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Original Article

Cross-cultural adaptation of the General Functioning Scale of the family into the Malay language

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Introduction: The McMaster Family Assessment Device (FAD) has been used to measure family functioning in several cultures. The FAD's 12-item General Functioning Subscale (GF12) provides a general assessment of family functioning. This study aims to assess the cross-cultural adaptation of the FAD-GF12 scale in the Malaysian population.

Methods: The translation and adaptation procedure of the Malay GF12 was based on the dual-panel methodology. This involved a bilingual panel (providing the initial translation into the Malay language) followed by a lay panel (where items are assessed for comprehension and acceptability). A mixed-methods approach with exploratory sequential study design was employed. This study used a mixed-methods approach, combining a quantitative survey of the Malay version of GF12 and a qualitative focus group analysis of dual-panel members.

Results: Two hundred and fifty-one parents who have children attending *Tadikas* (pre-school) responded to the Malay GF12. In the reliability analysis, the internal consistency value was good; in the test-retest analysis, the intra-class correlation values were more than 0.7. In the exploratory factor analysis, two factors were extracted. In the confirmatory factor analysis, a single factor 12-item model did not fit well. Alternatively, a 2-factor-6-item model showed sufficient fit. The two constructs are comprised of Positive and Negative Items.

Conclusion: The Malay version of GF12 has adequate psychometric properties to measure family functioning in the Malay speaking population.

Keywords: *family functioning, Family Assessment Device, confirmatory factor analysis, reliability, construct validity, Malay*

Introduction

The vital role of the family in child growth and well-being is widely recognised[1]. Family and family life have long been recognised as complex historical, social, and cultural phenomena[2]. It is crucial to look at how the family uses their resources and how this forms part of their cultural pathway to health. A child's health status is also determined by the child and family history of health and illness and the parents' genetic dispositions[2]. Families play a significant role in the expression of various ailments, including psychiatric and oral disorders[3,4]. Parents' socioeconomic status and poor oral health habits have been linked directly to dental caries among children[4–6].

Nevertheless, the role of family functioning and its relationships in determining a child's oral health has not received much attention in the literature[7]. Family is the primary socialisation unit during childhood and is central in shaping engagement in health behaviour, including physical activity. Thus, it has been propounded that a child's health status could be directly linked to parents' health behaviour, including disease and genetic composition[2].

Family functioning may be described as a balance between family cohesion and adaptability to challenges within the family and the environment[7]. Health literacy of a family may influence health information's

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communication to the family, individual health beliefs and health-related behaviour[8]. A child is part of a more extensive family system and the family, in turn, is part of a broader neighbourhood or community system. Consequently, any changes in the family may affect the child and changes in child development[9].

Perceived family functioning can be studied extensively using a self-reported assessment tool, Family Assessment Device (FAD)[10]. The FAD is a 60-item measure built on the McMaster Model of Family Functioning[11,12]. A brief FAD version, the General Functioning subscale [GF12], has shown excellent psychometric properties in measuring general family functioning[13]. General Functioning subscale (GF12) is a shortened version of FAD with all the domains but reduced items for rating. The GF12 has been adapted into several languages for ease of application and usage within different ethnic communities worldwide[14–20].

Various methods have been employed to translate the instrument for cross-cultural adaptation and implementation concerning self-reported health outcome questionnaires[21–24]. The Dual Panel (DP) method utilised a consensus translation methodology with two panels[25]. The DP methodology appears to produce item wording that is perceived to be more acceptable[25].

An investigation of family functioning in the context of Malaysia's diverse family structures, from urban to the rural, single parent to extended families, within a multi-racial society can provide an understanding of the multi-factorial causes of chronic non-communicable oral diseases, including dental caries. There is a need to measure the impact of family functioning on the health of the Malaysian population. It is important to study how families function in these challenging times in the era of fast changing economic, social, and political landscapes. The GF12 instrument has been widely used in this pursuit, but translation and validation in the local language are requisites. Thus, the objective of this study was to conduct a cross-cultural adaptation and validation of the GF12 instrument of the McMaster Family Assessment Device (FAD) into the Malay language.

Methods

This study intended to adapt cross-cultural attributes to the GF12 instrument of the FAD and subsequent psychometric validation in the Malay language. The GF-12 instrument is self-administered with a 4-point Likert scale, ranging from 1 (strongly agree) to 4 (strongly disagree). The methodology adopted mechanism elaborated from guidelines and strategies by Guillemin and colleagues[26]. The Malay version was transcribed from the English version based on the semantic, operational and measurement equivalences. After translation to the Malay language, the questionnaire was pre-tested for its cognitive attribute, followed by pilot testing.

Translation of the English GF12 into the Malay Language

A dual-panel approach was utilised. This method was suggested by Hunt et al.[22] and supported by Swaine-Verdier et al.[23] for a concept based translation. Linguistic equivalence was not considered in this approach. The contemplation is based on the premise that obtaining a "natural" translation for an item in a new language is a difficult proposition. Hence, a word that is equivalent to the conceptual meaning is usually sought. Further, the translation is attempted to harness words that are in common usage.

The dual-panel translation procedure comprised the following main steps:

Panel 1: A panel of five bilingual healthcare professionals consisting of a nurse, a public health specialist, a community nutritionist, a dentist and a dental support assistant deliberated on the first draft of the Malay GF12 for conceptual equivalent with the English version.

Panel 2: This panel consisted of a monolingual nurse, a dental surgery assistant, and three persons from the targeted community (lay people) with Malay as their first language. This group focused on reviewing the first draft of the Malay GF12 to ensure the translations were expressed in a natural, everyday Malay language. Two members of the research team facilitated the thorough scrutiny of the translation process. At the end of the session, the panel agreed on the draft Malay GF12 with minor changes.

Validation of the draft Malay GF12

A mixed-methods approach with an exploratory sequential study design was employed. Face validity and content validity of the draft Malay GF12 was tested using a pre-test qualitative mechanism. At each stage, signed informed consent was obtained from the participating parent of the child. The consent form and study information sheet were sent to the parents through the school. Confidentiality and safe record-keeping were ensured to the participants at both data collection stages.

Pre-test: The pre-test of the draft Malay GF12 involved an expert panel of eight members (two general dentists, two dental public health specialists, two nurses, and two dental academicians) and a group of pre-school children's parents. The pre-test's purpose was to assess the presence of ambiguities in the translation process, identify items with inappropriate conceptual levels, and identify wordings that were confusing to understand[24]. The questionnaire was emailed to the eight-member expert panel who were bilingual. They were instructed to comment on the conceptual equivalence and wordings of the draft Malay GF12. The parents attended a focus group discussion (FGD) to assess whether the purpose, instructions and items were relevant and easily understood and whether the items measured were culturally relevant. The FGD was audio-recorded, and field notes were taken; interpretation biases and discrepancies in the observations were assessed using the 'member check' approach. The research team reviewed the two pre-test outcomes (expert panel and parents), and the Malay version of GF12 was finalised.

Pilot test: A total of 510 parents of 5-6-year-old children from 11 *Tadikas* (pre-school) randomly selected in the Petaling district were invited to participate in the pilot test. The parents answered the draft Malay GF12 and questions on pre-school children and parent's socio-demographic profiles (name, age, gender, marital status, religion, employment status, occupation, education, and ethnicity) in the presence of a member of the research team. The questionnaire was filled by either the mother or father. Studies have demonstrated similar parenting characteristics between mothers and fathers[27]. Participants were required to rate how well an item described their families. Subsequently, 15 parents were asked to answer the Malay GF12 questionnaire two weeks later.

Data analysis

Data from pre-test were analysed using NVivo-11 software. Textual data were obtained from the recorded data and field notes from the FGD using the verbatim transcription method. A detailed thematic

analysis followed the above procedure. IBM Statistical Package for the Social Science (Chicago, IL, USA) version 25 software was used for data analysis. The GF-12 instrument was self-administered among the respondents. The scores for negative items were reversed and the total score was calculated by summing up the scores of the 12 items. Descriptive statistics (frequency, mean and standard deviation) were used to describe parents' socio-demographic details. The psychometric properties of the Malay GF12 were assessed in terms of internal consistency, test-retest reliability, and construct validity. Cronbach's alpha coefficient measured the internal consistency of the Malay GF12. The homogeneity between the items was explored in this assessment. The statistical computations, including intra-class correlation (ICC) coefficient, exploratory factor analysis, confirmatory factor analysis (CFA) was employed to analyse test-retest reliability, construct validity, assessment of the measurement equivalence of Malay GF12, respectively. The analysis examined the instrument factors and factor loadings, including expressiveness of factor loadings with respect to the structure of GF12 through convergent and discriminant validity. IBM® SPSS® Amos™ software was utilised to perform the above computations. Amos™ uses the maximum likelihood estimation (MLE) method, which requires the assumption of multivariate normality (MVN). The expressiveness of factor loadings, residual variances and modification indexes were analysed. The best model fit with a value < 0.08 is represented as the Root Mean Square Error of Approximation (RMSEA). Good results for the Comparative Fit Index (CFI) and the Tucker-Lewis Index (TLI) are within the range of > 0.90. The Goodness-of-Fit statistic (GFI) calculates the proportion of variance accounted for by the estimated population covariance. The GFI cut-off point of ≥ 0.90 shows how closely the model comes to replicating the observed covariance matrix. The AGFI adjusts the GFI based upon degrees of freedom, and generally, the values of ≥ 0.90 indicate well-fitting models. Furthermore, Composite Reliability (CR) values > average variance extracted for the items (AVE) values indicate a good fit of the model. The AVE value is the average of squared factor loadings. For example, if all the factor loading are > 0.7, then the AVE will be > 50%. The higher the AVE, the better the model fit. To test for discriminant validity, the magnitude of the shared variance between the final two constructs (R^2) is checked to be less than the within construct variances (AVEs). A non-significant value for χ^2, values as close as possible to 1.00 for adjusted goodness-of-fit index (AGFI), values higher than 0.95 for normed fit index (NFI) and comparative fit index (CFI), a value as close as possible to zero for standardised root mean square residual (SRMR). A value lower than 0.05 for root mean square error of approximation (RMSEA) is indicative of a good fit between the estimated model and input data[28]. Hu et al. noted a value of RMSEA as high as 0.08 and values for CFI ranging from 0.90 to 0.95 for an acceptable fit of a confirmatory factor model[29]. In confirmatory factor analysis (CFA), the following cut-points were used to test for model fit: Chi-square/df < 3, CFI, TLI, GFI AGFI > 0.9 and RMSEA < 0.08[30].

The study was approved by the International Medical University (IMU) Joint Research and Ethics Committee (IMUR 157-2014). Consent was obtained from parents willing to participate in the study.

Results

In the pre-test of the draft Malay GF12, all the eight expert panel members and the eight parents who were approached responded. They found the translated

version of GF12 in the Malay language easy to adapt and simple. In item 1, the final Malay word for the word "*sukar*" (difficult) was changed to "*susah*" (a synonym of "*sukar*"), in item 2 the word "*krisis*" (crisis) was changed to "*masalah*" (a synonym of "*krisis*"), and in item 5 the word "*gusar*" (concern) was changed to "*risau*" (a synonym of "*gusar*"). Item 12 of the Malay version was rephrased from "*Kami bersikap terbuka di antara satu sama lain*" (We confide in each other) to "*Kami selesa berkongsi masalah antara satu sama lain*", which was conceptually equivalent. Table I shows the final Malay translation against the original version of the GF12 subscale after final amendments were made based on the review committee's decisions.

Table I: The Malay translation items and the corresponding GF12 items

No	English version	Malay version
1	Planning family activities is difficult because we misunderstand each other	*Merancang aktiviti keluarga menjadi susah kerana kami tidak sefahaman*
2	In times of crisis we can turn to each other for support	*Kami menyokong satu sama lain semasa ada kesukaran/ masalah*
3	We cannot talk to each other about the sadness we feel	*Kami tidak selesa berterus terang tentang kesedihan yang kami alami*
4	Individuals are accepted for what they are	*Setiap ahli keluarga diterima seadanya*
5	We avoid discussing our fears and concerns	*Kami mengelak dari membincangkan perasaan takut dan risau*
6	We can express feelings to each other	*Kami selesa meluahkan perasaan antara satu sama lain*
7	There are lots of bad feelings in our family	*Terdapat banyak perasaan kurang senang di dalam keluarga*
8	We feel accepted for what we are	*Kami rasa diterima seadanya*
9	Making decisions is a problem for our family	*Membuat keputusan adalah suatu kesukaran dalam keluarga kami*
10	We are able to make decisions about how to solve problems	*Kami boleh membuat keputusan bagaimana untuk menyelesaikan masalah*
11	We don't get along well together	*Kami tidak sehaluan antara satu sama lain*
12	We confide in each other	*Kami selesa berkongsi masalah antara satu sama lain*

For the pre-test, of the 510 parents who were approached, 251 parents agreed to participate (49.5% response rate). The parents' children were almost equally distributed in terms of gender (male = 50.2%, female = 49.8%) and age (5-year-olds = 46.2%, 6-year-olds = 53.8%). The majority of the parents were working full-time (46.6%) or were housewives (45.4%) and belonged to a low-income group (67.3%). Table II shows the participants' socio-demographic information. The parents were residing in urban and rural neighbourhoods. All the respondents were Malays (n=251), with the majority having education up to secondary school level (90%), and nearly half were working full-time (46.6%).

Table II: Socio-demographic characteristics of the children and their parents (n=251)

VARIABLE	n	%
Age of child/year		
5	116	46.2
6	135	53.8
Gender		
Male	126	50.2
Female	125	49.8
Ethnicity		
Malay	250	99.6
Indian	1	0.4
Parent's education level		
Primary school	7	2.8
Secondary school	202	80.5
Tertiary education *	24	9.5
No Education	18	7.2
Parent's employment status		
Full-time working	117	46.6
Self-employed	19	7.6
Housewife	114	45.4
Part-time	1	0.4

* Vocational training, college, and university.

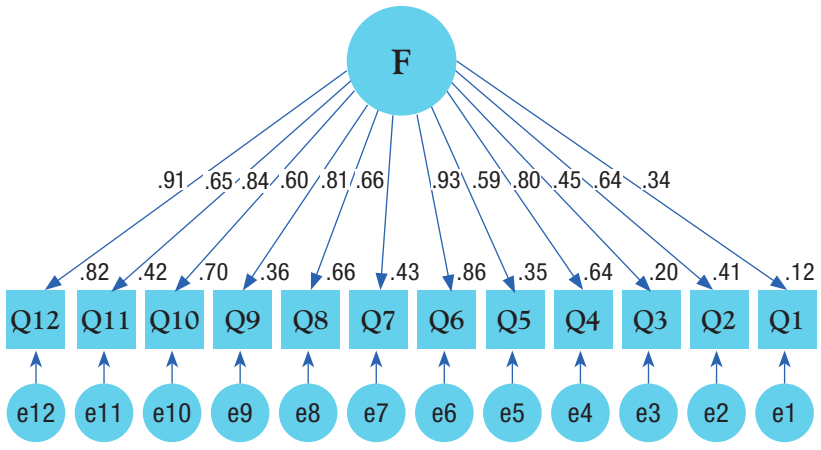
The Cronbach alpha of the Malay GF12 was 0.89. In test-retest reliability analysis, the ICC values were more than 0.75. ICC values of 0.75 and 0.9 indicate good reliability[31].

In the final analysis, there were a total of 251 respondents. In exploratory factor analysis (EFA), the Keiser-Meir-Olkin (KMO) value was 0.8, which is considered good. Two factors were extracted: factor 1 consisting of positively worded items (2, 4, 6, 8, 10, 12) and factor 2 consisting of negatively worded items (1, 3, 5, 7, 9, 11) (Table III).

Table III: Results from Exploratory Factor Analysis (EFA) of the Malay General Functioning 12 items.

No	PATTERN MATRIX	FACTORS	
		1	2
12	We confide in each other	.920	
6	We can express feelings to each other	.913	
4	Individuals are accepted for what they are	.911	
8	We feel accepted for what we are	.835	
10	We are able to make decisions about how to solve problems	.777	
2	In times of crisis, we can turn to each other for support	.644	
5	We avoid discussing our fears and concerns		.784
9	Making decisions is a problem for our family		.778
3	We cannot talk to each other about the sadness we feel		.753
7	There are lots of bad feelings in the family		.743
1	Planning family activities is difficult because we misunderstand each other		.683
11	We don't get along well together		.676

The two factors explained 64% of the total variation in the 12 items. In confirmatory factor analysis (CFA), a single factor model (Figure I) did not fit well (Chi-square/df < 3, fit indices < 0.9 and RMSEA > 0.09).



Chi-square=746.689
df=54 p=.000
Chi-square/df=13.828
CFI=.709 TLI=.645
GFI=.614 AGFI=.442
RMSEA=.227

Figure I: Theoretical model

Based on the factor weights extracted, there were two distinct factors: items 1, 3, 5, 7, 9, and 11 in one factor and items 2, 4, 6, 8, 10 and 12 in the other. Hence, a two-factor model with the respective items was tested. The two-factor model (Figure II) did not fit well either (Chi-square/df < 3, fit indices < 0.9 and RMSEA > 0.09). Modification Indices (MI) showed high levels of associations for items 1, 2, 3, 4, 5 and 12 with other items. Hence, these items were dropped one at a time and the final model (Figure III & Table IV) with sufficient model fit (Chi-square/df < 3, fit indices > 0.9 and RMSEA < 0.09) was obtained. In the final model, the two-factor-three-item model was found to fit well. The RMSE value of 0.087 is very close to 0.08. Since the items in the model are meaningful, no further fine tuning was done. The first factor is a measure of Positive Items, and the second factor is a measure of Negative Items. Since no specific names could be given to the factors, we named them positive and negative factors. The AVE values were 0.736 and 0.732, respectively. The correlation value between the two factors was 0.67, which is less than the square roots of the AVE values. Hence there was sufficient discriminant validity between the two factors. The minimum factor loading was 0.77.

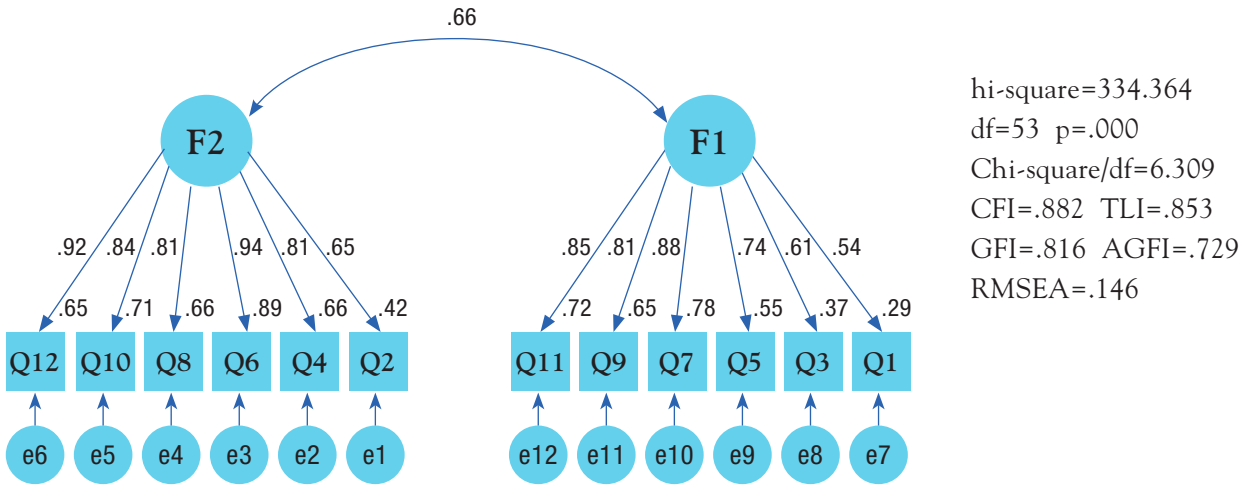


Figure II: Two-factor Model in confirmatory factor analysis (CFA)

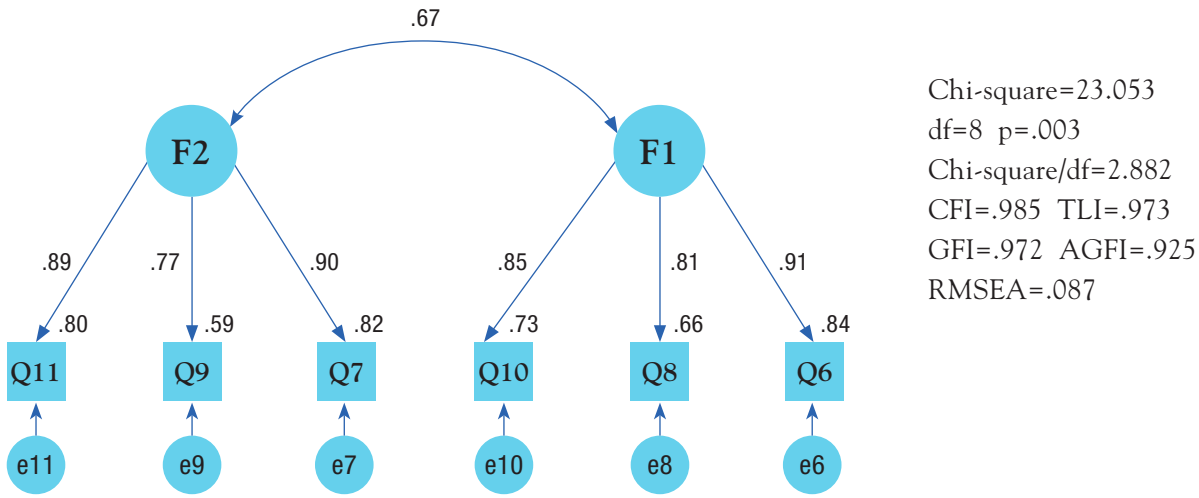


Figure III: After correcting, Final model

Table IV: Final model as per the description in the theoretical model (Figure III)

FACTOR	ITEMS	Factor Loading (FL)	Average Variance Extracted (AVE)	Composite Reliability (CR)
1	6. We can express feelings to each other	0.91	0.736	0.893
	8. We feel accepted for what we are	0.81		
	10. We are able to make decisions about how to solve problems	0.85		
2	7. There are lots of bad feelings in the family	0.90	0.732	0.891
	9. Making decisions is a problem for our family	0.77		
	11. We don't get along well together	0.89		

Discussion

This study aimed to explore a cross-cultural adaptation and validation of the Malay GF12 of the FAD. The study findings indicate that the Malay GF12 consisting of 2 factors with three items in each factor is valid and reliable to assess family functioning in the Malaysian setting. The reliability of the Malay GF12 was tested in terms of internal consistency and test-retest reliability, whereby findings were in agreement with the Portuguese and French FAD-GF12 studies[32,33]. The Cronbach alpha of the Malay GF12 was 0.89, which indicates a high level of internal consistency supporting the previous findings of Spanish and Dutch versions[34,35]. For test-retest reliability analysis, the ICC value was more than 0.75, which is considered good and in agreement with the ICC value for the French FAD-GF12[33,36]. Georgiadis et al. found internal consistency 0.89, and Zubrick et al. alpha 0.88, comparable to our study 0.89[37,38]. However, studies have reported that the instrument may show a different behaviour between families of different cultures and socioeconomic backgrounds, limiting study findings' generalisability to other cultures[39].

In the confirmatory factor analysis, the original 12-item model did not produce a well-fitted model because the RMSEA value of 0.227 was larger than the recommended value of less than 0.05 for a well-fitted model[40]. Instead, a two-factor and six-item model showed a sufficient fit. The results indicate the feasibility of administering six of the twelve items of the Malay GF12 (3 positively worded and 3 negatively worded items) to measure family functioning in the Malaysian population. Our study findings are different from the Italian GF-12 subscale validation findings, which has a 4-factor model with the following domains: competence, emotional, communication, and centre-on-self [41]. A possible explanation could be attributed to the differences in education levels and cultures between the two populations, which conceptualise normal family functioning differently[42]. Different cultural norms regarding family functioning may have affected the results, varying according to socioeconomic status. In the final analysis of the study, items 1, 2, 3, 4, 5 and 12 will be maintained, despite the correlation. Operationally, this option would allow for decision-making in the analysis phase.

Finally, the process of translating and cross-cultural adaption is classified in a hierarchy, from requiring minimum effort (Category 1—Forward-only translation) to substantial effort (Category 6—Back translation, monolingual, and bilingual tests)[43]. Considering this study's methods of translation and cultural adaption, it is classified in Category 4.

Limitations

Malaysia is a multi-racial country consisting of Malays, Chinese, Indians and indigenous peoples. As almost 100% of the respondents in this study were Malays, it is not a true representation of the population at large. The instrument may show different behaviour in other Malaysian races or cultural contexts. It may not be appropriate to use this Malay GF12 in its current form for participants of the other ethnicities within Malaysia until further validations have been carried out. Further studies are recommended to assess the validity of the Malay GF12 across different cultural settings and establish the cut-off point between "pathological" and "healthy" family functioning in the Malaysian population.

Conclusion

The results of our study show that the Malay GF12 is a valuable tool for assessing family functioning. This study's findings indicate that 6 (3 positively worded and 3 negatively worded items) of the 12 items of the Malay GF12 have adequate psychometric properties to measure family functioning in the Malaysian context. As family functioning is embedded in the cultural context, further studies should compare groups across different cultural settings to increase the index's specificity.

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