



# The Relationship Between Supplementary Feeding Consumption Made from Local Foods and the Nutritional Status of Wasting and Stunting Toddlers

Siti Rachmah<sup>1\*</sup>, Nurul Mawaddah<sup>1</sup>, Rhisma Andini Ainul Rahim<sup>1</sup>


<sup>1</sup> Program Studi Pendidikan Ners,  
STIKES Majapahit, Mojokerto,  
Indonesia

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## Abstract

Indonesia still faces nutritional problems in toddlers, especially malnutrition (wasting) and stunting, which can lead to the loss of a quality generation. The government has implemented a PMT (Supplementary Feeding) program made from local foods to improve nutritional problems in toddlers. The purpose of this study was to examine the relationship between the consumption of PMT made from local foods and the nutritional status of toddlers with wasting and stunting. This study used a quantitative method with an analytical observational research type that used an ex post facto research design. Sampling used a proportional random sampling technique with a total of 43 respondents. Data collection techniques used an interview guide sheet, an observation sheet for changes in nutritional status in the form of weight data before and after the PMT program was implemented. The results of the study after conducting interviews with toddler mothers showed that the majority of respondents (58.1%) had consumed PMT made from local foods in accordance with the program's recommendations, and as many as 58.2% of respondents experienced an increase in nutritional status after being given PMT made from local foods according to the program. The results of statistical tests showed a significant relationship between the consumption of PMT made from local foods and the nutritional status of toddlers. Consumption of PMT made from local foods can improve the nutritional status of toddlers with malnutrition and stunting.

**Keywords:** Local food, Nutritional status, Supplementary feedings, PMT, Stunting, Toddlers

## Correspondence

Siti Rachmah  
Program Pendidikan Ners STIKES Majapahit Mojokerto, Indonesia  
Jl. Raya Gayaman, Mojoanyar, Mojokerto, Jawa Timur 61364  
Email: rachmah64@gmail.com

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## 1. BACKGROUND

Indonesia is still facing major nutritional problems, namely wasting and stunting in toddlers, which can lead to a

lost generation (Sari et al., 2023). Toddlers who experience stunting, in addition to stunted physical growth, also experience impaired cognitive abilities such as low

learning abilities, mental disorders, decreased intelligence due to imperfect brain development, decreased quality of human resources in the future, the risk of chronic diseases in adulthood, stunted children tend to have more difficulty concentrating on learning and understanding lesson materials at school (Novianti et al., 2021). Nutritional problems, if not addressed optimally, will impact the nutritional status of children, such as wasting, stunting, underweight, and obesity. Therefore, efforts are needed to improve the nutritional status of toddlers.

The prevalence of wasting (undernutrition) according to SSGI 2022 data shows an increase, namely, from 7.1% to 7.7%. Meanwhile, globally, the prevalence of stunting worldwide was 22% or as many as 149.2 million people in 2020. According to data from the Ministry of Health, the stunting rate in Indonesia remains quite high, reaching 24.4% and decreasing to 21.6% in 2022, recorded at 21.5%, only a decrease of 0.1% from the previous year. Meanwhile, the target to be achieved is 14% by 2024 (Ministry of Health of the Republic of Indonesia, 2023). An average reduction of 3.8% is needed per year. Based on data obtained from East Java Province, the prevalence of stunting in

2022 was 19.2%, while in 2023 there was a decrease in prevalence of 17.7% (Dinkes, East Java 2023). According to 2021 SSGI data, the prevalence of stunting in Gresik Regency was 23%, followed by a decline in the prevalence of stunting in Gresik Regency in 2022, reaching 10.7% (Gresik Regency Health Office 2022). This exceeded the national target of 14%. Although stunting prevalence has decreased compared to the previous year, Indonesia must continue to work hard to prevent new cases of stunting, particularly those caused by poor diet and parenting.

The Gresik Regency Government is very serious and continues to strive to prevent and reduce the rate of malnutrition and stunting to 0%. Gresik Regency also has a stunting acceleration team (TPPS). Not only that, Gresik Regency continues to strive to reduce malnutrition and stunting, one of which is by launching a new innovation, the GUS (Gresik Urus Stunting) application. This application will continue to be developed more completely and comprehensively to support the acceleration of the reduction of stunting and malnutrition rates in Gresik Regency which will be implemented for the publication of stunting data and specific intervention assistance, namely the provision of supplementary food made

from local foods (PMT) for stunted and malnourished toddlers. Local food ingredients related to the acceleration of the reduction of stunting and malnutrition rates in Gresik require quite high protein while Gresik City is known for its extensive fishing areas. Gresik City is a protein warehouse. Various types of high-protein foods can be obtained in Gresik by utilizing seafood such as milkfish, tilapia, catfish, shrimp, lobster and others which are then processed into a variety of food ingredients that are easy to consume by toddlers. In addition, local food ingredients are relatively easier to obtain in almost all areas in the Gresik region, including utilizing catfish ponds, harvesting large amounts of patin fish, tilapia, and mujaer which are the result of cultivation in local reservoirs for food security programs and helping to overcome stunting problems in the village. Therefore, the government has established priority health efforts in nutrition services, namely through efforts to reduce the prevalence of malnutrition and stunting with a program providing supplementary recovery food (PMT-P) made from local food.

PMT is provided through community health centers with cross-sector support such as sub-districts, village midwives, cadres, and others. This program runs for

90 days according to consumption requirements where the aim is to improve the nutritional status of toddlers so that they achieve good nutritional status and nutritional conditions according to their age (Ministry of Health of the Republic of Indonesia, 2023). Based on the results of a preliminary study conducted by researchers through interviews with 5 mothers of target toddlers, it was found that PMT made from local food given to toddlers was not consumed properly or according to recommendations. Reasons for not being consumed according to recommendations include toddlers not finishing the PMT menu given because they don't like it, toddlers only finish a few menus they like such as fruits and vegetables, and some said the fishy smell, and high oil content that make toddlers unwilling to consume PMT, and the lack of taste that makes toddlers unwilling to consume PMT and prefer snacks or snacks that make them quickly full before consuming PMT. So that mothers do not force their children to consume PMT, the aim is to prevent toddlers from crying.

The supplementary feeding program for toddlers has been well implemented, but obstacles and problems are evident in the process, input, and output (Aini et al., 2023). The factor that causes obstacles to

the program's failure to achieve is that PMT (Food-Based Food) made from local foods is not consumed according to recommendations. Based on the results of research by Irwan et al., (2020), it shows that poor consumption is closely related to low family economic factors, which limit the selection of highly nutritious food ingredients, and low parental knowledge about selecting nutritious local ingredients and cooking methods that are attractive to toddlers (thus children refuse). A factor causing low PMT consumption is the habit of consuming snacks excessively, which is one of the causes of toddlers experiencing eating difficulties. This makes them feel full before mealtimes. In accordance with the results of a study by Asnaningsih et al. (2024), it shows that children with a high frequency of snack consumption mostly experience low appetite. Excessive consumption of snacks can cause children to feel full before mealtimes, negatively impacting the intake of main foods, including PMT. Another factor is that some toddlers' diets are also less varied and only consume foods they like, such as rice with chicken or egg side dishes, or rice and broth alone, which can disrupt metabolism in the body due to an imbalance in nutrients that causes toddlers to experience malnutrition (Amala et al., 2023). Based on the above

background, researchers conducted a study to determine "The Relationship Between PMT Consumption Made from Local Foods and the Nutritional Status of Wasting and Stunting Toddlers".

## 2. METHODS

This study uses an analytical observational research type, with an Ex Post Facto Research research design, which aims to see programs or activities that have been ongoing or have occurred. The population of this study were all mothers of wasting and stunting toddlers, and had received PMT made from local food, using the Proportionate random sampling technique, a sample of 43 toddlers was obtained. The research instrument used an interview guide sheet, an observation sheet for changes in nutritional status obtained from secondary data obtained from nutritionists at the Community Health Center in the form of weight data before and after giving PMT made from local food. Data collection was carried out from December 2024 to January 2025, and has been declared ethically feasible by the STIKES Majapahit Health Research Ethics Commission based on number 123/EC-SM/2024. Furthermore, the collected data were processed and

analyzed using univariate and bivariate analysis techniques.

### 3. RESULTS

This research was conducted at the Kapatihan Community Health Center in Menganti District, Gresik Regency, specifically in Gempol Kurung Village and Kapatihan Village, which have implemented locally sourced PMT for

toddlers with wasting and stunting nutritional status. Data are presented in the form of univariate and bivariate analyses. Univariate analysis was used to analyze existing variables descriptively, while bivariate analysis was used to determine the relationship between local food-based PMT consumption and the nutritional status of toddlers with wasting and stunting.

Table 1. Respondent Characteristics

Variable	frequency	Percentage (%)
Toddler Gender		
Male	19	44.1
Female	24	55.9
Toddler Age		
0-25 mounths	15	34.9
26-45 mounths	20	46.5
46-60 mounths	8	18.6
History of Infectious Diseases		
Upper respiratory tract infection	15	34.9
Urinary tract infectio	5	11.6
Diarrhea	5	11.6
Fever	10	23.3
Worms	5	11.6
Other or more	3	7.0
Mother's Age		
20- 30 years	15	34.9
31-40 years	20	46.5
41- 50 years	8	18.6
Mother's Education		
Elementary School	8	18.7
Junior High School	9	20.9
High School	23	53.5
College	3	6.9
Mother's Job		
Housewife	28	65.1
Factory Employee	15	34.1

Based on table 1 above, it shows the characteristics of respondents, including the majority of toddlers are female (55.9%),

almost half of respondents are aged 26- 45 months (46.5%), and all respondents have a history of previous infectious diseases

such as Upper respiratory tract infection, Urinary tract infection, diarrhea, fever, worms and others. In addition, the characteristics of mothers of toddlers are also known, including almost half of the

respondents are mothers of toddlers aged 31-40 years, most have a high school education or equivalent (53.5%), and the majority of mothers' occupations are housewives (65.1%).

Table 2. Analysis of the Relationship between Consumption of PMT Made from Local Food and the Nutritional Status of Toddlers with Wasting and Stunting

Consumption of PMT made from local food	Changes in Nutritional Status						Total		p-value
	Decreasing		Constant		Increasing				
	F	%	F	%	F	%	F	%	
Obedient	9	20.9%	9	20.9%	0	0.0%	18	41.9%	0,001
Not obedient	0	0.0%	0	0.0%	25	58.2%	25	58.1%	
Total	9	20.9%	9	20.9%	25	58.2%	43	100%	

Based on Table 2 above, it shows that the results of cross-tabulation data between the Relationship between PMT Consumption Made from Local Food and Toddler Nutritional Status show that almost half of the 18 (41.8%) respondents were not compliant/inconsistent in consuming PMT made from local food for 60 days for wasting toddlers and 90 days for stunting toddlers according to program recommendations. Of the 18 respondents, there was a decrease in nutritional status of 9 (20.9%) respondents and there were 9 (20.9%) respondents with a constant nutritional status because they were not compliant in consuming PMT made from local food for reasons that toddlers did not like it, the food was not tasty, had no taste, the food contained a lot of oil and so on. Meanwhile, of the 25 (58.1%) respondents, most respondents were compliant in consuming PMT made from local food for

60 days for wasting toddlers and 90 days for stunting toddlers. There were 25 (58.2%) respondents whose nutritional status improved after being compliant in consuming PMT made from local food because the consumption of local PMT was very important in helping to improve changes in the nutritional status of toddlers, especially if consumed regularly, diligently and on target. The results of the Chi-Square analysis showed a p-value of 0.001 ( $p < 0.05$ ), meaning  $H_a$  was accepted and  $H_0$  was rejected. These results prove that there is a significant relationship between the consumption of locally sourced PMT and the nutritional status of wasting and stunting toddlers.



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#### 4. DISCUSSION

##### Consumption of PMT Based on Local Food Ingredients in Toddlers with Wasting and Stunting

Consistent consumption or compliance with locally sourced PMT consumption showed that most respondents complied with routine local food-based PMT consumption for 60 days for wasting toddlers and 90 days for stunting toddlers (25 respondents, 58.2%). This was influenced by several factors, including the mother's highest education level, the mother's occupation, and the mother's age. Crosstab results of PMT consumption with maternal education showed that almost half of the respondents, mothers of toddlers, had a high school education or equivalent (53.5%). There was a highly significant relationship between maternal education and toddler nutritional status. Maternal education correlated with nutritional knowledge and compliance with PMT provision. The higher the mother's education level, the more they understood the importance of consuming locally sourced PMT to improve the nutritional status of toddlers (Deo et al., 2024).

The crosstab results of the consumption of locally sourced PMT (PMT) with maternal occupation showed that the majority of mothers were

housewives (65.1%). Housewives tend to be more active in participating in integrated health service posts (Posyandu) and nutrition intervention programs because they have more time, attention, and direct involvement in PMT program planning (Sugiman & Indrawati, 2023). This supports their high level of compliance in providing PMT. Working mothers as housewives make them more focused and diligent in providing PMT consumption from locally sourced foods every day. They can also monitor the growth and development of toddlers during the PMT program. In contrast, mothers who are busy working in factories, almost half (15 respondents) sometimes lack the patience and often forget to provide PMT consumption from locally sourced foods, which affects the nutritional status of toddlers.

Crosstab results of the consumption of locally sourced food supplements (PMT) by maternal age showed that almost half of the respondents (46.5%) were mothers of toddlers aged 31-40 years. Maternal age, education, and experience can indirectly influence compliance (Trisasmita & Harsoyo, 2025). Mothers older than average (adults) are more compliant with nutrition education provided by health workers and are more likely to engage in positive health behaviors, including

compliance with nutritional supplementation. This is due to their high motivation to ensure optimal child growth and their ability to make better decisions based on knowledge and experience. Maternal age is a crucial determinant of the success of nutrition intervention programs because it is closely related to a more rational mindset and readiness to receive information from health workers. Therefore, age is a factor that can influence compliance. The older a person is, the higher their level of compliance with locally sourced food supplements. More mature and educated mothers tend to have a better understanding of nutritional supplements according to the recommended guidelines for their toddler's age (Novianti et al., 2021).

The results of the research conducted by the researcher showed that most respondents were compliant or consistent in providing PMT consumption made from local foods regularly for 60 days for malnourished toddlers and 90 days for stunted toddlers (58.1%). This means, the higher the level of education of parents, as well as mothers who work as housewives, then supported by the maturity of the mother's age which makes respondents able to provide PMT consumption made from local foods regularly so that it can improve the nutritional status of the target

toddlers. The results of interviews conducted by researchers using an interview guide sheet that according to respondents consuming PMT made from local foods is very important in improving the nutritional status of toddlers, respondents also said that there are several menus from the PMT program that toddlers are willing and able to finish so that mothers try to make the same menu and hope that toddlers are willing and able to finish the menu. That way, the improvement in nutritional status and daily food intake will be absorbed more quickly. Then in the PMT menu made from local foods contains a lot of protein, vitamins, minerals, and other nutrients that can help improve toddler nutrition. Respondents who are compliant in providing PMT consumption made from local foods said that in ½ portion of food they finished in that time.

The results of the research conducted by the researcher also showed that some respondents were not compliant. They were not routinely consuming PMT made from local food for 60 days for malnourished toddlers and 90 days for stunted toddlers, a small portion of 18 (41.8%) respondents. So that non-compliance with the program's recommendations makes it difficult for toddlers' nutritional status to change.



Respondent non-compliance can be influenced by the low level of maternal education, a small portion of which is at elementary school level (8 respondents) (18.6%). And almost half of the mothers who work in factories (15) (34.1%) which makes mothers less monitoring in providing PMT consumption made from local food, it can also be seen based on the mother's age factor. Sometimes mothers who are over 41-50 years old are less responsive and less patient in providing PMT consumption so they often forget to provide PMT consumption.

The results of interviews conducted by researchers using an interview guide sheet with mothers of target toddlers showed that toddlers' non-compliance in consuming PMT made from local food was caused by toddlers not liking the menu obtained from the PMT program, the food was not tasty and had no taste, the smell of the food was quite strong, the food contained a lot of oil, toddlers were picky eaters, and there were some toddlers who had GTM (Closed Mouth Movement) when consuming PMT. And there were also toddlers who experienced infections, and allergies that made it difficult for toddlers to eat and difficult to gain weight. There were respondents who only finished 1-2 spoons and some finished up to ¼ of the portion. Not only that, there were also

several respondents who said that PMT was also consumed by other family members such as siblings, and the toddler's mother herself. Respondents also said that they were not diligent and patient in providing PMT consumption so that toddlers' weight decreased and some remained the same. Based on the interview results, several respondents said that toddlers had consumed PMT but their nutritional status remained due to genetic factors of their parents. Studies have shown that maternal genetics, such as short stature (<150 cm), are associated with a child's risk of stunting (Oktarina & Sulastrri, 2024). While genetics play a role, stunting is more influenced by the interaction between nutrition, environment, infection, and parenting styles (Heriawita & Sulastrri, 2024).

### **Changes in the Nutritional Status of Wasting and Stunting Toddlers after Consuming PMT Based on Local Food Ingredients**

The study results showed that the majority of respondents after being given routine local food-based PMT interventions for 60 days for wasting toddlers and 90 days for stunting toddlers were 25 (58.2%). Of the 25 respondents, 24 (55.9%) respondents experienced an increase in nutritional status, namely

female respondents. Changes in nutritional status are influenced by several factors such as gender, history of infection, toddler age, and income. The crosstab results of changes in toddler nutritional status by gender showed that respondents who experienced an increase in nutritional status were 14 (32.6%) female toddlers. In line with research by Samuel et al., (2022), female toddlers tend to have better nutritional status (higher LAZ and WLZ values) than male toddlers, due to the influence of breastfeeding patterns and differences in early life physiology. This is due to a more stable biological response to food intake. This occurs because female toddlers are easier to give direction and do not do much outdoor activity so that nutrient absorption is faster.

The crosstab results of changes in nutritional status with infection history factors showed that almost half of respondents with a history of upper respiratory tract infections (15%, 34.9%) experienced an improvement in nutritional status. PMT made from local foods with a duration of  $\geq 30$  days can increase the weight and height of toddlers, especially in the group with a history of infection (Apriliani et al., 2024). A history of upper respiratory tract infections is closely related to decreased nutritional status. However, with appropriate nutritional

intervention, these children are more responsive to improvements in nutritional status compared to children with diarrhea (Horidah et al., 2023). There is a significant relationship between a history of infectious diseases in toddlers and the incidence of stunting (Suhartanti et al., 2023).

The crosstab results of changes in nutritional status by toddler age showed that almost half of toddlers aged 26-45 months (20 respondents (46.5%) experienced an improvement in nutritional status. Technically, PMT is given to malnourished toddlers aged 6-59 months in the form of nutritious food for 30-90 consecutive days, which can lead to an increase in body weight (BW) or height (HW) so that nutritional status improves. At this age, toddlers' developmental needs are very high, so the provision of PMT programs made from local foods can help accelerate the growth and development of target toddlers (Apriliani et al., 2024).

The results of the study conducted by researchers showed that most respondents after being given interventions in the form of supplementary food (PMT) made from local food for 60 days for malnourished toddlers and 90 days for stunted toddlers experienced an increase in nutritional status during the consumption of PMT made from local food by 25 respondents. (58.2%). However, there were also

respondents who experienced a decrease in nutritional status by 9 respondents. (20.9%) and there were also those whose weight remained the same after being given interventions in the form of PMT made from local food as many as 9 respondents (20.9%). The results of this study are in line with research (Hartono, et al 2024) The results of the study stated that there was an effect of Providing Supplemental Food (PMT) made from local food on weight gain in malnourished toddlers with  $p = 0.002$  ( $p < 0.05$ ). According to researchers, this effect was caused by the Provision of Supplemental Food (PMT) and the food intake consumed by toddlers increased every day so that the daily intake level could mostly be met. So it is effective in improving the nutritional status of malnourished toddlers.

The results of interviews conducted by researchers using an interview guide sheet according to one respondent said that the change in nutritional status of the target toddlers showed the results of the mother's patience and diligence in providing PMT consumption made from local foods had a positive impact on improving the nutritional status of toddlers. Supported by high protein intake from main foods in addition to Supplementary Food (PMT), so that the daily intake level can be largely met.

According to several respondents, consuming PMT made from local foods is very important in helping to improve the nutritional status of toddlers, as well as increasing public awareness about the importance of balanced nutrition.

### **The Relationship Between Consumption of PMT Made from Local Food and the Nutritional Status of Wasting and Stunting Toddlers in the Work Area of the Kepatihan Community Health Center**

The results of the Chi-Square Test show the Asymptotic Significance value (2-sided) shows a  $p$  value of 0.001 ( $< 0.05$ ) which means  $H_0$  is rejected  $H_a$  is accepted so it can be concluded that there is a significant relationship between the Consumption of PMT Made from Local Food and the Nutritional Status of Toddlers, which means the higher the level of mother's compliance in providing PMT consumption made from Local Food, the more changes in the nutritional status of toddlers will increase and vice versa. Based on the results of the crosstab relationship between PMT consumption made from local food and Toddler Nutritional Status, the results showed that most respondents were compliant in consuming PMT made from local food as many as 25 (58.2%) respondents. And there was an increase in

nutritional status after being given PMT consumption made from local food routinely for 60 days and 90 days for stunted toddlers as many as 25 respondents (58.2%). And 18 respondents (41.8%) were not compliant in consuming PMT made from local food. Of these, 18 respondents (20.9%) experienced a decline in nutritional status, while 9 respondents (20.9%) remained stable after being given PMT-P consumption made from local foods. The results of related studies indicate a strong relationship between maternal nutritional knowledge and compliance with PMT-P on the food intake of wasting toddlers (Fatira et al., 2024). Maternal nutritional knowledge significantly influences compliance with providing PMT-P made from local foods, and this impacts the nutritional status of toddlers, especially in cases of wasting or stunting. Mothers' ignorance about the benefits of nutrition is one of the causes of non-compliance with routine provision of essential nutrients.

## 5. CONCLUSION

The results of the study showed that the consumption of locally sourced PMT in wasting and stunting toddlers was mostly (58.1%) compliant or consistent in consuming according to program recommendations, and the majority

(58.2%) experienced an increase in nutritional status after consuming locally sourced PMT regularly according to program recommendations, namely every day for 60 days for malnourished toddlers and 90 days for stunting toddlers. Therefore, it can be concluded that there is a relationship between the consumption of locally sourced PMT and changes in toddler nutritional status based on the results of statistical tests. These results are expected to mothers of toddlers with nutritional status of wasting and stunting to ensure that toddlers receive local PMT regularly, as well as increase knowledge in processing daily food outside of PMT meal times so that toddlers do not feel bored and nutritional intake needs are absorbed more quickly. It should be remembered that PMT is only a supplementary food and not as a substitute for main meals. In addition, health workers at community health centers can conduct periodic evaluations and mentoring in the delivery of programs and provide health education to increase knowledge and motivation of mothers to consistently provide PMT consumption made from local foods according to program recommendations so that it can improve the nutritional status of toddlers. Future researchers can continue the research by providing efforts to increase the consumption of PMT made from local

foods so that it can be consumed routinely and consistently according to program recommendations so that program objectives can be achieved.

#### AUTHOR CONTRIBUTIONS

The author contributes in conceptualization, data collection and analysis Siti Rachmah, Nurul Mawaddah, Rhisma Andini Ainul Rahim. Writing and manuscript revisions: Siti Rachmah, and Nurul Mawaddah.

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#### CONFLICT OF INTEREST

The authors declare that there are no conflicts of interest in this research.

#### DATA AVAILABILITY STATEMENT

The data are available from the corresponding author upon reasonable request.

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