

MENTAL HEALTH LITERACY AND STIGMA QUESTIONNAIRE: A VALIDATION STUDY AMONG YOUNG ADULTS

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(Received 01st April 2026; revised 24th May 2026; accepted 06th June 2026)

Abstract. This study aimed to validate the Mental Health Literacy and Stigma Questionnaire among young adults residing in Kuala Lumpur and Selangor. Although other instruments assessing knowledge, attitudes, and help-seeking domains have been validated, there is currently no published validation study of this specific questionnaire targeting early adulthood in the Malaysian context. A purposive sampling method was employed using online recruitment. A total of 289 participants completed the online survey, with a mean age of 20.82 years. Confirmatory Factor Analysis was conducted on eight latent constructs. The final 58-item model demonstrated an acceptable fit based on relative chi-square and Root Mean Square Error of Approximation indices. Convergent validity was established for five constructs: Knowledge about Prevention, Help-Seeking, Perceived Self-Stigma, Perceived Community Stigma, and Social Distance. Most constructs also demonstrated discriminant validity. Furthermore, high composite reliability values were observed for Knowledge about Illness, Knowledge about Prevention, Help-Seeking, Perceived Self-Stigma, Perceived Community Stigma, and Social Distance. This study contributes to the field by offering a preliminary validation of a culturally relevant tool for assessing mental health literacy and stigma among Malaysian youth.

Keywords: *mental health literacy, stigma, help-seeking, reliability*

Introduction

The prevalence of mental health disorders is alarming globally. In 2017, 10.7% of the global population, or 792 million people, suffered from mental illness (Dattani et al., 2021). Among the mental health disorders, depression and anxiety issues are most frequently reported worldwide (3.4 percent and 3.8 percent respectively). In the National Health and Morbidity Survey (NHMS), mental health disorders among Malaysians aged 16 and above grew by 18.5 percent between 1996 and 2015, from 10.7% to 29.2% (MOHM, 2015). More recently, depressive symptoms were reported by 2.3 percent of Malaysians aged 18 and above (MOHM, 2020). Especially so among the university students', mental health and well-being have grown significantly in the last 10 years, showing the concern about psychological problems faced by this vulnerable population (Hernández-Torrano et al., 2020). In Malaysia, the prevalence risk of anxiety among university students was 29% (Mohamad et al., 2021). As the prevalence of mental disorders increases, it is crucial to consider if the public has sufficient knowledge and awareness regarding mental health which is termed as mental health literacy by Jorm et al. (1997). The concept of mental health literacy was derived from health literacy, which is the ability to gain access to, understand, and use information in ways which promote and maintain good health (Nutbeam et al., 1993). Jorm et al. (1997) critiqued that mental health literacy is absent from the definition of health literacy, therefore coined his own definition as the acquisition of knowledge, attitude, and beliefs towards mental illness. The concept of mental health literacy goes beyond

defining knowledge solely. It also encompasses that appropriate actions are required to be taken by individuals for the well-being of themselves or others.

Mental health literacy includes seven key components: (1) the ability to recognize specific disorders or different types of psychological distress, (2) knowledge and beliefs about risk factors and causes, (3) knowledge and beliefs about self-help interventions, (4) knowledge and beliefs about professional help available, (5) attitudes which facilitate recognition and appropriate help-seeking, (6) knowledge of how to seek mental health information, and (7) early recognition, prevention, and mental health first aid skills. As defined by Kutcher et al. (2016) and Jorm et al. (1997), the three domains of mental health literacy are knowledge, attitudes, and help-seeking. The concept of MHL has been further refined by several researchers as the ability to obtain and sustain good mental health, comprehend mental health issues and treatments available, avoid stigma associated with mental health, improve help-seeking behaviours, and provide support to others through mental health first aid (Kutcher et al., 2016; Jorm, 2012). Globally, there is heightened concern about the need to improve mental health literacy. These concerns are stimulated by inappropriate and negative attention received by people suffering from mental illnesses and their families from the general public, social networks, and other family members (Eigenhuis et al., 2021; Coates et al., 2019). Negative attitudes and intolerance toward people with mental disorders are frequently attributed to a lack of knowledge about these disorders, which can have a negative impact on help-seeking attitudes and behaviours (Eigenhuis et al., 2021; Jorm, 2012). This is because people do not know where to go, what types of treatments are available, or what resources are available to them (Jorm, 2012).

Nevertheless, mental health literacy stands at a low level (Venkataraman et al., 2019) especially among university students in developing countries such as Saudi Arabia, Iran, Malaysia, Indonesia, and Vietnam (Almanasef, 2021; Jafari et al., 2021; Kotera et al., 2021; Kristina et al., 2020; Abolfotouh et al., 2019; Nguyen Thai and Nguyen, 2018). As the majority of mental health issues that arise during the lifespan can be detected by the age of 25, it is essential to improve mental health literacy in young people to assist them to achieve better mental health outcomes (Jones, 2013; Jorm, 2012). Considering increasing cases and prevalence of mental health among university students, a valid scale that evaluates mental health literacy among university students is needed. Several mental health literacy reviews have been carried out, showed the inadequate reporting of psychometric properties (Wei et al., 2016; 2015; O'Connor et al., 2014). The lack of a standardized assessment that assesses all the domains of mental health literacy has had an impact on research in mental health literacy (Munawar et al., 2022). Instruments that test a particular domain of mental health literacy such as knowledge, attitudes, or help-seeking are widely used in research (Wei et al., 2016; 2015; O'Connor et al., 2014) but there are only a few instruments which investigate all the components of mental health literacy (Kågström et al., 2023). For example, in a scoping review conducted by Wei et al. (2015), 62% of mental health literacy showed no psychometric properties reported. Furthermore, they identified many gaps such as disproportionate application of knowledge and help-seeking evaluation measured as compared to the stigma/attitude's measures. Another gap is the yet-to-be validated measures in each outcome category, and the scarcity of tools that assess all components of mental health literacy simultaneously.

As a result, determining a measure's value and whether it has strong psychometric properties is challenging (Simkiss et al., 2021). Munawar et al. (2022) systematic

review summarises that only eight Malaysian research articles that investigated the three sub-components of mental health literacy which are knowledge, attitudes, and help-seeking as defined by Kutcher et al. (2016) and Jorm et al. (1997). It is challenging to compare these studies due to the differences in the domains incorporated under mental health literacy conceptual framework (Spiker and Hammer, 2019). On another note, studies on mental health literacy are mostly conducted in Australia, the USA, and the UK (Sweileh, 2021). This geographically focused measuring tool leaves a significant gap in the literature in Asian countries, where cultural, social, and systemic differences may influence how mental health is comprehended and addressed. The lack of contextually relevant measurement tool limits the generalizability of existing findings and raises concerns about the applicability of current measurement tools across diverse ethnicity in Malaysia. Therefore, it is crucial to develop and validate a comprehensive instrument that captures all core components of mental health literacy. There are a few instruments that evaluate all the three main domains of mental health literacy instruments-knowledge, attitudes, and help-seeking such as Mental Health Knowledge Schedule (MAKS) (Evans-Lacko et al., 2010), Mental Health Literacy Scale (MHLS) (O'Connor and Casey, 2015), Mental Health Literacy questionnaire (MHLq) (Campos et al., 2016), a vignettes-based questionnaire of a person with a mental disorder (Reavley and Jorm, 2011a; 2011b; Jorm et al., 1997), and Mental Health Literacy and Stigma questionnaire (Singh et al., 2021).

Mental Health Knowledge Schedule (MAKS) (Evans-Lacko et al., 2010) is developed to evaluate stigma-related mental health knowledge. It is separated into two parts with 6 items in each part. Part A evaluates knowledge of mental health stigma regarding help-seeking, recognition, support, employment, treatment, and recovery. On the other hand, part B evaluates knowledge on mental health diagnoses. The items are rated on a 5-point Likert scale, ranging from 1 (strongly disagree) to 5 (strongly agree). MAKS was translated into the Malay language in order to apply it in Malaysian context (Pheh et al., 2017). The Cronbach's alpha coefficients of the Mental Health Knowledge Schedule, Malay Version (MAKS-M) were poor. In the pre-test, Cronbach's alpha coefficients were .289 for part A, -.449 for part B, and .095 for overall internal consistency. In the post-test, the coefficients improved to .46 in part A, .531 in part B, and .62 for overall internal consistency. On the other hand, the Mental Health Literacy Scale (MHLS) (O'Connor and Casey, 2015) aims to measure all domains of mental health literacy. It consists of 35 items, with 8 items measuring on ability to recognize disorders, 4 items on knowledge and attitudes about where to seek information, 2 items on knowledge of risk factors and causes, 2 items on knowledge of self-treatment, 3 items on knowledge of professional help available and 16 items on attitudes that promote recognition or appropriate help-seeking behaviours. All the knowledge items are rated on a 4-point Likert scale while the help-seeking items are rated on a 5-point Likert scale ranging from none of the time (1) to all of the time (5). The Cronbach's alpha level was .873, indicating good internal consistency.

In addition, the Mental Health Literacy questionnaire (MHLq) (Campos et al., 2016) consists of 33 items, and it aims to assess young people's MHL who are 12 to 14 years old. The items of MHLq are separated into three factors which are 10 items in first aid skills (Factor 1), 18 items in knowledge/stereotypes (Factor 2), and 3 items in self-help strategies (Factor 3). The items are rated on a 5-point Likert scale. The internal consistency for the total score is .84, Factor 1 is .79, Factor 2 is .78, and Factor 3 is .72. MHLq was then adapted for the young adult. The MHLq-young adult is a 29-item scale.

The scale was developed with the intention of measuring mental health literacy from four aspects which are (1) Knowledge of Mental Health Problems, (2) Erroneous Beliefs/Stereotypes, (3) First Aid Skills and Help-Seeking Behaviour, and (4) Self-Help Strategies. The response format is 5-point Likert scale ranging from “strongly disagree” to “strongly agree”. The internal consistency for the total scale was high, that was .84. A vignettes-based questionnaire from an Australian national survey (Reavley and Jorm, 2011a; 2011b; Jorm et al., 1997) is widely used in mental health literacy studies (Wei et al., 2015). The questionnaire is based on a person with a mental disorder, and it employs an open-ended response format. The questionnaire focuses on the recognition of mental disorders, beliefs about appropriate interventions and treatments, personal and perceived stigma, and social distance. Singh et al. (2021) adapted the questionnaire and developed a 75-item Mental Health Literacy and Stigma Questionnaire. The items are evaluated using a 3-point Likert scale, with response options including yes, no, and don't know. The questionnaire was translated into Malay and validated in a study with adolescents in Malaysia. The Cronbach's alpha across all constructs ranged from .52 to .76. Given that the 75-item Mental Health Literacy and Stigma Questionnaire assesses the three components of mental health literacy and demonstrates moderate to acceptable internal consistency in a Malaysian study, the researcher opted to validate it among the undergraduate population. To the researcher's knowledge, there has been no published research on the validation of Mental Health Literacy and Stigma Questionnaire among university students in Malaysia to date. Therefore, this study aims to examine the validity and reliability of Mental Health Literacy and Stigma Questionnaire among university students in Malaysia.

Present study

There is a need to validate MHL instrument among Malaysian undergraduates owing to the stigma towards mental health, hence reduction in help-seeking behaviour. Moreover, existing instruments show poor reliability and not culturally adapted owing to items leaning towards Western culture, which may not capture cultural specific beliefs, stigma and help-seeking patterns in Malaysia, a collectivistic country. Furthermore, undergraduate's students in Malaysia may have thoughts, knowledge due to exposure to social media and attitudes towards mental health which may differ from adolescents and older adults. A valid and reliable MHL instrument may serve more targeted intervention in mental health education, improve screening and prevention programmes at the university level and policy making at the governmental level. This validation study aims to provide the psychometric properties of the construct validity and composite reliability of Mental Health Literacy and Stigma Questionnaire among university students in Kuala Lumpur and Selangor. This study validated vignettes-based questionnaire from an Australian national survey (Reavley and Jorm, 2011a; 2011b; Jorm et al., 1997) which consists of 75-item Mental Health Literacy and Stigma Questionnaire. Extended work by Singh et al. (2021), this study aims to validate this questionnaire among university students.

Materials and Methods

The research design employed a cross-sectional study to validate adapted instrument on mental health literacy. The ideal sample size as suggested by Guilford (1954) is 200. Using Confirmatory Factor Analysis, small samples may result in unstable parameter

estimate. Based on the above recommendations, for a more robust analysis, we proposed a sample size of 200. The sample size collected was 345 initially and upon data screening, the final usable samples are 289, which complied to the two conditions: (1) minimum sample size in confirmatory factor analysis should be at least 200 (Guilford, 1954); (2) Sample size should be in minimum of three for each item ($75 \text{ item} * 3 = 225$). The samples were recruited using purposive sampling method among university students ranging from 18-40 years old. The sample was collected in universities across Kuala Lumpur and Selangor states of Malaysia. This research was approved by IMU Joint-Committee on Research and Ethics (IRB No. 4.15/JCM-266/2023). This study has no physical risks, and minimal psychological or social risks. Participation was strictly on a voluntary basis, and responses were kept anonymous. Among 289 respondents, 79.9% were female ($n = 231$), 17.6% were male ($n = 51$) and 2.4% preferred not to disclose their gender ($n = 7$). The mean age of the participants was 20.82 years old.

The instrument of the study was Mental Health Literacy and Stigma Questionnaire which was the adapted version by Singh et al. (2021) from Reavley and Jorm (2011a; 2011b; 2011c) and Jorm et al. (1997), for their validation study of the instrument to the Malaysian adolescents dated in 2017. The 75 items cover the three main constructs of mental health literacy i.e. knowledge, help-seeking, and stigma. There are 8 sub domains i.e. (1) knowledge on ability of recognition of disorder, (2) knowledge about first aid for mental disorder, (3) knowledge about interventions of mental disorder, (4) knowledge about prevention of mental disorder, (5) help-seeking, (6) personal stigma, (7) perceived stigma, and (8) social distance. The first to fourth domain represent the knowledge component in mental health literacy, while the fifth domain represents the help-seeking component. The sixth to eighth domain collectively represent the attitudes component. Mental Health Literacy and Stigma Questionnaire adopts a 3-point Likert scale with the rating a rating of “Yes”, “No”, “Don’t Know”. Singh et al. (2021) had validated the scale for adolescents in Kuala Lumpur, Malaysia. All constructs' coefficients of Cronbach's alpha varied between .52 to .76 (Singh et al., 2021), indicating questionable to a good level of internal consistency. The Cronbach alpha of each construct was: .64 for knowledge on ability of recognition of disorder, .52 for knowledge about first aid for mental disorder, .76 for knowledge about interventions of mental disorder, .52 for knowledge about prevention of mental disorder, .63 for help-seeking, .62 for personal stigma, .71 for perceived stigma, and 0.66 for social distance. The researchers justify that the slight difference of Cronbach alpha value for the ability to recognise a disorder (.64), first aid (.52), intervention (.76), and prevention knowledge (.52) compared to the Cronbach alpha values of .50, .59, .72, .60 in a Portugal study by Loureiro et al. (2013) could be due to the smaller sample size. Besides, personal stigma (.62) and perceived stigma (.71) were reported lower compared to an Australian study (Griffiths et al., 2008) with the internal consistency value of .77 and .82. Singh et al. (2021) justified that it could be due to the recruitment of younger participants in their study. Permission to modify the questionnaire was obtained from Dr. Sarbhan Singh.

Adopting questionnaire for young adults, the age of the character in the scenario was modified from 15 years old to 21 years old (Reavley and Jorm, 2011). The scenario of the Mental Health Literacy and Stigma Questionnaire presented a person with depression as follows. The major depression symptoms of the character are designed

according to the Diagnostic and Statistical Manual of Mental Disorders, fourth edition (DSM IV):

“Ali is a 21-year-old who has been feeling unusually sad and miserable for the last few weeks. He is tired all the time and has trouble sleeping at night. Ali doesn’t feel like eating and has lost weight. He can’t keep his mind on his studies and his marks have dropped. He puts off making any decisions and even day-to-day tasks seem too much for him. His parents and friends are very concerned about him.”

In addition, to have a better capture of the responses, the ratings for 75 items in the questionnaires were modified to a 5-point Likert scale. Midpoint scales were suggested by Krosnick (1991) as it will be easier to gather more valuable data even though midpoint scales have poorer reliability. In addition, participants are allowed to choose a neutral position in midpoint scales (Colman et al., 1997). It has no impact on the standards for the reliability and validity of psychometric measurements (Taherdoost, 2019), thus, 5-point Likert scale will be used in this study. For example, the knowledge on ability of recognition of disorder was rated from 1 “very unlikely” to 5 “very likely”. Besides, the knowledge about first aid for mental disorder and knowledge about interventions of mental disorder was rated from 1 (very harmful) to 5 (very helpful); the knowledge about prevention of mental disorder, personal stigma, and perceived stigma items will be rated from 1 (strongly disagree) to 5 (strongly agree); help-seeking items will be rated from 1 (extremely unlikely) to 5 (most likely); and social distance items will be rated from 1 (definitely unwilling) to 5 (definitely willing). In contrast to all other items, which were rated on a 5-point Likert scale, only HS1 utilized a 3-point Likert scale with response options of “Yes”, “No”, “Don’t Know”. In addition, reverse scoring was performed on the 30 negative statements such as KoRD6, KaFA3, KaFA4, KaI19, KaI20, KaI2, HS6 to HS16, PSS1 to PSS6, and PCS1 to PCS7.

Data was analysed using Statistical Package for Social Science (SPSS) Version 22 for descriptive analysis. Data screening was performed to identify the missing data, normality of the distribution, and outliers. The data is considered normal distribution with the inspection of skewness (-2 to +2) and z-score (-3 to +3) (Byrne, 2010), and Analysis of Moment Structures (AMOS) version 29 for Confirmatory Factor Analysis. To evaluate the construct validity, convergent validity, discriminant validity, and composite reliability of Mental Health Literacy and Stigma Questionnaire, confirmatory factor analysis (CFA) was performed by using the maximum likelihood method. Factor loading for every item should be more than .5, a positive value, and not more than 1.0 (Byrne, 2010; Hair et al., 2010), items that fall below are deleted. If fit indices are not met and all factor loadings $> .5$, Modification Indices (MI) can be performed to identify potential indicators to be deleted or correlated. Construct validity refers to the degree to which a measure evaluates the theoretical construct it is intended to evaluate (Shaughnessy et al., 2015). To measure the construct validity, the Model Fit Indexes are needed to achieve the required level. To determine the “goodness of fit” of the measurement model, several Fitness Indexes such as relative chi-square (χ^2/df), Comparative Fit Index (CFI), Tucker–Lewis Index (TLI), and Root Mean Square Error of Approximation (RMSEA) were examined (Table 1). The value of chi-square divided by degree of freedom (χ^2/df) falls within the range of 2 to 5 is considered a reasonable fit (Bollen, 1989). CFI and TLI values ranged from .90 to .95 suggest a good fit (Hu and

Bentler, 1999). In addition, RMSEA values less than .05 indicate a good fit while .08 indicates reasonable fit (Browne and Cudeck, 1993).

Table 1. The fit indices for the initial measurement model of 75-item Mental Health Literacy and Stigma Questionnaire.

Construct	Chi-Square (χ^2)	Chisq/df (χ^2 /df)	CFI	TLI	RMSEA	Cronbach Alpha (α)
KoRD	48.24	5.36	.74	.56	.12	.50
KaFA	46.27	9.25	.63	.25	.17	.25
KaI	2455.13	9.74	.32	.25	.17	.83
KaP	108.20	12.02	.87	.78	.20	.83
HS	895.41	8.53	.49	.41	.16	.69
PSS	90.74	10.08	.86	.77	.18	.81
PCS	116.29	8.31	.87	.80	.16	.84
SD	36.92	7.38	.96	.92	.15	.89

This study established the convergent and discriminant validity. Convergent validity refers to a set of indicators that presume to measure a construct. It represents the strength of relationship between items that are predicted to represent a single latent construct. Convergent validity of Mental Health Literacy and Stigma Questionnaire is achieved when the measurement models fit the data, standardised factor loadings are statistically significant with loading $> .4$, and the average variance extracted (AVE) is $> .5$ (Cheung et al., 2024). On the other hand, Hair et al. (2016) state that the construct's convergent validity is still acceptable if the AVE is greater than .4 and the composite reliability (CR) is higher than .6 (Fornell and Larcker, 1981). The discriminant validity refers to the extent in which a construct is truly distinct from other constructs of similar nature (Taherdoost, 2016). The discriminant validity of Mental Health Literacy and Stigma Questionnaire is achieved when the AVE is greater than the shared variance (Cheung et al., 2024). Composite reliability (CR) is a more precise measure of internal consistency in a structural equation model (SEM) as it considers the factor loadings of the indicators, enhancing its accuracy in assessing the reliability of a construct. A satisfactory construct reliability ranges from .70 to .95 (Cheung et al., 2024; Hair et al., 2020).

Results and Discussion

Confirmatory Factor Analysis (CFA)

Confirmatory Factor Analysis (CFA) was conducted for the 8 latent constructs of the Mental Health Literacy and Stigma Questionnaire, namely knowledge on ability of recognition of disorder (KoRD), knowledge about first aid for mental disorder (KaFA), knowledge about interventions of mental disorder (KaI), knowledge about prevention of mental disorder (KaP), help-seeking (HS), personal stigma (PSS), perceived stigma (PCS), and social distance (SD). The CFA was run separately for every measurement model. All 8 initial measurement model for each construct did not fulfil the fit indices and presented a poor model fit (*Table 1*). Besides, the CFA of the 75-item Mental Health Literacy and Stigma Questionnaire showed that the model fit the data inadequately: $\chi^2 (2673) = 7662.00$, $\chi^2/df = 2.87$, $p < .001$, CFI = .51, TLI = .49, RMSEA = .08 (*Figure 1*). Therefore, the items having factor loadings below .5 were identified. Items with negative factor loadings were eliminated, and items exhibiting high Modification Indices (MI) values were correlated. A total of 17 items from 7 constructs were deleted as the factor loading of the item was still below .5 after doing MI (*Table 2*). The deleted items were KoRD6, KaFA4, KaI9, KaI19, KaI20, KaI21, KaP6, HS1,

HS2, HS3, HS4, HS5, HS6, HS7, HS9, PSS6, and PCS1. The revised model of each construct showed an improved model fit (*Table 3*). Upon removing 17 redundant items and conducting MI, *Figure 2* illustrates the final model of the 58-item showed a reasonable fit in relative chi-square and RMSEA whereas a poor fit in CFI and TLI: χ^2 (1555) = 2680, χ^2/df = 1.84, CFI = .83, TLI = .82, RMSEA = .05. Although the CFI and TLI do not match the good fit of the value of .90, they are still close to it.

Table 2. Original, deleted, and total number of items in each construct.

Construct	Original n of Items	Deleted n of Items	Total N of Items
KoRD	6	1	5
KaFA	5	1	4
KaI	24	4	20
KaP	6	1	5
HS	16	8	8
PSS	6	1	5
PCS	7	1	6
SD	5	0	5

Table 3. The fit indices for the 58-item Mental Health Literacy and Stigma Questionnaire.

Construct	Chi-Square (χ^2)	Chisq/df (χ^2/df)	CFI	TLI	RMSEA	Cronbach alpha (α)
KoRD	16.92	3.38	.90	.81	.09	.58
KaFA	4.95	2.47	.96	.88	.07	.43
KaI	447.09	2.74	.89	.88	.08	.85
KaP	9.47	1.89	.99	.98	.06	.79
HS	60.65	3.19	.95	.93	.09	.84
PSS	25.80	3.23	.97	.94	.09	.82
PCS	16.76	2.39	.99	.97	.07	.84
SD	5.46	1.37	1.00	1.00	.04	.89

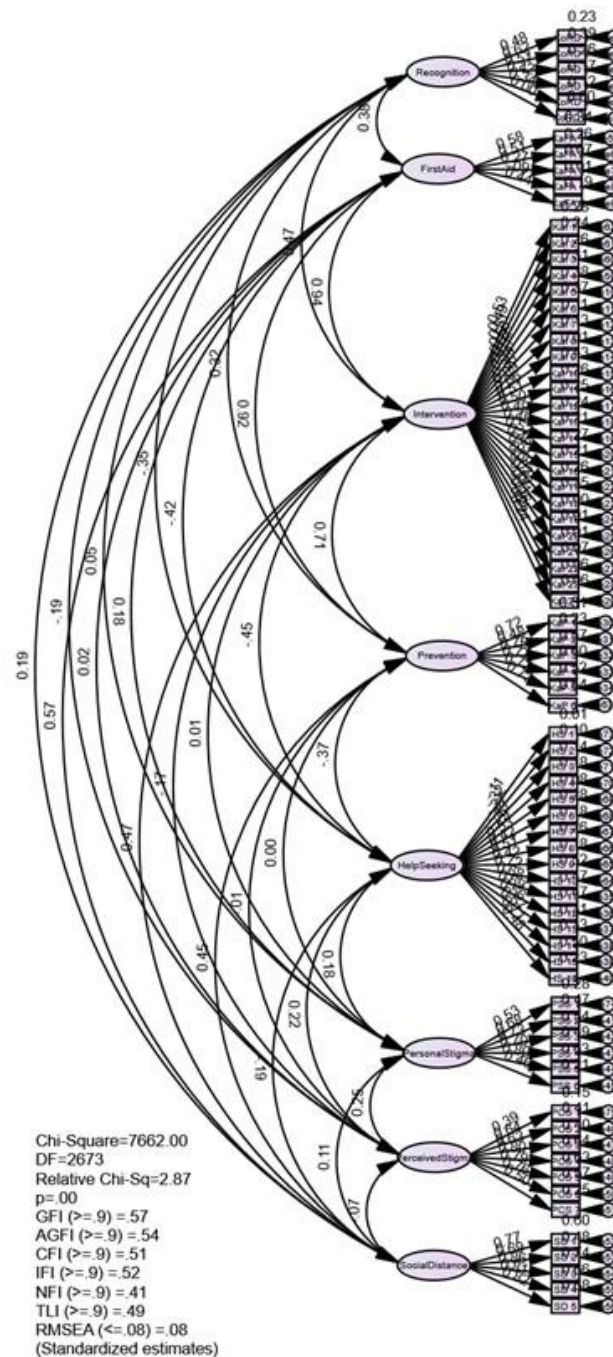


Figure 1. Initial measurement model of the 75-item Mental Health Literacy and Stigma Questionnaire.

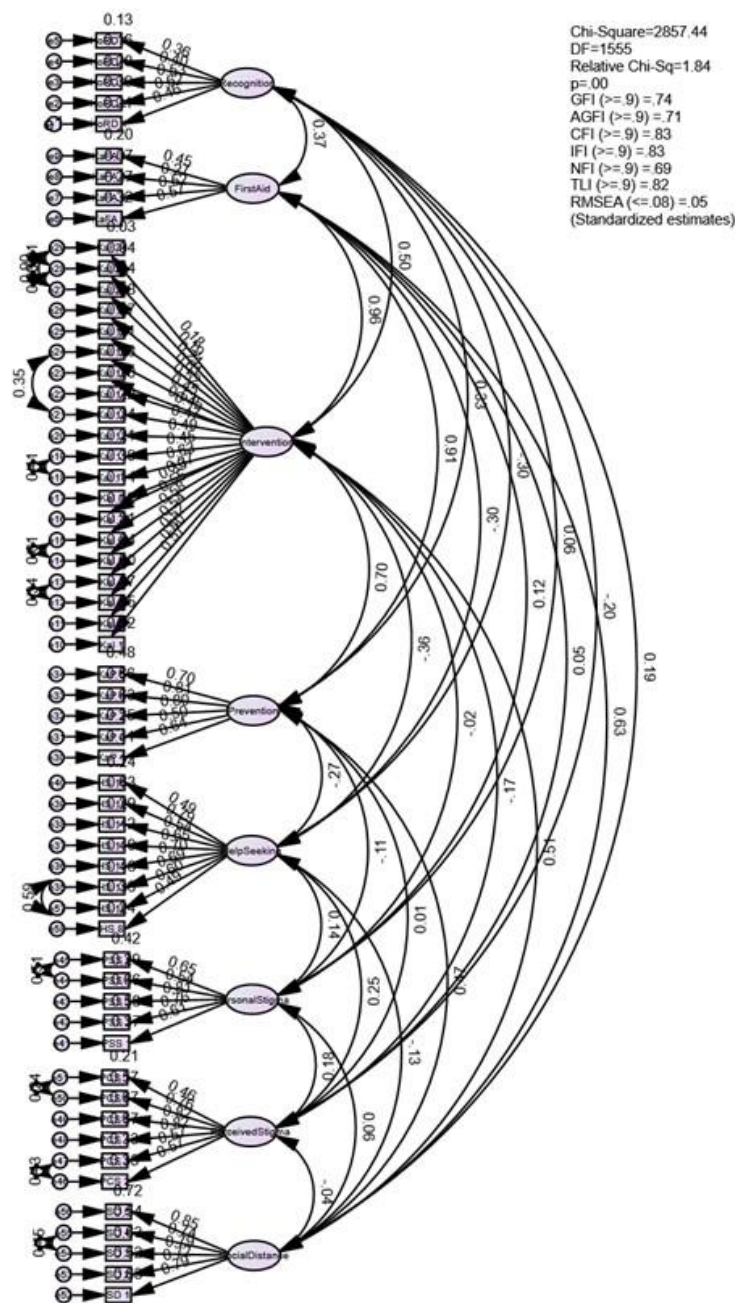


Figure 2. Revised measurement model of the 58-item Mental Health Literacy and Stigma Questionnaire.

Convergent validity

To test the convergent validity of the instrument, Average Variance Extracted (AVE) for each construct was measured. Table 4 shows that the AVE for each construct was: AVE KoRD = .23, AVE KaFA = .24, AVE KaI = .23, AVE KaP = .48, AVE HS = .49, AVE PSS = .42, AVE PCS = .47, and AVE SD = .61. As suggested by Hair et al. (2016), construct that met the requirement of the AVE greater than .4 and composite reliability greater than .6 can be concluded that it has the convergent validity. The

findings of this study indicate that five constructs: KaP, HS, PSS, PCS, and SD; have successfully demonstrated convergent validity.

Table 4. Composite reliability, AVE, and squared correlation coefficients for each construct.

Category	CR	KoRD	KaFA	KaI	KaP	HS	PSS	PCS	SD
KoRD	.59	.23							
KaFA	.52	.14	.24						
KaI	.85	.24	.92	.23					
KaP	.82	.11	.83	.48	.48				
HS	.83	.09	.09	.13	.07	.39			
PSS	.81	.00	.02	.00	.01	.02	.42		
PCS	.83	.04	.00	.03	.00	.06	.03	.47	
SD	.89	.04	.39	.26	.22	.02	.00	.00	.61

Discriminant validity

Discriminant validity is achieved when the Average Variance Extracted (AVE) exceeds the shared variance (Cheung et al., 2024). Table 4 presents the results of discriminant validity for the constructs. While 22 pairs of constructs showed discriminant validity, 6 pairs did not meet this criterion: (1) KoRD-KaI, (2) KaFA-KaI, (3) KaFA-KaP, (4) KaFA-SD, (5) KaI-KaP, and (6) KaI-SD.

Composite Reliability (CR)

The composite reliability (CR) was calculated using factor loading of the measurement model. After deleting the 17 items, the CR results showed that KaI, KaP, HS, PSS, PCS, and SD demonstrated high CR values, ranging between the thresholds of .70 and .95, in line with the recommendations of Cheung et al. (2024) and Hair et al. (2020). However, KORD and KaFA showed a comparatively lower CR. The CR was presented in Table 4 as follows: CR KoRD = .59, CR KaFA = .52, CR KaI = .85, CR KaP = .82, CRHS = .82, CRPSS = .81, CR PCS = .83, and CR SD = .89.

This study is designed to evaluate the construct validity and composite reliability of the Mental Health Literacy and Stigma Questionnaire among undergraduate students based on the four fit measures: χ^2/df , CFI, TLI, and RMSEA. The respective cut-off criteria proposed by Hu and Bentler (1999), Browne and Cudeck (1993), and Bollen (1989) were applied for the AMOS estimators in assessing the model-data fit in Confirmatory Factor Analysis (CFA). A total of 17 items, distributed across 7 constructs, were removed from the analysis. These exclusions were made because the items either exhibited negative loadings or their factor loadings remained below .5 even after modification indices (MI). Specifically, items with negative loadings included KoRD6, HS2, HS3, HS4, and HS5. Items with factor loadings below .5 were KaFA4, KaI9, KaI19, KaI20, KaI21, HS1, HS6, HS7, HS9, PSS6, and PCS1. On the other hand, KaP6 was eliminated due to redundancy, as it was identified to be the same as KaP1. This redundancy may have arisen from a typing error in the original questionnaire. The decision to delete KoRD6 from the knowledge on ability of recognition of disorder (KoRD) construct was based on its negative factor loading. The scenario presented in the questionnaire, involving Ali and certain conditions, makes it less likely for respondents to perceive that there is nothing wrong with Ali. Given that the scenarios describe various mental health symptoms, respondents should reasonably be able to identify potential mental health issues that Ali might be facing. Consequently, retaining KoRD6 would not contribute meaningfully to the construct.

The negative loadings observed in the four items (HS2, HS3, HS4, and HS5) within the help-seeking (HS) construct may be attributed to the nature of these items, as they focus on the person one would seek help from. In contrast, items HS6 to HS16 pertain to barriers to seeking help. While both sets of questions relate to help-seeking behavior, it's plausible that HS2 to HS5 measure a "help-seeking person" construct, while HS6 to HS16 capture a "help-seeking reason" construct. The decision to delete the four items with negative loadings led to an improved model fit for the HS construct. This improvement suggests that the HS construct may indeed be more accurately represented as two distinct constructs: one related to the person seeking help and the other associated with the reasons for seeking help. Furthermore, the RMSEA for the HS construct did not reach a value lower than .08, and the loadings for HS7 and HS9 remained low even after conducting MI. Consequently, these two items were excluded from the analysis. Furthermore, HS6 exhibited a low factor loading of .44. The removal of HS6 led to an improvement in the RMSEA, which decreased from 0.11 to 0.09. The low factor loading indicates a weak association between the item and the underlying construct. With a factor loading of .01, KaFA4 may suggest that most respondents recognize that "keeping him busy to keep his mind off problems" is not perceived as an optimal approach for providing first aid in the context of mental disorders. Eliminating this item not only enhanced the model fit but also reduced redundancy, relieving future respondents from answering unnecessary items.

In the knowledge about interventions for mental disorders (KaI) construct, items KaI9, KaI19, KaI20, and KaI21 were excluded. KaI9 refers to "sleeping pills" in the questionnaire. The use of sleeping pills has been a topic of debate and discussion within both the medical community and the general public. Determining whether sleeping pills could be considered an intervention for mental disorders poses challenges, including the risk of overdose. The scenario in the questionnaire did not clearly specify the dosage of the sleeping pills or whether Ali had a prescription, making it difficult to assess whether it can be considered an intervention for mental health issues. Moreover, the decision to delete KaI19, related to "drinking alcohol to relax", KaI20, referring to "smoking cigarettes", and KaI21, involving "using marijuana", contributed to an improvement in the RMSEA for the construct. These three items exhibit strong loadings within the same construct in the Exploratory Factor Analysis (EFA), indicating the possibility that they may measure a distinct construct, such as avoidant coping behaviours, as proposed by Simkiss et al. (2021). Moreover, the decision to delete PSS6, which pertains to "You would not tell anyone if you had a problem like Ali's," was influenced by its factor loading of .46 and the failure of the RMSEA for the personal stigma (PSS) construct to fall below .8. After excluding this item, the RMSEA improved from .178 to .083. Although it still falls short of the .08 threshold, it is in close proximity, and both the CFI and TLI have attained acceptable levels.

Similarly, PCS1, which states "Most other people believe that Ali could snap out of it if he wanted," exhibited a factor loading of .39. Despite this, the fitness indexes reached satisfactory levels after the removal of the item, and modification indices (MI) were made between PCS2 and PCS3, as well as PCS6 and PCS7. Despite the general guideline of removing items with factor loadings below .5, the decision was made to retain some of these items. This choice was influenced by the fact that the construct had already achieved satisfactory Model Fit Indexes. The researcher opted to keep these items as much as possible, aligning with Awang (2012) recommendation that item deletion should not exceed 20% of the total items in a model. To answer the first

research question, construct validity, convergent validity, and discriminant validity were examined. The fit indices are the primary criterion for accepting or rejecting a proposed model in most of the current practice (Xia and Yang, 2019). Most researchers agree that a higher RMSEA and lower CFI and TLI values imply a poor fit, which leads them to adjust their models and seek a more accurate explanation of the relationships among variables. The adoption of this practice is controversial because the results of fit indices are influenced by numerous extraneous variables. Xia and Yang (2019) cautioned against relying exclusively on cutoff values as the sole basis for model acceptance, as these thresholds are influenced by numerous extraneous variables. In this study, the 58-item Mental Health Literacy and Stigma Questionnaire exhibited an acceptable fit in terms of relative chi-square and RMSEA but revealed a less favourable fit in CFI and TLI. Despite this, the researcher considers the model to be moderately fitting as the CFI and TLI values are close to .9. Thus, the conclusion is that the construct validity of this questionnaire has been achieved.

On the other hand, the positive finding of convergent validity in the five constructs which are KaP, HS, PSS, PCS, and SD imply that the items within each construct are interrelated and align with the mental health literacy conceptual framework. On the contrary, the absence of convergent validity for KoRD, KaFA, and KaI may indicate a need for further refinement in the measurement tools associated with these constructs. This suggests a potential need for adjustments or enhancements to ensure this instrument effectively captures the intended aspects of mental health literacy. In summary, three constructs in this instrument did not demonstrate convergent validity, whereas five constructs did. In addition, the majority of construct pairs (22 pairs) demonstrated discriminant validity while 6 pairs of constructs did not meet the discriminant validity criterion. The high discriminant validity within the 22 pairs of constructs indicates that the constructs are unique and do not measure the same underlying concept. However, the low degree of discriminant validity of the six pairs of constructs: KoRD-KaI, KaFA-KaI, KaFA-KaP, KaFA-SD, KaI-KaP, and KaI-SD; suggests that most items within these constructs overlap, which may indicate that they are measuring the same thing. For the second research question, concerning the composite reliability (CR) in this study, six constructs: KaI, KaP, HS, PSS, PCS, and SD; demonstrated robust CR values, ranging from .81 to .89, indicating a respectable degree of reliability. However, the construct reliability for KaFA was notably lower ($\alpha = .25$, CR = .52), which is consistent with a finding in a study conducted in Malaysia by Singh et al. (2021) ($\alpha = .52$). This implies that a closer look into the components of this construct is necessary. Furthermore, the reliability of KoRD in this study was also poor ($\alpha = .50$, CR = .59), despite Singh et al. (2021) reporting a greater reliability ($\alpha = .64$). The low reliabilities of KoRD and KaFA in this study indicate poor internal consistency and reliability for these two constructs. The poor composite reliability of KoRD and KaFA affected the construct validity of the instrument. Consequently, there is a need for refinement in these constructs to enhance their reliability and the overall construct validity.

Although additional efforts are needed to enhance the quality of the Mental Health Literacy and Stigma Questionnaire, this study can serve as a foundational step in identifying a reliable and valuable instrument for assessing mental health literacy in the Malaysian context. As some mental health literacy instruments focus on specific components (Wei et al, 2015), the Mental Health Literacy and Stigma Questionnaire comprehensively addresses all aspects of mental health literacy. Although it may not be

considered an optimal measurement tool, it still serves the purpose of evaluating and improving understanding of the states of mental health literacy. The 58-item Mental Health Literacy and Stigma Questionnaire might be a useful tool to evaluate the mental health literacy level among university students. The results of the mental health literacy could be useful for the university in promoting mental health literacy such as designing an effective mental health intervention program (Venkataraman et al., 2019). The program will be helpful for the students to cope with mental health challenges effectively, with the hope that it can contribute to reducing stigma associated with mental health disorders.

One of the limitations of the study is the recruitment of research participants. Brown (2015) has emphasized that the statistical power and precision of Confirmatory Factor Analysis (CFA) and Structural Equation Modelling (SEM) model parameter estimates are known to be influenced by the sample size. There is a widely acknowledged understanding that problems may arise due to a small sample size. In the context of this study, the researcher had difficulties in recruiting a large number of participants within a limited timeframe. Consequently, the researcher opted for the minimum required sample size of 300 participants. However, it is acknowledged that a larger sample size would be beneficial for future research, as recommended to enhance the model fit and overall robustness of the study findings. While this instrument has demonstrated its validity and reliability for evaluating mental health literacy among undergraduate students, it is crucial to recognize that its development was based on a sample of Malaysian adolescents. As of the researcher's knowledge, this is the only study to date that has investigated its factor structure and reliability among undergraduate students. Further studies are essential to validate the instrument's reliability and validity in different populations. In addition, although the RMSEA value of the 58-item Mental Health Literacy and Stigma Questionnaire indicates a good fit within the university student population, it is suggested that refining the factor model, possibly by exploring different number of factors, may be necessary. This adjustment has the potential to improve CFI and TLI, resulting in a more optimal fit for the model. Recent studies have acknowledged the limitations associated with current mental health literacy measures (Jung et al., 2016). The difficulty lies in capturing various constructs of mental health literacy as proposed by Jorm et al. (1997) in a questionnaire. It is hard to create an instrument that covers all aspects of mental health literacy while maintaining an appropriate number of questions, ensuring that respondents are not unduly burdened (Jung et al., 2016).

Conclusion

The analysis included 289 respondents with a mean age of 20.82. Cronbach's Alpha for each construct in the Mental Health Literacy and Stigma Questionnaire varied from .25 to .89. The Kaiser-Meyer-Olkin (KMO) statistic was .80, indicating good sampling adequacy, and Bartlett's Test of Sphericity was statistically significant. CFA was conducted for the 8 latent constructs of the Mental Health Literacy and Stigma Questionnaire. A total of 17 items across 7 constructs were excluded from the analysis due to negative loadings or factor loadings below .5, even after modification indices (MI). Following the removal of 17 redundant items and modification indices (MI) for certain items, the final model consists of the 58-item. It reflects construct validity ($\chi^2(1555) = 2680$, $\chi^2/df = 1.84$, CFI = .83, TLI = .82, RMSEA = .05). Among the eight

constructs, five of them, knowledge about interventions (KaP), help-seeking (HS), personal stigma (PSS), perceived stigma (PCS), and social distance (SD), showed convergent validity. Furthermore, out of the 28 pairs of constructs, 22 pairs demonstrated discriminant validity. This demonstrates that the multiple constructs are unique and do not measure the same underlying concept, hence confirming the questionnaire's ability to distinguish between different aspects of mental health literacy and stigma. Additionally, six constructs: KaI, KaP, HS, PSS, PCS, and SD; demonstrated robust composite reliability values, while the remaining two constructs did not. This suggests that these constructs have a high level of internal consistency and reliability. In summary, the refined 58-item questionnaire appears to be a reasonably valid and reliable instrument for assessing mental health literacy and stigma among Malaysian university students, with most constructs showing satisfactory convergent validity, discriminant validity, and composite reliability.

Acknowledgement

Special thanks to IMU University for funding this research (IRB No: 4.15/JCM-266/2023) and all the research participants.

Conflict of interest

The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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