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Original Article

Development, validity, and reliability of a questionnaire on mothers' knowledge in complementary feeding practices (*PI-MPASI*) in Indonesia

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Abstract

Background A number of complementary educational feeding modules have been circulating in the community, but mothers have yet to use them optimally. There is an urgent need for an effective educational method on appropriate complementary feeding and an instrument to measure maternal knowledge in proper complementary feeding practices.

Objective To develop and assess the validity and reliability of a questionnaire on complementary feeding practices.

Methods We conducted a qualitative study to develop a questionnaire followed by a cross-sectional study to test the validity and the reliability of the *PI-MPASI* questionnaire. The research team designed the *PI-MPASI* questionnaire through a literature review with a team of experts, based on the evidence-based feeding practice recommendations for infants and toddlers in Indonesia as compiled by the *Indonesian Pediatric Society* (IPS) in 2015. Content validation was carried out through expert review, whilst the construct validity and the reliability were tested on 110 mothers who met the inclusion criteria.

Results In the content validity assessment, an average congruent percentage of 90% was obtained for the sub-themes of time, nutritional adequacy, safety, and feeding responsiveness as the four essential points that mothers should know regarding proper complementary feeding practices. Most of the item scores showed moderate to high correlations with the total score, with reliability test showcasing a good internal consistency (Cronbach's alpha=0.715).

Conclusion This study showed that our questionnaire on mothers' knowledge in complementary feeding practices (PI-MPASI) is a valid and reliable instrument to assess maternal knowledge on correct complementary feeding practices in Indonesia. **[Paediatr Indones. 2023;63:335-45; DOI: https://doi.org/10.14238/pi63.4.2023.335-45**].

Keywords: *development; questionnaire, knowledge; complementary feeding; module*

Nutritional problems faced by Indonesian children today include the triple burden of nutrition, namely undernutrition, overnutrition, as well as micronutrient deficiencies.[1] Malnutrition at an early age may hinder brain development, in turn affecting children's cognitive and behavioral abilities, physical and psychosocial health, as well as future productivity.[2,3] Malnutrition in infants is often caused by errors in providing complementary foods (commonly known by the acronym "MPASI" in Indonesian),[4-6] namely due to inadequate nutritional intake, lack of food variation, and the lack of iron content. In addition, there are also problems in feeding practices such as not giving infants the opportunity to self-feed and improper hygiene in preparing foods.

Previous studies have found an association between mothers' knowledge and complementary feeding behavior and food intake in infants. The

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provision of health education regarding correct feeding practices for mothers and immediate family members would have an impact on the mother's knowledge. Mother's knowledge regarding proper complementary feeding practices is expected to improve maternal behavior in the practice of complementary feeding, so that infants may receive adequate food intake. Food intake in infants will subsequently affect their growth and nutritional status.[7,8]

There were a number of complementary feeding education modules circulating in the community, both in the form of books and short articles in maternal and child health magazines. The Ministry of Health of Indonesia had also published a *Maternal and Child Health Handbook* (known as the *KIA Handbook* in Indonesian) for mothers, and the book was expected to increase knowledge and understanding of maternal and child health so that the community could be mobilized to seek access to health services, practice healthy living , and understand how to care for babies and children, especially regarding nutritional care and the monitoring of growth and development. The government has previously instilled policies for health workers to use the *KIA Handbook* as a medium for public education, as outlined in a Regulation of the Minister of Health.

Although the KIA handbook had been compiled extensively and comprehensively, evaluations carried out in several regions revealed that mothers have not used the book optimally. A study in Yogyakarta of 119 mothers, all of whom owned a copy of the KIA handbook, revealed that only 48.7% of mothers made good use of the book. The study showed that mothers did not read all the materials in the KIA book because the materials compiled were too long and broad, thus mothers only read the basic materials. The materials on breastfeeding were read by 54.6%, materials on complimentary feeding by 48.7%, and materials on nutritional requirements by 42.8% of the mothers in the study. Overall, only 68% of the materials was read and understood by the mothers, and only 22.7% of mothers applied what they had read in their feeding practices.[9,10]

For the reasons described above, there is an urgent need for an effective educational method for proper complementary feeding at every stage of the infant's age. Such a method should be able to reach a wider community, be easily understood, and consist of structured and correct educational materials. To assess the effectiveness of the complementary feeding module, a questionnaire is required.

This study aimed to assess the validity and reliability of the *Questionnaire on Mother's Knowledge in Complementary Feeding Practice* (*PI-MPASI*). The data on mother's complementary feeding knowledge obtained by this questionnaire can inform decision-makers in identifying issues that mothers have yet to understand regarding correct complementary feeding practices, so that the focus of future services can be determined. These guidelines may then be widely used to empower mothers to properly administer complementary feeding.

Methods

The development of the questionnaire on mothers' knowledge on complementary feeding practices (*PI-MPASI*) was carried out by a qualitative study for the preparation of the initial questionnaire and a cross-sectional study for the questionnaire validation process. The research team designed a questionnaire using questions relevant to evidence-based feeding practice recommendations for infants and toddlers in Indonesia as compiled by the *Nutrition and Metabolic Disease Coordination Unit* of the *Indonesian Pediatric Society* in 2015.[11] These recommendations were expected to be a reference for general practitioners and pediatricians throughout Indonesia in providing information on correct feeding practices for infants and toddlers in Indonesia and were based on the available scientific evidence (**Table 1**).

Based on these recommendations, our research team compiled a questionnaire that included the following assessment components:

a. The right time to start complementary feeding:
   This was determined by taking into consideration the baby's age and the baby's developmental abilities.
b. Adequacy in giving complementary feeding:
   Adequate components included the frequency of complementary feeding according to age, the amount and consistency of complementary foods according to age, the composition of breast milk and complementary foods in a day, and the composition of carbohydrates, proteins, and fats in

complementary foods according to age.

c. Safety in complementary feeding practice:
   This component included mothers' knowledge regarding the safe preparation of complementary foods and knowledge regarding the appropriate sugar, salt, and oil content for infants.
d. Rules in giving complementary feeding and the method of responsive feeding.

We developed a collection of 30 items based on our qualitative results and literature review. The questionnaire was developed to measure mothers' knowledge regarding appropriate infant complementary feeding practices based on a recommendation book compiled by experts on the existing scientific basis. The process of preparing the initial questionnaire began with the formation of a Delphi panel, a team of experts to determine the main materials, i.e., the essential topics that a mother must know in order to practice proper complementary feeding. The expert panel included six pediatricians subspecializing in nutrition and metabolic diseases with an average work experience of 31.5 (SD 11.9) years in the field. Each expert provided suggestions to delete, approve, or modify each question item as well as gave comments on the items to be modified.

The questionnaire was arranged as multiple choice questions and true-or-false questions. Based on the experts' suggestions, we retained, added, modified, or removed items, modified the answer options, changed the order and grouping of the questions, or revised the language used. The resulting questionnaire was brought back to the experts for an

Table 1. Evidence-based feeding practice recommendations for infants and toddlers in Indonesia[11]

Recommendation 1
All health workers involved with infants and toddlers must: 1. Prevent malnutrition by counseling proper feeding practices. 2. Have the competence to conduct counseling on correct feeding practices obtained as part of formal education and continuing training.
Recommendation 2
1. Give exclusive breastfeeding for six months and monitoring its adequacy, namely by assessing growth using the WHO Growth Velocity Standards table. 2. If exclusive breastfeeding has been given in the correct way but the baby shows signs of being at risk of failure to thrive, then assess the baby's readiness to receive complementary feeding. 3. If exclusive breastfeeding has been given in the correctway but the baby shows signs of at risk of failure to thrive and does not yet have the motoric readiness to receive complementary feeding, then donor breast milk may be considered. If donor breast milk is not available, infant formula milk is given.
Recommendation 3
1. Complementary feeding is started at the age of 6 months, but if there is insufficient breast milk, complementary foods can be given as early as 4 months (17 weeks) by assessing the oromotor readiness of the baby to receive solid foods. 2. Complementary feeding should not be given later than the age of 6 months (27 weeks) because after the age of 6 months, exclusive breastfeeding is no longer sufficient to meet the nutritional needs of infants. 3. Complementary feeding in terms of quality and quantity must meet the macronutrient and micronutrient needs of infants according to their age. 4. The preparation, presentation, and provision of complementary foods must be carried out in a hygienic manner. 5. Salt can be added to complementary foods to ensure the development of the infant's taste buds, but still taking into account infant's immature kidney function. 6. To determine the amount of salt that can be given, refer to the recommended daily intake of sodium for the infant's age. 7. Sugar can be added to complementary foods to support the development of taste repertoire in infants. 8. To determine the amount of sugar that may be added to complementary foods, refer to the recommendation of Codex Standard for Processes Cereal-based Foods for Infants and Young Children, Codex Alimentarius Stan 074-1981 Rev. 1-2006. 9. Avoid foods that contain nitrates in infants under 6 months of age. 10. The feedings of infants and toddlers must follow the rules of responsive feeding. 11. Responsive feeding rules need to be socialized to health workers and parents.
Recommendation 4
1. Infant formula milk is given for medical indications based on WHO Recommendations in 2009. 2. Infant formula milk is indicated for babies who are exclusively breastfed in the correct way but show signs of being at risk of failure to thrive when these infants do not yet have the motoric readiness to receive solid food and when there is no available donor breast milk that meets safety requirements.
Recommendation 5
1. The feedings of toddlers must follow the feeding rules to prevent feeding problems. 2. Eating problems in toddlers need to be evaluated and managed comprehensively early on by doctors to prevent malnutrition.

Table 2. Preparation of the *PI-MPASI Questionnaire*

Main topics in complementary feeding knowledge	Related literatures	Number of expert opinions on the importance of the material	Main sub-themes included in the list of questions
Time	Guiding principles for complementary feeding of the breastfed child[1] Feeding and nutrition of infants and young children: guidelines for the WHO European Region, with emphasis on the former Soviet countries[14] *Rekomendasi Praktik Pemberian Makan Berbasis Bukti pada Bayi dan Batita di Indonesia untuk Mencegah Malnutrisi*[11] (Recommendations on Evidence-Based Feeding Practices in Infants and Under-Three-Year-Olds in Indonesia to Prevent Malnutrition) Complementary Feeding: Review of Recommendations, Feeding Practices, and Adequacy of Homemade Complementary Food Preparations in Developing Countries - Lessons from Ethiopia[15]	9 experts	When to start complementary feeding
Adequacy	Guiding principles for complemen-tary feeding of the breastfed child[1] Feeding and nutrition of infants and young children: guidelines for the WHO European Region, with em-phasis on the former Soviet coun-tries[14] *Rekomendasi Praktik Pemberian Makan Berbasis Bukti pada Bayi dan Batita di Indonesia untuk Mencegah Malnutrisi*[11] (Recommendations on Evidence-Based Feeding Practices in Infants and Under-Three-Year-Olds in In-donesia to Prevent Malnutrition) Complementary Feeding: Review of Recommendations, Feeding Prac-tices, and Adequacy of Home-made Complementary Food Prep-arations in Developing Countries - Lessons from Ethiopia[15]	9 experts	Frequency of complementary feeding according to age The amount of complementary foods given according to age Types of complementary foods given, variety and composition Comparison of the amount of breast milk and complementary feeding given in a day
Safety	Guiding principles for complementary feeding of the breastfed child[1] Feeding and nutrition of infants and young children: guidelines for the WHO European Region, with emphasis on the former Soviet countries[14] *Rekomendasi Praktik Pemberian Makan Berbasis Bukti pada Bayi dan Batita di Indonesia untuk Mencegah Malnutrisi*[11] (Recommendations on Evidence-Based Feeding Practices in Infants and Under-Three-Year-Olds in Indonesia to Prevent Malnutrition) Recommendations on complementary feeding for healthy, full-term infants[5] Complementary Feeding: Review of Recommendations, Feeding Practices, and Adequacy of Homemade Complementary Food Preparations in Developing Countries - Lessons from Ethiopia[15] Breastfeeding and Complementary Feeding[6]	9 experts	The process of preparing solid complementary foods The process of providing safe complementary foods Safe cooking process for solid foods Complementary foods storage Amount of salt, sugar and oil

Table 2. Preparation of the PI-MPASI Questionnaire (continued

Main topics in complementary feeding knowledge	Related literatures	Number of expert opinions on the importance of the material	Main sub-themes included in the list of questions
Responsive feeding	Guiding principles for complementary feeding of the breastfed child[1] Feeding and nutrition of infants and young children: guidelines for the WHO European Region, with emphasis on the former Soviet countries[14] *Rekomendasi Praktik Pemberian Makan Berbasis Bukti pada Bayi dan Batita di Indonesia untuk Mencegah Malnutrisi*[11] (Recommendations on Evidence-Based Feeding Practices in Infants and Under-Three-Year-Olds in Indonesia to Prevent Malnutrition) Complementary Feeding: Review of Recommendations, Feeding Practices, and Adequacy of Homemade Complementary Food Preparations in Developing Countries - Lessons from Ethiopia[15]	9 experts	Rules on complementary feeding schedule Appropriate environment for giving complementary foods The correct procedure for giving complementary foods

in-depth interview session to obtain final revisions before being administered to the mothers.

The questionnaire pilot test was conducted on mothers with babies aged 4-12 months, since this is the time at which mothers become interested in gaining knowledge about correct complementary feeding practices. The inclusion criteria was mothers with babies aged 4-12 months. Mothers received an explanation regarding the stages of the research carried out and filled out the informed consent form if they were willing to participate in the study. The mothers completed the questionnaire immediately during their visit to the clinic.

This questionnaire contained questions that assessed mothers' knowledge of complementary feeding in general as well as questions on more comprehensive knowledge. The completed questionnaire was graded on a scale of 0-100 based on the percentage of correct answers. The grades were then grouped into knowledge categories as follows: "good" if the grade was >89, "moderate" if it was between 81 to 89, and "poor" if it was <81. These knowledge categories were determined after an initial pre-test was conducted on 30 mothers to get their average grade. Mothers were also asked to comment on the clarity of the wording of the question items.

Content validity of the feasibility and relevance of the questions was established by analysis by a panel of experts. Content validity described how well the questionnaire functioned in assessing related topics and ensured that the measurement included an adequate set of items that represented the topic to be tested. The more items that reflected the overall concept being measured, the greater the content validity of a questionnaire. One of the approaches for evaluating content validity was the content validity index (CVI). This approach involved a team of experts to determine whether each item on the scale is appropriate or relevant to its construct. The conformity value, referring to the percentage of items deemed relevant by each expert, was calculated. Conformity values given by all the experts involved were then averaged to yield an index value referred to as the average congruency percentage (ACP). We used an ACP value of >90% as a condition for the acceptance of the questionnaire.[12]

The construct validity measured whether an instrument was able to capture what was intended to be measured. Construct validation was carried out by measuring the correlation between each item with the total score of each category to establish its relationship with other variables. Theoretically this should result in positive, negative, or practically no association. To measure the construct validity of the *PI-MPASI* questionnaire, Pearson correlation coefficient values between each item and the total score for each item

were calculated, with the r table value for df=n-2=108 with P<0.05 being 0.1576. The coefficient was deemed as significant if the value of r for the item was larger than 0.1576. The correlation was classified as moderate when r was between 0.30 to 0.49 and strong when r was >0.50.13 A reliability test was conducted to identify the internal consistency of the questionnaire. Cronbach's alpha coefficient was used as a measure of internal consistency.

This study was conducted after obtaining ethical approval from the institutional review board of Tanjungpura University. All subjects signed a written informed consent prior to their participation.

Results

The process of writing the questionnaire started in July to September 2018, followed by small-group trials and questionnaire revisions from October 2018 to January 2019. Further validation was carried out between March to April 2019 at three community health centers (*puskesmas*) in a sub-district of the city of Pontianak, West Kalimantan, and involved 110 mothers who met the inclusion criteria. The characteristics of the respondents are described in **Table 3**.

Table 3. Characteristics of the respondents

Characteristics	N=110
Mother's age, n(%)	
19-29 years	85 (77.3)
30-49 years	25 (22.7)
Infant's age	
4-6 months	15 (13.6)
6-9 months	56 (50.9)
9-12 months	39 (35.5)
Mother's occupation	
Housewife	105 (95.5)
Work outside the home	5 (4.5)
Mother's income	
No income	105 (95.5)
<2,1 million rupiah	3 (2.7)
2,1-3,5 million rupiah	2 (1.8)
Mother's education	
Elementary-middle school	15 (13.6)
High school	87 (79.1)
Diploma-bachelor	8 (7.2)
Primary caregiver	
Mother	110 (100)
Grandmother/family	0
Nanny	0
Secondary caregiver	
Mother	38 (34.5)
Grandmother/family	72 (65.5)
Nanny	0
Tertiary caregiver	
Mother	2 (0.8)
Grandmother/family	108 (98.2)
Nanny	0
Numbers of visiting health facilities	
Integrated healthcare center (*Posyandu*) and public health center (*Puskesmas*)	107 (97.3)
Doctor's clinic	3 (2.7)
Mother's health information source	
Family/neighbors	108 (98.2)
Health worker (midwife/nurse/doctor)	103 (93.6)
Integrated healthcare center (*posyandu*) public health center (*puskesmas*)	73 (66.4)
Printed media (leaflets/magazines newspapers/others)	44 (40.0)
Electronic media (television/radio/Internet social media)	103 (3.6)

The development of the initial questionnaire design referred to the *Recommendations on the Evidence-Based Feeding Practices in Infants and Toddlers in Indonesia* as compiled by the *Nutrition and Metabolic Disease Coordination Unit of the Indonesian Pediatric Society in 2015* which included 4 essential points that mothers should know about proper complementary feeding practices, they are: on-time, adequate, safe, and responsive feeding.[11] Based on the experts' suggestions, out of 30 items, 19 were retained, 2 were removed, and the remaining 9 items were converted into a true-or-false checklist form, so that the total number of items was 55. Subsequently, some items were revised by a team of experts including the multiple choices given, the language used, and the order and groupings of the questions presented. Items that were consistently rated by a team of experts for deletion were removed, and items that needed to be modified were modified.

The questionnaire was then tested on 30 mothers to evaluate the language used. In general, the mothers' comments revealed no lack of clarity in the wording of the items. From the results of this test run, several items were supplemented with clarifying pictures and charts. These 55 items were then further revised by the experts regarding the composition of the questions, the topics asked, the weight of the questions, and the language used. Some items were grouped into sub-questions of a question number (e.g., question no. 11 consisted of items 11A to 11F, etc). In its final

form, the questionnaire consisted of 28 closed-ended questions, consisting of 19 multiple choice questions and 9 true-or-false questions.

After the revisions, in-depth interviews were conducted with each expert to assess content validity. This also served as another opportunity to suggest revisions. Overall, an ACP of 90% for the main topics of feeding timeliness, adequacy, and safety and responsive eating was obtained. Pearson correlation coefficient values to measure the construct validity of the *PI-MPASI* questionnaire are listed in **Table 4**.

We then assessed the internal consistency of the resulting questionnaire. Cronbach's alpha value obtained for the *PI-MPASI* questionnaire was 0.715. Corrected correlation coefficients and Cronbach's alpha values for individual items are listed in **Table 5**.

Table 4. Item-Total correlation coefficient of the *PI-MPASI Questionnaire*

Questionnaire subsection/item number	Item-total correlation
Time to start complementary feeding	
1	0.428**
2	0.365**
Frequency of complementary feeding according to age	
3	0.059
4	0.465**
5	0.378**
The number of complementary foods given according to age	
6	0.403**
7	0.312**
Types of complementary foods given	
8	0.605**
9	0.416**
10	0.237*
11A	.c
11B	0.099
11C	0.243*
11D	0.236*
11E	0.268**
11F	0.167
Composition of breast milk and complementary foods given	
12	0.511**
13	0.155
14	0.455**
15	0.406**
Knowledge on feeding rules and responsive feeding	
16	-0.019
17	0.190*
18A	0.355**
18B	0.600**
18C	0.563**
19A	.c
19B	0.346**
19C	.c
20A	0.526**
20B	0.395**
20C	0.564**
20D	.c
20E	0.385**
21A	0.091
21B	0.345**
21C	0.473**
21D	0.279**
21E	0.430**
The preparation process of complementary foods	
22	0.423**
23A	0.393**
23B	0.389**
23C	0.378**
Salt, sugar and oil amounts in complementary foods	0.416**
24A	0.426**
24B	0.371**
24C	0.379**
24D	0.490**
24E	0.178
25A	0.020
25B	0.308**
25C	0.117
25D	0.394**
25E	0.001
26	0.452**
27	0.357**
28	

**P value = <0.001; *P value = <0.05/ .c = Item cannot be computed because the variable was constant

Table 5. The internal consistency of the *PI- MPASI Questionnaire*

Questionnaire subsection/item number	Item correlation-corrected total	Cronbach's Alpha if item is deleted	Cronbach's Alpha
Time to start complementary feeding			
1	0.403	0.708	0.715
2	0.334	0.709	
Frequency of complementary feeding according to age			
3	0.043	0.715	
4	0.444	0.708	
5	0.346	0.708	
The number of complementary foods given according to age			
6	0.382	0.710	
7	0.285	0.711	
Types of complementary foods given			
8	0.582	0.703	
9	0.388	0.708	
10	0.202	0.712	
11A	0.000	0.715	
11B	0.085	0.715	
11C	0.233	0.714	
11D	0.211	0.712	
11E	0.241	0.711	
11F	0.136	0.713	
Composition of breast milk and complementary foods given			
12	0.489	0.707	
13	0.137	0.714	
14	0.425	0.706	
15	0.382	0.709	
Knowledge on feeding rules and responsive feeding			
16	-0.056	0.717	
17	0.154	0.713	
18A	0.346	0.713'	
18B	0.586	0.708	
18C	0.549	0.709	
19A	0.000	0.715	
19B	0.328	0.711	
19C	0.000	0.715	
20A	0.510	0.709	
20B	0.370	0.709	
20C	0.549	0.708	
20D	0.000	0.715	
20E	0.364	0.710	
21A	0.079	0.715	
21B	0.322	0.710	
21C	0.454	0.709	
21D	0.245	0.711	
21E	0.403	0.708	
The process of complementary foods preparation			
22	0.343	0.702	
23A	0.379	0.712	
23B	0.373	0.711	
23C	0.368	0.712	

Table 5. The internal consistency of the *PI- MPASI Questionnaire* (continued)

Questionnaire subsection/item number	Item correlation-corrected total	Cronbach's Alpha if item is deleted	Cronbach's Alpha
Salt, sugar and oil amounts in complementary foods			
24A	0.387	0.708	
24B	0.397	0.708	
24C	0.339	0.708	
24D	0.347	0.708	
24E	0.466	0.707	
25A	0.149	0.713	
25B	-0.010	0.716	
25C	0.278	0.710	
25D	0.092	0.714	
25E	0.368	0.709	
26	-0.011	0.715	
27	0.432	0.709	
28	0.324	0.709	

Discussion

This study provides evidence of the validity and reliability of a questionnaire regarding mothers' knowledge in complementary feeding practice (*PI-MPASI*), the first in Indonesia which was compiled based on a scientific, evidence-based recommendation book on the correct complementary feeding practice. The components of the assessment included the right time to start the complementary feeding, the adequacy of the complementary foods given as assessed by the frequency and amount of complementary foods given according to age, the variety of complementary foods that must be given, the composition of breast milk and complementary food in a day, and the composition of carbohydrates, proteins and fats in the complementary foods given.[11] The safety component of complementary feeding practice included the process of preparing, cooking, and giving complementary foods, including safety in adding salt, sugar, and oil in complementary foods, as well as the knowledge regarding responsive feeding that consisted of meal schedules and rules, feeding environment and feeding procedures.[11,14,15]

The development of the *PI-MPASI Questionnaire* was started with qualitative research and was followed by the validity and reliability assessment process. The questionnaire items were compiled from a combination of literature review processes, expert studies, and a pilot trial on the target audience.[16-18] With this series of processes, it is expected that the dimensions that the assessor would want to measure from the mothers' knowledge could be achieved using the PI-MPASI questionnaire. The simple grading system of this questionnaire also helped to facilitate the final assessment of mothers who filled out the questionnaire. The classification of the value of the category as poor (grade <81), moderate (grade 81-89), and good (grade >89), in addition to the numerical value obtained, made it easier to give an assessment of the mother's knowledge. These grade categories were determined by a preliminary run to determine the range of values of the mother's initial knowledge about complementary foods.

Typically, in the development of a questionnaire, around 5-7 experts will evaluate each item to determine whether the item represents the domain of interest. The expert must be independent from the questionnaire developer so that the assessment can be carried out systematically to avoid bias in the ratings of the items.[19] Overall, based on the analysis of the assessment and inputs from the experts, the ACP was determined to be 90% for the sub-themes of timing, adequacy, safety, and responsive eating as the four essential topics that mothers need to know about proper complementary feeding practices. In our questionnaire, these sub-themes were compiled into 28 questions addressing the four aforementioned topics as well as the correct procedure for preparing complementary foods.

The construct validity test was conducted to assess whether the questionnaire was able to assess the knowledge components that were intended to be assessed. Most of the items tested showed moderate

to high correlation with the corrected total score, but there were some items that with low and/or statistically non-significant correlations. Overall, the *PI-MPASI Questionnaire* had a total of 55 items, of which 41 or 74.5% of the question items were found to be valid with moderate correlations. Subsequent revisions had been made to several items that had low correlations, including the language used and the multiple choice answer options.[18]

Cronbach's alpha coefficient has been used to evaluate the internal consistency of the questionnaire. A Cronbach's alpha of >0.70 is considered good, and as the reliability increases, the fraction of test scores that resulted from errors will also decrease.[13] The Cronbach's alpha of the PI-MPASI questionnaire was 0.715, indicating that the questionnaire is reliable. Since our respondents came from a wide range of social and economic backgrounds, we believe that the heterogeneity of our study population would vastly improve the questionnaire's generalizability.

A limitation of this study was that this questionnaire was prepared only in the Indonesian language. Therefore, the use of this questionnaire is currently limited to respondents who understand written Indonesian language. The *PI-MPASI Questionnaire* has not been translated and tested in other languages, such as English, so it cannot be used in populations speaking other languages.

In conclusion, the PI-MPASI questionnaire can be used as a valid and reliable tool to measure mothers' knowledge levels regarding correct complementary feeding practices in accordance with evidence-based recommendations in Indonesia.

Conflict of interest

None declared.

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