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# The Effectiveness of the Supplementary Feeding Program (PMT) in Improving the Nutritional Status of Undernourished Toddlers

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**ABSTRACT**

Undernutrition remains a public health issue requiring urgent attention. This condition has long-term impacts on toddlers' growth, development, and immune function. Therefore, appropriate nutritional interventions are essential to prevent stunting and other health complications in toddlers. This study aimed to evaluate the effectiveness of Supplementary Feeding Program (PMT) in improving the nutritional status of undernourished toddlers in the working area of Waindu Community Health Center, Yapen Islands Regency. This study employed a quasi-experimental design with a pre-test and post-test approach. The sample comprised 30 toddlers aged 12-59 months classified as undernourished. Univariate analysis revealed an increase in the mean weight-for-age Z-score from -2.5 at baseline intervention to -1.7 post-intervention. Furthermore, Pearson correlation analysis demonstrated $p<0.001$ and $r=0.993$, indicating a strong positive relationship between pre- and post-intervention Z-scores. In conclusion, the Supplementary Feeding Program (PMT) significantly improved the nutritional status of undernourished toddlers in the working area of the Waindu Community Health Center, Yapen Islands Regency.

## INTRODUCTION

Nutritional status serves as a critical indicator for assessing the quality of life, growth, and development of toddlers during the golden age period, which ultimately determines future human resource quality (1). Inadequate nutrition during this critical period may result in growth disorders, suboptimal brain development, increased susceptibility to diseases in later life(2). One form of malnutrition that remains a public health concern is undernutrition, characterized by a weight-for-age Z-score (WAZ) below -2 standard deviations (SD)(3). Multiple factors contribute to undernutrition, including insufficient intake of

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balanced nutrients, inadequate feeding frequency, recurrent infectious diseases, and low socio-economic status(4).

In 2023, the World Health Organization (WHO) reported that the nutritional status of children aged 12-59 months remains concerning. In 2022, it was recorded that approximately 45 million children were affected by wasting (low weight-for-height), representing approximately 6.8% of the global under-five population(5). In Indonesia, childhood undernutrition persists a significant public health concern. According to the 2022 Indonesian Nutritional Status Survey (SSGI), the national prevalence of undernutrition among toddlers reached 17.7%(6).

As a strategic intervention to improve the nutritional status of toddlers, the Indonesia Ministry of Health implements the Supplementary Feeding (PMT) program for undernourished toddlers through Community Health Centers (Puskesmas)(7). PMT is a targeted nutrition intervention utilizing locally sourced foods, designed to address malnutrition among toddlers (8). Through regular and measured provision of PMT over a specified period, toddlers' nutrient intake is expected to significantly improve, thereby enhancing their nutritional status and minimizing the risk of health complications associated with malnutrition(9). Empirical evidence demonstrates the effectiveness of locally-based PMT: in Taktakan Village, a significant increase was observed in toddlers' body weight ($p= 0.0005$)(10), and in Gresik District, there was a significant change in Z-scores before and after the intervention ($p<0.001$), confirming that locally sourced PMT is effective in improving toddlers' nutritional status(11). Thus, locally based PMT serves as a strategic and evidence-based solution for enhancing toddlers' nutritional status.

In Waindu Village, Yapen Islands Regency, 20 cases were documented of severe undernutrition among toddlers in 2022, representing 33.1% of the under-five population. The high prevalence of undernutrition in this area is attributed to multiple factors, including limited access to healthcare services, poor socio-economic conditions, inadequate dietary diversity among toddlers(12). Therefore, nutritional intervention through the Supplementary Feeding Program (PMT) is urgently required in this region. This study was conducted to determine the extent to which the PMT program can effectively improve the nutritional status of undernourished toddlers based on a scientifically measurable approach(13).

## METHOD

This study employed a quantitative method with a quasi-experimental research design using a pretest–posttest approach(14)**.** This design was employed to assess the effectiveness of the Supplementary Feeding Program (PMT) by examining the relationship between the intervention and nutritional status outcomes. The population consisted of all undernourished toddlers (aged 12–59 months), and the sample comprised 30 undernourished toddlers from the working area of Waindu Community Health Center, Yapen Islands Regency. The sampling technique used was total sampling. Data were processed through editing, coding, and tabulation**.** The data analysis comprised univariate and bivariate analyses. Univariate analysis was used to examine each variable individually and to describe the characteristics of each research variable. Bivariate analysis was performed to assess the effectiveness of the PMT intervention on the nutritional status of undernourished toddlers, using Pearson correlation test (15).

This study began by preparing the research consent form, a research assignment letter from the Research and Community Service Institute (LPPM) of Kurnia Jaya Persada University and obtaining permission from the local Community Health Center (Puskesmas). Subsequently, the researcher conducted preliminary observations at the study site and then proceeded with the research. Based on the initial observations, 30 undernourished toddlers were identified in the working area of Waindu Community Health Center, Yapen Islands Regency. Of the 30 undernourished toddlers (aged 12–59 months), The intervention consisted of locally sourced Supplementary Feeding (PMT) over 30 consecutive days, nutritional education for parents, and counseling on toddler feeding practices and infection prevention, which were monitored weekly. The locally sourced PMT included chicken, fish, local fruits, and local vegetables.

In this study, the research instrument was developed based on theoretical reviews as a tool used by the researcher to collect data, making the research process easier and ensuring the accuracy of the results.


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The data collection instrument used was an Observation Sheet. The components of development measured included body weight.

## RESULTS AND DISCUSSION

This research was conducted in the working area of Waindu Community Health Center, Raimbawi District, Yapen Islands Regency, Papua Province.

**Table 1. Baseline Weight-for-Age Z-Scores of Undernourished Toddlers (N=30)**

| Z- Score Value | N | Mean | Standard Deviation (SD) | Min | Max |
|---|---|---|---|---|---|
| Z-Score value before receiving PMT | 30 | -2.5 | 0.2638 | -3.1 | -2.1 |

*Source: Primary Data, 2024*

Table 1 shows that the mean baseline weight-for-age Z-score (WAZ) among toddlers aged 12–59 months before receiving Supplementary Feeding (PMT) was –2.5 with a standard deviation (SD) of 0.2638. This value is clearly below the WHO undernutrition threshold (< –2SD), indicating all participants were classified as undernourished, with the lowest score approaching the severely underweight category, as shown by the lowest score of –3.1. The narrow range of values and small SD reflect the homogeneity of undernutrition conditions among all toddlers in the study.

In comparison, a study in Ethiopia reported an underweight prevalence of 9% among children aged 6–23 months(16). This indicates that the nutritional status of children in Ethiopia is relatively much better than the findings presented in the table above.

**Table 2. Post-Intervention Weight-for-Age Z-Scores of Undernourished Toddlers (N=30)**

| Z- Score Value | N | Mean | Standard Deviation (SD) | Min | Max |
|---|---|---|---|---|---|
| Z-Score Value After Receiving Supplementary Feeding (PMT) | 30 | -1.7 | 0.3661 | -2.5 | -1.0 |

*Source: Primary Data, 2024*

Table 2 shows that the mean post-intervention weight-for-age Z-score (WAZ) among 30 toddlers aged 12–59 months was –1.7, indicating an improvement in nutritional status from the undernourished category, with relatively tight individual consistency (SD = 0.3661). (17). Similarly, a study in Agam District reported that locally sourced PMT significantly increased body weight by 10–100 grams(18).

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**Table 3. Individual Changes in Body Weight and Nutritional Status Pre- and Post-Intervention (N=30)**


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| N | Before PMT | | After PMT | |
|---|---|---|---|---|
| | **Weight (kg)** | **Nutritional status** | **Weight (kg)** | **Nutritional status** |
| 1 | 11.4 | Undernutrition | 11.9 | Undernutrition |
| 2 | 12.2 | Undernutrition | 13.4 | Normal |
| 3 | 10.6 | Undernutrition | 11.6 | Normal |
| 4 | 7.0 | Undernutrition | 8.4 | Normal |
| 5 | 13.0 | Undernutrition | 13.9 | Normal |
| 6 | 9.5 | Undernutrition | 10.3 | Normal |
| 7 | 9.0 | Undernutrition | 9.7 | Normal |
| 8 | 13.7 | Undernutrition | 14.5 | Normal |
| 9 | 13.2 | Undernutrition | 13.9 | Normal |
| 10 | 12.6 | Undernutrition | 13.4 | Normal |
| 11 | 10.6 | Undernutrition | 10.9 | Undernutrition |
| 12 | 9.3 | Undernutrition | 10.0 | Normal |
| 13 | 8.8 | Undernutrition | 9.6 | Normal |
| 14 | 10.9 | Undernutrition | 11.7 | Normal |
| 15 | 9.5 | Undernutrition | 10.3 | Normal |
| 16 | 8.2 | Undernutrition | 8.8 | Normal |
| 17 | 7.6 | Undernutrition | 8.2 | Normal |
| 18 | 8.4 | Undernutrition | 9.1 | Normal |
| 19 | 9.0 | Undernutrition | 9.6 | Undernutrition |
| 20 | 10.3 | Undernutrition | 10.8 | Normal |
| 21 | 12.1 | Undernutrition | 12.8 | Normal |
| 22 | 8.0 | Undernutrition | 8.7 | Normal |
| 23 | 7.8 | Undernutrition | 8.5 | Normal |
| 24 | 10.0 | Undernutrition | 10.6 | Normal |
| 25 | 11.7 | Undernutrition | 12.0 | Undernutrition |
| 26 | 13.0 | Undernutrition | 13.6 | Normal |
| 27 | 12.2 | Undernutrition | 12.9 | Undernutrition |
| 28 | 11.5 | Undernutrition | 12.4 | Undernutrition |
| 29 | 10.9 | Undernutrition | 11.7 | Normal |
| 30 | 10.0 | Undernutrition | 10.5 | Undernutrition |

*Source: Primary Data, 2024*

Table 3 presents that the weight of toddlers (ages 12–59 months) before receiving Supplementary Feeding (PMT) all fell under the undernutrition category. However, after receiving PMT, there was an improvement in their nutritional status, with 23 toddlers reaching normal status and 7 toddlers still categorized as undernourished.

The results of this study show that the average Z-score value before the implementation of the Supplementary Feeding (PMT) program represents the initial condition reflecting the nutritional status of toddlers, where the Z-scores fall into the undernutrition category. Multiple factors contributed to the high undernutrition prevalence in this population, including inadequate dietary intake failing to meet nutritional requirements, poor food quality and quantity, and recurrent infections that further compromise nutritional status. Additionally, limited maternal knowledge regarding appropriate complementary feeding practices and inadequate access to nutrition information exacerbated undernutrition risk among toddlers in this area.


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Post-intervention results demonstrated significant nutritional improvement following the 30-day PMT program. Participants received one daily meal (six days per week) according to the following standardized weekly menu: **Monday**: Rice, vegetable soup (carrot, potato, chicken, and quail egg), watermelon

2. **Tuesday**: Rice, fried chicken, chayote squash vegetable, boiled egg, banana
3. **Wednesday**: Snack (pudding, donut, and steamed bun made from purple sweet potato)
4. **Thursday**: Rice, fish in yellow sauce, long bean vegetable, orange
5. **Friday**: Mung bean porridge
6. **Saturday**: Rice, fried fish, moringa leaf vegetable, boiled egg, apple.

These findings demonstrate successful nutritional status improvement from undernourished to normal categories in 76.7% of participants, attributable to the comprehensive PMT intervention implemented at Waindu Community Health Center. However, seven participants (23.3%), despite demonstrating Z-score improvements, remained undernourished post-intervention. This partial response may reflect the supplementary nature of PMT; without concurrent improvement in the quality of primary household meals, PMT alone may be insufficient to achieve normal nutritional status, particularly among children with more severe baseline undernutrition.

**Table 4. Pearson Correlation Analysis Between Pre- and Post-Intervention Weight-for-Age Z-Scores (N=30)**

| | | Before PMT | After PMT |
|---|---|---|---|
| Before PMT | Pearson Correlation | 1 | 0.993 |
| | Sig. (2-tailed) | | 0.000 |
| | N | 30 | 30 |
| After PMT | Pearson Correlation | 0.993 | 1 |
| | Sig. (2-tailed) | 0.000 | |
| | N | 30 | 30 |

*Source: Primary Data, 2024*

Pearson correlation analysis revealed a very strong positive correlation between pre- and post-intervention WAZ values (r=0.993, **p<0.001**), indicating that the PMT intervention was highly effective in improving nutritional status among undernourished toddlers.

For children with undernutrition (WAZ or WHZ <-2 SD), supplementary feeding is recommended until nutritional status normalizes, as evidenced by sustained weight gain and Z-score improvement(19). After improvement, the child continues to consume balanced family meals according to their nutritional needs. The duration of supplementary feeding for undernourished toddlers may vary and can be extended beyond one month. Toddlers receiving supplementary feeding must be regularly monitored for weight gain to assess the effectiveness of the intervention(20).

According to the Ministry of Health of the Republic of Indonesia (2018), supplementary food for toddlers includes all additional food provided during *posyandu* sessions (educational PMT) as well as specific supplementary food given to underweight toddlers over a period of 90 feeding days (rehabilitative PMT)(21). Nutritional supplementation is an effort aimed at addressing deficiencies in daily dietary intake, which can lead to health and nutrition problems, especially in nutritionally vulnerable groups(22). The rehabilitative PMT for children aged 6–59 months is intended to serve as a supplement, not as a replacement for their main daily meals(23,24).


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These findings align with Nelista et al. (2021), who reported significant weight improvements among undernourished toddlers receiving locally-sourced supplementary feeding (pre-intervention mean: 9.74 kg; post-intervention mean: 10.02 kg; **p<0.001**).(25).

The PMT program's effectiveness stems from its targeted approach, providing additional nutritional intake specifically to undernourished children with elevated nutrient requirements. Program components included daily supplementary meals provided by health workers and concurrent parental nutrition education, addressing both immediate nutritional deficits and underlying knowledge gaps. Supplementary feeding directly increases nutrient intake, improving nutritional status. Concurrently, parental health education enhances nutrition knowledge, promoting behavioural changes in food preparation and consumption that sustain long-term nutritional improvements. For this reason, health workers are expected to optimize this program by further empowering health cadres to maximize the coverage of PMT provision to toddlers in need.

## CONCLUSION

This study demonstrates that a 30-day supplementary feeding intervention significantly improved nutritional status among undernourished toddlers aged 12-59 months, with 76.7% achieving normal status post-intervention. Statistical analysis confirmed strong intervention effectiveness (r=0.993, **p<0.001**), with mean WAZ increasing from -2.5±0.26 at baseline to -1.7±0.37 post-intervention. To optimize program effectiveness, we recommend: (1) utilizing locally sourced, nutrient-dense foods to ensure program sustainability; (2) extending intervention duration to 3-6 months for optimal nutritional improvement; and (3) integrating comprehensive parental nutrition education with active involvement of health cadres and village midwives in growth monitoring.

## AUTHOR CONTRIBUTIONS

Andi Maryam: Conceptualization, methodology, data analysis
Andi Elis: Article writing, article submission.
Irmayanti: Data collection

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## REFERENCES

1. Iswari, Y., & Hartati, S. (2022). Monograf status gizi dan perkembangan anak usia 0–24 bulan di Desa Sri Kamulyan dan Sukaluyu Kabupaten Karawang. Penerbit NEM.
2. Maryam, A., Rahmawati, R., Elis, A., Lismayana, L., & Yurniati, Y. (2021). Peningkatan gizi anak sebagai upaya pencegahan stunting melalui pembuatan MP-ASI berbahan ikan mairo. *JMM (Jurnal Masyarakat Mandiri)*, 5(3), 901–907.
3. Maryam, A., Elis, A., & Mustari, R. (2023). Hubungan ASI eksklusif dengan kejadian stunting pada balita. *Health Tadulako Journal (Jurnal Kesehatan Tadulako)*, 9(1), 87–93.
4. Ramlah, U. (2021). Gangguan kesehatan pada anak usia dini akibat kekurangan gizi dan upaya pencegahannya. *Ana'Bulava: Jurnal Pendidikan Anak*, 2(2), 12–25.
5. Sawitri, H., & Desti, M. R. (2023). Hubungan pola asuh ibu dengan status gizi balita usia 12–59 bulan di Kecamatan Banda Sakti. *Jurnal Ilmiah Manusia dan Kesehatan*, 6(1), 109–122.


DOI: http://dx.doi.org/10.35730/jk.v16i3.1249 

6. Nurdin, A., Masrul, M., Gusnedi, G., Umar, H. B., Purnakarya, I., & Syafrawati, S. (2023). Prevalence and determinants of stunting risk factors among children under five years old: An analysis of the Indonesian secondary database.
7. Tripuspita, S. I. F., & Sihidi, I. T. (2024). Analisis implementasi program pemberian makanan tambahan (PMT) untuk penanggulangan stunting di Kabupaten Probolinggo. *Jurnal Kebijakan Pembangunan*, 19(1), 27–42.
8. Rengganis, A., & Katmini, K. (2021). Application of the Theory of Planned Behavior on the implementation of the Emo Demo creation of healthy PMT with full nutrition in Posyandu Gedang-Gedang Village, Batuputih, Sumenep. *Journal of Quality Public Health*, 5(1), 19–26.
9. Ariesthi, K. D., Pattypeilohy, A., Fitri, H. N., & Paulus, A. Y. (2021). Additional feeding is based on local food to improve the nutritional status of toddlers. *Jurnal Kesehatan Masyarakat*, 17(1), 67–74.
10. Purbaningsih, H., & Syafiq, A. (2023). Efektivitas pemberian makanan tambahan (PMT) berbahan pangan lokal terhadap kenaikan berat badan balita. *Media Publikasi Promosi Kesehatan Indonesia*, 6(12), 2550–2554.
11. Ramadhania, S., Mulyani, E., & Ariestiningsih, E. S. (2025). Evaluation of local supplemental food program for undernourished toddlers. *Jurnal KESMAS dan Gizi*, 7(2), 402–406.
12. Koridama, S. S., Puspitaningrum, D., Mulyanti, L., & Dewi, M. U. K. (2023). Melalui pojok gizi, bidan dan petugas gizi atasi stunting di Kabupaten Kepulauan Yapen Provinsi Papua. In *Seminar Nasional Kebidanan Unimus*.
13. Suryani, D., Purwanto, P., Puryono, S., Afrizal, T., & Purnaweni, H. (2021). The effectiveness of the early childhood supplementary feeding program (PAUD) in Bantul Regency.
14. Faridi, A., Susilawaty, A., Rahmiati, B. F., Sianturi, E., Adiputra, I. M. S., & Budiastutik, I. (2021). *Metodologi penelitian kesehatan*.
15. Priadana, M. S., & Sunarsi, D. (2021). *Metode penelitian kuantitatif*. Pascal Books.
16. Ararsa, G. G., Getachew, M. T., Diddana, T. Z., & Alemayehu, F. R. (2023). Prevalence of undernutrition and associated factors among children aged 6–23 months: A cross-sectional analysis from South-East Ethiopia. *Journal of Nutritional Science*, 12, e127.
17. Herina, T., Muwakhidah, M., & Hidayati, L. (2025). Efektivitas pemberian PMT terhadap kejadian underweight di Kabupaten Sukoharjo. *Jurnal Manajemen Kesehatan Yayasan RS Dr. Soetomo*, 11, 133.
18. Fitriah, R. R., Anggraini, Y., & Erpidawati, E. (2023). Kenaikan berat badan balita usia 12–24 bulan setelah pemberian makanan tambahan berbasis kearifan lokal di Jorong Pahambatan Kenagarian Balingka Kabupaten Agam. *Innovative Journal of Social Science Research*, 3(6), 8421–8435.
19. Refni, R. (2021). *Pengaruh pemberian makanan tambahan (PMT) terhadap status gizi pada balita gizi kurang (usia 12–59 bulan) di Puskesmas Ujung Gading Kabupaten Pasaman Barat Tahun 2020* (Undergraduate thesis). Universitas Perintis Indonesia.
20. Hartono, L., & Saimi, S. (2024). PMT bahan makanan lokal pada balita gizi kurang di Desa Kuta Kecamatan Pujut Kabupaten Lombok Tengah. *Darussalam Nutrition Journal*, 8(2), 96–107.
21. Amala, H. Z., & Ruhana, A. (2023). Efektivitas pelaksanaan pemberian makanan tambahan (PMT) pemulihan bagi balita gizi kurang di Desa Watubonang Kecamatan Badegan Kabupaten Ponorogo. *Jurnal Gizi Universitas Negeri Surabaya*, 3(1), 193–198.
22. Verawati, B., Yanto, N., & Nova, C. O. W. (2021). Hubungan jumlah konsumsi biskuit PMT-P dengan kenaikan berat badan pada balita gizi kurang usia 12–24 bulan. *Prepotif Jurnal Kesehatan Masyarakat*, 5(2), 1353–1358.

 DOI: http://dx.doi.org/10.35730/jk.v16i3.1249

23. Teta, I., Foudjo, B. U. S., Nielsen, J. N., Oben, J., Nguefack-Tsague, G., & Ntentie, F. R. (2023). Outcomes of a food voucher program and factors associated with the recovery rate of children with moderate acute malnutrition in Far North Cameroon. *Journal of Health, Population and Nutrition*, 42(1), 37.
24. Wassonguema, B., N'diaye, D. S., Michel, M., Ngabirano, L., Frison, S., & Ba, M. (2024). The economic burden of severe acute malnutrition with complications: A cost analysis for inpatient children aged 6 to 59 months in Northern Senegal. *Nutrients*, 16(14), 2192.
25. Nelista, Y., & Fembi, P. N. (2021). Pengaruh pemberian makanan tambahan pemulihan berbahan dasar lokal terhadap perubahan berat badan balita gizi kurang. *Jurnal Kesehatan Masyarakat*, 5(2), 1228–1234.
26. Zulfiana, Y., Fatmawati, N., Pratiwi, Y. S., Setyawati, I., & Herlina, S. M. (2023). Peningkatan pengetahuan pemberian makanan pendamping ASI dalam pencegahan gizi buruk pada balita. *SELAPARANG Jurnal Pengabdian Masyarakat Berkemajuan*, 7(2), 1188–1192.


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