VALIDATION AND ADAPTATION OF THE BAHASA MELAYU VERSION OF THE EXPLANATORY MODEL INTERVIEW CATALOGUE STIGMA SCALE AMONG COVID-19 SURVIVORS IN MALAYSIA

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Abstract

The Coronavirus disease (COVID-19) imparted unprecedented negative impact worldwide since it was declared as a global pandemic in 2020 due to its high infectivity and mortality rate. Consequently, those who have been infected with COVID-19 experienced significant amount of social stigma which resulting in deterioration of mental well-being. Hence, this study aimed to translate the Explanatory Model Interview Catalogue Stigma Scale (EMIC-SS) into Malay and investigate the reliability and validity of the Malay version (EMIC-SS-M) among COVID-19 survivors in Malaysia. Initially, concurrent translation and back translation of the EMIC-SS was conducted followed by the assessment of its face and content validity. Then, the EMIC-SS-M was administered to 219 COVID-19 survivors recruited from three targeted centers for assessment of its reliability (internal consistency [IC]) and validity (convergent and discriminant validity, exploratory factor analysis [EFA] and confirmatory factor analysis [CFA]). The EMIC-SS-M reported an acceptable internal consistency with Cronbach's α of 0.727, while its domains reported acceptable Cronbach's α ranged from 0.708 to 0.795. EFA and CFA confirmed that the EMIC-SS-M consisted of 15 items in 4 domains. The EMIC-SS-M exhibited good psychometric properties and ready for use to assess stigma among COVID-19 survivors in Malaysia. It can be adapted for use to assess stigma in other disease conditions among the Malaysian population in future studies.

Keywords: COVID-19 survivors, social stigma, reliability, validity, Malaysia

Introduction

Coronavirus disease (COVID-19) which is characterized by high infectivity began to spread in Wuhan, China at the end of 2019 and rapidly emerged as a global infection pandemic in less than 6 months. Despite the infection is better controlled since 2021, to date, the number of people being infected with COVID-19 rise to 571 million people worldwide and mortality is at 6.3 million people (1). Consequently, due to its high rate of infectivity and mortality, social stigma towards people who are infected with COVID-19 is not uncommon.

Stigma is a process in which there is negative discrimination against people with certain physical, behavioral or social attributes. Social stigma is related to negative association of a person, a group of people or places sharing certain characteristics or disease state. Social stigma attributed to infectious diseases may lead to rejection by family members, spouse or partner, the surrounding community and dismissal from work which in turn contribute to various negative mental health impact, such as depression and anxiety (2, 3).

Social stigma was as high as 5% among those being diagnosed with COVID-19 reported that they were being stigmatized by the community that they live in. Those who were aged 40 and above, those who live in area in

which COVID-19 is a severe epidemic and had difficulty to find and understand information on COVID-19 were vulnerable to being stigmatized (4). Social stigma is experienced not only by those being diagnosed with COVID-19, but also among healthcare workers who are exposed to COVID-19 patients (5). Stigma related to COVID-19 has been reported to contribute to depression and anxiety among the patient who recovered from COVID-19 (6). COVID-19 related stigma may also contribute to lower quality of life among COVID-19 survivors mediated by depression symptomatology (7). Hence, it is pivotal to assess stigma among COVID-19 survivors and establish psychosocial interventions which could alleviate stigma to reduce the risk of psychological sequelae attributed by COVID-19 related stigma.

Although there are a variety of instruments use to assess stigma, most of these tools measure stigma among people with mental illnesses or cancer patients. Furthermore, instrument in the Malay language is only available to assess stigma among patients with mental illness, such as the Malay version of the Stigma Questionnaire toward Severe Mental Illness. However, there are only a few instruments which measured the degree of stigma towards infectious diseases, such as the Explanatory Model Interview Catalogue Stigma Scale (EMIC-SS) (8), HIV Stigma Scale (9), Perceived TB stigma scale (10) and Hepatitis C stigma scale (11). One instrument which has been extensively studied is the EMIC-SS which was originally used to measure stigma related to leprosy (8). It was constructed based on four themes, such as general illness belief and behavior, help seeking behavior, perceived causes and patterns of distress related to patient's concern regarding to their illness. The EMIC-SS exhibited good reliability in which its internal consistency (IC) registered a Cronbach's α of 0.88. In addition, it also had strong correlations with other scales which measure stigma, such as the Participation Scale (coefficient = 0.68) and the Internalized Stigma of Mental Health (coefficient = 0.70) (12). Cross-cultural adaptation of the EMIC-SS for assessing social stigma among leprosy survivors have been documented in Indonesia (13). The EMIC-SS was adapted to assess stigma in those with physical disability (14), tuberculosis (15), onchocerchal skin disease (16); leishmaniasis (17), HIV/AIDS (18) and COVID-19 (19). However, the translation of the EMIC-SS into Bahasa Melayu and validation of the Bahasa Melayu version of the EMIC-SS among COVID-19 survivor population in Malaysia has not been carried out, despite stigma is highly prevalent among this group of the population. Hence, this study translated the English version of the EMIC-SS into Bahasa Melayu and investigate the reliability and validity of the Bahasa Melayu version of the EMIC (EMIC-SS-M) for use to measure stigma among COVID-19 survivors in Malaysia.

Materials and Methods

Study design

This study was approved by the Medical Ethics of Ministry of Health Malaysia (MOH) (NMRR-20-1288-55105) and the Ethics Committee of Faculty of Medicine, National University of Malaysia (UKM PPI/111/8/JEP-2020-352). This validation study ran between April 2020 to July 2021, in which subjects was recruited from those who discharged from three designated COVID-19 care center in the Klang Valley of Peninsular Malaysia, such as Sungai Buloh Hospital (which was a COVID-19 treatment centre in Malaysia), Canselor Tuanku Muhriz Hospital (HCTM) (another COVID-19 treatment centre in Malaysia) and the Agro Exposition Park in Serdang serving a a quarantine centre for COVID-19 in Malaysia. Klang Valley is an urban conglomeration which housed about 8 million people located in the center of Peninsular Malaysia where it is the heartland of the Malaysian industry and commerce center. The estimated sample size required for the study was calculated as followed:

[1] For calculation of the estimated sample size required for assessment of internal consistency (to achieve objective 1), the StatsToDo program was used, in which the type I error was 0.05, power was 1- type II error = 0.8, and expected Cronbach's α was 0.95. Hence, 4 subjects per item was needed. As the EMIC consists of 15 items, the estimation of sample size needed for objective (1) was 72 (inclusive of 20% drop out rate).

[2] For evaluating the estimated sample size required for assessment of exploratory factor analysis (EFA) (to achieve objective 2), the rule of 5 was used, whereby the sample size needed must be at least 5 folds greater than the sum of the number of observed variables of interest. Since the EMIC-SS has 15 items, 90 subjects are required to achieve objective 2 (inclusive of 20% drop out rate).

[3] As for the sample size needed for assessment of confirmatory factor analysis (CFA) (to achieve objective 3), A-Priori sample size calculator for structural equation model was used and in reference to a validation study of the Arabic version of the EMIC for evaluating stigma among COVID-19 survivors in Saudi Arabia (16), whereby the anticipated effect size= 0.28, power = 0.8, latent variables = 4, observed variables = 15, α error = 0.05. From the calculation, 193 subjects were needed for this study (inclusive of 20% drop out rate).

Hence, since the estimated sample size for objective 3 was the largest among all three objectives, the estimated sample size needed for this validation study was 193 subjects.

The sampling method for this study was convenient sampling, in which the sampling frame was COVID-19 positive patients who were admitted and discharged from the three targeted center. Initially, the patients from the three targeted center were screened for inclusion and exclusion criteria by referring to the hospital registry. The inclusion criteria were: [1] patient diagnosed with COVID-19, whereby COVID-19 polymerase chain reaction test is positive, [2] 18 years

and above, and [3] Bahasa Melayu literate. Patients were excluded if: [1] they had past and current history of medical and/or mental illness, and [2] non-Malaysian citizen. Those who were eligible for the study were contacted through electronic email, phone calls or text messages. All respondents signed written informed consent to participate in this study if they voluntarily agreed after reading through the patient information sheet in the Google Form survey and were assured anonymity and data confidentiality.

Translation and back translation of the EMIC-SS

The EMIC-SS was translated into Bahasa Melayu by a bilingual native Bahasa Melayu speaking language expert from the School of Language, Literacies and Translation, Universiti Sains Malaysia and then followed by back translation of the Malay version into English by a bilingual native English speaking language expert from the School of Language, Literacies and Translation, Universiti Sains Malaysia who have not read the English version of the EMIC-SS and not in contact with the language expert who initially translated the EMIC-SS into Malay. Then, the translated and back translated draft of the EMIC-SS were reviewed by the expert team (consists of two psychologists, one psychiatrist, two community health specialists and a public health specialist).

As for assessment of the content validity, each expert panel member was requested to evaluate the relevance of all the items of the EMIC-SS-M. The response options for each item were "item is not relevant to the measured domain", "item is relevant to the measured domain" and "item is highly relevant to the measured domain". Expert who scored with the latter two responses will be allocated 1 point, while those who scored the item with the latter response (item is not relevant to the measured domain) will be allocated 0 point. The item-level content validity index (I-CVI) was calculated as the expert numbers who judged each item as "relevant" or "highly relevant" in relation to its designated domain over the total number in the team of experts. The acceptable value of the I-CVI was > 0.83 (20). The Scale-level-CVI (S-CVI) is made up of two types, which are the universal agreement (UA) among experts (S-CVI/UA) and the average scale-level CVI (S-CVI/Ave). The S-CVI/UA is assessed by the sum of all the items with I-CVI score of 1 over the total number of items of the EMIC-SS-M. Universal agreement for an item was assigned with a score of 1 if all the experts agreed (100%) that the item is relevant or highly relevant in relation to its designated domain, while any item which was not fully agreed by all the experts was scored 0. Then, the S-CVI/Ave is the sum of I-CVIs over the total number of items of the EMIC-SS-M. if the S-CVI/UA score was ≥ 0.8 and the S-CVI/Ave score was ≥ 0.9, then the content validity index was considered high (21, 22). In this study, the range of scores of the I-CVI of all the items were from 0.83 to 1.0. While the S-CVI/UA was 0.8 and the S-CVI/Ave was 0.97. The CVI findings of the EMIC-SS-M are presented in Table 1.

Table 1: Content validity index (CVI) assessment of the EMIC-M by six experts

Questions	Expert 1	Expert 2	Expert 3	Expert 4	Expert 5	Expert 6	Experts in agreement	I-CVI	UA
Question 1	1	1	1	1	1	1	6	1	1
Question 2	1	1	1	1	0	1	5	0.83	0
Question 3	1	1	1	1	1	1	6	1	1
Question 4	1	1	1	1	1	1	6	1	1
Question 5	1	1	1	1	1	1	6	1	1
Question 6	1	1	1	1	1	0	5	0.83	0
Question 7	0	1	1	1	1	1	5	0.83	0
Question 8	1	1	1	1	1	1	6	1	1
Question 9	1	1	1	1	1	1	6	1	1
Question 10	1	1	1	1	1	1	6	1	1
Question 11	1	1	1	1	1	1	5	1	1
Question 12	1	1	1	1	1	1	5	1	1
Question 13	1	1	1	1	1	1	5	1	1
Question 14	1	1	1	1	1	1	6	1	1
Question 15	1	1	1	1	1	1	6	1	1
Proportion relevance	0.93	1.0	1.0	1.0	0.93	0.93			
Average proportion of questions judged as relevant across the six experts						0.97	S-CVI/Ave: S-CVI/UA	0.97	0.80

I-CVI = item-level content validity index, UA = universal agreement, S-CVI/Ave = average of the scale-level content validity index, S-CVI/UA = average of the scale-level content validity index across universal agreement among experts

The drafted Bahasa Melayu version of the EMIC (EMIC-SS-M) was answered by 20 COVID-19 positive patients randomly selected from the three targeted center who were native Malay speakers in a pilot study to evaluate the face validity of the EMIC-SS-M. They were asked to rate the EMIC-SS-M in a face-to-face interview to assess the semantic aspect of the wordings, sentences and instructions in the questionnaire, the comprehensibility of the content, any redundancy in the wordings, sentences and instructions used, and the time used for answering the questionnaire; whether these variables were "insufficient", "sufficient", or "very sufficient". The findings of the interview indicated that 75% of the respondents agreed that the semantic aspect of the wordings, sentences and instructions used, the comprehensibility of the content, and the duration of administration of the questionnaire were "sufficient" and there was no redundancy in the words and sentences used. While another 25% of the respondents agreed that these variables of assessment were "very sufficient" and there was no redundancy in the words and sentences used. Hence, the EMIC-SS-M draft did not warrant any amendments from the team of experts.

Measures

A total of 219 participants were recruited for the study and they were administered the demographic and clinical items questionnaire and the EMIC-SS-M through the online Google Form survey. The demographic and clinical items questionnaire collected data on age, sex, race, occupation status, monthly income, education, marital status, history of medical and psychiatric illness via self-reporting by the participants.

While the EMIC-SS is a self-administered instrument for assessing stigma on being infected with leprosy, but it has been adapted to assess stigma in various diseases. Stigma is assessed based on four key themes i.e. perceived cause, patterns of distress related to patient's concern regarding their illness, general illness beliefs and behaviors, and help-seeking patterns. It consists of 15 items in two domains, whereby the perceived stigma domain comprised of items 1, 2, 3, 4, 5 and 14; while the experienced stigma domain consists of items, 6, 7, 8, 9, 10, 11, 12, 13, and 15. Each item is measured in a Likert scale, ranging from 3 = Yes, 2 = possibly, 1 = not sure, and 0 = No; whereby people who response to "Yes" would have a great degree of and most probable indication of stigma and hence given the highest point, while vice versa for those who answer "No". However, item 2 has reverse score. Hence, the higher the total score, the greater is the degree of stigma. However, there is no cut-off score to indicate whether a person is experiencing stigma and there is no classification of scoring into different categories of degree of stigma experienced by a person (8, 19).

Statistical analysis

All data analysis was performed using the Statistical Package for Social Sciences (SPSS) version 26 (SPSS 26; SPSS Inc., Chicago, Illinois). Demographic and clinical items and the total EMIC-SS-M score were presented, in which nominal variables were recorded in frequency and percentage, while continuous variables were reported in mean and standard deviation.

Reliability was assessed by the IC of the EMIC-SS-M, in which Cronbach's alpha of ≥ 0.7 was considered acceptable. The construct validity was examined using EFA and CFA. Initially, for factor extraction, parallel analysis was applied, whereby the Eigenvalues of the principal component analysis were compared with the mean Eigenvalues computed by using parallel analysis. The factor extraction was evaluated as the number of factors with mean Eigenvalue in parallel analysis smaller than that of the Eigenvalue generated by principal component analysis. The EFA was considered valid if the Kaiser-Meyer-Olkin (KMO) measure of sample adequacy was > 0.6 and the Barlett's test of sphericity had a p-value of < 0.05. Then, Promax oblique rotation of all the items was performed and factor loading of item of > 0.4 was retained. CFA was performed using IBM Analysis of Moment Structure (AMOS) version 25 to determine the best fitting factorial model of the EMIC-M. The following variables were assessed in CFA whereby the measured variables was considered acceptable if: [1] standardized chi-square (χ^2/df) was < 3.0, [2] comparative fit index (CFI) was ≥ 0.95, [3] Tucker-Lewis index (TLI) was ≥ 0.95, [4] goodness of fit index (GFI) was ≥ 0.90, and [5] root mean square error of approximation (RMSEA) was < 0.06.

Results

Respondents

The demographic and clinical characteristics of all the respondents are summarized in Table 2. The respondents were within the adult age group (mean = 36.45, standard deviation [SD] = 14.90) and more than half of them were males (n = 139, 63.5%). Malays made up of three quarters of all participants (n = 168, 76.7%). The mean total EMIC-SS-M score of the participants was 11.92 (SD = 6.56).

Table 2: Demographic and clinical items of the respondents

Variables	Number of respondents (n)	Percentage (%)
Age	36.45[a]	14.90[b]
Gender:		
Male	139	63.5
Female	80	36.5
Ethnicity:		

Malay	168	76.7
Non-Malay	51	23.3
Monthly household income:		
RM 5000 to RM 10000	184	84.0
> RM 10000	35	16.0
Marital status:		
Married	98	44.7
Single/divorce/widow or widower	121	55.3
Education status:		
No formal education or up to primary education		
Up to secondary education	9	4.1
Tertiary education	60	27.4
Occupation status:	150	68.5
Retired		
Unemployed/housewife/student	14	6.4
Employed	87	39.7
History of medical illness:	118	53.9
Yes		
No	50	22.8
History of psychiatric illness:	169	77.2
Yes		
No	8	3.7
Total EMIC-M score	211	96.3
	11.92[a]	6.56[b]

[a] Mean, [b] standard deviation

Reliability of the EMIC-M

The IC of the total EMIC-SS-M score displayed a Cronbach's alpha of 0.727. In term of the internal consistency of the domains of the EMIC-SS-M, the Cronbach's α of perceived stigma was 0.795, experienced stigma was 0.784, marriage-related stigma was 0.719 and unmarried stigma was 0.708.

Validity of the EMIC-SS-M

Factor extraction in EFA with parallel analysis for the EMIC-SS-M are summarized in Table 3. Factor extraction revealed that 4 factors were extracted (four mean Eigenvalue in parallel analysis smaller than that of the Eigenvalue generated by principal component analysis). The scree plot for the factor extraction is illustrated in Figure 1.

Table 3: Factor extraction in EFA of the EMIC-SS-M using parallel analysis.

Factor	Eigenvalue from principal factor analysis	Eigenvalue from parallel analysis
1	3.288	1.468
2	2.676	1.360
3	2.103	1.283
4	1.290	1.210
5	0.912	1.032

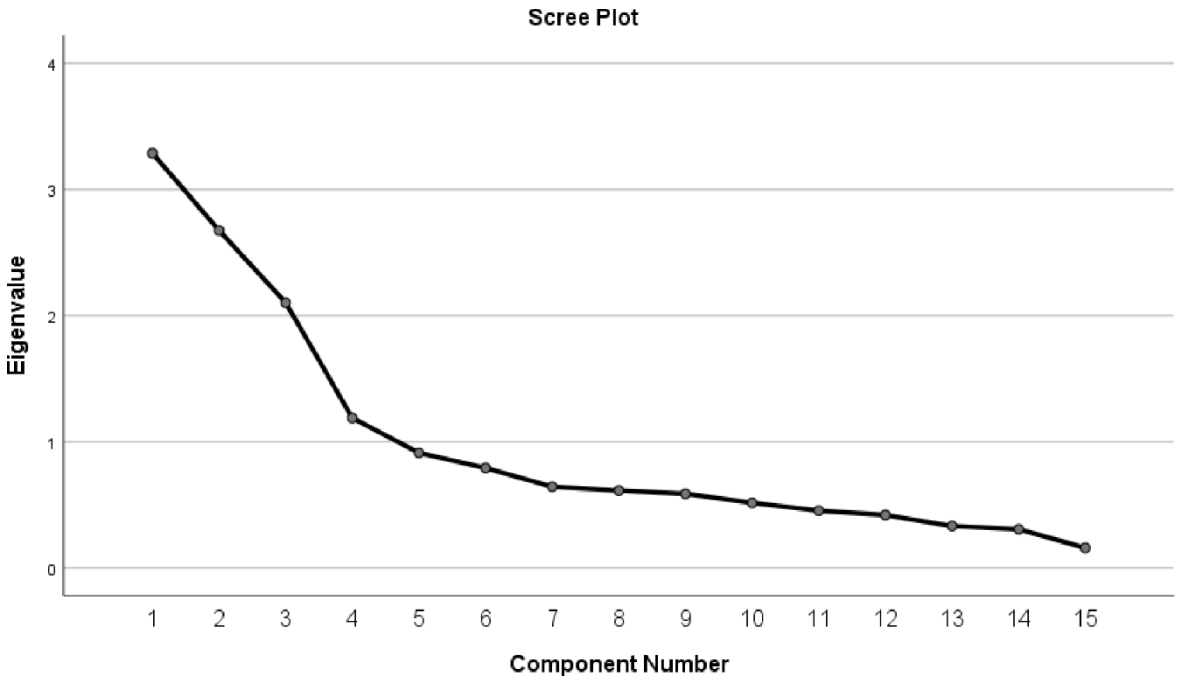

Figure 1: Scree plot illustrating factor extraction of the EMIC-SS-M

EFA with Kaiser normalization and Promax oblique rotation of the EMIC-SS-M registered a KMO Measure of Sampling Adequacy of 0.717 and the Bartlett's Test of Sphericity was significant ($p < 0.05$). After Promax oblique rotation, our findings indicated that factor 1 was made up of items 1, 3, 4, 5, and 6 (factor loading ranged from 0.655 to 0.864). Factor 2 comprised of items 7, 8 and 9 **(**factor loading ranged from 0.812 to 0.835). Factor 3 was made up of items 2, 13, 14 and 15 (factor loading ranged from 0.408 to 0.881). Finally, factor 4 consists of items 10, 11, and 12 (factor loading ranged from 0.737 to 0.784). The EFA with Kaiser normalization and Promax oblique rotation of the EMIC-SS-M are presented in Table 4.

Table 4: Exploratory factor analysis with Promax oblique rotation and Kaiser normalization for the EMIC-M

Items	Perceived stigma	Experienced stigma	Marriage-related stigma	Unmarried stigma
Item 1	**0.735**			
Item 3	**0.864**			
Item 4	**0.678**			
Item 5	**0.727**			
Item 6	**0.655**			
Item 7		**0.835**		
Item 8		**0.812**		
Item 9		**0.813**		
Item 2R	0.407		**0.408**	
Item 13		0.402	**0.707**	
Item 14			**0.823**	
Item 15			**0.881**	
Item 10		0.402		**0.737**
Item 11				**0.784**
Item 12				**0.756**
Eigenvalue	3.288	2.676	2.103	1.190
Variance (%)	21.919	17.840	14.023	7.931
Total variance (%)				61.713

CFA with four different models of the EMIC-SS-M is summarized in Table 5. A 4-factor model whereby the items were allocated according to other translated versions of the EMIC-SS was not fitting (chi-square = 2.115, $p < 0.05$; CFI= 0.908, GFI = 0.903, TLI = 0.884, RMSEA = 0.072). A 3-factor model of the EMIC-SS-M also did not fit the data well (chi-square = 2.433, $p < 0.05$; CFI= 0.882, GFI = 0.889, TLI = 0.851, RMSEA = 0.081). Then, a 2-factor model of the EMIC-SS-M also did not fit the data well (chi-square = 2.306, $p < 0.05$; CFI= 0.882,

GFI = 0.889, TLI = 0.851, RMSEA = 0.081). Finally, a 4-factor model in which items were allocated according to what was suggested by EFA was found to be the best-fitting model (chi-square = 1.995, $p < 0.05$; CFI= 0.958, GFI = 0.911, TLI = 0.950, RMSEA = 0.058).

Table 5: CFA of three different models of the Bahasa Melayu version of the EMIC-SS-M

Variables	4-factor model of the EMIC-M	4-factor model of the EMIC-M (according to EFA)	3-factor model of the EMIC-M	2-factor model of the EMIC-M
Chi-square	2.115	1.995	2.433	2.306
CFI	0.908	0.958	0.882	0.898
GFI	0.903	0.911	0.889	0.906
TLI	0.884	0.950	0.851	0.864
RMSEA	0.072	0.058	0.081	0.077

Discussion

Our study successfully translated the English version of the EMIC-SS into Bahasa Melayu, and validated and adapted the EMIC-SS-M for use to assess stigma in COVID-19 survivors in Malaysia by investigated the reliability and validity of the EMIC-SS-M. The IC of the EMIC-SS-M was acceptable (Cronbach's alpha = 0.727) and almost similar to that of the Arabic version of the EMIC-SS (Cronbach's alpha of 0.79); which was the only translated version of the EMIC-SS adapted to assess stigma among COVID-19 survivors prior to this study (22). The internal consistency of the EMIC-M is also consistent with that of the Brazilian version of EMIC-SS (Cronbach's alpha of 0.78) (23) but less reliable compared with the Chinese version of the EMIC-SS (Cronbach's alpha of 0.897) (14). The difference in internal consistency between the EMIC-SS-M and the Chinese version of the EMIC-SS may be contributed by the different adaptation of the two translated versions of EMIC-SS for measuring different construct, in which the EMIC-SS-M in our study measured stigma in COVID-19 survivors, while the Chinese version of EMIC-SS adapted for assessing patients with physical disabilities (14).

The translation and back translation of questionnaire procedure in this study abide by the standard procedure for translating questionnaire recommended by the International Test Commission (24). While in the pilot study, as all the respondents agreed that the words and sentences in the questionnaire had "sufficient" and "very sufficient" semantic quality, comprehensibility, duration of administration and without redundancy and no further amendments of the EMIC-SS-M was needed by the team of experts, indicated that the face validity of the EMIC-SS-M was achieved. In addition, I-CVI score of between 0.83 to 1.0, S-CVI/UA of 0.8 and S-CVI/Ave of 0.97 for the EMIC-SS-M denoted that the translated questionnaire had good content validity.

The EFA with Kaiser normalization and of the EMIC-SS-M reported KMO Measure of Sampling Adequacy of > 0.6 and the Bartlett's Test of Sphericity was significant ($p < 0.05$), indicating that the EFA of the EMIC-SS-M was valid. The EFA of EMIC-SS-M extracted 4 factors which was similar to what was reported in the Arabic version of the EMIC-SS (which is also adapted to assess stigma in COVID-19 survivors) (19). CFA of the EMIC-SS-M confirmed the findings of the EFA, in which the best fitting model consisted of 4 factors whereby items 1, 3,4,5 and 6 were assigned to the perceived stigma domain; items 7, 8, and 9 were assigned to the experienced stigma domain; items 10, 11 and 12 designated to the unmarried stigma domain, and items 2R, 13, 14, and 15 designated to the marriage-related stigma. However, the factor extraction and items allocation in the Brazilian (23) and the Chinese version of the EMIC-SS (14) are different (only 2 factors were extracted in both versions). This discrepancy between the EMIC-SS-M and the Brazilian and Chinese versions of the EMIC-SS could be due their adaptation to measure different constructs or disease states.

There were a few limitations of this study to be considered when interpreting our data. First, the socio-demographic characteristics of our study sample, such as gender, age, and education status may not be representative of the Malaysian COVID-19 survivor population. Hence, the generalizability of study results may be questionable. Finally, criterion validity was not evaluated in our study as there was lack of a gold standard instrument for assessing stigma among COVID-19 survivors.

Despite the limitations of the study, this study had successfully translated the EMIC-SS-M and demonstrated that the EMIC-SS-M was reliable and valid for use to assess the degree of stigma among the COVID-19 survivors in Malaysia. Data on stigma and its

correlated factors are vital for clinicians to plan for psychosocial interventions to alleviate the psychosocial impact of COVID-19 on the Malaysian population.

Conclusion

This study successfully translated and validated the EMIC-SS-M for assessing stigma in COVID-19 survivors in Malaysia. Our findings revealed that the EMIC-SS-M exhibited acceptable internal consistency, good face and content validity. Construct validity confirmed that the EMIC-SS-M consists of 4 domains and 15 items. The EMIC-SS-M can now be adapted and validated for use in other groups of population in Malaysia.

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Competing interests

The authors declare that they have no competing interests.

Ethical Clearance

We obtained approval from the Medical Research Committee, Faculty of Medicine, National University of Malaysia (UKM PPI/111/8/JEP-2020-352), and the MREC of the MOH Malaysia (NMRR-20-1288-55105).

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