

Translation of child food insecurity experience scale (CFIES) into Bahasa Melayu and its validation

Syahrul Bariah Abdul Hamid^{1,2*} and Ainna Nafisa Amir Hamzah¹

¹Centre for Dietetics Studies, Faculty of Health Sciences, Universiti Teknologi MARA, Puncak Alam Campus, 42300 Puncak Alam, Selangor, Malaysia

²Maternal, Infant & Young Children Nutrition (MiChild) Research Group, Faculty of Health Sciences, Universiti Teknologi MARA, Puncak Alam Campus, 42300 Puncak Alam, Selangor, Malaysia

Abstract. Existing food insecurity surveys may not accurately capture the experiences and challenges faced by children. While the child food insecurity experience scale (CFIES) is a globally recognized tool, the absence of a validated Bahasa Melayu version hinders its application within Malaysia. This study aimed to develop a Bahasa Melayu translation of the CFIES and assess its content validity, face validity, and reliability to determine its suitability for application among children in Malaysia. This cross-sectional study followed a rigorous three-phase validation protocol. Forward-backward translation was employed to ensure conceptual equivalence. Content validity was evaluated by eight subject-matter experts using the content validity index (CVI), and face validation was conducted with ten children to assess understandability using the face validity index (FVI). Finally, internal consistency was tested among 130 schoolchildren using Cronbach's alpha. Results demonstrated tremendous content validity (S-CVI=0.95) and acceptable face validity (S-FVI clarity=0.83; understandability=0.79). The instrument demonstrated acceptable internal reliability, as indicated by a Cronbach's alpha coefficient of 0.787. Therefore, the Malay adaptation of the CFIES is a valid and reliable instrument that provides a foundation for future research, monitoring, and intervention efforts targeting child food insecurity in Malaysia.

1 Introduction

Food insecurity remains a significant global public health challenge, posing serious risks to children's physical health, growth, mental well-being, and overall development [1]. While numerous instruments exist to measure food insecurity such as the food insecurity experience scale (FIES), the household food security survey module (HFSSM), and the Household Food Insecurity Access Scale (HFIAS), these primarily operate at the household or adult level. Consequently, they often fail to capture the unique lived experiences, internal stresses, and subtle coping mechanisms of children, who may intentionally shield their parents from their

* Corresponding author: syahrulbariah@uitm.edu.my

concerns or interpret food scarcity in ways that adult-proxy reports cannot detect [2]. To address this critical gap, the child food insecurity experience scale (CFIES) was developed as a child-centered tool, gaining recognition for its ability to directly assess children's experiences across diverse cultural settings.

This study contributes a new advancement by introducing the first Bahasa Melayu version of the CFIES that has undergone cultural adaptation and psychometric validation. This represents a significant advancement over existing Malaysian assessments that predominantly rely on adult-proxy reporting. By amplifying the child's own voice, this research moves beyond household-level data to address the utilization gap, where food may be available in the home but remains inaccessible to the child due to complex household dynamics. Consequently, this tool offers a more nuanced and accurate understanding of pediatric food insecurity than traditional surveys.

The child food insecurity experience scale (CFIES) has been shown to be a valid and reliable tool for assessing food insecurity directly from children across diverse cultural settings [1]. However, no validated Bahasa Melayu version is currently available for Malaysian children. To address this gap, it must undergo rigorous translation and cultural adaptation into Bahasa Melayu. Without a culturally adapted and validated Bahasa Melayu CFIES, efforts to monitor child food insecurity, design targeted interventions, and inform evidence-based policies in Malaysia remain limited. Accordingly, this study aimed to develop a Bahasa Melayu translation of the CFIES and assess its content validity, face validity, and reliability to establish its suitability for application among children in Malaysia.

2 Materials and methods

2.1 Study design and settings

This study employed a cross-sectional design and was conducted in three phases as follows. Content validation was conducted via email. Face validation was conducted in two villages in Jengka 15, Pahang and Rantau, Negeri Sembilan. A reliability study was carried out in three private primary schools in Puncak Alam, Selangor.

Ethical approval was obtained from the Research Ethics Committee, Research Management Centre, Universiti Teknologi MARA (Reference: FERC/FSK/MR/2025/00077) prior to data collection.

2.2 Study participants and sampling

A convenience sampling method, a non-probability sampling method, was utilized. The sample size was determined using the recommended respondent-to-item ratio of 10:1, indicating that ten respondents are required for each instrument item; given that the CFIES comprises ten items, a minimum of 100 respondents was appropriate [3]. For content validation, eight experts with backgrounds in food security, nutrition and dietetics were recruited to evaluate the representativeness and clarity of the items. Face validation was conducted with ten children aged 9–12 years to assess item clarity and comprehensibility. Subsequently, reliability testing was performed among 130 children aged 9–12 years from three private primary schools, who completed the Bahasa Melayu version of the CFIES. To note, the age group of 9 to 12 years was selected because children at this stage have adequate cognitive and reading abilities to understand questionnaire items and accurately report their own experiences of food insecurity. This is also consistent with the target population used in the original CFIES validation study [2].

2.3 Data collection tool and technique

CFIES is a ten-item self-reported questionnaire that assesses children's experiences of food insecurity, including anxiety about food access, reduced dietary quality, decreased food intake, hunger, and emotional awareness [2]. Each item is designed as a question, with response options of more than 2 times, 1–2 times, or never in the past 12 months [2]. The validation of the Malay-translated CFIES involved three phases: (i) translation, (ii) content and face validation, and (iii) reliability testing.

2.3.1 Phase 1: Translation

The translation process began with forward translation of the questionnaire into Malay, followed by backward translation into English by certified translators from the Malaysian institute of translation and books (ITBM). This two-step method ensured linguistic accuracy, conceptual equivalence, and cultural appropriateness before finalizing the adapted version for use in the study.

2.3.2 Phase 2: Validation

Eight subject-matter experts, including experts in food security, public health, dietetics, and nutrition, evaluated the original questionnaire, the forward, and the backward versions. The assessment was conducted based on three main aspects: representativeness, clarity, and comprehensiveness. Each item was evaluated for representativeness and clarity using a four-point Likert scale. For representativeness, the ratings ranged from 1 (not representative) to 4 (fully representative), with intermediate scores indicating the need for major or minor revisions. Similarly, clarity was scored from 1 (not clear) to 4 (clear), with scores of 2 and 3 reflecting the extent of revisions required. To address potential discrepancies in judgment, at least 6 experts should be involved [6]. The experts were also given open-ended space to offer comments and recommendations on item refinement. For completeness, they were requested to evaluate all items and provide suggestions on adding or removing items, as well as on the structure of the CFIES. Items rated 1 or 2 were considered invalid, whereas items rated 3 or 4 were deemed acceptable. Content validity was quantified using the Content Validity Index (CVI), calculated at both the item level (I-CVI) and the scale level (S-CVI). A CVI threshold of ≥ 0.80 was interpreted as indicating satisfactory content validity.

Face validity was assessed among 10 schoolchildren aged 9 to 12 years. Each item was evaluated using a four-point Likert scale across two dimensions: clarity and understandability. Clarity referred to the extent to which the items were clearly worded (1=not clear, 2=less clear, 3=quite clear, and 4=very clear), whereas understandability reflected the degree to which respondents comprehended the meaning of each item (1=not understood, 2=poorly understood, 3=moderately understood, and 4=fully understood). Items receiving ratings of 1 or 2 were considered unacceptable, whereas those rated 3 or 4 were deemed acceptable. Face validity was quantified using the Face Validity Index (FVI), calculated at the item (I-FVI) and scale (S-FVI) levels. An FVI value of ≥ 0.80 was interpreted as indicating satisfactory face validity [7].

2.3.3 Phase 3: Reliability

Reliability was assessed among 130 schoolchildren aged 9 to 12 years to evaluate the internal consistency of the scale using Cronbach's alpha coefficient [4]. A Cronbach's alpha value of 0.70 or higher was considered indicative of acceptable reliability. Item-total correlations and

Cronbach's alpha if the item was deleted were also examined to assess each item's contribution to overall scale reliability.

2.4 Statistical test

Data analysis was performed using IBM SPSS Statistics version 29. Participant demographics and responses to each item were summarized using descriptive statistics. In assessing both the content validity index (CVI) and face validity index (FVI), item ratings of 3 or 4 on the four-point Likert scale were deemed acceptable, with scores of 0.80 or higher indicating adequate validity [5]. The internal consistency of the Bahasa Melayu version of the CFIES was evaluated by calculating Cronbach's alpha. Reliability was considered acceptable when the Cronbach's alpha coefficient reached at least 0.70 [4]. Where relevant, statistical significance was determined at a threshold of $p < 0.05$.

3 Result

3.1 Phase 1: Translation

Through content and face validation, modifications to translation and simplified items were made without altering the original context to suit language, clarity, and the comprehension level of children. For instance, the more child-friendly term "*risau*" was used in place of "*bimbang*", "*susah*" was derived from "*sukar*", and "*tidak berjaya*" was changed from "*gagal*". Content validation demonstrated validity with strong agreement among experts, particularly in terms of clarity and representatives, and a minor issue was adjusted based on the expert suggestions.

The experts suggested "utilization" as a key concept of food insecurity, where food may be available but is not consumed due to the absence of parents or caretakers. The idea of "utilization" was not incorporated into this version of the questionnaire to maintain fidelity to the original concept of CFIES. The expert suggested specifying the term "enough food" or "*makanan yang cukup*" as the term may differ among individuals. The original CFIES used general terms to reflect the children's experience with food insecurity. This study retained the general term to enable the children to answer based on their own experience, aligned with the purpose of CFIES.

3.2 Phase 2: Validation

3.2.1 Content validation

The findings of content validation among eight experts are shown in the Supplementary Material (Table 2). For representativeness, the I-CVI for each item and the S-CVI were 1.00, indicating that the experts agreed that each item represented food insecurity. For clarity, the I-CVI values were 0.75, 0.88, and 1.00, with Item 3 (WANTED) receiving the lowest score. The S-CVI for clarity was 0.95, indicating strong agreement among the experts regarding clarity; however, minor revisions, simplification of wording, and the use of age-appropriate terms were required for a few items.

3.2.2 Face validation

The I-FVI for clarity across the 10 items ranged from 0.60 to 0.90, with an average S-FVI of 0.83, indicating acceptable clarity of the questionnaire among children, as shown in Supplementary Table 3. However, Item 1 (WORRYFOOD) received the lowest clarity score (I-FVI=0.60), suggesting that it requires revision. The I-FVI for understandability ranged from 0.60 to 0.90, and the average S-FVI for understandability indicated that most items were reasonably understandable, although some required minor modifications.

3.3 Phase 3: Reliability

The overall Cronbach's alpha for the ten-item scale among 130 participants was 0.787, indicating that the Bahasa Melayu version of the CFIES demonstrated acceptable reliability, as shown in the Supplementary Material (Table 4). The detailed tables/figures supporting these results can be accessed at the following link: https://drive.google.com/drive/u/3/folders/1f-b63I9aBW84p8WChy9_5fvgG3GdsT9T

4 Discussion

The findings of this study indicate that the Bahasa Melayu adaptation of the child food insecurity experience scale (CFIES) is a valid and reliable measure for assessing food insecurity among Malaysian children aged 9-12 years. The findings indicate that the translated scale successfully preserves the conceptual intent of the original instrument while ensuring linguistic, cultural, and developmental appropriateness for local use. Strong content validity scores (S-CVI=1.0 for relevance; 0.95 for clarity) reflected substantial expert agreement that the translated items adequately captured the construct of child food insecurity and were suitable for the target age group. Similarly, face validation findings suggested that children generally understood the items well, although minor refinements were necessary to improve contextual clarity and emotional appropriateness.

The multi-step translation approach incorporating forward translation, backward translation, expert content review, and face validation with children proved effective in producing a culturally-grounded version of the instrument. Expert reviewers highlighted the need for simpler, child-friendly phrasing, and their feedback helped ensure that the translated items retained the original constructs without overwhelming young respondents.

The Bahasa Melayu CFIES also demonstrated satisfactory internal consistency, with a Cronbach's alpha of 0.787, exceeding the recommended threshold of 0.70 [4]. Although slightly lower than that reported for the original CFIES by Frongillo et al. (2022), the value remains acceptable and is comparable to findings from Malay adaptations of other food insecurity measures. Differences in cultural norms, emotional expression, and children's awareness of household food circumstances may contribute to variations in response patterns across settings. Nevertheless, all ten items contributed meaningfully to scale consistency, supporting retention of the complete item set in the Malaysian context.

The findings are consistent with previous studies that established the CFIES as a unidimensional measure of children's food insecurity experiences. Particular attention was given to preserving conceptual integrity while ensuring cultural sensitivity during translation. For example, terms with potentially negative emotional connotations were modified to more neutral expressions, such as replacing "*gagal*" with "*tidak berjaya*". Likewise, familiar terms such as "*risau*" were retained to reflect children's experiences of food-related concern without introducing stigma. These adaptations acknowledge cultural norms in Malaysia, where discussions of family hardship may be influenced by values of parental respect and emotional restraint [8].

A notable strength of this study is its comprehensive validation approach, which incorporated both expert and child perspectives. The need for culturally relevant examples, particularly for coping-related items such as SHAMEDO, is consistent with findings by Taylor et al. [9] and Landry et al. [10], who reported that children may underreport hardship due to concerns about family reputation or appearing ungrateful. Overall, the validated Bahasa Melayu CFIES addresses an important gap in food insecurity measurement by providing a child-centered tool that captures children's own experiences, thereby generating more accurate and nuanced data than adult-reported measures alone.

Despite the strengths of this study, several limitations should be considered. The reliability testing was conducted among children from private Islamic schools, which may limit the generalizability of the findings to Malaysian children from different socioeconomic, cultural, and educational backgrounds. Criterion validation was not performed due to the absence of a validated child-reported food insecurity instrument in Bahasa Melayu. Existing food insecurity measures used in Malaysia are largely household-based and rely on adult reports, which may not adequately reflect children's own experiences. Additionally, construct validity and confirmatory factor analysis (CFA) were not assessed, limiting further evaluation of the scale's psychometric properties. The cross-sectional design also precluded assessment of test-retest reliability and changes in food insecurity experiences over time.

5 Conclusion

The validated Bahasa Melayu version of the child food insecurity experience scale (CFIES) is a reliable tool for assessing child food insecurity in Malaysia and serves as an important resource for informing health policies and interventions. By enabling the direct assessment of children's experiences, the CFIES can help identify at-risk populations, guide targeted nutritional assistance programs, and monitor equitable health outcomes. Moreover, this study lays the groundwork for future research on the prevalence, determinants, and consequences of child food insecurity in Malaysia. Future studies should validate the Malay CFIES across more diverse populations, including children from public schools and vulnerable communities, and incorporate additional psychometric testing while examining associations with nutritional, psychosocial, and educational outcomes. Further psychometric evaluations, including confirmatory factor analysis and test-retest reliability, as well as longitudinal studies examining associations with nutritional, developmental, and health outcomes, are recommended to strengthen the scale's utility and support evidence-based policymaking.

We would like to express gratitude to Universiti Teknologi MARA (UiTM) Cawangan Selangor (UCS) for the financial support under SULAM Internal Grant [600-UITMSEL (PI. 5/4) (029/2023)].

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