

## MATERNAL KNOWLEDGE OF COMPLEMENTARY FEEDING, COMPLEMENTARY FEEDING INTAKE, AND HISTORY OF EARLY COMPLEMENTARY FEEDING INTAKE AMONG STUNTED AND NON-STUNTED CHILDREN AGED 12–24 MONTHS IN THE GANTING COMMUNITY HEALTH CENTER AREA, GEDANGAN DISTRICT, SIDOARJO

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Received : May 30, 2026

Revised : May 31, 2026

Accepted : June, 22, 2026

Published : June, 29, 2026

DOI : <https://doi.org/10.59733/medalion.v7i2.313>

Publish Link : <https://medalionjournal.com/index.php/go>

### Abstract

Stunting remains a major nutritional problem in children under two years old (toddlers), and one factor suspected to play a role is the practice of providing complementary feeding intake to breast milk (MPASI). This study aims to analyze differences in maternal knowledge regarding MPASI, MPASI intake, and history of early MPASI provision in stunted and non-stunted children aged 12–23 months in the Ganting Community Health Center Working Area, Gedangan District, Sidoarjo Regency. The study used an observational analytical design with a matched case-control approach. The study population was toddlers aged 12–23 months and their mothers. The sample consisted of 60 mother-child pairs selected by purposive sampling: 30 stunted children as the case group and 30 non-stunted children as the control group, matched by age and gender. Data were collected using a MPASI knowledge questionnaire, interviews regarding the history of early MPASI provision, the 24-hour dietary recall method, and anthropometric measurements. Data analysis was performed using the McNemar test and Odds Ratio (OR) calculation. The results showed a significant difference in maternal knowledge regarding complementary feeding ( $p < 0.001$ ) and history of early complementary feeding ( $p = 0.022$ ), while complementary feeding intake based on the Minimum Acceptable Diet indicator did not show a significant difference ( $p = 0.332$ ). It was concluded that low maternal knowledge and a history of early complementary feeding were factors that differentiated the stunted and non-stunted groups, while complementary feeding intake did not show a significant difference.

**Keywords:** Maternal knowledge of complementary feeding, complementary feeding intake, history of early complementary feeding, stunting, children aged 12-24 months

### INTRODUCTION

The first 1,000 days of life (1000 HPK) are recognized as a golden period that plays a crucial role in determining a child's growth and development. This period is considered highly important because rapid physical and cognitive development occurs during this stage, which may have long-term consequences for an individual's future health and quality of life (Sudargo et al., 2018). Nutritional deficiencies may begin during pregnancy and continue in the early years of life. However, the manifestation of stunting is generally identified after a child reaches two years of age. Stunted and severely stunted children are defined as children with Length-for-Age Z-scores (LAZ) or Height-for-Age Z-scores (HAZ) below -2 standard deviations and below -3 standard deviations, respectively.

Stunting remains a major nutritional problem in Indonesia, particularly among children aged 6–24 months. Based on the results of the Indonesian Nutritional Status Survey (SSGI) 2022, the prevalence of stunting among children aged 6–11 months was 13.7%, increasing to 22.4% among children aged 12–23 months. This indicates that the number of children experiencing stunting in the 12–23 month age group was approximately 1.6 times higher than in the 6–11 month age group. One of the factors contributing to stunting among children aged 6–24 months in Indonesia is the low quality of complementary feeding practices and the inappropriate timing and nutritional adequacy of complementary foods provided to

children. As a result, nutrient intake may not sufficiently meet children's energy and nutritional requirements (Widiastuti *et al.*, 2018).

Complementary feeding becomes essential after six months of age because breast milk alone can no longer fulfill the nutritional requirements needed to support optimal growth and development. Appropriate complementary feeding not only contributes to meeting nutritional needs but also plays a role in protecting children from various diseases. Children older than six months generally have a more developed immune system compared to younger infants. Therefore, the provision of complementary feeding at the appropriate age is important. Conversely, the early introduction of complementary feeding may increase the risk of infections and other health problems in children (Setiawan, 2019).

Various factors influence complementary feeding practices, including maternal knowledge, educational level, sociocultural factors, and access to information (Wulandari *et al.*, 2018). Among these factors, maternal knowledge plays a particularly important role because mothers are generally the primary caregivers responsible for child feeding practices. Adequate maternal knowledge regarding complementary feeding can support appropriate feeding practices, including the timing of introduction, food selection, feeding frequency, and portion size. One practice that is strongly influenced by maternal knowledge is the provision of early complementary feeding, which may negatively affect child nutritional status if introduced before the recommended age (Wahyuhandani & Mahmudiono, 2017).

In Sidoarjo Regency, stunting continues to be a public health concern. Based on the Indonesian Nutritional Status Survey (SSGI), the prevalence of stunting among children under five in Sidoarjo Regency was 16.1%. Furthermore, data from the Family Health and Nutrition Division of Sidoarjo Regency in 2022 showed that Ganting Village had a stunting prevalence of 8.8%, making it one of the areas with the highest proportion of stunted children in the regency. This situation highlights the need for further investigation into factors associated with stunting in the area.

According to information obtained from nutritionists at Ganting Community Health Center, several factors are considered contributors to stunting among children in the area, including maternal knowledge regarding complementary feeding, complementary feeding intake, and the early introduction of complementary feeding. Although these factors have been identified as potential determinants of stunting, studies comparing these variables between stunted and non-stunted children are still limited, particularly at the community health center level.

Based on the above description, this study aims to analyze differences in maternal nutritional knowledge regarding complementary feeding (MPASI), complementary feeding intake, and the history of early complementary feeding in stunted and non-stunted children aged 12-24 months in the Ganting Community Health Center Work Area. This study is important because it can provide empirical evidence regarding the factors contributing to stunting at the community level. The novelty of the study lies in a comprehensive analysis that integrates three main factors—maternal knowledge, complementary feeding intake, and history of early complementary feeding—in a comparative design between stunted and non-stunted groups in an area with a relatively high stunting prevalence. The research findings are expected to enrich the development of theories regarding the determinants of stunting in toddlers and serve as a basis for developing more effective nutrition education programs and child feeding interventions at the primary health care level.

**METHOD**

This study is a quantitative study with an analytical observational design using a matched case-control study approach. This design was chosen to analyze the relationship between exposure factors such as maternal knowledge about complementary feeding (MPASI), complementary feeding intake, and history of early complementary feeding with the incidence of stunting in children aged 12–23 months. According to Creswell and Creswell (2023), a case-control design allows researchers to identify risk factors by comparing groups experiencing an event with groups that did not experience the event. The study was conducted in December 2025 in the Ganting Community Health Center Working Area, Gedangan District, Sidoarjo, which is one of the areas with a relatively high prevalence of stunting based on data from the Sidoarjo Regency Family Health and Nutrition Center.

The study population included all children aged 12–23 months who resided in the Ganting Community Health Center Working Area along with their mothers or primary caregivers responsible for feeding the children. The sample was selected using a purposive sampling technique with a 1:1 matching approach based on age and gender as suggested by Sugiyono (2022) to obtain comparable groups. The study sample consisted of 30 stunted children as the case group and 30 non-stunted children as the control group, resulting in a total of 60 mother-child pairs. The case group was determined based on the length-for-age (PB/U) index with a Z-score value of  $\geq -3$  SD to  $< -2$  SD, while the control group had normal nutritional status based on WHO growth standards (2023). Respondents with chronic diseases, congenital abnormalities, or incomplete data were excluded from the study.

Data collection was conducted through structured interviews and anthropometric measurements. Maternal knowledge of complementary feeding (MPASI) was measured using a questionnaire adapted from Rahmawati (2024) consisting of 20 multiple-choice questions with a scoring system according to Khomsan (2021). Data on complementary feeding intake (MPASI) were obtained using the 24-hour dietary recall method to assess Minimum Meal Frequency (MMF), Minimum Dietary Diversity (MDD), Minimum Milk Feeding Frequency (MMFF), and Minimum Acceptable Diet (MAD) indicators according to WHO and UNICEF guidelines (WHO, 2023; UNICEF *et al.*, 2024). Data on the history of early complementary feeding provision were obtained through interviews regarding the child's first age at receiving food other than breast milk, while data on nutritional status were obtained through body length measurements using a Body Length Board, which were then analyzed based on the PB/U index according to WHO standards.

The study began with a licensing process, coordination with the Ganting Community Health Center, and the selection of respondents based on available nutritional status data. After the case and control groups were determined through a matching process, researchers visited the respondents to obtain informed consent, conduct interviews using questionnaires, collect 24-hour dietary recall data, and measure the children height. All collected data then underwent stages of data completeness checking (editing), coding, data entry, and verification before statistical analysis was conducted according to the quantitative research procedures recommended by Emzir (2023).

Data analysis was performed using the Statistical Package for the Social Sciences (SPSS) software. Univariate analysis was used to describe the characteristics of respondents and the distribution of each research variable in the form of frequencies and percentages. Furthermore, bivariate analysis was performed using the McNemar test because the data came from pairs of cases and controls that had been matched by age and sex (Sudaryono, 2021). The statistical significance level was set at  $\alpha = 0.05$ , so a  $p$ -value  $\leq 0.05$  indicates a significant difference between the stunting and non-stunting groups. Additionally, Odds Ratio (OR) and 95% Confidence Interval (CI) calculations were performed to measure the risk factors

of maternal knowledge, complementary feeding intake, and history of early complementary feeding on stunting (Megasari *et al.*, 2024).

**RESULTS AND DISCUSSION**

**Respondent Characteristics**

**Table 1 Characteristics of Toddlers**

Characteristics	Stunted		Non-Stunted	
	n	%	n	%
<b>Children Age</b>				
12-23 months	30	100	30	100
<b>Gender</b>				
Man	16	53.3	16	53.3
Woman	14	46.7	14	46.7
Total	30	100	30	100
<b>Nutritional status</b>				
Very short <-3SD	4	13.3	0	0
Short -3SD sd <-2SD	26	86.7	0	0
Normal -2SD to +3SD	0	0	30	100
Total	30	100	3	100

**Table 1 Mother's Characteristics**

Characteristics	Stunted		Non-Stunted	
	n	%	n	%
<b>Mother's Age</b>				
≤ 19 years	1	3.3	0	0
20-35 years	26	86.7	27	90
>35 years	3	10	3	10
Total	30	100	30	100
<b>last education</b>				
Elementary School	1	3.3	1	3.3
Junior High School	8	26.7	1	3.3
Senior Hig Schoolc	15	50	22	73.3
College	6	20	6	20
Total	30	100	30	100
<b>Mother's job</b>				
Work	7	23.3	5	16.7
Doesn't work	23	76.7	25	83.3
Total	30	100	30	100
<b>Family income</b>				
<UMR(<Rp.4,870,511)	10	33.3	8	26.7
≥UMR (≥Rp.4,870,511)	20	66.7	22	73.3
Total	30	100	30	100

**Univariate Analysis**

**Table 2 Maternal Knowledge Regarding Complementary Feeding**

Category	Stunted		Non-Stunted	
	n	%	n	%
Good (76-100%)	9	30	21	70
Poor (>55-75%)	21	70	9	30
Total	30	100	30	100

**Table 3 Breastfeeding Status of Children Aged 12-24 Months**

Category	Stunted		Non-Stunted	
	n	%	n	%
Breastfeeding	24	80	19	63.3
Non-breastfed	6	20	11	36.7
Total	30	100	30	100

The analysis was conducted based on the children breastfeeding category. For children who were still breastfeeding, three indicators were analyzed: Minimum Meal Frequency (MMF), Minimum Dietary Diversity (MDD), and Minimum Acceptable Diet (MAD). Meanwhile, for children who were not breastfed, four indicators were analyzed: Minimum Meal Frequency (MMF), Minimum Milk Feeding Frequency (MMFF), Minimum Dietary Diversity (MDD), and Minimum Acceptable Diet (MAD).

**Table4 Minimum Meal Frequency (MMF)**

Category	Stunted		Non-Stunted	
	n	%	n	%
Met	18	60	19	63.3
Did not meet	12	40	11	36.7
Total	30	100	30	100

There is an additional category for children who are not breastfed/not breastfed by their mothers, in the stunted group there are 6 children, and in the non-stunted group there are 11 children.

**Table5 Minimum Milk Feeding Frequency For non-Breastfed (MMFF)**

Category	Stunted		Non-Stunted	
	n	%	n	%
Met	6	100	11	100
Did not meet	0	0	0	0
Total	6	100	11	100

**Table 7 Minimum Dietary Diversity (MDD)**

Category	Stunted		Non-Stunted	
	n	%	n	%
Met	19	63.3	27	90
Did not Meet	11	36.7	3	10
Total	30	100	30	100

MDD, MMF, and MMFF are components that make up the MAD indicator, so the following is the MAD achievement as a picture of the fulfillment of comprehensive feeding practices.

**Table 8 Food Intake for children, Minimum Acceptable Diet (MAD)**

Category	Stunted		Non-Stunted	
	n	%	n	%
Met	14	46.7	19	63.3
Did not Meet	16	53.3	11	36.7
Total	30	100	30	100

**Table 9 History of Early Complementary Feeding**

Category	Stunted		Non-Stunted	
	n	%	n	%
Early complementary feeding	11	36.7	2	6.7
No early Complementary Feeding	19	63.3	28	93.3
Total	30	100	30	100

**Bivariate Analysis**

**Table 10 Differences in Maternal Knowledge Regarding Complementary Feeding Among Mothers of Stunted and Non-Stunted Children Aged 12-24 Months**

Maternal knowledge case		Maternal knowledge control		Total	<i>p-value</i>
		Not enough	Good		
Maternal knowledge case	Poor	12	9	21	<0.01
	Good	0	9	9	
	Total	12	18	30	

It can be seen that the significance value of maternal knowledge in stunted and non-stunted children is 0.001 (*p-value* <0.05) which indicates that H1 is accepted, namely there is a significant difference in maternal knowledge between stunted and non-stunted children in the Ganting Health Center work area. In discordant couples, as many as 9 couples showed better maternal nutritional knowledge in the control group compared to the case group.

**Table 11 results of Odd Ratio calculations**

Variables	OR	95% CI	<i>p-value (McNemar)</i>	Information
Mother's knowledge	Cannot be counted ( $\infty$ )	-	<0.01	Discordant cells have a value of 0.

It can be seen that the results of the Odd Ratio calculation cannot be calculated ( $\infty$ ) because one of the discordant pair cells has a value of zero in the paired case control design.

**Table 12 Differences in Complementary Feeding Intake Among Stunted and Non-Stunted Children Aged 12–24 Months**

		MAD control		Total	<i>p-value</i>
		Did not Meet	Met		
MAD case	Did not Meet	5	11	16	0.332
	Met	6	8	14	
	Total	11	29	30	

It can be seen that the significance value of complementary feeding intake in stunted and non-stunted children is 0.332 (*p*-value (>0.005)). This indicates that H0 is accepted, which means that there is no difference in complementary feeding intake between stunted and non-stunted children in the Ganting Health Center work area. In discordant couples, 11 couples showed MAD in the control group that was sufficient compared to the case group, while 6 couples showed the opposite.

Variables	OR	95% CI	<i>p-value</i> (McNemar)
MAD	1.83	0.68-4.95	0.332

Children who did not meet the Minimum Acceptable Diet (MAD) criteria had a 1.83-fold higher likelihood of being stunted compared to those who met the MAD criteria. However, the 95% Confidence Interval (CI) ranged from 0.68 to 4.95 and included 1, suggesting that the association was not statistically significant.

**Table 14 Differences in the History of Early Complementary Feeding Between Stunted and Non-Stunted Children Aged 12–24 Months**

			Early MPASI control		Total	<i>p-value</i>
			Early MPASI	No Early MPASI		
Early case	MPASI	Early complementary feeding	0	11	11	0.022
		No complementary feeding	2	17	19	
		Total	2	28	30	

This indicates that H1 is accepted, namely that there is a significant difference in the history of early complementary feeding in stunted and non-stunted children. In discordant couples, 11 couples showed no history of early complementary feeding, while 2 couples showed the opposite.

Variables	OR	95% CI	<i>p-value</i> (McNemar)
Early complementary feeding	5.5	1.22-24.83	0.022

Children with a history of early complementary feeding had a 5.5-fold higher likelihood of being stunted compared to those who did not receive early complementary feeding. The 95% Confidence Interval (CI) ranged from 1.22 to 24.83 and did not include 1, indicating a statistically significant association.

## **Discussion**

### **Univariate Analysis**

#### **1. Maternal knowledge Regarding Complementary Feeding**

Based on the results of the descriptive test conducted in Table 3, it is known that the majority of mothers in the stunted children group had poor knowledge regarding complementary feeding (MPASI), which is 70%, while in the non-stunted children group, most mothers have a good level of knowledge, which is 70%. These results indicate a difference in maternal knowledge between mothers of stunted and non-stunted children. Maternal knowledge regarding complementary feeding is an important factor influencing child feeding practices. Good knowledge can support the appropriate time, frequency, texture, and portion of complementary feeding according to the child's age. Based on the results of the study, both in the case group (stunted children) and the control group (non-stunted children) there were still inaccurate answers in several aspects of MPASI knowledge. In the case group (stunted children), mothers of children gave more inaccurate answers to questions regarding the benefits, texture, and frequency of complementary feeding (MPASI).

Maternal knowledge regarding complementary feeding is influenced by several factors, one of which is educational level. Mothers with higher education are more receptive to information, thus gaining more information. Mothers with lower education are more likely to experience limitations in receiving information (Turyati & Siti Nurbaeti, 2018). This aligns with research conducted by Simatupang (2021) that found a relationship between education and mothers' knowledge about providing complementary feeding (p-value 0.000).

Based on the results of the research that has been conducted, poor maternal knowledge complementary feeding was more commonly found in mothers with lower education. All mothers with elementary and junior high school education were categorized as having poor knowledge, each at 100%. Meanwhile, in the high school education group, only 35,1% had poor knowledge, indicating that the majority had good knowledge regarding complementary feeding. This indicates a tendency that the higher the level of education of the mother, the better the level of knowledge regarding complementary feeding. According to Notoadmodjo (2018), education level influences the learning process; the higher a person's education level, the easier it is for them to receive and understand information.

#### **2. Complementary Feeding intake**

Based on the results of the analysis of complementary feeding (MPASI) intake obtained through the 24-hour recall method in table 5, then analyzed using indicators of child feeding practices according to WHO and UNICEF recommendations, namely Minimum Meal Frequency (MMF), Minimum Milk Feeding Frequency (MMFF), Minimum Dietary Diversity (MDD), Minimum Acceptable Diet (MAD). Based on the analysis of Minimum Meal Frequency (MMF), it is known that in the stunted children group, 60% of children have met MFF, while 40% of have not met it. In the non-stunted children group, there are 63.3% of children who have met it, and 36.7% have not met it. It is known that all children who do not receive breast milk (non-breastfed), both in the stunted and non-stunted groups meet the indicators of Minimum Milk Feeding Frequency (MMFF). In the stunted children group, there are 6 children (100%) who meet it, and in the non-stunted children group there are 11 toddlers (100%) who meet the MMFF indicator.

However, meeting the MMFF indicator does not necessarily indicate that a child's nutritional needs have been met. In the stunted children group, 80% of children are still breastfed. This may occur because after 6 months of age, a child's nutritional needs can no longer be met solely by breast milk, so complementary feeding intake also play a significant role. At 12-23 months of age, a child's nutritional needs consist of 30% breast milk and 70% complementary feeding intake (Ministry of Health, 2021). Therefore, even if the frequency of breastfeeding is as recommended, if complementary feeding intake do not meet the needs in terms of quantity, quality, and diversity, the child remains at risk of stunting. In the two groups that did not meet the MAD indicator, the contributing factors were different. In the stunted toddler group, the most significant contributing component was the failure to meet the Minimum Dietary Diversity (MDD) indicator, indicating a low diversity of food consumption. Meanwhile, in the non-stunted children group, the component that contributed most to the failure to meet the MAD was the Minimum Meal Frequency (MMF), which showed that the frequency of feeding children in non-stunted children was still not in accordance with age recommendations.

The difference in the quality of complementary feeding (MPASI) intake between stunted and non-stunted children in this study may be influenced by the family's socioeconomic status and the child's age. Based on the results of the study, in the non-stunted children group, the proportion of family income  $\geq$  Minimum Regional Minimum Wage (UMR) was greater than in the stunted children group. This condition can affect the mother's ability to provide diverse and quality complementary feeding (MPASI). Family income level plays an important role in determining nutritional fulfillment in the household, low-income families will be at greater risk of experiencing stunting, which is caused by difficulties in meeting nutritional needs, both in terms of quantity, type, and frequency. If this continues for a sufficient period of time, it can cause physical growth disorders (Wati & Ichsan, 2024). This is in line with the research of R. Putri *et al.*, (2024) that family economic status, maternal occupation, and child age fulfill MAD.

### 3. History of Early Complementary Feeding

Based on the results of the descriptive test that has been carried out in table 9 it is known that the history of providing early complementary feeding intake in stunted children is 11 toddlers (36.7%), while in non-stunted children there are 2 children (6.7%) who have a history of providing early complementary feeding intake. In accordance with the results of Rosita's research, (2021) regarding complementary feeding intake with the incidence of stunting in children, it shows that the age of children when they first received complementary feeding intake has a significant relationship with stunting conditions with a correlation of -0.812 which indicates that the more appropriate the age of providing complementary feeding intake to children, the lower the risk of stunting that occurs.

Based on research by Nababan & Widyaningsih, (2018), mothers who have a good level of education but still provide early complementary feeding intake are influenced by cultural traditions, family traditions, and the assumption that breast milk is not sufficient for infants' needs. Based on the results of interviews with mothers of children who provide early complementary feeding intake, the majority of mothers provide early complementary feeding intake at the age of 5 months. This is also in line with research (Wahdah & Ruhana, 2023) that the average age of providing complementary feeding intake is when the child is 5 months old. According to research conducted by Andriani *et al.*, (2021), it shows that 20.9% of mothers provide complementary feeding intake at the age of 5 months. Providing complementary feeding intake too early, such as bananas and rice, often causes gastrointestinal

blockages or diarrhea and increases the risk of infection, so that children will experience diarrhea (Merben, 2023).

### **Bivariate Analysis**

#### **1. Differences in Maternal Knowledge Regarding Complementary Feeding Among Mothers of Stunted dan Non-Stunted Children Aged 12-24 Months**

The results of the statistical test using McNemar in table 10 obtained a p-value of  $<0.001$  ( $p < 0.005$ ) which indicates a significant difference between the level of knowledge of mothers in stunted children and non-stunted children in the Ganting Community Health Center work area. The results of this study indicate that in the stunted children group, the majority of mothers have knowledge that is included in the poor category, while in the non-stunted children group, the majority of mothers have knowledge in the good category. Based on the results of the Odds Ratio calculation, it is known that the OR value cannot be calculated. This may be caused by one of the cells in the matched case control design having a discordant value of zero. This condition indicates that there are no pairs of respondents where the mother in the stunted group has good knowledge while the mother in the non-stunted group has poor knowledge. This indicates a fairly clear difference in knowledge patterns between the two groups of respondents. Although the OR value cannot be calculated statistically, the significant results of the McNemar test indicate a difference in the level of knowledge of mothers between stunted and non-stunted children.

This finding is in line with the research of Ramdaniati & Nastiti (2019) that there is a significant relationship between the level of maternal knowledge about nutrition and the incidence of stunting in children because the p-value ( $0.018$ )  $< \alpha$  ( $0.05$ ) with an OR value of 3.167 which means that mothers who have a low level of knowledge about nutrition will be 3.167 (CI 95%: 1.195-8.389) times more at risk of causing stunting in their children compared to mothers who have high knowledge. In a study conducted by Nimah & Sukendra (2023) that mothers who have less knowledge and have stunted children are 72.7%, while mothers who have less knowledge and have children who are not stunted are 27.3%. The results of the chi-square test showed a p-value of 0.030 which can be seen that there is a relationship between maternal knowledge about complementary feeding and the incidence of stunting. This finding indicates that low maternal knowledge about nutrition plays a role in the occurrence of stunting in children.

Mothers' knowledge about complementary feeding is influenced by several factors, one of which is education. Education can influence how they view themselves and their environment. Mothers with higher education will find it easier to receive information, while mothers with lower education will find it more difficult to receive information (Turyati & Nurbaeti, 2018). Factors influencing knowledge include internal and external factors. Internal factors include age, education, and occupation. External factors include information sources, environment, and socio-cultural factors (Rizkia, 2022). According to (Muzayyaroh, 2021), knowledge can be obtained from various information media such as counseling, seminars, and even social media. Mothers who have the ability to receive and apply information will increase their knowledge.

#### **2. Differences in Complementary Feeding (MPASI) intake among stunted and non-stunted Children Aged 12-24 Months**

Based on the results of the analysis of Complementary Feeding (MPASI intake) obtained through the 24-hour recall method, then analyzed using indicators of child feeding practices according to WHO and UNICEF recommendations, namely Minimum Meal Frequency (MMF), Minimum Milk Feeding Frequency (MMFF), Minimum Dietary Diversity (MDD), Minimum Acceptable Diet (MAD). The results of the McNemar statistical test obtained a p-value of 0.332 ( $p\text{-value} > 0.05$ ) which indicates no

significant difference between MPASI intake in stunted and non-stunted children in the Ganting Health Center work area. The results of the Odds Ratio calculation show that the OR value is 1.83 which indicates that children who do not meet the MAD indicators have a 1.83 times greater tendency to have a greater chance of being stunted than children who meet the MAD indicators.

This finding aligns with Putri *et al.*'s (2025) chi-square test results, which showed a p-value of 0.899, indicating statistical insignificance. The OR calculation result was 1.3, indicating that children aged 6-23 months who did not meet the MAD criteria had a 1.3-fold greater risk of stunting. According to Molla *et al.* (2021), MAD is a variable influenced by several factors, including maternal education, paternal education, antenatal visits, and residence. The insignificant effect of MAD on stunting may be due to the child's health condition, which can increase their nutritional needs, so stunting can occur even though child feeding practices are adequate (Julianti & Elni, 2022).

This study also aligns with Hanan & Riyadi's (2023) study, which showed that the MAD indicator was not significantly related to stunting. The MMF indicator, however, did show a significant relationship with stunting. This suggests that age-appropriate feeding frequency can have a greater impact on child growth. Furthermore, the study also showed that child age and maternal education were significantly related to stunting, suggesting that stunting is influenced by several factors and is not solely determined by feeding practices.

### 3. Differences in the History Early Complementary Feeding among Stunted and Non-Stunted children Aged 12-24 Months

The results of the statistical test using McNemar in the table obtained a p-value of 0.022 ( $p < 0.05$ ) which indicates a significant difference in the history of early complementary feeding in stunted and non-stunted children. The results of the Odd Ratio calculation show that the OR value is 5.5 which means that children who have a history of early complementary feeding have a 5.5 times greater chance of experiencing stunting than those who do not receive early complementary feeding. This finding is in line with the research of Yoshua Prihutama *et al* (2018) that the results of the Kruskal Wallis p-value test of 0.000 were obtained by children with early complementary feeding as many as 34 (65.4%) as cases and 5 children (9.6%) as controls, and children who received early complementary feeding have a 17.65 times greater risk of experiencing stunting compared to children who received complementary feeding >6 months.

This study is also in line with the research of Marfuah *et al* (2023) which showed the results of the chi square test p-value of 0.000 indicating a difference between the history of providing complementary feeding intake in stunted and non-stunted children. Based on the results of the Odd Ratio, it was concluded that the provision of early complementary feeding intake had a risk of experiencing stunting by 75.4 times greater than toddlers with a history of providing complementary feeding intake appropriate for their age. In the study of Fitri & Ernita, (2019) which showed the results of the chi square test obtained a p-value of 0.001 which means there is a significant relationship between the provision of early complementary feeding intake and the incidence of stunting in children. One factor that parents provide complementary feeding intake too early is because they believe that breast milk alone is not enough to meet the child's needs. Also, there are other parents who provide complementary feeding intake before the age of 6 months but their children remain healthy and do not experience health problems, therefore mothers are not worried about providing complementary feeding intake too early to their children (Nababan *et al.*, 2018)

## CONCLUSION

This study shows that there are significant differences in maternal knowledge regarding complementary feeding and the history of early complementary feeding between stunted and non-stunted children aged 12–23 months in the Ganting Community Health Center Working Area. Most mothers in the stunted group have a low level of knowledge about complementary feeding, while the majority of mothers in the non-stunted group have a good level of knowledge. In addition, a history of early complementary feeding was found to be more common in the stunted group and was shown to increase the chance of stunting by 5.5 times compared to children who received complementary feeding according to age recommendations. In contrast, complementary feeding intake as measured by the Minimum Acceptable Diet (MAD) indicator showed no significant difference between the two groups, although children who did not meet the MAD indicator had a higher risk of stunting. These findings confirm that parenting behavioral factors, especially maternal knowledge and the timeliness of complementary feeding, have an important role in preventing stunting in children.

However, this study has several limitations. The case-control design cannot directly explain causal relationships, while the relatively small sample size and the study's coverage limited to a single community health center (Puskesmas) area limit the generalizability of the results. Furthermore, measuring complementary feeding intake using a 24-hour recall method has the potential to introduce respondent recall bias. Therefore, future research is recommended to use a longitudinal or cohort design with a larger sample size and include other variables such as maternal nutritional status, history of infectious diseases, household food security, parenting patterns, and sociocultural factors. Practically, the results of this study can serve as a basis for community health centers and policymakers to strengthen nutrition education programs, counseling on appropriate complementary feeding, and promoting exclusive breastfeeding through integrated health posts (Posyandu) and primary health care services to reduce the risk of stunting in early childhood.

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## **MATERNAL KNOWLEDGE OF COMPLEMENTARY.....**

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