The Relationship Between Knowledge Of Complementary Foods Processing (MPASI) and Child Anthropometry

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ABSTRACT

Nutritional problems among infants and toddlers remain a major public health concern. Despite various interventions, child malnutrition persists, highlighting the influence of maternal, behavioral, and environmental factors. This study aimed to analyze the relationship between maternal knowledge of complementary food processing and child anthropometric status. A quantitative cross-sectional study was conducted among 75 mothers of children aged 6 months to 3 years selected from 10 Posyandu using simple random sampling. Maternal knowledge was assessed using a validated 25-item questionnaire. Child anthropometric status was measured using weight, height/length, mid-upper arm circumference, and body mass index according to the WHO Child Growth Standards. Data were analyzed using descriptive statistics and Fisher's Exact Test. Most mothers had good knowledge of complementary food processing (61.3%), most children had normal nutritional status (90.7%). Maternal education was significantly associated with knowledge of complementary food processing (p = 0.014), whereas maternal age (p= 0.848), occupation (p= 1.000) were not. No significant association was found between maternal knowledge and child anthropometric status (p= 0.476). Maternal knowledge of complementary food processing was not significantly associated with child anthropometric status. Child nutritional outcomes are influenced by multiple factors beyond maternal knowledge, including feeding practices, socioeconomic conditions, health status, environmental factors.

INTRODUCTION

Malnutrition among infants and young children remains a major public health concern worldwide, including in Indonesia. According to the 2024 Joint Child Malnutrition Estimates, approximately 150.2 million children under five years are affected by stunting, 42.8 million by wasting, and 35.5 million by overweight or obesity. This condition reflects the continuing global challenge of child malnutrition, which includes both undernutrition and overnutrition and requires effective preventive strategies, particularly during early childhood. (Indonesia, 2021b;

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Organization, 2009, 2020; UNICEF, 2013, 2021, 2025)

The first 1,000 days of life, from conception until the age of two years, represent a critical period for child growth and development. Inadequate nutritional intake during this period may result in impaired growth, increased susceptibility to infection, and long-term developmental consequences. In Indonesia, reducing child malnutrition remains a national priority, with complementary feeding practices considered an important component of child nutrition interventions. (Indonesia, 2021a; Rahmawati et al., 2022) The complementary feeding period begins at six months of age when breast milk alone is no longer sufficient to meet children's nutritional requirements. Appropriate complementary feeding requires adequate food quality, quantity, frequency, diversity, and safe preparation practices. Inappropriate complementary feeding practices may contribute to inadequate nutrient intake and increase the risk of growth problems among young children. (Perdana & Butar Butar, 2024; Riyanti & Nurlaila, 2025; Wahyuni, 2024)

Child nutritional status is commonly assessed using anthropometric indicators, including weight-for-age, length/height-for-age, and weight-for-length/height based on the World Health Organization (WHO) Child Growth Standards. Anthropometric measurements provide important information regarding children's growth patterns and nutritional conditions. However, optimal anthropometric outcomes depend not only on food availability but also on caregivers' knowledge and ability to implement appropriate feeding practices. (Perdana & Butar Butar, 2024; Riyanti & Nurlaila, 2025; Wahyuni, 2024) (Dewi, 2024; Fitrianingsih, 2024; Riyanti & Nurlaila, 2025; Wahyuni, 2024) Maternal knowledge regarding complementary feeding processing plays an important role in determining feeding quality. Mothers with adequate knowledge are more likely to understand appropriate food selection, preparation methods, portion requirements, and feeding frequency according to children's nutritional needs. Conversely, limited maternal knowledge may lead to inappropriate complementary feeding

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practices, potentially affecting children's nutritional status. Previous studies have suggested that maternal knowledge is associated with child feeding behaviours; however, the relationship between maternal knowledge of complementary food processing and children's anthropometric status requires further investigation, particularly in community settings. (Fitrianingsih, 2024; Stuart and Stuart Scott, 2024; Rachmaniah and Agustina, 2024)

Tasikmalaya Regency, West Java, is one of the areas that continues to face child nutritional challenges. The Cisayong Community Health Centre working area has reported variations in toddler nutritional status based on anthropometric indicators, indicating the need to strengthen family-based nutrition interventions. Understanding whether maternal knowledge of complementary food processing is associated with children's anthropometric outcomes is important to support more targeted nutrition education programs. .(Fitrianingsih, 2024; Stuart and Stuart Scott, 2024; Rachmaniah and Agustina, 2024) Therefore, this study aimed to analyze the relationship between maternal knowledge of complementary food processing (MP-ASI) and child anthropometric status among toddlers in the working area of the Cisayong Community Health Centre, Tasikmalaya Regency. The findings of this study are expected to provide evidence regarding the role of maternal knowledge in supporting appropriate complementary feeding practices and child growth. (Istammah, 2025; Octaviana, 2024; Perdana & Butar Butar, 2024)

RESEARCH METHODS

This quantitative study employed a cross-sectional design involving mothers of toddlers aged 6 month until 3 years in the working area of the Cisayong Community Health Centre, Tasikmalaya Regency, Indonesia. The target population consisted of 156 eligible mothers registered at 10 integrated health posts (Posyandu). The minimum required sample size was calculated using the Slovin formula with a 95% confidence level and a 5% margin of error, resulting in a minimum sample of 112 participants. However, due to non-response and incomplete data, 75 mothers who met the inclusion criteria

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and completed all study procedures were included in the final analysis. The inclusion criteria were mothers of healthy toddlers aged 6 months – 3 years who were the primary caregivers and agreed to participate in the study.

A simple random sampling technique was employed. First, a sampling frame containing all eligible mothers was compiled from the Posyandu registration records. The total sample was allocated proportionally to each of the 10 Posyandu according to the number of eligible mothers registered at each site. Within each Posyandu, participants were selected by simple random sampling using a lottery method until the required number of respondents from each Posyandu was obtained.

Data were collected using a structured questionnaire and anthropometric measurements. Maternal knowledge regarding complementary feeding practices was assessed using a 25-item multiple-choice questionnaire that had been tested for validity and reliability (item validity coefficient $r > 0.50$; Cronbach's alpha > 0.70). Anthropometric measurements were performed by a trained assessor using standardised procedures. Body weight was measured using a calibrated electronic weighing scale, while head circumference and mid-upper arm circumference (MUAC) were measured using a non-stretchable measuring tape. The primary anthropometric indicators were weight-for-age (WAZ), height/length-for-age (HAZ), weight-for-height (WHZ), head circumference-for-age, and MUAC, which were interpreted according to the World Health Organisation (WHO) Child Growth Standards.

Data were analysed using SPSS version XX. Univariate analysis was performed to describe respondents' characteristics, maternal knowledge, and children's anthropometric status using frequencies, percentages, means, and standard deviations, as appropriate. Anthropometric indices were converted into WHO Z-scores using the WHO Child Growth Standards. Bivariate analysis was conducted using Fisher's Exact Test to examine the association between maternal knowledge and children's nutritional status. Fisher's Exact Test was selected because the assumptions of the Pearson Chi-square test were not satisfied, with more than

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20% of the contingency table cells having an expected frequency of less than five, making Fisher's exact Test a more appropriate method for obtaining an accurate p-valueThis research has received a research ethics permit from the Ethics Committee of the Polytechnics of the Ministry of Health of Tasikmalaya with the ethics number DP.04.03/F.XVIII.1.3.1/497/2026.

RESULTS AND DISCUSSION

Table 1. showed that most mothers were aged 20–35 years (85.3%), which represents the optimal reproductive age. Mothers within this age group are generally considered to have greater physical and psychological readiness for childcare and are more likely to access maternal and child health information through health services. This age distribution may have contributed to the relatively high proportion of mothers with good knowledge regarding complementary feeding practices observed in this study. Most respondents were unemployed (84.0%), indicating that they were primarily responsible for childcare at home. Although mothers who do not work may have more time to prepare complementary foods and monitor their children's growth, employment status alone did not necessarily reflect the quality of childcare or feeding practices. Other factors, such as maternal knowledge, family support, and socioeconomic conditions, may also influence child nutrition and development.

Table 1. Respondent characteristics and results of child anthropometry examination

Characteristic	Frequency (n=75)	Percent (%)
Mother characteristic		
Age		
Under 20	1	1.3
20-35	64	85.3
Over 35	10	13.3
Occupation		
Works	12	16
No works	63	84
Education		
Elementary	5	6.7
Junior high	23	30.7
Senior high	40	53.3
Graduated	7	9.3
Knowledge		
Good	46	61.3
Adequate	24	32
Lack	5	6.7
Child characteristic		
Child age		
6-12 months	17	22.7
13-24 months	57	76
24-36 Months	1	1.3
Anthropometry indicator		
Weight birth		
Under 2500 gr	3	4
2500 gr - 4000 gr	72	96
Weight for age		
Normal	59	78.7
Abnormal	16	21.3
Weight for length		
Normal	51	68
abnormal	24	32

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Mid Upper arm circumference		
Normal	64	85.3
Abnormal	11	14.7
BMI for age		
Normal	51	68
Underweight	16	21.3
Overweight/obesit	8	10.7
Nutritional status (WHO Child Growth Standards)		
Normal	68	90.7
wasted	6	8
Over weight	1	1.3

Regarding educational attainment, more than half of the mothers had completed senior high school (53.3%), while only a small proportion had graduated from higher education (9.3%). Educational level is recognised as an important determinant of health literacy because mothers with higher educational attainment are generally better able to obtain, understand, and apply health information, including recommendations related to complementary feeding and child nutrition. This educational profile may partly explain why most respondents demonstrated good knowledge regarding complementary feeding practices.

In terms of maternal knowledge, 61.3% of mothers had good knowledge of complementary feeding preparation, whereas only 6.7% had poor knowledge. This finding suggests that nutrition education delivered through community health services, including Posyandu and maternal and child health programs, may have contributed to improving mothers' understanding of appropriate complementary feeding practices. Most children were aged 13–24 months (76.0%), which corresponds to the period when complementary feeding becomes the primary source of nutrition alongside continued breastfeeding. This age is considered a critical window for growth and development because inadequate feeding practices during this period may adversely affect nutritional status and child development.

The anthropometric assessment showed that the majority of children had normal birth weight (96.0%), normal weight-for-age (78.7%), normal weight-for-length (68.0%), normal mid-upper arm circumference (85.3%), and normal BMI-for-age (68.0%). Furthermore, according to the WHO Child Growth Standards, 90.7% of children had normal nutritional status, while only 9.3% were classified as wasted. The predominance of normal anthropometric outcomes indicates that most children in

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the study had achieved appropriate growth. This favourable nutritional profile may reflect adequate feeding practices, regular growth monitoring through Posyandu, and good access to maternal and child health services in the study area. However, the relatively small proportion of children with nutritional problems may also reduce the variability of the outcome, thereby limiting the ability to detect statistically significant associations between maternal knowledge and anthropometric status in subsequent analyses.

Table 2. Association between maternal characteristics and maternal knowledge of complementary feeding practices

Variabel	Knowledge (N=75)			ρ value
	Good (n=46)	Adequate (n=24)	Lack (n=5)	
Age				
Under 20	1	0	0	0.848*
20-35	39	21	4	
Over 35	6	3	1	
Occupation				
Works	39	20	4	1*
No works	7	4	1	
Education				
Elementary	0	4	1	0.014*
Junior high	12	9	2	
Senior high	29	10	1	
Graduated	5	1	1	

*Fisher Exact Test; N=75, α 5%

Table 2. presents the association between maternal characteristics and maternal knowledge regarding complementary feeding (MPASI) processing. Most mothers with good knowledge were aged 20–35 years (39/46; 84.8%), while mothers with adequate and poor knowledge were also predominantly in the same age group. Fisher's Exact Test showed that maternal age was not significantly associated with knowledge of complementary feeding processing (p = 0.848).

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Table 3. The relationship between knowledge of complementary foods processing and child anthropometry

Variabel	Nutritional status (WHO Child Growth Standards) (n=75)			ρ value
	Normal (n=68)	Wasted (n=6)	Overweight (n=1)	
Mother Knowledge				
Good	41	5	0	
Adequate	22	1	1	0.476*
Lack	5	0	5	

Fisher Exact Test; N=75, α 5%

From Tables 1 to 3 found that maternal knowledge regarding complementary feeding (MP-ASI) processing was not significantly associated with children's nutritional status based on WHO Child Growth Standards (p = 0.476). Although most mothers had good knowledge of complementary feeding processing, the majority of children had normal nutritional status. Among mothers with good knowledge, 41 out of 46 children (89.1%) had normal nutritional status, while children with wasting were still found among mothers with good knowledge (5 children). This finding indicates that adequate maternal knowledge alone may not directly determine children's nutritional outcomes.

The absence of a significant association may be explained by the multifactorial nature of child nutritional status. Anthropometric outcomes are influenced not only by maternal knowledge but also by the actual implementation of feeding practices, food availability, household socioeconomic conditions, history of infectious diseases, sanitation, and access to health services. Mothers may have adequate knowledge but face challenges in applying this knowledge due to limited resources, family food preferences, or environmental constraints. food (Nguyen et al., 2024). Furthermore, the distribution of nutritional status in this study was dominated by children with normal nutritional status (68/75; 90.7%), while only a small number of children experienced wasting (6 children) and overweight (1 child). The limited variation in nutritional status may reduce the statistical power to detect an association between maternal knowledge and anthropometric outcomes. In addition, the small number of children in the abnormal nutritional status categories may influence the

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stability of statistical estimates. (Juniarti et al., 2023).

These findings are consistent with the understanding that knowledge is an important but insufficient factor in improving child nutrition. Knowledge may influence mothers' decisions regarding food preparation and feeding practices; however, its effect on children's growth depends on the successful translation of knowledge into appropriate feeding behaviours and is affected by broader determinants of health. (Khan et al., 2024) This study involved 75 mothers of toddlers and their children in the working area of Cisayong Community Health Centre. Most mothers were aged 20–35 years (85.3%), unemployed (84.0%), and had completed senior high school education (53.3%). The predominance of mothers in the reproductive age group may indicate that most respondents were in a suitable period for childcare and health information acquisition. Furthermore, the relatively high educational level may contribute to mothers' ability to understand information related to complementary feeding practices. Regarding maternal knowledge of complementary feeding (MP-ASI) processing, most mothers demonstrated good knowledge (61.3%), while only a small proportion had poor knowledge (6.7%). This finding suggests that maternal exposure to nutrition information through community health services, such as Posyandu, may contribute to improving mothers' understanding of complementary feeding practices.

The children's anthropometric characteristics showed that most children had normal nutritional status based on WHO Child Growth Standards (90.7%), while wasting and overweight were found in 8.0% and 1.3% of children, respectively. Most children also had normal weight-for-age (78.7%), weight-for-length (68.0%), mid-upper arm circumference (85.3%), and BMI-for-age (68.0%). The high proportion of normal nutritional status indicates that most children achieved appropriate growth conditions; however, the presence of wasting highlights the continued need for monitoring and nutritional support. (Khan et al., 2024; Nguyen et al., 2024). Bivariate analysis showed that maternal age (p = 0.848) and occupation (p = 1.000) were not significantly associated

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with maternal knowledge of complementary feeding processing. In contrast, maternal education was significantly associated with knowledge ($p = 0.014$). Mothers with higher educational attainment tended to have better knowledge, suggesting that education may improve the ability to access, understand, and apply nutrition-related information.

Furthermore, maternal knowledge of complementary feeding processing was not significantly associated with children's nutritional status based on WHO Child Growth Standards ($p = 0.476$). Although most mothers had good knowledge and most children had normal nutritional status, nutritional status is influenced by multiple factors, including actual feeding practices, food availability, socioeconomic conditions, infection history, and environmental factors. In addition, the dominance of children with normal nutritional status and the small number of children with wasting or overweight may have limited the ability to detect statistical differences. (Bastola & Li, 2026).

Overall, this study highlights that maternal education is an important factor related to nutrition knowledge, but knowledge alone may not be sufficient to determine children's anthropometric outcomes. Comprehensive approaches that consider feeding practices and other household-level factors are needed to support optimal child growth. This study has several limitations. The cross-sectional design only describes the relationship between variables at a single point in time and does not allow causal inferences. In addition, the relatively small sample size and the predominance of children with normal nutritional status may have limited the ability to detect significant associations. Future studies using longitudinal designs and incorporating additional determinants of child nutritional status, such as feeding practices, household socioeconomic conditions, infectious diseases, and environmental factors, are recommended to provide a more comprehensive understanding of factors influencing child anthropometry.

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CONCLUSIONS

This study found that most mothers of toddlers had good knowledge regarding complementary feeding (MP-ASI) processing. Maternal education was significantly associated with the level of knowledge, whereas maternal age and occupation were not. Furthermore, no significant association was found between maternal knowledge of complementary feeding processing and the anthropometric status of children aged 6 months to 3 years. These findings suggest that maternal knowledge alone may not be sufficient to influence children's anthropometric outcomes, which are likely affected by multiple factors beyond the scope of this study.

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