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Exploratory Factor Analysis: Validity and reliability of Mental Health Literacy Questionnaire among Sabahan Adolescents

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Abstract: This study aims to evaluate the validity, reliability and factor analysis of the 33-item Mental Health Literacy Questionnaire (MHLq) among adolescents in Sabah. Data is collected from a pilot sample of 132 participants. The Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy shows the value of 0.736 and Bartlett's test of sphericity shows a significant value ($p < .001$), which confirm the data is suitable for factor analysis. The data was also found to be reliable with Cronbach's alpha of .867. Exploratory Factor Analysis (EFA) then confirms the three key dimensions of mental health literacy which are self-help strategies (SHS), first aid skills (FASH), and knowledge of mental health issues (KS). The dataset was able to explain 38.12% of the variance. These findings suggest that the scale is a reliable and valid tool for assessing mental health literacy among adolescents in this context, providing a foundation for future research and interventions.

Keywords: Mental Health, Mental Health Literacy, Adolescence

INTRODUCTION

The term mental health literacy (MHL) was introduced by Jorm in 1996. At first, MHL was defined as the knowledge and beliefs about mental health disorders which provide insight on recognition, management or prevention of any mental health related issue (Singh et al., 2022). MHL consist of several attributes with the three major ones focusing on (i) the ability to identify mental disorders, (ii) knowledge about treatment and prevention and (iii) attitudes toward help-seeking behaviour (Seedaket et al., 2020). More recently study, has expanded MHL to include a few more attributes such as mental health first aid, reducing stigma, and empowering individuals to seek

evidence-based care which before this has been considered separately (O'Connor & Casey, 2015; Seedaket et al., 2020). Among the importance of having a satisfactory understanding of MHL is so that one's individual can detect the signs and symptoms of mental health disorders early making them able to receive timely intervention and improved mental health outcomes.

Even so, despite the universal agreement that a low level of MHL is associated with delayed help-seeking, increased stigma, and poorer mental health outcomes (Campos et al., 2016; Fleary & Joseph, 2020), past researches still shows that adolescents particularly in developing nations like Malaysia, often exhibit stigmatizing attitudes towards mental health MHL (Munawar et al., 2022). The impact of this can be seen through the prevalence of depression in Malaysia has doubled between 2019 – 2023 with the highest rates of depression are found among individuals aged 16-19 (Abu Hassan, 2024). This highlights the urgent need to assess and improve MHL in this population.

Despite its importance, the psychometric properties of MHL measurement tools remain underexplored, particularly in the Malaysian context. Past research has shown evidence in using other MHL measurement tools such as Mental Health Knowledge Schedule (MAKS) (Evans-Lacko et al., 2019) and Adolescent Depression Knowledge Questionnaire (ADKQ) (Hart et al., 2014). However, it often focus on narrow and particular dimensions of MHL only in order to cater specific populations, such as adults or healthcare students or to just specific diagnosis (Singh et al., 2022). Not just that, most of the tools were developed in Western contexts, which may not fully suitable for the multi-diversity of Malaysian adolescents, particularly those in Sabah.

Research Objective

This study aims to evaluate the validity, reliability and factor analysis of the MHLq using exploratory factor analysis (EFA). By evaluating the psychometric properties of this tool, this study seek to shed some insights to for future research in enhancing MHL among this population.

METHODOLOGY

Instrument

The Mental Health Literacy Scale (MHLq) used in this study consisted of 33 items. The items are theoretically categorised into three components which are (i) Self-Help Strategies (SHS), measured by five items, (ii) First Aid Skills and Help-Seeking (FASH), measured by 10 items and (iii) Knowledge/Stereotypes (KS), measured by 18 items. Responses were recorded using 10-point Likert scale, ranging from 1 ("Strongly Disagree") to 10 ("Strongly Agree"). The 10-points Likert was implemented. Awang et al. (2020) in his study has outlined the benefits of using a broader scale as it provides a more precise measure of participants' granularity, or in this case, precisely reflecting respondents knowledge for each item.

To increase the comprehension and understanding among the participants, the questionnaire was also translated into Bahasa Melayu which serves as an attempt to reduce potential language barriers. This effort is to ensure that responses accurately reflect their extent of mental health literacy. The translation process was done using the back-to-back translation method. The method involves a two-step process in which the initial translation of the original instrument was translated into Bahasa Melayu, followed by a reverse translation into English by an independent translator to ensure conceptual equivalence. The bilingual version of the MHLq was then provided for all participants.

Table 1 shows the items and their corresponding translations, categorized according to their respective components.

Table 1: MHLq items and translations

Factor	Item No.	Item
Self-Help Strategies (SHS)	1	Talking over problems with someone helps to improve mental health. *Berbincang mengenai masalah dengan seseorang dapat membantu dalam meningkatkan tahap kesihatan mental.*
	2	Doing something enjoyable helps to improve mental health. *Melakukan sesuatu yang menyeronokkan dapat membantu dalam meningkatkan tahap kesihatan mental.*
	9	Good sleep helps to improve mental health. *Tabiat tidur yang baik membantu meningkatkan tahap kesihatan mental.*
	10	Physical exercise helps to improve mental health. *Senaman fizikal membantu meningkatkan tahap kesihatan mental.*

	11	Having a balanced diet helps to improve mental health. *Mengamalkan diet seimbang membantu meningkatkan kesihatan mental.*
First Aid Skills and Help-Seeking (FASH)	12	If I had a mental disorder, I would seek my family's help. *Jika saya mengalami kecelaruan mental, saya akan mendapatkan bantuan dari ahli keluarga.*
	19	If a friend of mine developed a mental disorder, I would encourage her/him to go to a doctor. *Jika rakan saya mengalami kecelaruan mental, saya akan menasihatinya untuk berjumpa dengan doktor.*
	20	If I had a mental disorder, I would seek professional help (psychologist and/ or psychiatrist). *Jika saya mengalami kecelaruan mental, saya akan mendapatkan bantuan professional (ahli psikologi dan/atau pakar psikiatri).*
	21	If a friend of mine developed a mental disorder, I would encourage her/him to look for a psychologist. *Jika rakan saya mengalami kecelaruan mental, saya akan menasihatinya untuk berjumpa dengan ahli psikologi.*
	22	If a friend of mine developed a mental disorder, I would talk to the form teacher or another teacher. *Jika rakan saya mengalami kecelaruan mental, saya akan memaklumkan kepada guru kelas atau mana-mana guru*.
	23	If I had a mental disorder, I would seek my friends' help. *Jika saya mengalami kecelaruan mental, saya akan mendapatkan bantuan dari rakan-rakan saya.*
	24	If a friend of mine developed a mental disorder, I would talk to her/parents. *Jika rakan saya mengalami kecelaruan mental, saya akan memaklumkan kepada ibu bapanya.*
	26	If a friend of mine developed a mental disorder, I would offer her/his support. *Jika rakan saya mengalami kecelaruan mental, saya akan memberikan sokongan kepadanya.*
	27	If a friend of mine developed a mental disorder, I would not be able to help her/him. *Jika rakan saya mengalami kecelaruan mental, saya tidak akan mampu untuk membantunya.*
	32	If a friend of mine developed a mental disorder, I would listen to her/him without judging or criticizing. *Jika rakan saya mengalami kecelaruan mental, syaa akan mendengar tanpa menghakimi atau mengkritik.*
Knowledge/ Stereotypes (KS)	3	A person with depression feels very miserable. *Seseorang yang mengalami kemurungan berasa sangat serabut.*
	4	In bulimia nervosa, to compensate for overeating and to prevent weight gain, the person is forced to vomit or exercise vigorously, or use laxatives inappropriately. *Jika makan berlebihan, seseorang yang mengalami bulimia nervosa akan mengambil julap secara tidak beretika, memaksa diri untuk muntah atau bersenam secara berlebihan untuk mengelakkan peningkatan berat badan.*
	5	Drug addiction may cause mental disorders. *Ketagihan dadah boleh menyebabkan kecelaruan mental.*
	6	Mental disorders affect people's thoughts.

	Kecelaruan mental mempengaruhi pemikiran seseorang.
7	Brain malfunctioning may cause the development of mental disorders. *Kecederaan pada otak boleh menyebabkan kecelaruan mental.*
8	Highly stressful situations may cause mental disorders. *Situasi yang sangat tertekan boleh menyebabkan kecelaruan mental.*
13	A person with an anxiety disorder may panic in situations that she/he fears. *Seseorang yang mengalami kecelaruan kereseahan mungkin akan panik jika berada dalam situasi yang ditakuti.*
14	The symptoms' length is one of the important aspects to determine whether a person has, or has not a mental disorder. *Tempoh gejala adalah salah satu aspek yang penting dalam menentukan sama ada seseorang itu mengalami kecelaruan mental atau tidak.*
15	One of the symptoms of depression is the loss of interest or pleasure in most things. *Salah satu gejala kemurungan ialah kehilangan minat dalam banyak perkara.*
16	Alcohol use may cause mental disorders. *Pengambilan alkohol boleh menyebabkan kecelaruan mental.*
17	A person with anxiety disorder avoids situations that may cause her/his distress. *Seseoarang yang megalami kecelaruan keresahan mengelak situasi yang mungkin menyebabkan tekanan.*
18	Anorexia nervosa is a type of eating disorder that can lead to death. *Anoreksia nervosa ialah sejenis kecelaruan pemakanan yang boleh menyebabkan kematian.*
25	People with mental disorders come from families with little money. *Mereka yang mengalami kecelaruan mental datang dari keluarga yang miskin.*
28	Depression is not a true mental disorder. *Kemurungan bukan sejenis kecelaruan mental.*
29	Mental disorders do not affect people's behaviors. *Kecelaruan mental tidak memberi kesan kepada tingkah laku manusia.*
30	Only adults have mental disorders. *Hanya orang dewasa yang mengalami kecelaruan mental.*
31	The sooner mental disorders are identified and treated, the better. *Adalah lebih baik jika kecelaruan mental dikenal pasti dan dirawat dengan lebih awal.*
33	Mental disorders do not affect people's feelings. *Kecelaruan mental tidak memberi kesan kepada perasaan seseorang.*

Data Collection and Sampling

The study employed convenience sampling. Data were collected through a questionnaire distributed via a QR code linked to a Google Form that contain MHLq, specifically targeting adolescents age 13-15 who lives in Sabah. Of the 180 questionnaires distributed, a total of 166 responses were received. The responses then undergo cleaning process where incomplete and inconsistent responses were removed, 132 valid datasets were retained for analysis.

Procedure

The first step of the data analysis is conducting the Kaiser-Meyer-Olkin (KMO) Measure of Sampling Adequacy to determine whether the sample size was sufficient enough for further analysis. Next, Bartlett's Test of Sphericity was carried out to assess whether the correlations among items were sufficiently large to justify the use of Exploratory Factor Analysis (EFA).

After that, the reliability of MHLq and each of the components were then evaluated. Cronbach's Alpha with value of 0.7 will be considered acceptable for internal consistency. This step ensured that the scale and its subscales were statistically robust and reliable in measuring what it's intended to.

Once the validity and reliability of the data were confirmed, Exploratory Factor Analysis (EFA) was conducted in order identify the underlying factor structure of the MHLq. Lastly, Principal Component Analysis (PCA) was then applied as the extraction method with Varimax rotation used to provide the interpretability of the factor loadings.

RESULTS

The findings of this study are divided into three sections. First of all, the descriptive statistics are conducted to provide an overview of the distribution and variability of scores of MHLq. Second, the validity and reliability of MHLq are examined. The Kaiser-Meyer-Olkin (KMO) Measure of Sampling Adequacy and Bartlett's Test of Sphericity were conducted to assess the suitability of the data. For reliability, Cronbach's alpha is used to determine the internal consistency of the questionnaire. Finally, the third part provides the results of factor analysis. This includes the scree plot, total variance explained, and the results of PCA with Varimax rotation, which aims to identify the factor structure of MHLq.

Descriptive Statistics

The descriptive statistics for the Mental Health Literacy Questionnaire (MHLq) items are summarized in Table 2. The mean scores for individual

items ranged from 5.57 to 9.08, with standard deviations between 1.85 and 2.90, indicating variability in participant responses. The highest mean score was observed for item ks3 *(Drug addiction may causes mental disorders.)* indicating stronger agreement or knowledge among participants, while the lowest mean score was recorded for ks2 *(In bulimia nervosa, to compensate for overeating and to prevent weight gain, the person is forced to vomit or exercise vigorously, or use laxatives inappropriately.)* suggesting areas where understanding or agreement was comparatively lower. These results reflect the diversity in mental health literacy levels among Sabahan adolescents.

Table 1: Descriptive Statistics of MHLq

Descriptive Statistics

	N	Mean	Std. Deviation
shs1	132	6.61	2.307
shs2	132	8.29	1.851
shs3	132	8.12	2.197
shs4	132	7.92	2.033
shs5	132	7.39	2.157
fash1	132	6.20	2.762
fash2	132	7.52	2.466
fash3	132	7.04	2.904
fash4	132	7.86	2.235
fash5	132	6.20	2.787
fash6	132	5.98	2.683
fash7	132	6.21	2.780
fash8	132	8.19	2.133
fash9*	132	7.64	2.214
fash10	132	8.14	2.305
ks1	132	7.41	2.477
ks2	132	5.57	2.566
ks3	132	9.08	1.910
ks4	132	8.57	1.951
ks5	132	7.19	2.179
ks6	132	7.87	1.859
ks7	132	8.35	1.898
ks8	132	6.86	2.083
ks9	132	8.02	2.008
ks10	132	8.02	2.051
ks11	132	7.48	2.215
ks12	132	6.63	2.336
ks13*	132	6.85	2.528
ks14*	132	7.50	2.581

ks15*	132	8.23	2.230
ks16*	132	8.27	2.465
ks17	132	8.17	2.282
ks18*	132	8.08	2.567
Valid N (listwise)	132		

*indicate reverse item

Validity

Two diagnostic tests were performed as per shown in Table 3 to assess the adequacy of the data for Exploratory Factor Analysis (EFA). The Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy shows the value of 0.736, which exceeds the minimum threshold of 0.6 (Awang et al., 2020; Nasaireh, 2020), which confirmed that the sample size was sufficient to proceed with factor analysis. Bartlett's Test of Sphericity also shows a significant value of $\chi^2 = 1774.82$, df = 528, $p < 0.001$. This also indicates that the data were suitable for factor analysis. These findings validate the use of EFA on the dataset.

Table 2: Validity of MHLq

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.736
Bartlett's Test of Sphericity	Approx. Chi-Square	1774.820
	df	528
	Sig.	<.001

Reliability

The reliability of the MHLq and the three components was assessed using Cronbach's alpha. The overall reliability was found to be strong, as the value exceeded the commonly accepted minimum threshold of 0.7 (Taber, 2018), with a Cronbach's alpha value of 0.867. It indicates the internal consistency is strong enough across all of the items.

Each of the three components of the MHLq also demonstrated reliability value that are adequate for psychological measures. Table 4 shows the Cronbach alpha value for each of the component. The first component, Self-Help Strategies (SHS) shows Cronbach's alpha of 0.719, indicating sufficient

reliability in measuring adolescents' strategies for managing their own mental health. The second component, First Aid Skills and Help-Seeking (FASH) demonstrated a reliability coefficient of 0.765, indicating a consistent measure of adolescents' knowledge in mental health first aid and ability to seek help. The Knowledge/Stereotypes (KS) component showed the highest internal consistency with a Cronbach's alpha of 0.827, reflecting a strong and reliable measure of mental health-related knowledge and misconceptions.

These results confirm that the MHLq is a reliable instrument for assessing mental health literacy among adolescents, making it a suitable tool for future research and interventions.

Table 3: Reliability of MHLq

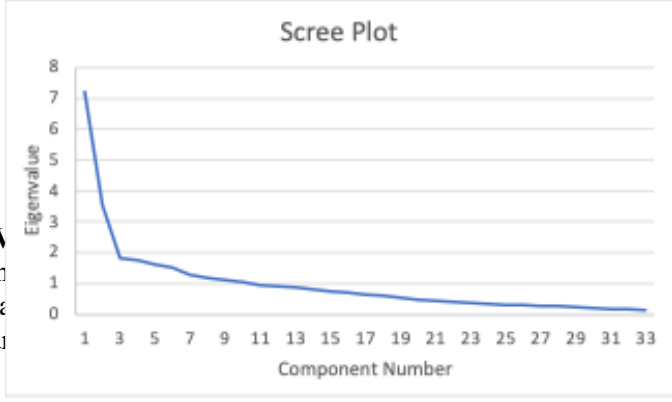
Component	Item	Cronbach Alpha
SHS	5	.719
FASH	10	.765
KS	18	.827
Overall		**.867**

3.3 Factor Analysis

Scree Plot

The scree plot was analyzed to determine the optimal number of factors to retain. Figure 1 shows that the elbow point was observed at component number 3 indicating the retention of 3 factors.

Figure 1: Scree plot



Total V

This an alysis (PCA) as extra rlying structu e explained

by each of the components. Cumulatively, the three factors accounted for 38.12% of the total variance, indicating a notable portion of the variability in the dataset is observed. The proportion of variance explained suggests that these factors effectively represent key dimensions of mental health literacy among adolescents, supporting the suitability of the MHLq for further psychometric evaluation.

Table 5: Total Variance Explained

	Extraction Sums of Squared Loadings		
Component	Total	% of Variance	Cumulative %
1	7.202	21.825	21.825
2	3.542	10.735	32.559
3	1.836	5.563	38.122

Extraction Method: Principal Component Analysis.

Rotated Component Matrix

Varimax rotation aims to improve the interpretability of the factor structure (Osborne, 2015) and to observe whether the items align with its respective theoretical domain (Carrizosa et al., 2020; Dilbeck, 2017). Table 6 shows the EFA result based on the rotated component matrix.

Based on this dataset, the rotated component matrix revealed that most items loaded strongly onto their expected components, supporting the three-factor structure consisting of Self-Help Strategies (SHS), First Aid Skills and Help-Seeking (FASH), and Knowledge/Stereotypes related to mental health (KS).

However, two items failed to load onto any factor. These items did not exhibit a strong enough association with any of the extracted factors with factor loadings below the 0.3 threshold. It indicates that the respondents may not understand the item or the items do not align conceptually with the existing structure of the scale. Their low loadings indicate the need for further evaluation to determine whether these items should be revised or removed in future studies.

In addition, the results also show that, a few items did not load onto their theoretically intended factors and instead loaded onto different components. This misalignment suggests possible conceptual overlap in how participants

interpreted certain items. Such inconsistencies highlight areas where refinements to wording of the item or conceptual definitions is needed to improve the structural clarity of the MHLq.

Some items also exhibited cross-loadings, in which they loaded onto more than one factor. While this cross-loading issue can indicate multidimensionality, it might also reflect conceptual ambiguity within certain items. In this case, the standard practice in factor analysis indicate that the items will be assigned to the factor where it demonstrated the highest loading (Samuels, 2016). Future refinement of these items could help ensure clearer differentiation between factors.

Despite these minor irregularities, majority of items loaded properly onto their respective factors. These indicate that the MHLq is a suitable tool for assessing mental health literacy among adolescents, though certain items may benefit from revision to enhance clarity and conceptual alignment.

Table 6: Rotated component matrix for MHLq

Rotated Component Matrix[a]

	Component		
	1	2	3
shs1	.301	.414	
shs2	.373	.383	
shs3			
shs4		.575	
shs5		.393	
fash1		.656	
fash2		.624	
fash3		.753	
fash4		.492	
fash5		.631	
fash6		.630	
fash7		.664	
fash8	.376		.403
fash9*			.548
fash10			.598
ks1	.465		
ks2			
ks3	.636		
ks4	.730		
ks5	.489		
ks6	.759		

ks7	.662		
ks8	.435		
ks9	.584		
ks10	.430	.320	
ks11	.506		
ks12	.523		
ks13*			.562
ks14*			.423
ks15*			.683
ks16*	.474		.450
ks17			.510
ks18*	.631		.318

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.
a. Rotation converged in 6 iterations.

DISCUSSION

This study aims to examine the factor structure and reliability of the Mental Health Literacy Questionnaire (MHLq) among adolescents in Sabah, Malaysia. The Exploratory Factor Analysis (EFA) results supported a three-factor structure comprising Self-Help Strategies (SHS), First Aid Skills and Help-Seeking (FASH), and Knowledge/Stereotypes related to mental health (KS). The Kaiser-Meyer-Olkin (KMO) measure and Bartlett's Test of Sphericity confirmed that the dataset was suitable for factor analysis.

Reliability and Validity

Validity and reliability is one of the most fundamental aspects in evaluating the psychometric property of a measurement tool. Validity refers to how well an instrument measures the intended construct (Habibi et al., 2019). The KMO value of 0.736 indicates that the sample was adequate for factor analysis and the Bartlett's Test of Sphericity of $p < 0.001$ confirms that the correlation matrix was appropriate for factor extraction. Meanwhile, reliability is defined as the consistency of a measure (Habibi et al., 2019; Taherdoost, 2016) with Cronbach's alpha value above 0.7 is agreed to be acceptable (Carrizosa et al., 2020). The MHLq demonstrated strong overall reliability ($\alpha = 0.867$), statistically proving that the items within the scale were internally consistent.

From the dataset, SHS showed the lowest reliability (α = 0.719) which indicates variability in the responses measuring self-help strategies. One possible explanation for this might be because of the items themselves. The items in the SHS components focus primarily on lifestyle factors, such as having a balanced diet, getting enough sleep and doing enjoyable activities. It is possible that a lot of respondents did not associate these behaviours with mental health self-help strategies, which led to inconsistencies in the responses. This is in line with past research that suggests that Malaysian adolescents have a limited understanding of the connection between lifestyle behaviours and mental well-being (Munawar et al., 2022). Other research also indicates that, while activities such as exercise, sleep, and diet are widely recognized for their benefits, adolescents may not consider them related to mental health (Abdullah et al., 2020; Singh et al., 2022) unless they have been explicitly taught about it. This gap may have resulted in uncertainty or varied interpretations of the SHS items, leading to weaker internal consistency within this domain.

Items That Did Not Load Cross-Loading Issues

While most items loaded well onto their respective components, two items failed to meet the 0.3 loading threshold. The items are SHS3 ("Good sleep helps to improve mental health.") and KS2 ("In bulimia nervosa, to compensate for overeating and to prevent weight gain, the person is forced to vomit or exercise vigorously, or use laxatives inappropriately."). These low factor loadings suggest that these items did not strongly align with any of the identified factors (Osborne, 2015), potentially due to conceptual ambiguity, poor item phrasing, or difficulty in comprehension among respondents (Knekta et al., 2019; Swami et al., 2023).

For SHS3, one possible explanation for the poor loading is that sleep quality and mental health are often perceived as related to general well-being rather than a self-help strategy (Dagani et al., 2024). Unlike other well-known self-help strategies such as mindfulness, breathing techniques and journaling (Town et al., 2024), sleep is typically viewed as a biological necessity rather than an intentional coping mechanism (Rakhimov et al., 2023). This could lead to variability in how participants interpreted this item, reducing its alignment with the self-help strategies factor. Future revisions of the MHLq may consider rewording this item to emphasize intentional sleep management

as a mental health strategy, such as: "maintaining a regular sleep schedule can improve mental health."

For KS2, the complexity of the item might have contributed to its failure to load onto any factor. Bulimia nervosa is a specific clinical disorder (Mond et al., 2007) that requires prior knowledge of eating disorders, which many adolescents may not have (Bullivant et al., 2020). Given that mental health literacy in Malaysia is still developing and discussions around eating disorders remain limited, it is possible that many respondents were unfamiliar with the terminology used in this item. The item also presents multiple behaviours (vomiting, excessive exercise, and laxative use) within a single statement, which could have made it difficult for participants to focus on a single concept. A potential solution is to simplify the item or break it into separate statements that assess knowledge of eating disorders more clearly.
The result also shows that some items loaded onto different components than theoretically expected, suggesting potential conceptual overlap between the three domains. This misalignment may reflect differences in how adolescents conceptualize mental health literacy, or it may indicate that certain items assess multiple aspects of mental health knowledge and help-seeking. Furthermore, a few items also exhibited cross-loadings, meaning they loaded onto more than one factor. While this might indicate shared variance between factors, they may also reflect ambiguities in item wording or content. In such cases, the item was assigned to the factor with the highest loading (Li et al., 2020).

Factor Analysis and Total Variance Explained
The total variance explained of 38.12% indicate that the extracted factors had explained a reasonable but not comprehensive representation of mental health literacy among Sabahan adolescents. In psychological research, the variance explained typically ranges between 40–60% (Floyd & Widaman, 1995), with higher values indicating a more exhaustive model (Floyd & Widaman, 1995; Swami et al., 2023; Yong & Pearce, 2013).

One possible explanation for the relatively low variance explained is that mental health literacy is a multidimensional construct that may not be fully captured by the three-factor model. This is in line with recent studies that have

identified additional dimensions of MHL such as calibration of mental health knowledge, help-seeking and stigma factors (Kutcher et al., 2016; Munawar et al., 2022), which were not distinctly represented in MHLq. The absence of these factors could indicate that the MHLq, while practical, may not be comprehensive in explaining aspects of adolescent mental health literacy.

To address this concern, future research should apply Confirmatory Factor Analysis (CFA) to further test the model fit and determine whether additional factors should be included. Expanding the sample to include a more diverse adolescent population and conducting qualitative validation such as Focus Group Discussion may also provide a clearer picture of the factor structure and able to improve the variance explained in future studies.

Implications, Strengths, and Limitations

The findings of this study have several important implications for mental health literacy research and practice. The MHLq demonstrated strong reliability and validity, confirming its suitability for assessing mental health literacy among adolescents in Malaysia. Its bilingual administration enhanced accessibility, particularly for participants from various educational background, where English proficiency may vary.

Despite these strengths, the study has several limitations. The presence of misaligned items and cross-loadings items indicate that the MHLq requires further refinement before extensive application. The variability in item interpretations, particularly in the SHS component, suggests the need for enhanced clarity in item wording to ensure that adolescents fully understand the connection between daily habits and mental well-being.

As a self-report questionnaire, the MHLq is subject to social desirability bias, where participants may provide responses they think to be socially acceptable rather than what they truly belief. Qualitative methods, such as interviews or focus groups, could be implemented in future studies to provide deeper insights into adolescent mental health literacy. Finally, while this study established the factor structure through EFA, future research should conduct CFA to validate the structure and assess its applicability across different adolescent populations.

CONCLUSION

The findings of this study confirm that the Mental Health Literacy Questionnaire (MHLq) is a reliable and valid instrument for assessing mental health literacy among Sabahan adolescents. The three-factor structure identified through Exploratory Factor Analysis (EFA) aligns with established theoretical frameworks of mental health literacy, reinforcing its multidimensional nature. The strong internal consistency of the scale, as indicated by Cronbach's alpha values above the acceptable threshold, further supports its reliability as a psychometric tool.

Despite minor cross-loading issues and non-loading items, the overall factor structure remains stable, suggesting that the MHLq effectively captures key dimensions of adolescent mental health literacy. Its high reliability underscores its potential application in future research to explore help-seeking behaviors, stigma reduction, and intervention effectiveness among youth populations. By providing a culturally relevant measure of mental health literacy, this study contributes to the growing body of research on youth mental health in Southeast Asia. The validated MHLq can serve as a foundation for educational initiatives, policy development, and mental health awareness programs, ultimately fostering a more informed and proactive approach to adolescent mental well-being.

Informed Consent Statement

All participants involved in this study were informed about the objectives, procedures, potential risks, and benefits prior to participation. Written informed consent was obtained from each participant or their legal guardians. Participation was voluntary, and participants were assured of their right to withdraw from the study at any time without penalty.

Conflict of Interest

The authors declare that there is no conflict of interest regarding the publication of this article. All affiliations and financial involvements that could be perceived as potential sources of bias have been disclosed.

Ethics Statement
This research was conducted in accordance with the ethical standards of the institutional research committee. Ethical approval was obtained from the Medical Research Ethics Commitee, Universiti Malaysia Sabah.

Author Contributions
The study was part of Masters's Degree by xxxx, supervised by xxx. Data collection, analysis, and interpretation were performed by the author. The manuscript was drafted and revised by the supervisor, who approved the final version for submission.

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Data Availability Statement
The data that support the findings of this study are available from the corresponding author upon reasonable request. Restrictions may apply due to confidentiality or ethical considerations.

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