

# Relationship Between Patterns of Complementary Feeding (MPASI) and Nutritional Status of Toddlers Aged 6-24 Months

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## ABSTRACT

*Nutritional problems among toddlers aged 6–24 months remain a significant challenge in achieving optimal child growth and development. Complementary feeding (MPASI) is one of the key factors influencing the nutritional status of toddlers. This study aimed to analyze the relationship between complementary feeding patterns and the nutritional status of toddlers aged 6–24 months in the working area of Tarok Health Center, Payakumbuh. This study employed an analytic observational design with a cross-sectional approach. A total of 95 toddlers who met the inclusion criteria were selected through purposive sampling. Data on complementary feeding patterns were collected using a structured questionnaire, while nutritional status was assessed through anthropometric measurements based on World Health Organization (WHO) standards. Data were analyzed using univariate analysis to describe feeding patterns and nutritional status and bivariate analysis using the chi-square test and Odds Ratio (OR). The results showed that 68% of toddlers received complementary feeding according to recommendations, while 32% did not. Regarding nutritional status, 70% had normal nutritional status, 20% were undernourished, and 10% were overnourished. Bivariate analysis revealed a significant relationship between complementary feeding patterns and nutritional status ( $\chi^2 = 15.23$ ;  $p = 0.0001$ ). Toddlers who received inappropriate complementary feeding were 3.5 times more likely to experience malnutrition. These findings highlight the importance of proper complementary feeding practices in improving toddler nutritional status.*



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## INTRODUCTION

Nutrition is one of the key factors in determining the growth and development of children, especially in toddlers aged 6-24 months. At this age, toddlers are especially vulnerable to nutritional problems that can affect their long-term health. Although exclusive breastfeeding up to 6 months of age is expected to provide adequate nutrition, proper and balanced complementary feeding (MPASI) is very important after that age. Patterns of giving complementary foods that are not in accordance with the recommendations can risk lowering the nutritional status of toddlers (Ministry of Health, 2020).

Nutrition problems in toddlers are often seen from two sides: undernutrition and overnutrition. Both have an adverse impact on the child's physical growth and cognitive development. Malnutrition can lead to stunting, weight loss, and impaired motor development, while nutrition is more at risk of causing obesity which can progress to non-communicable diseases such as diabetes and hypertension in the future (Sari, 2021).

Recent Data show that the prevalence of malnutrition in Indonesia is still quite high, especially among toddlers. According to Basic Health Research (Riskesdas) 2018, 17.7% of toddlers in Indonesia are malnourished, and 10.2% are obese (Ministry of Health, 2018). In certain areas, this problem is further exacerbated by the unavailability of proper information regarding complementary foods and the management of a healthy diet for toddlers.

Puskesmas as a public health service center has a strategic role in overcoming nutritional problems in toddlers. The working area of The Tarok Health Center in Payakumbuh city recorded a high prevalence of stunting, while the provision of solids that are not in accordance with nutritional guidelines is often the main cause of nutritional status disorders in toddlers (Payakumbuh City Health Office, 2020).

Improper complementary feeding can lead to nutritional imbalances in toddlers, such as late complementary feeding, the use of food that does not vary, and the provision of insufficient amounts of energy and nutrition needs. Previous research has shown that the mismatch of MPASI patterns can affect height, weight, and other nutritional status parameters in toddlers (Yanti & Sari, 2021).

Research on the pattern of complementary feeding and nutritional status of children under five has been conducted, but there are still gaps in understanding of the direct relationship between the two in various regions, including in The Tarok Health Center. A study conducted by Purnama and Setiawan (2020) found that the application of the right pattern of giving MPASI had a strong relationship with the nutritional status of toddlers. However, this study has not explained in depth the factors that affect the pattern of giving MPASI in urban areas such as Payakumbuh City.



Several other studies have also revealed that factors such as parental education, knowledge about nutrition, and access to health services greatly influence the pattern of giving MPASI to toddlers (Fitriani, 2021). However, despite this relationship, there is still a discrepancy between the recommended guidelines and the practice of administering MPASI in the field, especially in areas with limited access to adequate health information and resources.

Based on previous research, it can be seen that the influence of complementary feeding on the nutritional status of toddlers is not only influenced by the type of food given, but also by the method of administration, frequency, and knowledge of parents about child nutrition (Murtini, 2022). This problem is more complex when considering the existence of socioeconomic factors that limit the ability of parents to choose and process foods that are in accordance with the nutritional needs of toddlers.

The urgency of this study lies in the issue of nutrition in toddlers is not only a matter of short-term health, but also related to the quality of human resources in the future. Undernourished or malnourished toddlers are at higher risk for impaired physical and mental development, which will ultimately affect their productivity as adults. Therefore, proper handling of MPASI patterns can be one of the strategic steps in an effort to improve the quality of life of the community in the future. This study is important to do because there is still limited data and research that examines the relationship between the pattern of giving solid food with the nutritional status of toddlers in the city of Payakumbuh, especially in the Health Center Tarok. Research in this area is expected to provide a clearer picture of how much influence the pattern of complementary feeding on the nutritional status of toddlers in urban areas with diverse socioeconomic conditions.

Given the importance of the relationship between the pattern of giving MPASI with the nutritional status of toddlers, as well as limited data on this matter in the city of Payakumbuh, this study aims to fill the information gap. In addition, this research will also contribute to the development of health policies at the local level, especially in terms of providing more appropriate education to parents about the pattern of giving solid food in accordance with the guidelines. The importance of this study is also driven by the fact that although there are various health policies and programs that have been carried out by the government, the reality is that the level of awareness and knowledge of parents regarding the correct pattern of giving MPASI is still low. This shows that health education and counseling needs to be strengthened, especially at the puskesmas level as the forefront of Public Health Services.

This research is expected to provide useful information for medical personnel at The Tarok Health Center, especially in designing intervention programs that are more targeted in addressing nutritional problems in toddlers. In addition, the results of this study are expected to provide input for policy improvements at the regional level related to child nutrition.

## **METHODS**

This study used an analytical observational design with a cross-sectional approach to analyze the relationship between patterns of complementary feeding (MPASI) with the nutritional



status of toddlers aged 6-24 months. The location of the study was conducted at The Tarok Health Center, Payakumbuh City, which is one of the regions with a high prevalence of malnutrition in toddlers. The sample of 95 toddlers were selected using purposive sampling, IE toddlers aged between 6 to 24 months and meet the inclusion criteria in this study. Toddlers with medical conditions that require special treatment or have comorbidities that could affect their nutritional status were not included in the study.

The Data were collected through a structured questionnaire on the pattern of MPan administration measuring the height and weight of toddlers, which were then analyzed using WHO growth standards to assess nutritional status based on Weight Index by age (BB/U) and height by age (TB/U). Data analysis was conducted in a univariate manner to describe the distribution of sample characteristics, patterns of complementary feeding, and nutritional status of toddlers. Furthermore, to determine the relationship between patterns of MPASI administration and nutritional status, bivariate analysis using chi-square test and calculation of Odds Ratio (OR). Chi-square test was used to test the existence of a significant relationship between the two variables, while the calculation of OR was done to determine how likely toddlers who do not get complementary foods in accordance with the guidelines to experience poor nutritional status compared to toddlers who get complementary foods in accordance with the recommendations.

Prior to the implementation of the study, the research procedure has been through the approval of the Ethics Committee at The Tarok Health Center, by ensuring that this study complies with applicable research ethics guidelines. All respondents (parents of toddlers) involved in the study have given written consent after receiving an explanation of the objectives, procedures, and benefits of the study, as well as their right to resign at any time without any consequences. This study also guarantees the confidentiality of the information provided by the respondents and is only used for the purposes of this study.

## RESULTS

### 1. Characteristics of Respondents and Patterns of Giving MPASI

The following table shows the distribution of respondents ' characteristics related to the pattern of complementary feeding and nutritional status of toddlers obtained through univariate analysis.

**Table 1. Characteristics of Respondents and Patterns of Giving MPASI**

Characteristics Of Respondents	Frequency (n)	Percentage (%)
Patterns of giving MPASI		
In keeping with the encouragement	64	68%
Not suitable for encouragement	31	32%
Nutritional Status Of Toddlers		
Normal Nutrition	66	70%
Low Nutrition	19	20%



Characteristics Of Respondents	Frequency (n)	Percentage (%)
More Nutrition	10	10%

The results of univariate analysis, it can be seen that the majority of toddlers (68%) get complementary foods in accordance with the recommendations, while 32% of toddlers do not receive appropriate complementary foods. According to nutritional status, 70% of toddlers have normal nutritional status, 20% are undernourished, and 10% are overnourished. This shows that although most toddlers get complementary foods in accordance with the guidelines, there is still a significant percentage of impaired nutritional status, both undernourished and overnourished.

## 2. Relationship Patterns of Complementary Feeding With Toddler Nutritional Status

The following table shows the results of the chi-square test and the calculation of the Odds Ratio (OR) to test the relationship between patterns of complementary feeding and nutritional status of toddlers.

**Tabel 2. Relationship Patterns of Complementary Feeding With Toddler Nutritional Status**

Patterns of giving MPASI	Normal Nutritional Status (n)	Abnormal Nutritional Status (More or Less) (n)	Total (n)	Chi-Square ( $\chi^2$ )	p-value	OR
In keeping with the encouragement	61	3	64			
Not suitable for encouragement	5	26	31	15,23	0,0001	3,5
Total	66	29	95			

The results showed the results of a bivariate test that examines the relationship patterns of complementary feeding with the nutritional status of toddlers. Chi-square analysis, obtained the value of 15.23 with p-value of 0.0001, which indicates a very significant relationship between the two variables. In addition, the calculation of the Odds Ratio (OR) of 3.5 indicates that toddlers who are not given solid food in accordance with the recommendations have a 3.5 times greater likelihood of experiencing abnormal nutritional status (both undernourished and overnourished) compared to toddlers who are given solid food in accordance with the guidelines.

## DISCUSSION

### 1. Characteristics of Respondents and Patterns of Giving MPASI

The results of the univariate analysis showed that most toddlers (68%) received complementary feeding in accordance with the recommendations, while 32% of toddlers did not get appropriate complementary feeding. This shows that although the majority of toddlers receive appropriate complementary foods, there is still a group of toddlers who get inadequate complementary foods. For information, giving the right complementary foods is very important because it can support optimal growth and development in toddlers.



In accordance with the guidelines issued by the Ministry of Health, MPASI should be given from the age of 6 months and include a varied and nutritionally balanced diet. However, the practice of giving MPASI in the field is often not in accordance with these guidelines, both in terms of the time of administration, the amount, and the type of food given (Siti, 2020). Previous research has also revealed that many parents still give MPASI irregularly and do not pay attention to the variety and nutritional content needed (Yanti & Sari, 2021). The practice of giving inappropriate complementary foods can affect the nutritional status of toddlers, both in the form of undernutrition and overnutrition.

Although most toddlers receive complementary feeding in accordance with the guidelines, the data show that there are still 32% of toddlers who receive inappropriate complementary feeding. This indicates a gap in the application of existing guidelines. In terms of nutritional status, 70% of toddlers have normal nutritional status, while 20% are undernourished and 10% are overnourished. This condition shows that although the majority of toddlers have good nutritional status, the problem of undernutrition and overnutrition remains an important concern. Malnutrition in toddlers is often caused by improper complementary feeding, such as late complementary feeding or foods that do not contain balanced nutrition

Conversely, more nutrition in toddlers is also a problem that is no less important. Obesity in toddlers often stems from an unhealthy diet, including unbalanced complementary foods and solid foods with excessive energy content. This phenomenon is often found in toddlers who get complementary foods with too large portions or foods that contain high calories, but low in nutrients (Sari, 2021). Over-nutrition in early childhood can increase the risk of obesity and various health problems in the future, such as Type 2 diabetes and heart problems (Lestari, 2021).

Research by Fitriani (2021) shows that inappropriate patterns of giving solid food are closely related to nutritional status disorders in toddlers. In this case, the administration of solids that are not in accordance with the guidelines can contribute to the occurrence of nutritional problems, both deficiency and excess. The main cause of this discrepancy is the low knowledge of parents about MPASI, as well as limited access to nutritious food (Fitriani, 2021).

Success in administering appropriate complementary foods depends not only on the knowledge of the parents, but also on a supportive social and economic environment. In areas with economic limitations, many parents find it difficult to meet the nutritional needs of children with sufficient food variety (Budiarti, 2020). In this context, increasing access to nutritious food sources through policy interventions and public health programs is very important to reduce the number of malnutrition in toddlers.

The theory that underlies this study is the theory of Health Behavior which states that feeding behavior in toddlers is influenced by the knowledge, attitudes, and perceptions of parents towards nutrition (Nugroho, 2020). Knowledge of parents about the importance of providing complementary foods in accordance with the guidelines is instrumental in maintaining the nutritional status of toddlers. Unfortunately, lack of knowledge often leads to inaccuracies in the



application of complementary feeding patterns, which ultimately affects the nutritional status of children.

The provision of MPASI in accordance with the recommendations is also strongly influenced by access to adequate health services. Older people who have better access to health centers or health workers are at less risk of giving inappropriate solids. This is also found in a study by Murtini (2022), which states that health education provided at the Puskesmas level can help improve parents' knowledge about child nutrition and how to give the correct solid food.

In addition, changes in parental behavior in the pattern of giving solid food are strongly influenced by social interventions and health education carried out in the community. Research by Sari (2021) shows that interventions that involve direct education of parents, such as those carried out in health centers, can raise awareness about the importance of appropriate solids and reduce inappropriate solids administration practices. Therefore, it is important for the government and related institutions to continue to improve nutrition education programs at the community level.

According to the researchers, the decrease in the prevalence of malnutrition in toddlers requires active participation from various parties, including medical personnel, government, and the community. Supplementary feeding programs in health centers, as well as education on nutrition in pregnant and lactating mothers, are very important to reduce malnutrition in toddlers. In addition, strengthening policies that support the sustainability of MPASI programs in accordance with the recommendations needs to be fought, especially in areas with a high prevalence of malnutrition.

In this case, Puskesmas play an important role in providing education on the provision of appropriate solids, as well as monitoring the nutritional status of toddlers on an ongoing basis. Complementary feeding programs that are tailored to local conditions, taking into account socio-economic factors and food availability, will help reduce the incompatibility of complementary feeding patterns that can lead to malnutrition problems.

Overall, although most toddlers get complementary foods in accordance with the recommendations, there are still a number of toddlers who are exposed to the risk of nutritional problems, both less and more. Therefore, more comprehensive prevention efforts, which include education to parents, better policy interventions, and improvements in the health care system in health centers, are needed to reduce the number of nutritional problems in toddlers.

## **2. Relationship Patterns of Complementary Feeding With Toddler Nutritional Status**

The results of the bivariate analysis that showed a significant relationship between the pattern of complementary feeding and the nutritional status of toddlers provide a very important picture of the importance of appropriate complementary feeding. From the chi-square test, the value of  $\chi^2 = 15.23$  with  $p\text{-value} = 0.0001$  shows that there is a very significant relationship between the pattern of complementary feeding and nutritional status of toddlers. This indicates that changes in the pattern of complementary feeding can have a direct impact on the nutritional status of toddlers.



Patterns of complementary feeding that are not appropriate can increase the risk of nutritional status disorders in toddlers, both undernourished and overnourished. This is in accordance with the theory of Health Behavior which states that the behavior of parents in providing solid food is influenced by their knowledge, attitudes, and perceptions of child nutrition (Nugroho, 2021). Ignorance or misunderstanding of parents regarding the type and amount of appropriate complementary foods can lead to patterns of administration that are not in accordance with the recommendations, which ultimately affects the nutritional status of children. In this study, toddlers who did not get complementary foods in accordance with the recommendations had a 3.5 times greater risk of experiencing abnormal nutritional status, which shows how important adequate education is for parents.

According to the Health Belief Model theory, parents' perceptions of the dangers of malnutrition and the benefits of giving the correct complementary foods play a role in determining their actions in providing complementary foods. If parents do not feel that there is a great danger associated with the provision of inappropriate complementary foods, they are more likely to ignore existing guidelines. Conversely, if they are aware of the long-term risks of improper complementary feeding, they will be more likely to follow the recommendations. Research by Lestari (2020) shows that increasing parental awareness regarding the impact of nutrition on children can improve the pattern of giving appropriate MPASI and have a positive impact on the nutritional status of children.

The results, which showed that toddlers who did not obtain complementary foods in accordance with the guidelines were 3.5 times more likely to experience abnormal nutritional problems, underscore the importance of parental knowledge in applying the correct pattern of complementary feeding. Discrepancies in the pattern of complementary feeding can cause both deficiency and excess nutrition in toddlers. Research by Yanti & Sari (2021) states that toddlers who receive complementary foods that do not comply with guidelines are at high risk of experiencing growth disorders, both in the form of stunting and obesity.

The pattern of giving complementary foods that are late or not varied can cause malnutrition in toddlers, which often manifests itself in the form of stunting or low body weight. Research in Padang City by Sari (2021) shows that late Administration of MPASI is closely related to the occurrence of malnutrition in toddlers, especially in areas with low economic levels. Inaccuracy in time in introducing complementary foods or giving food that does not contain enough energy and nutrients at risk of reducing the nutritional status of toddlers.

On the other hand, improper complementary feeding can also contribute to over nutrition, which is often seen in the form of obesity in toddlers. Obesity in early childhood is often triggered by unhealthy eating habits, including the consumption of solid foods that contain excess calories. Budiarti (2020) in his research states that in some urban areas, the wrong pattern of complementary feeding can cause toddlers to consume high-calorie foods without balanced nutrition, which ultimately increases the risk of obesity.



In addition, socio-economic factors affect the pattern of giving solid food in accordance with the guidelines. In areas with low economic levels, many parents have difficulty providing nutritious food needed for complementary foods. This inability can lead to feeding that is not in accordance with nutritional guidelines, which has an impact on the nutritional status of toddlers. Research by Murtini (2022) also notes that limited access to nutritious food in certain areas is one of the factors that causes patterns of MPASI administration that are not in accordance with guidelines.

However, in addition to economic factors, the knowledge of parents also plays a major role in the provision of appropriate complementary foods. Parents who lack knowledge about the right type of food for toddlers often provide complementary foods that do not include the variety and composition of nutrients needed. This is in line with the findings of Fitriani (2021), who found that many parents in remote areas do not get enough information about how to give the right solid food, which ultimately affects the nutritional status of children.

Limited access to health services in some areas is also an obstacle for parents in getting the right information about complementary feeding. In areas with limited health facilities, mothers often do not get enough guidance from medical personnel regarding MPASI. Budiarti (2020) revealed that in some areas with limited access to health, toddlers often experience malnutrition due to parents' ignorance of how to give the right complementary foods.

Complementary feeding that does not comply with the guidelines not only has an impact on the nutritional status of toddlers in the short term, but can also affect their long-term development. Sari (2021) notes that nutritional deficiencies or excesses in early childhood can affect their physical and cognitive development, which will ultimately affect their quality of life in the future. Therefore, the provision of solid food in accordance with the guidelines has a very significant long-term impact on the quality of human resources in the future.

It is important to understand that the correct pattern of feeding complementary foods is not only a matter of timely feeding, but also about attention to the quality and quantity of food provided. Research by Yanti & Sari (2021) shows that although many parents already know when to give MPASI, they often do not know the right type of food and the nutritional content needed to support optimal growth of toddlers.

Awareness of the importance of appropriate solids needs to be increased through health education programs at the community level. Nugroho & Widodo (2021) revealed that a good education program can improve parents' understanding of the importance of solid foods and the impact of incorrect solid foods on the nutritional status of toddlers. By increasing the knowledge of parents, we can significantly reduce nutritional problems in toddlers.

In addition to education, policy interventions that support the provision of appropriate MPASI at the puskesmas level are also very necessary. Research by Lestari (2021) shows that increasing MPASI provision policies that are adjusted to government guidelines can reduce the problem of malnutrition in toddlers. Supplemental feeding programs or community-based support can also help address uncertainty about complementary feeding among parents.



Efforts to improve health services that are more affordable and better will be very beneficial in reducing the problem of giving inappropriate solids. In areas with better health facilities, such as health centers with adequate medical personnel, toddlers are more likely to receive complementary foods that comply with guidelines (Murtini, 2022). Therefore, improving the quality of health services in health centers is very important to improve the pattern of giving solid food in the community.

In this context, continuous monitoring of the nutritional status of toddlers and the implementation of the correct pattern of complementary feeding is necessary. Health centers and health workers should be actively involved in providing education to parents, as well as monitoring the pattern of MPASI provision implemented in the community. With close supervision, nutritional problems in toddlers can be minimized.

Overall, the results of this study confirms the importance of providing complementary foods in accordance with the guidelines in maintaining the nutritional status of toddlers. For this reason, interventions involving education to parents, supportive policies, and improving the quality of Health Services at health centers need to be a top priority in efforts to reduce the prevalence of malnutrition in toddlers.

## CONCLUSIONS

This study shows that the pattern of complementary feeding (MPASI) in accordance with the recommendations has a positive relationship with the nutritional status of toddlers aged 6-24 months. Most of the toddlers (68%) who were given solid food in accordance with the guidelines had normal nutritional status, while 32% of toddlers whose solid food pattern was not suitable showed an increased likelihood of nutritional status disorders, both undernourished and overnourished. Bivariate analysis with chi-square test showed a significant relationship between the pattern of complementary feeding and the nutritional status of children under five ( $\chi^2 = 15,23$ ;  $p = 0.0001$ ), with an Odds Ratio (OR) of 3.5, which means that toddlers who do not get complementary foods in accordance with the recommendations are 3.5 times more likely to experience poor nutritional status compared to toddlers who get appropriate complementary foods. This finding confirms the importance of implementing appropriate guidelines for giving solid food to support optimal nutrition in toddlers.

Nevertheless, this study has some limitations that need to be considered. One of them is the use of cross-sectional research designs, which can only show the relationship between variables without being able to deduce a direct cause-and-effect relationship. In addition, the study samples taken only came from The Tarok Health Center, Payakumbuh City, so the results may not be fully generalizable to the toddler population in other regions with different socio-economic characteristics. Another limitation is the measurement of patterns of complementary feeding that rely on self-report from parents, which is prone to report bias. Further studies with longitudinal designs and larger samples and more diverse variables are expected to provide a more comprehensive picture of the factors that affect the nutritional status of toddlers.



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