Journal of Bulletin of Inspiring Developments and Achievements in Midwifery
Vol. 03, No. 1, June 2026, 75-83
***e*-ISSN: 3089-672X**

Determinants of Appropriate Complementary Feeding Practices among Mothers of Toddler

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Article Information
Received: April 11, 2026
Revised: June 22, 2026
Online: June 27, 2025

Keywords
MPASI, Knowledge, Education, Support, Toddler

ABSTRACT

Timely and recommended complementary feeding (MPASI) is an important factor in preventing stunting and impaired growth and development in toddlers. However, the accuracy of complementary feeding in the working area of Andalas Health Center is still not optimal, influenced by low maternal knowledge, education level, and family support. This condition has the potential to increase the risk of nutritional problems in toddlers. This study purpose to analyze the determinants of appropriate complementary feeding practices among mothers of toddler. This study uses quantitative methods with a cross-sectional design. The population is all mothers who have toddlers aged 6–24 months, with a sample of 96 respondents selected through purposive sampling technique. The study was conducted in the working area of Andalas Padang Health Center. Data collection used structured questionnaires. Data analysis was conducted univariate to see the frequency distribution and bivariate using the chi-square test with a confidence level of 95% (α=0.05). The strength of the relationship was analyzed using the Contingency coefficient (C). Univariate results show that 62.5% of mothers provide proper complementary feeding, 70.8% have good knowledge, 58.3% have secondary-higher education, and 65.6% have good family support. The results of bivariate analysis showed a significant relationship between knowledge, education, and family support with the accuracy of complementary feeding. It was concluded that knowledge and family support had a strong relationship, while education had a moderate relationship. Operational implications highlight the need to optimize family-based nutrition education and counseling.

Keywords: *MPASI, Knowledge, Education, Support, Toddler*

http://doi.org/10.69855/bidan.v3i1.569
https://gpijournal.com/index.php/bidan

INTRODUCTION

Complementary feeding (MPASI) is one of the most important nutritional interventions during the first 1,000 days of life because it plays a critical role in preventing stunting and supporting optimal child growth and development. After six months of age, breast milk alone is no longer sufficient to meet all energy and nutrient requirements; therefore, complementary foods should be introduced at the appropriate time, frequency, consistency, and quantity while continuing breastfeeding (WHO, 2023). However, the implementation of appropriate complementary feeding practices remains a challenge in many settings. Previous studies have demonstrated that determinants of complementary feeding practices vary according to social, educational, cultural, and family characteristics. The novelty of this study lies in examining the determinants of appropriate complementary feeding practices among mothers of children aged 6–24 months by assessing the strength of the relationship between maternal knowledge, educational level, and family support. Furthermore, this study compares the strength of these factors using contingency coefficients to identify which factor has the strongest association with appropriate complementary feeding practices.

The World Health Organization recommends introducing complementary foods at six months of age while continuing breastfeeding up to two years or beyond. These recommendations are based on scientific evidence regarding infant physiological readiness and nutritional requirements. Inappropriate timing of complementary feeding may increase the risk of infection and nutrient deficiencies, making adherence to these recommendations an important indicator of infant feeding practices (WHO, 2022).

In Indonesia, child nutrition remains a major public health concern. Although the prevalence of stunting has declined in recent years, it remains a significant problem requiring sustained intervention. The Indonesian government has implemented various nutrition programs to accelerate stunting reduction; however, variations in program outcomes suggest that family-level behavioral factors continue to play an important role (Kementerian Kesehatan RI, 2023).

Stunting affects not only physical growth but also cognitive development, educational achievement, and future productivity. Children experiencing chronic undernutrition are at risk of reduced human capital outcomes later in life. Therefore, improving complementary feeding practices has become a key component of national nutrition strategies and requires family-centered and multisectoral approaches (UNICEF, 2023).

Numerous studies and global reports have shown that maternal knowledge is a key determinant of appropriate complementary feeding practices. Mothers with adequate nutrition knowledge are more likely to provide age-appropriate foods, maintain feeding frequency, and ensure dietary adequacy for their children. In addition, health literacy enables mothers to access, understand, and utilize nutrition information effectively in daily childcare practices (Nutbeam, 2022). The increasing use of digital media has also expanded access to nutrition information; however, misinformation may adversely affect feeding decisions. Therefore, evidence-based digital nutrition education should be strengthened.

Maternal education is another important factor influencing child-feeding practices. Mothers with higher educational attainment generally have greater access to health information and better capacity to interpret and apply nutrition recommendations. Evidence from Indonesia indicates that maternal education is associated with improved infant and young child feeding practices, including dietary diversity and meal frequency (Lestari et al., 2020).

Family support also contributes substantially to successful complementary feeding practices. Family members, particularly spouses and caregivers, can provide emotional, informational, and practical support that facilitates appropriate feeding behaviors. According to the Health Behavior framework, social support functions as a reinforcing factor that promotes positive health behaviors (Glanz et al., 2015). Therefore, family involvement should be considered an integral component of nutrition interventions.

The role of health workers in delivering nutrition education and counseling is equally important. Health promotion activities implemented through primary healthcare facilities, such as posyandu and puskesmas, contribute to improving caregivers' knowledge and feeding practices. Continuous nutrition education has been recommended as a strategy to enhance complementary feeding practices and prevent child malnutrition (WHO, 2023).

As a primary healthcare facility, Puskesmas has a strategic role in implementing promotive and preventive nutrition programs. Activities such as growth monitoring, nutrition counseling, and health education are expected to improve maternal knowledge and child-feeding practices. However, variations in nutrition indicators across regions indicate the importance of understanding local determinants to design context-specific interventions (Kementerian Kesehatan RI, 2022).

Padang city as an urban area in West Sumatra has a diverse social dynamics. Lifestyle changes and the increasing number of working mothers can affect the feeding patterns of children. The working area of Andalas Health Center has a fairly large number of toddlers with a heterogeneous socio-economic background. This variation has the potential to affect the accuracy of MPASI administration practices. Although health services are available, not all mothers make optimal use of nutritional counseling. Therefore, the identification of locally influential factors is important.

A quantitative approach is needed to analyze the relationship between knowledge, education, and family support with the accuracy of complementary feeding. Sugiyono (2022) states that analytical design allows researchers to objectively identify the strength of relationships between variables. Statistical analysis provides a scientific basis in determining intervention priorities. Thus, the results of the study can be used as evidence-based practice.

Although several studies have examined complementary feeding practices in Indonesia, limited studies have specifically analyzed the combined influence of maternal knowledge, education, and family support in urban primary healthcare settings such as Andalas Health Center. Interest in the title "factors affecting the accuracy of complementary feeding in toddlers " is based on the urgency of child nutrition problems and the importance of evidence-based interventions at the primary service level. The working area of Andalas Puskesmas was chosen because it has heterogeneous community characteristics and variations in MPASI practices are still being found. This study is expected to provide an empirical description of the strength of the relationship between the variables studied. Thus, the results can be fundamental in the preparation of educational programs and interventions that are more operational and targeted.

METHODS

This study uses quantitative methods with cross sectional design to analyze the factors that affect the accuracy of complementary feeding in toddlers. The study population is all mothers who have toddlers aged 6-24 months in the Working Area of Andalas Health Center. A sample of 96 respondents was selected using purposive sampling technique with inclusion criteria: mothers

who have toddlers aged 6-24 months, willing to be respondents, and can communicate clearly; while the exclusion criteria include mothers with serious health problems or toddlers with chronic diseases that affect the provision of complementary foods.

Data collection was conducted using structured questionnaires that have been tested for validity and reliability. The validity of the questionnaire was tested using the product Moment correlation test, while the reliability was measured by Cronbach's Alpha coefficient to ensure the internal consistency of the instrument. The study also adhered to the rules of research ethics; before filling out the questionnaire, respondents were given an explanation of the purpose of the study, procedures, the right to refuse or stop participation, and confidentiality of data. Written consent is obtained from all respondents as a form of informed consent.

Data analysis was conducted univariate to see the frequency distribution of each variable and bivariate using chi-square test with a confidence level of 95% (③=0.05). In addition, the strength of the relationship between variables was analyzed using the Contingency coefficient (C) to identify the dominant factors that affect the accuracy of complementary feeding. The results of this analysis are expected to provide a valid and reliable empirical picture for nutrition intervention planning based on Puskesmas working area.

RESULTS

The following research results are presented in the form of a table to provide an overview of the distribution of variables in a univariate and bivariate intervariable relationships. Univariate analysis aims to see the proportion of each variable, while the bivariate analysis uses chi-square test and contingency coefficient (C) to assess the relationship between the factors studied with the accuracy of complementary feeding in toddlers.

1. Univariate Distribution of Research Variables

Table 1. Univariate distribution of research variables (n=96)

Variable	Categories	Frequency (f)	Percentage (%)
MPASI accuracy	Exact	60	62.5
	Not Exactly	36	37.5
Mother's Knowledge	Good	68	70.8
	Less	28	29.2
Mother's Education	Medium-High	56	58.3
	Low	40	41.7
Family Support	Good	63	65.6
	Less	33	34.4

Based on the univariate table, the majority of mothers (62.5%) gave MPASI precisely according to the recommendations. A total of 70.8% of respondents have good knowledge about the provision of solid foods. More than half of the respondents (58.3%) had a secondary-higher education, while 65.6% received good family support. These results show that most mothers have positive supporting factors to provide complementary foods on time, although there are still some that are not optimal.

2. Factors That Affect the Accuracy of MPASI

Table 2. Factors That Affect the Accuracy of MPASI

Variable	p-value	Contingency Coefficient (C)	Relationship Strength
Mother's Knowledge	0.000	0.621	Height
Mother's Education	0.012	0.472	Medium
Family Support	0.000	0.648	Height

Bivariate results showed that maternal knowledge has a significant and strong relationship with the accuracy of MPASI (p=0.000; C=0.621). This indicates that mothers who have good knowledge are more likely to provide solid food on time. Family support was also significantly related to the accuracy of complementary feeding (p=0.000; C=0.648) with high relationship strength, indicating that support from the husband or other family members influenced the practice of complementary feeding. Meanwhile, maternal education was associated significantly but with moderate relationship strength (p=0.012; C=0.472), indicating that education affects the behavior of complementary feeding, but not as strong as knowledge and family support.

DISCUSSION

1. Variable Frequency Distribution of Research

The univariate analysis showed that 62.5% of mothers had provided appropriate complementary feeding practices. This finding indicates that the majority of mothers have a relatively good understanding of the importance of providing complementary foods according to children's age and nutritional requirements. The relatively high proportion of appropriate feeding practices may be associated with nutrition education activities conducted through primary healthcare services such as posyandu and puskesmas. Continuous nutrition education has been recognized as an effective strategy for improving caregivers' knowledge and feeding practices (WHO, 2023).

Most respondents had good knowledge regarding complementary feeding (70.8%) and a secondary or higher educational level (58.3%). Education facilitates access to health information and enhances the ability to understand and apply nutrition recommendations. Previous evidence has shown that maternal education is positively associated with infant and young child feeding practices, including dietary diversity and meal frequency (Lestari et al., 2020). Similarly, health literacy plays an important role in enabling mothers to obtain, understand, and utilize nutrition information appropriately (Nutbeam, 2022).

Good family support was reported by 65.6% of respondents. Family support may include emotional encouragement, assistance in food preparation, and involvement in childcare activities. According to health behavior theory, social support functions as a reinforcing factor that promotes healthy behaviors and facilitates the implementation of recommended health practices (Glanz et al., 2015). Therefore, family involvement is essential for sustaining appropriate complementary feeding practices.

Despite the relatively high proportion of appropriate complementary feeding, 37.5% of mothers had not yet implemented feeding practices according to recommendations. This finding suggests that knowledge and education alone may not be sufficient to ensure optimal feeding behavior. Other factors such as socioeconomic conditions, food availability, access to information, and cultural practices may also influence feeding decisions. UNICEF (2023) emphasizes that

complementary feeding practices are shaped by a combination of individual, family, and environmental factors.

Overall, the findings suggest that maternal knowledge, educational attainment, and family support are important resources that contribute to appropriate complementary feeding practices. Strengthening nutrition education programs while involving family members may help improve feeding practices and support optimal child growth and development.

Overall, the results showed that maternal knowledge, level of education, and family support are important capital in supporting the practice of providing appropriate complementary foods. These three factors interact with each other in shaping maternal health behavior. Therefore, efforts to improve the practice of giving MPASI need to be done through sustainable nutrition education and family-based approach in order to support the growth and development of toddlers optimally.

According to the researchers, mothers who follow nutritional counseling regularly show more consistent behavior in giving solid food. This confirms that the sustainability of education is an important factor in maintaining good practice. Knowledge, education, and family support are the dominant factors associated with the practice of proper complementary feeding. Interventions that focus on only one factor may be less effective; a holistic approach is needed to improve the overall quality of complementary feeding. The variation in the level of knowledge, education and family support indicates the need for interventions adapted to the characteristics of the local community. The researchers hope that these results can be the basis for planning an operational and sustainable nutrition education program at Andalas Health Center.

2. Factors That Affect the Accuracy of MPASI

The bivariate analysis demonstrated a significant relationship between maternal knowledge and appropriate complementary feeding practices (p=0.000; C=0.621). This finding indicates that mothers with better knowledge are more likely to provide complementary foods according to recommended timing, frequency, and nutritional requirements. Maternal knowledge is essential because it influences decision-making related to food selection, meal preparation, and feeding practices. WHO (2023) highlights that adequate caregiver knowledge is a key determinant of appropriate infant and young child feeding practices. Furthermore, health literacy enables mothers to understand and apply nutrition information effectively, thereby improving feeding behaviors (Nutbeam, 2022).

Family support was also significantly associated with appropriate complementary feeding practices and showed the strongest relationship among the studied variables (p=0.000; C=0.648). Family support may provide practical assistance, emotional encouragement, and positive reinforcement for healthy feeding behaviors. According to Glanz et al. (2015), social support is an important determinant of health behavior because it strengthens motivation and facilitates the adoption of recommended practices. In the context of complementary feeding, family members can contribute to food preparation, childcare, and decision-making, thereby increasing the likelihood of appropriate feeding practices.

Maternal education was significantly associated with complementary feeding practices (p=0.012; C=0.472), although the strength of the relationship was moderate compared with maternal knowledge and family support. Education contributes to cognitive skills and improves the ability to access and interpret health information. However, educational attainment alone does not guarantee appropriate feeding practices if it is not accompanied by adequate nutrition

knowledge and supportive family environments. Consistent with previous findings, maternal education influences child-feeding practices primarily through improved access to health information and greater understanding of nutrition recommendations (Lestari et al., 2020).

From the bivariate results, it is also known that family support has a significant relationship and the strength of the high category relationship with the accuracy of MPASI (p=0.000; C=0.648). This means that mothers who get good family support tend to be more precise in providing complementary foods to children. Family support can include help in preparing meals, emotional support, as well as discussions about proper nutrition practices.

The findings indicate that maternal knowledge and family support have stronger associations with appropriate complementary feeding practices than maternal educational level. Although education provides a foundation for understanding health information, knowledge and social support appear to have a more direct influence on feeding behavior. These results support the use of family-centered nutrition interventions that combine health education with active involvement of family members.

Nutrition education programs delivered through puskesmas and posyandu should not only target mothers but also involve fathers and other caregivers. Such an approach may strengthen social support, improve nutrition literacy, and facilitate the implementation of recommended feeding practices. In addition, educational materials should be adapted to local cultural contexts to ensure greater acceptance and sustainability of behavior change (WHO, 2023; UNICEF, 2023).

The results of the analysis showed that maternal education was also significantly associated with the accuracy of complementary feeding (p=0.012), but with the strength of the relationship of medium category (C=0.472). This shows that although the mother's formal education affects the behavior of giving complementary foods, the effect is not as big as the knowledge and support of the family. Formal education helps shape the mother's basic cognitive abilities, but does not always guarantee a deep understanding of nutrition.

These bivariate findings also indicate that interventions that focus on only one aspect, such as formal education without family support or without increased knowledge, tend to be less effective. Interventions that are multisector, including education, health, and family, are better able to produce sustainable behavior change.

The researchers ' analysis showed that maternal knowledge and family support are two main factors that reinforce each other in determining the accuracy of complementary feeding. In the context of Puskesmas Andalas, intervention strategies need to focus on two dominant variables, namely increasing maternal knowledge and strengthening family support as a top priority. Researchers hope that these results can be the basis for recommendations for a more targeted work program. High knowledge without family support tends to be difficult to apply in daily practice, especially if the mother faces limited time, work or economic constraints. On the other hand, family support without adequate knowledge also does not guarantee the proper practice of complementary foods. Therefore, interventions that emphasize only one aspect will not be optimal, and nutritional literacy improvement programs must always involve the family as an integral part of the implementation strategy.

In addition, the researchers assessed that maternal education variables act as additional supporting factors that strengthen the influence of knowledge on the practice of complementary feeding. Formal education improves mothers ' cognitive and analytical skills in understanding nutritional information, but the maximum impact is only when combined with special nutrition

education and family support. In other words, the success of MPASI practice in the field is the result of a complex interaction between knowledge, education, and social support. Therefore, intervention strategies that are holistic, community-based, and tailored to local characteristics will be more effective in improving the accuracy of MPASI delivery in the working area of Andalas Health Center.

CONCLUSIONS

Based on the results of univariate and bivariate, it can be concluded that maternal knowledge and family support have a strong relationship with the accuracy of complementary feeding in toddlers, while maternal education has a moderate relationship. The majority of mothers in this study have good knowledge (70.8%) and get adequate family support (65.6%), so the practice of giving complementary foods appropriately (62.5%) is quite high. These findings confirm the importance of a combination of knowledge, education, and social support in ensuring optimal nutrition practices for toddlers in the working area of Andalas Health Center.

Limitations of this study include a relatively limited number of samples (96 respondents) and the location of the study that only covers one working area of the health center, so the generalization of the results to a wider population needs to be done carefully. In addition, the data were obtained through self-report questionnaires, so that possible social biases or filling errors cannot be completely avoided. Researchers suggest further research with a larger sample and direct observation method to strengthen the findings related to factors that affect the accuracy of MPASI administration. Further research is also expected to explore other factors such as family economic status, culture or eating habits in the community, as well as the mother's job that can affect parenting patterns and practices of giving complementary foods to children.

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