8).
>
> *"I think adolescents nowadays are lacking in their social competency because they are very.. err very engrossed in gadgets. They don't mind not having real friends. They don't know how to talk to people and choose to be quiet most of the time in social situations"* (Teacher #3).

Moreover, parents noted that reduced face-to-face interaction due to the pandemic is a concern since adolescents are no longer used to engaging with significant others, which dampens family bonding:

> *"I think it is a common problem in most families nowadays that their children are like.. away. I mean with all the gadgets, they are having less bonding time with parents.. like a face-to-face conversation"* (Parent #5).
>
> *"We need to resolve the problems of how to like.. making our children have back the normal face-to-face communication skills like before (the pandemic). So, parents play an important role in this"* (Parent #1).

3.1.1.1.3. Establishing healthy social boundaries

Social competency is also perceived as the ability to assert healthy boundaries in interpersonal relationships. Parents and teachers emphasized that establishing social boundaries indicates that adolescents are aware of the acceptable and unacceptable forms of social interactions and influences. This subskill falls under the domain of responsible decision-making in the CASEL framework since it involves making constructive choices about personal goals and social interactions in a specific context. A form of healthy social boundary is the ability to recognize toxic relationships in which adolescents may be misunderstood or manipulated. This boundary is essential to ensure emotional health and stability:

> *"What is important is that they know that it is not always their fault not necessarily because of them. Sometimes other people really have problems with their own self. They need to know where the boundary is. We need to teach our children about boundaries so that they don't feel that they are the ones who are always wrong. Like.. what is wrong with me? Am I problematic?"* (Parent #10).

Another form of healthy social boundary reported by the participants is the ability of adolescents to filter negative social influences from peers and social media usage. This again involves the capacity to make constructive choices on internalizing the good and the bad influences. By assessing and asserting this boundary, adolescents are able to inhibit unhealthy and harmful social influences:

> *"To me.. the adolescence phase is very fragile. So, if they mingle with the right crowd, they will be good. But if they mingle with the wrong crowd, it may give a bad influence on them"* (Teacher #5).
>
> *"Sometimes, when they view their social media like TikTok or Facebook, they themselves need to be able to evaluate what is good and what is bad in dealing with the social media influence. That is an important part of being socially competent"* (Parent #1).

Our finding on establishing social boundaries has been surprising, considering Asian culture emphasizes social harmony over individual autonomy. In addition, parents and teachers also claimed that maintaining healthy social boundaries may sometimes undermine social hierarchy. Although Asian culture emphasizes respecting older and authoritative people like parents and teachers, adolescents are still encouraged to assert boundaries they deem healthy and helpful:

> *"Respect.. yes, they need to respect. But if the teacher did something wrong, I say.. they need to know where the red flag is"* (Parent #6).

3.1.2. Subskills related to Asian values

3.1.2.1. Utilizing intrapersonal skills

Malaysian parents and teachers described social competency as the ability to control inner processes and internal attitudes to resolve external social circumstances. These intrapersonal skills are demonstrated by practicing cognitive flexibility and containing emotional dissatisfaction in dealing with social situations. Malaysian parents and teachers identified intrapersonal skills as a key to attaining interpersonal (social) competence, suggesting that SEC encompasses an interrelated set of skills.

3.1.2.1.1. Employing cognitive flexibility

An intrapersonal skill that helps in navigating interpersonal relationships is cognitive flexibility. Cognitive flexibility allows for flexible thinking in shifting internal attention, adjusting the cognitive content, and switching behavioral responses to correspond to different social situations and tasks. The utilization of cognitive flexibility in adjusting to the social world reflects the domain of social awareness in the CASEL framework. One of the manifestations of cognitive flexibility is the ability to adapt to new social environments.

> *"The way students adapt themselves to social environments, to me, is regarded as social competency. Whether in a family situation, in a classroom with teachers or in any other social circumstances... they know how to suit themselves"* (Parent #10).

This quality is endorsed by teachers at school: *"so we know students who have lower social competency, will be having a hard time to adapt with a new environment. He will need to take some time. Like in school, he will only greet his friends after recess time"* (Teacher #6), and in contrast: *"students who are better at social skills are those who are able to adjust to both online and face-to-face classroom situations" (Teacher #2).*

Employing cognitive flexibility would not only assist in navigating new social environments but also new people, which is why it is an essential component of social competency:

> *"Okay, to me social competence means umm being able to meet with people, old or new. Being able to, you know… handle different kinds of people in their surroundings and mixing around is very important"* (Parent #11).

Cognitive flexibility also encompasses the ability to shift internal attention, which allows individuals to make efficient choices in life. A parent described that socially competent adolescents understand the concept of locus of control in handling social conflicts or dilemmas. This involves focusing only on things that are controllable and not dwelling on the uncontrollable circumstances: *"Sometimes they need to realize that they do not have control over everything"* (Parent #5).

3.1.2.1.2. Containing emotional dissatisfaction

Containing emotional dissatisfaction is an aspect of social competence that involves the ability to suppress emotional experiences that are conflicted to prioritize social harmony in Asian culture. Parents and teachers emphasized that conflict is unavoidable when dealing with social situations. One of the practices in conflict management regarded as socially competent is to manage own emotional dissatisfaction rather than confronting it. This quality signifies selflessness by cherishing social harmony over individual ego. This adaptive skill in Asian culture is a component of experiential suppression that refers to direct attempts in suppressing the subjective emotional experience (43). This finding extended the conceptualization of the relationship skill domain in the CASEL framework:

> *"So, every time there is a conflict, they need to think of ways to settle it. It is between settling it with the person involved or settling it by managing their own emotion discontent when facing the conflict. Dealing with own emotion is easier and safer." (Parent #8).*
>
> "*In situations involving other people where they can contain their anger or stress, this indicates their quality of social competence*" (Teacher #1).
>
> "*When they can control their emotion well, they will be more likable*" (Parent #3).

Containing emotional dissatisfaction is described as a crucial skill in becoming socially competent and accepted. Another social circumstance that would benefit from one's ability to contain emotional dissatisfaction is to celebrate differences:

> *"If others' opinions are not the same as theirs, how they react emotionally in a way that it won't hurt other people is a kind of social competence too, you know"* (Parent #7).

3.1.2.2. Communicating effectively

Malaysian parents and teachers highlighted that social competence is highly influenced by the ability to communicate effectively with manners. Two qualities of communication expected from adolescents are the ability to convey appropriate content and to embrace Asian communication etiquette. While ensuring appropriate content facilitates adolescents on what is considered effective communication, embracing Asian etiquette facilitates how to communicate respectfully in Malaysian culture.

3.1.2.2.1. Coveying appropriate content

The quality of the message conveyed is perceived as an integral part of effective communication. The ability of adolescents to choose appropriate words in communicating with other people, especially those who are older and authoritative, indicates their social competence. This quality falls under the domain of relationship skills in the CASEL framework since effective communication is crucial for meaningful social interaction. Parents and teachers reported that socially competent adolescents are those who are able to restrict themselves from using bad language or inappropriate youth jargon even though it has been the communicating style of other peers around them:

> *"Good communication means they mind the choice of words that they use. Adolescents must have their own style of language... you know, the adolescents' jargon. But they know that they should not use it with parents and teachers"* (Parent #5).
>
> *"Some students came to school and talked using bad language. Maybe the students are used to it at home. Certain words may sound rude like they always say, 'so what, teacher?', and this somehow shows their level of social competence"* (Teacher #1).

Teachers described that another aspect of conveying appropriate content includes delivering meaningful messages and conveying their needs across. This basic communication skill was lost due to the prolonged period of social quarantine throughout the pandemic:

> *"Socially competent students would portray good communication skills. I think everyone can talk. But the… the ability to express one thing in a way that delivers actual meaning seems to be hard for our students nowadays, you know, after the pandemic and everything... I mean, the meaning needs to be there. And we know actually what the objectives is… clear objectives"* (Teacher #10).
>
> *"Students nowadays have a lot of problems. But they can't manage to, like… put it in proper words, especially when in a face-to-face conversation. They can't express their needs or the help that they are seeking in words. This has something to do with their social competency too, you know"* (Teacher #7).

3.1.2.2.2. Embracing Asian communication etiquette

Participants described some etiquettes in communication regarded as the foundation of adolescents' social competence. These etiquettes include voice intonation, sentence segmentation, and eye contact closely matched with Asian values and communication styles. The etiquette emphasized respectful gestures when communicating with older and authoritative people. This quality contributes to a unique conceptualization of subskill under the relationship skill domain of the CASEL framework. Example of Asian communication etiquette includes using a soft voice intonation when conversing with older people and maintaining eye contact to show attentiveness:

> *"Social competence is when our children can incorporate ethics and manners in communication... the voice intonation that they use, how many segmentations and pause depending on whom they speak to"* (Parent #12).
>
> *"Yes, the intonation. The way.. the eye contact, students don't make eye contact. Even when the teacher is asking questions, they don't look at the teacher to answer. I feel that is quite rude. Yeah? I don't know… sometimes I feel disturbed"* (Teacher #4).
>
> *"Aaa language intonation. Not just intonation of verbal communication, but the use of right body language needs to be taken into consideration too"* (Teacher #6).

A parent also claimed that adolescents are expected to uphold their etiquette when communicating with older people despite the closeness of relationships or spontaneous conversations:

> *"I always say this to my children, since we are close… you can talk to me like a friend, but at the same time, you have to remember that I am your mother. Okay, you can talk like a friend to your teacher but remember at the same time that she or he is your teacher"* (Parent #3).

3.2. Emotional competency

3.2.1. CASEL subskills

3.2.1.1. Practicing self-regulation

Emotional competency is viewed as the ability to apply self-regulation practices. Skills such as emotional awareness, pause behavior, and emotional control facilitate adolescents' self-regulation and become indicators of their emotional competence. These skills are also endorsed by the CASEL framework under the domains of self-awareness and self-management.

3.2.1.1.1. Emotional awareness

Participants mentioned that the ability to identify emotions present in oneself and others is the fundamental step in responding to and regulating emotions effectively. This skill falls under the domain of self-awareness in the CASEL competencies:

> *"They need to recognize their emotion to identify the reason their emotions are disturbed"* (Teacher #9).
>
> *"Emotional competency is when our children can recognize emotions that they experienced and then take action to regulate the emotions"* (Parent #11).

Another aspect of emotional awareness is acknowledging the emotions experienced. Participants cited that *"every emotion needs to be acknowledged"* (Parent #2) and *"acknowledging emotions helps them to know when to manage certain emotions"* (Teacher #5).

3.2.1.1.2. Pause behavior

Several participants emphasized practicing pause behavior as a sign of emotional competence. Pause is perceived as a practical approach to managing emotions and behaviors by allowing clarity to choose desired actions rather than allowing emotions to drive impulsive behaviors. Therefore, this skill falls under the domain of self-management in the CASEL competencies. A teacher quoted that emotional competency involves not being impulsive or reactive in dealing with emotional conflicts:

> *"For example, when they are stressed or too mad, they can choose not to react at that time or just pause for a while and take their me time to think and respond later"* (Teacher #9).

According to some parents, social competence involves the ability of adolescents to seek their own space and calm down before addressing intense emotions or problems:

> *"They know to take space to calm down and cool down first"* (Parent #10).
>
> *"Space… they know how to cool down and whatever they are feeling, they can express after that"* (Parent #9).

3.2.1.1.3. Emotional control

Emotional control is another self-regulation practice that indicates the emotional competency of adolescents. It falls under the domain of self-management in the CASEL competencies. Teachers mentioned that students with good emotional competency are able to manage the extent to which emotions can influence their thoughts and behaviors. Emotional control refers to the ability of adolescents to control the domination of emotions over their lives:

> *"What I understand about emotional competency is that they are able to handle emotional situations, they can control themselves and… they do not be carried away when they are emotionally affected, you know? They are very wise when handling it"* (Teacher #6).
>
> *"Emotional competency is when someone tries to control their emotion so it will not go far. The emotion is just there and stops there. They know how to control their emotion so that it will not affect them negatively"* (Teacher #3).

Another parent cited that emotional control entails the ability to alter the intensity of emotional experience and reactions:

> *"… to control their emotions so they will not be hyper or too sad or too stressed especially when it comes to facing the examination"* (Parent #4).

Adolescents exhibit emotional competency when they are able to control their emotions according to their knowledge, spirituality, and cultural aspects:

> *"Whatever they are feeling, they can still control themselves… you know, based on their knowledge, experience and exposure toward spiritual and cultural aspects"* (Parent #2).

3.2.1.2. Demonstrating help-seeking behavior

Malaysian parents and teachers pointed out that emotional competency encompasses the ability of adolescents to demonstrate

help-seeking behavior. This practice involves reaching out and opening up to seek emotional support and help, which are referred to as interpersonal ER in the literature (44). Demonstrating help-seeking is viewed as a sign of emotional competence since it involves not just acknowledgment of emotional problems but also appraisal of the problems faced. This skill falls under the domain of self-management in the CASEL framework. Emotionally competent adolescents are aware of their emotional condition and the degree of severity that warrants intervention:

> *"There is an extent to which they feel like 'oh, I need help, I need to seek help'… If they can identify that, this indicates their emotional competence"* (Teacher #8).
>
> *"They know that sometimes they need to seek help. They are aware of which emotional conditions need intervention. Because we do not want things to get more severe and chronic, right?"* (Parent #1).

Adolescents with high emotional competency are also capable of identifying maladaptive-prolonged emotional problems and choose to seek help:

> *"They are aware of when they need to seek help… the duration of their emotional problems. They know when they could no longer solve their emotional problems by themselves and choose to seek help"* (Parent #4).

However, from the participants' descriptions, help-seeking behavior primarily focuses on the familial and community approach. Parents and teachers value adolescents' ability to reach out and share their emotional problems with adults in the family or community. Unfortunately, there was no professional help mentioned by the parents and teachers, which supports studies reporting delays in professional help-seeking for mental health disorders among Asian due to first-line familial and community preferences (45–47). Peers were regarded as the least preferable individual to seek help to:

> *"In managing emotional problems, the most ideal would be they try to share and seek help through… firstly through prayers. And then secondly share with their parents or teachers whom they trust, or they are closed with… some adolescents have trust issue with parents, they are closer with their teachers, so no problem at all to open up their emotional problems to the teachers. Next, maybe they can share with the extended family whom they believe could help them, and peers are the last option"* (Parent #9).

Parents and teachers were concerned about their children and students who may be struggling emotionally on their own. Without emotional support, emotional problems could escalate into more serious mental disorders. Hence, they genuinely wish to intervene and offer their help in addressing adolescents' emotional problems. This could only be achieved if the adolescents are able to demonstrate help-seeking behavior:

> *"If they can open up to us or show us in a way that we can see clearly what their emotional problems are, then I will be able to you know umm… I'll be able to help the child, speak to the child, or get nearer to the child so that things will not get severe"* (Teacher #3).

3.2.2. Subskills related to Asian values

3.2.2.1. Upholding altruism

A distinctive finding of emotional competency that reflects Asian values is the ability to uphold altruism in dealing with emotional conflicts. Altruism is a moral principle concerning for happiness and benefit of other people. Even though altruism indicates more about prosocial behavior instead of emotional competency, according to Malaysian parents and teachers, upholding altruism reveals emotional competency since it involves the fundamental element of abstaining and forgoing one's emotions to prioritize societal harmony. It is an emotional competency manifested in interpersonal circumstances, suggesting that SEC encompasses an interrelated set of skills. This quality expands the conceptualization of subskill unique to Malaysian culture under CASEL's responsible decision-making domain since it involves making caring choices about personal behavior and social interactions. Upholding altruism serves as the intrinsic motivation and guiding principle in managing emotions which results in more positive and harmonious consequences for the people involved:

> *"Emotional competency, as I understand, is when my children can think of ways to manage their emotions that will eventually bring positive action and be considered a win-win for everybody. They know how to balance between prioritizing their own emotion and situations that involve other people"* (Parent #11).
>
> *"Students who can manage their emotional outlet and responses in a way that will not give a bad impact on other people"* (Teacher #7).

Several participants quoted that emotional competency is also manifested in adolescents' ability to abstain from personal egoism by empathizing with others in attending to interpersonal emotional conflicts:

> *"Emotional competency is when the adolescent is not selfish in dealing with interpersonal emotional conflicts. They try to see problems from other people's perspectives as well… they know that they are not necessarily always right. Like… they can empathize with others"* (Parent #8).

3.2.2.2. Maintaining cultural display rule

While upholding altruism serves as the intrinsic motivation in emotional management, maintaining cultural display rules imparts an external manifestation of the process. Cultural display rules are the social and cultural norms that influence the appropriate and acceptable expression of emotions. Adolescents who are able to perform culturally appropriate modifications in their

emotional expression are considered emotionally competent. The main objective in maintaining appropriate display rules in Asian culture is to respect older and authoritative people and preserve relationships and harmony during emotional conflicts or intense situations. Hence, it belongs to the domain of relationship skills of the CASEL competencies since it facilitates harmonious relationships in Malaysian culture.

This adaptive skill in Asian culture is a component of expressive suppression in ER (29, 43). Malaysian parents and teachers described cultural display rules expected in adolescents involve minimizing and masking some emotional expression. For example, since respecting older and authoritative figures is significant in Asian values, adolescents are supposed to control intense and conflicting emotions by minimizing their emotional expression to uphold their respect:

> *"Emotional competency is about knowing the right way to express emotions. To show that they are mad, but at the same time, still want to respect the person. For example, my child, when he is mad, but he still shows that he respects me as his mother"* (Parent #3).

Another form of emotional display rule highlighted by the participants is the ability of adolescents to mask certain emotions in challenging circumstances by expressing their calmness and patience during social conflicts:

> *"When the students can maintain their calmness and patience in front of other people, this shows how well they can manage their emotions"* (Teacher #8).
>
> *"Emotional competency in adolescents can be seen when they are able to be patient. They can show calmness in dealing with emotional problems"* (Parent #6).

Since Asian culture appreciates social harmony, participants denoted that sustaining positive affect and masking negative affect are also part of the emotional display rule that indicates adolescents' emotional competency:

> *"Part of emotional competence is the ability to show affection to other people, smile to their peers, to their teachers and so on"* (Teacher #2).
>
> *"I've seen students wow… very cheerful, very jovial, very happy, very active in class, but they are from problematic family"* (Teacher #7).

4. Discussion

This formative study explored Malaysian parents' and teachers' cultural conceptualization of adolescent SECs. Malaysian parents' and teachers' beliefs and understanding of what constitutes crucial SEC for adolescents were studied as part of a systematic cultural adaptation process from the ground up before implementing SEL in Malaysian education. Our findings suggested that the conceptualization of SEC in the Malaysian context is aligned with the established CASEL framework. Malaysian parents and teachers denoted similar conceptualization of subskills under the following five domains of CASEL competencies: self-awareness, self-management, social awareness, relationship skill, and responsible decision-making (Table 4). This implied the feasibility of SEL curriculums and modules based on the CASEL framework to be implemented in Malaysia.

In addition to covering all domains of the CASEL competencies, our themes and subthemes also extended the conceptualization of subskills under some CASEL domains according to Asian cultural values pertaining to social harmony and social hierarchy. Our findings revealed that Malaysian parents and teachers endorsed a self-concept defined by social embeddedness and interdependence with others which are core features of collectivist cultural orientation (48, 49). Malaysia, along with other Southeast Asian countries, has been known as a collectivist country, and this study adds to the evidence supporting this claim in the case of Malaysia. Two CASEL domains that highly reflected the Malaysian collectivist culture are relationship skills and responsible decision-making (Table 4). This is where the cultural adaptation process needs to be employed to ensure a culturally sensitive SEL intervention for Malaysian education.

Social and emotional competencies that relate to Asian collectivist values are discussed further by first highlighting suppression as an adaptive ER strategy for adolescents in Malaysia. Second, we offered a potential alternative ER strategy as a point to intervene through effective and respectful communication that honors Asian etiquette. Third, we suggested a culturally sensitive intervention known as expressive writing exercise to accompany the habitual use of emotional suppression in an emotional restraint culture like Malaysia. Finally, we outlined some strengths and limitations of the current study and provided recommendations for future directions.

4.1. Suppression: An adaptive emotion regulation strategy in a collectivist culture

Our study supported previous findings noting suppression as an adaptive ER strategy in a collectivist culture (24–29). Malaysian parents and teachers highlighted the importance of upholding altruism that serves as a principle of preserving social harmony and achieving collective goals. This principle represents the domain of responsible decision-making in the CASEL competencies since being responsible in making decisions in the Malaysian collectivist context involves upholding the altruism principle. Malaysian parents and teachers emphasized some approaches in line with the altruism principle under the relationship skill domain, which are containing emotional dissatisfaction, maintaining cultural display rules, and embracing Asian communication etiquette.

From here, we recognized patterns of adaptive suppression in collectivist culture deemed as crucial competencies for adolescents in Malaysia. For instance, containing emotional dissatisfaction in resolving interpersonal conflicts implies the use of experiential suppression in which the subjective emotional experience like anger or disappointment is suppressed there and then to preserve harmony. In addition, the ability of adolescents to maintain

TABLE 4 Themes and subthemes of SEC according to CASEL domains and subskills.

CASEL domains of competencies	CASEL subskills	Subskills related to Asian values
Self-awareness: the abilities to understand one's own emotions, thoughts, and values and how they influence behavior across contexts	- Practicing emotional awareness	
Self-managements: the abilities to manage one's emotions, thoughts, and behaviors effectively in different situations and to achieve goals and aspirations	- Practicing pause behavior - Practicing emotional control - Demonstrating help-seeking behavior	
Social awareness: the abilities to understand the perspectives of and empathize with others, including those from diverse backgrounds, cultures, & contexts	- Employing cognitive flexibility Having empathy	
Relationship skills: the abilities to establish and maintain healthy and supportive relationships and to effectively navigate settings with diverse individuals and groups.	- Being socially engaged Conveying appropriate message	- Containing emotional dissatisfaction - Embracing Asian communication etiquette - Maintaining cultural display rules
Responsible decision-making: the abilities to make caring and constructive choices about personal behavior and social interactions across diverse situations	- Establishing healthy social boundaries	- Upholding altruism

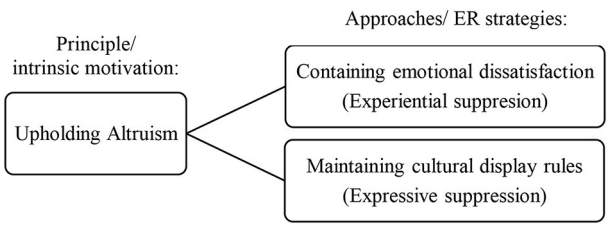

FIGURE 1
Potential drive toward adaptive suppression in Malaysian collectivist culture.

cultural display rules as an indicator of emotional competence denotes the use of expressive suppression in which the outward display of emotions is inhibited and concealed to show respect to someone older and authoritative. We postulated that the intrinsic motivation for selecting suppression as a preferred ER strategy in Malaysian collectivist culture comes back to altruism as a core principle. This postulation is worth to be studied further in future research to understand the underlying factor, intrinsic or extrinsic motivations toward emotional suppression in Asian context. Figure 1 summarizes our conceptual postulation regarding the drive of upholding altruism as a potential intrinsic motivation toward choosing suppression as an adaptive ER strategy.

Our findings that expanded the subskills of the CASEL framework according to Asian collectivist values are parallel with the adapted SEL framework used in Singapore. In addition to the five domains of CASEL competencies, Singapore's SEL framework posits Asian core values as central guidance in utilizing the SEL competencies. This is to emphasize that the implementation and teaching of SECs should be rooted and grounded in cultural values (30). The six core values introduced in Singapore's SEL framework include respect, responsibility, integrity, care, resilience, and harmony, which supports their community's collectivist cultural orientation (30, 31).

4.2. Effective and respectful communication: A point to intervene

Although our findings implied that emotional suppression is adaptive and favorable to Malaysian collectivist culture, Malaysian parents and teachers also highlighted the importance of help-seeking behavior, indicating an alternative interpersonal ER strategy. Malaysian parents and teachers highly valued the ability of adolescents to reach out and share their problems and emotional concerns. This suggested that the emotional health of adolescents matters and is prioritized. In addition, our findings also reported that there are instances whereby the importance of emotional health surpasses the demands of collectivist culture to preserve harmony. Malaysian adolescents are encouraged by their parents and teachers to pursue autonomy in establishing social boundaries if interpersonal relationship disrupts their emotional health and stability. This suggested that suppression is not the only potential ER pathway regarded as culturally sensitive in Malaysia.

Among the approaches to upholding the principle of altruism other than experiential and expressive suppression is the alternative strategy of communicating respectfully with Asian etiquette (Figure 2). In the Malaysian context, respectful communication following Asian etiquette is key for adolescents to convey their needs to adults around them. We would like to suggest this alternative pathway as a point to intervene in culturally adapting SEL intervention for Malaysian adolescents. A primary goal of SEL in Malaysia should be devoted to teaching students to communicate their social and emotional needs effectively while respecting Asian communication etiquette. SEL modules focusing on educating effective communication have already been implemented in other countries (50, 51). In Malaysia, lessons on communication skills need to be adapted with the appropriate communication etiquette that honors collectivist values. Fostering effective and respectful verbal communication between adolescents and adults in Malaysia would facilitate a better understanding of adolescents' social and emotional needs and difficulties. This will potentially promote interpersonal ER strategy among Malaysian adolescents through help-seeking

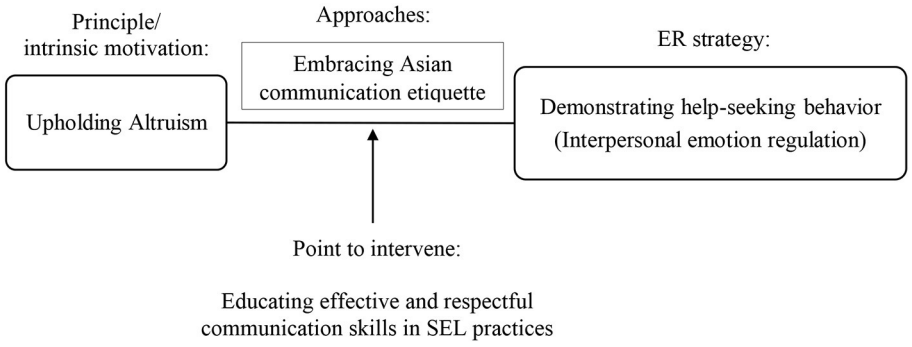

FIGURE 2
Potential alternative emotion regulation pathway for Malaysian collectivist culture.

behavior as valued and desired by Malaysian parents and teachers (Figure 2).

Second, due to the habitual use of emotional suppression in the Malaysian collectivist culture, we proposed the expressive writing intervention as one of the culturally sensitive SEL practices in Malaysia to improve adolescents' self-awareness and self-management. This practice of emotional disclosure through writing has been found to be effective, particularly among adolescents in improving emotional awareness and coping strategy (52, 53). A growing body of evidence suggests that expressive writing exercises promote wellbeing by improving perceptions regarding emotions and self-concept (54). Through expressive writing, one can overcome emotional avoidance and suppression through meaning-making that utilizes cognitive, affective, and motivational elements (55). According to the "affective adaptation theory," negative emotional reactions to events decrease with a deeper understanding of them, which makes expressive writing a key component of self-regulation (56, 57). This technique may offer a unique opportunity for Malaysian adolescents to express and process their emotions without worrying about relational social consequences or relationship repercussions (58). Expressive writing is a brief psychological intervention that bypasses the cognitive demand of respectful verbal communication between Malaysian adolescents and adults. This is not to say that expressive writing may replace the need for effective communication; however, it is an easier and quicker adaptive lesson to improve adolescents' wellbeing. Educating expressive writing intervention together with effective and respectful communication skills would enhance the cultural fit of SEL intervention in Malaysia.

4.3. Strength and limitations

A key strength of this current study is that it fulfills the niche in global SEL adaptation research by providing empirical data specific to a cultural group in the Southeast Asian region. This study provides a nuanced understanding of adaptive and normative ER strategies of experiential and expressive suppressions in a collectivist country like Malaysia. Its qualitative nature allows deeper exploration into the underlying and intrinsic motivation of emotional suppression which is to uphold the altruism principle. It also offers a potential alternative ER strategy suitable for Malaysian adolescents that embrace the respectful Asian style of communicating.

One of the limitations of this study pertains to the heterogeneity of cultures in Malaysia. Even though we did incorporate participants from three different races, it may not be adequate in representing Malaysian cultural perspectives as a whole due to the richness of other sub-ethnicities. Second, the homogeneous nature of most focus groups that consist of only Malay participants may not result in an optimum dynamic that provides in-depth understanding of cultural conceptualization in the Malaysian context. The safe homogeneous environment of the Malay groups may breed single-mindedness that could emerge into one-sided data (59). Third, this study was limited to exploring the perspectives of parents and teachers who deal with adolescents in concluding the Malaysian conceptualization of adolescents' SEC. As the saying goes, "*It takes a village to raise a child*"; therefore, opinions from more stakeholders such as counselors, parenting experts, and other folks who are not necessarily parents or teachers to an adolescent should also be taken into consideration.

5. Conclusion

By studying Malaysian parents' and teachers' cultural conceptualization of adolescent SEC, this formative study informed the feasibility of SEL modules developed based on the CASEL framework to be implemented in Malaysia. In addition, we suggested two key lessons to enhance the cultural sensitivity of SEL modules in Malaysia: effective, respectful communication and expressive writing exercises.

6. Recommendations

Future directions following this formative study would be used to triangulate data from this cultural study with the adolescent study to develop a culturally sensitive SEL framework for Malaysian adolescents. The parallel effort needs to be channeled to address the habitual use of suppression as the preferred ER strategy in

Malaysia. The hallmark features of SEL are more than just molding adolescents to behave in a certain acceptable way. It actually nurtures character strength, awareness of self and others, healthy coping skills, and many more. Hence, groundwork in the process of adapting SEL in Malaysia may include educating or raising awareness among parents and the community on the importance of healthy social and emotional development for children and adolescents. In addition to that, efforts in improving parents' and educators' SEC should be incorporated to facilitate the best delivery of SEL intervention in Malaysian education. In addition, due to the unique collectivist orientation in Malaysia, culturally sensitive assessment tools should be explored to measure the level of SEC among Malaysian children and adolescents. Future studies could be useful to explore the benefit of Asian collectivist values in supporting SEL. The significant strength of families and communities in a collectivist culture should be integrated with future SEL adaptation.

Data availability statement

The original contributions presented in the study are included in the article/supplementary material, further inquiries can be directed to the corresponding author/s.

Ethics statement

The studies involving human participants were reviewed and approved by Research Ethics Committee of the National University of Malaysia. The patients/participants provided their written informed consent to participate in this study.

Author contributions

Conceptualization of research: MM, LC, HM, AA, and NA. Data collection: NA and SA. Analysis of data: NA and ST. Writing: NA. Review of manuscript: MM, LC, and ST. All authors contributed to the article and approved the submitted version.

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Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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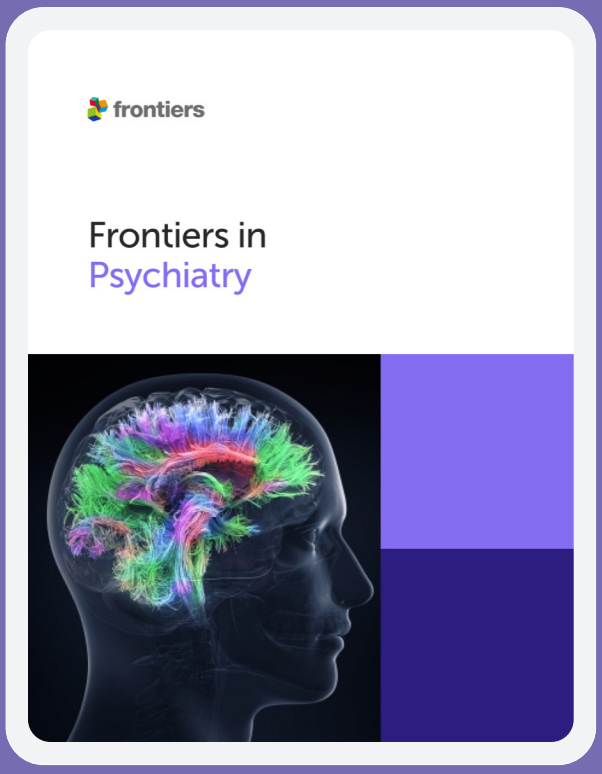

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