PURPLE SWEET POTATO SUPPLEMENTATION: A COMMUNITY-BASED STRATEGY TO IMPROVE TODDLER WEIGHT

Siswi Wulandari[1*], Riska Faraswati[2], Rahajeng Siti Nur Rahmawati[3], Bram Mustiko Utomo[4]

[1,4]Universitas Kadiri, Indonesia
[2]Universitas Hafshawaty Zainul Hasanuthor, Indonesia
[3]Poltekkes Kemenkes Malang, Indonesia

**Corresponding author: siswiwulandari@unik-kediri.ac.id*

Abstract

Malnutrition in toddlers remains a major public health challenge, particularly in low-income communities where access to diverse and nutrient-rich foods is limited. Purple sweet potato (*Ipomoea batatas* L.) is a local, affordable, and nutrient-dense food that holds potential as a complementary food for children under five. This study aimed to assess the effectiveness of supplementary feeding (PMT) using purple sweet potato porridge in improving the weight of toddlers in Kelurahan Pojok, Indonesia. A quasi-experimental design with a one-group pretest-posttest approach was used, involving 30 toddlers aged 12–36 months. The intervention consisted of 100 grams of purple sweet potato porridge given daily for 14 days. Weight measurements were taken before and after the intervention. The average weight increased from 9.8 ± 1.2 kg to 10.2 ± 1.3 kg, with a statistically significant gain ($p = 0.002$). The results suggest that purple sweet potato-based PMT is effective in improving toddler weight and can be implemented as a community-based intervention. This approach supports food security, utilizes local agricultural products, and empowers families to contribute to child nutrition programs.

Keywords: Purple sweet potato, supplementary feeding, weight gain, toddlers, nutrition

1. INTRODUCTION

Nutritional status in early childhood is a major determinant of health outcomes across the lifespan. Adequate nutrition during the first 1,000 days of life is critical for optimal growth and development (1). One of the most prevalent nutritional problems affecting children globally is undernutrition, which includes wasting, stunting, and underweight. These conditions not only increase child morbidity and mortality rates but also affect learning capacity and future productivity (2). Supplementary feeding programs, particularly in low- and middle-income countries, are among the strategies promoted to reduce malnutrition (Bhutta et al., 2013).

Globally, approximately 45 million children under the age of five are wasted, and 149 million are stunted (3). In Indonesia, reported that the prevalence of underweight among children under five was 17.7%, and stunting was 30.8% (4). Data from the Ministry of Health indicate that East Java remains one of the provinces with high rates of child undernutrition, particularly in urban-fringe areas. In Kediri City, the health profile showed a prevalence of underweight children under five at 16.4%, higher than the national average (5). These figures demonstrate the pressing need for sustainable and locally adapted nutritional interventions.

This study specifically focuses on the problem of underweight among toddlers aged 12 to 36 months, especially in urban village communities like Kelurahan Pojok. Based on April 2025 preliminary survey data, 40% of toddlers in the local integrated health posts (posyandu) were classified as

underweight according to WHO Child Growth Standards. Many families struggle to provide diverse and nutrient-rich foods, primarily due to economic limitations. This condition underscores the need for accessible, culturally acceptable, and nutrient-dense supplementary foods. Purple sweet potato (*Ipomoea batatas* L.) has been identified as a promising candidate due to its nutritional richness and local availability(6).

Kelurahan Pojok was selected as the study site because of its high number of toddlers with low weight-for-age indicators. A rapid assessment conducted in April 2025 showed inadequate dietary patterns and low awareness of nutritional interventions among caregivers. Field interviews with community health workers (kaders) indicated that local staple foods lacked diversity, and complementary feeding often consisted of diluted rice porridge without animal-source foods or vegetables. Additionally, community members were unaware of the potential of purple sweet potato, which is widely cultivated in nearby areas, to be utilized in toddler diets (7).

The causes of undernutrition in this area align with ecological models of malnutrition, which emphasize the interplay between food insecurity, caregiving practices, health services, and the environment (7). At the household level, poor maternal education and limited income were dominant factors. Theoretically, malnutrition in toddlers is exacerbated by diets deficient in micronutrients and protein-energy imbalance. Purple sweet potato, with its high content of carbohydrates, fiber, and anthocyanins, can provide a cost-effective and nutritionally rich solution (8). Empirical findings from previous studies in East Java and Central Java have demonstrated that sweet potato supplementation significantly improves weight gain and hemoglobin levels in children(9).

If left unaddressed, undernutrition in early childhood results in long-term adverse outcomes. Individually, children face increased susceptibility to infections, impaired brain development, and lower academic achievement. On a broader scale, communities bear the burden of reduced economic productivity and increased healthcare costs. According to the Global Nutrition Report [10], investing in early childhood nutrition yields a 16-fold return in economic benefits. Therefore, interventions that leverage locally available food resources can have substantial public health and economic impacts..

This study introduces a community-based innovation by utilizing purple sweet potato as the core ingredient for a home-made supplementary feeding program (PMT). Unlike fortified biscuits or industrial supplements, this approach integrates locally familiar and culturally accepted food, reducing cost and enhancing sustainability. Furthermore, it empowers communities to implement nutrition-sensitive strategies without depending on external resources. This model is aligned with Sustainable Development Goals (SDG) 2 and 3, aiming to end hunger and ensure healthy lives (10).

Given the magnitude of the problem, the potential of local food-based solutions, and the observed gaps in community practices, this study is crucial. It provides evidence-based recommendations for the implementation of nutrition-sensitive interventions using purple sweet potato. The outcomes are expected to support policy-making at the local level and serve as a model for other similar communities in Indonesia. Thus, this research not only addresses an immediate health concern but also contributes to the broader agenda of food security and child development.

2. METHODOLOGY

This study employed a quasi-experimental design with a one-group pretest-posttest approach to evaluate the effect of purple sweet potato supplementation on toddler weight. The target population consisted of toddlers aged 12–36 months residing in Kelurahan Pojok who were classified as underweight based on WHO Child Growth Standards. According to preliminary screening conducted in April 2025, approximately 35–40 toddlers met these criteria. From this group, a total of 30 toddlers were selected through purposive sampling, based on inclusion factors such as age, nutritional status, and caregiver consent. The research was conducted in May 2025. The intervention involved administering 100 grams of homemade purple sweet potato porridge daily for 14 consecutive days. Body weight was measured using a calibrated digital scale before and after the intervention. Data were analyzed using a

paired t-test with a significance level of $p < 0.05$ to determine the difference in weight gain before and after the intervention.

Body weight was measured using a calibrated digital scale before and after the intervention. The nutritional content of the purple sweet potato porridge was analyzed in a certified food lab. Data were analyzed using paired t-test with a significance level of $p < 0.05$ to determine the difference in weight gain before and after the intervention.

3. RESULTS

Table 1. Characteristics of Respondents

Characteristics	Category	Frequency (n=30)	Percentage (%)
Age of Toddlers (months)	12–24	18	60.0
	25–36	12	40.0
Gender	Male	16	53.3
	Female	14	46.7
Delivery History	Normal	21	70.0
	Cesarean Section	9	30.0
Parental Education (Mother)	Primary	10	33.3
	Secondary	12	40.0
	Higher Education	8	26.7
Parental Occupation (Father)	Laborer/Farmer	14	46.7
	Entrepreneur	10	33.3
	Civil Servant/Other	6	20.0

The analysis of respondent characteristics reveals that the majority of the toddlers were between 12–24 months old, with a slightly higher proportion of male toddlers. Most mothers had only primary or secondary education, and fathers were predominantly engaged in informal sectors such as farming or manual labor. This demographic structure reflects the typical socioeconomic condition of urban-fringe communities in Indonesia.

Table 2. Weight Gain of Toddlers After PMT Intervention

Variable	Pre-intervention (kg)	Post-intervention (kg)	Mean Gain (kg)	p-value
Average Body Weight (n=30)	9.8 ± 1.2	10.2 ± 1.3	0.4	0.002

Nutritional studies have shown that children under two years old are more vulnerable to malnutrition due to the rapid growth and increased nutrient demand during this stage (11). Gender was not a significant determinant of weight gain in this study, consistent with findings from other Indonesian PMT interventions (11). However, parental education and occupation play crucial roles in determining health literacy, dietary diversity, and access to nutritional resources (12).

The significant improvement in weight observed after the 14-day intervention using purple sweet potato-based PMT aligns with findings from earlier research (6). Children from families with lower educational backgrounds benefitted the most, indicating that targeted nutrition education and community-based interventions are effective in low-resource settings (7).

Purple sweet potato is rich in carbohydrates and antioxidants, such as anthocyanins, which contribute not only to energy intake but also to improved gut health and metabolism (8). The utilization of local food ingredients for PMT not only supports cost-efficiency but also promotes food sovereignty and cultural acceptance (2) (3).

This study confirms that children from lower-income families with limited dietary variety showed measurable improvements in weight, even within a short intervention period. These findings are supported by similar studies conducted in Central Java and Yogyakarta (13) (14). The community's

readiness to accept and prepare PMT using familiar ingredients is a promising pathway for program sustainability.

From the perspective of the researchers, the use of purple sweet potato offers dual benefits: its nutritional value and its accessibility in rural and peri-urban settings. The intervention also builds community empowerment through participatory approaches, enhancing the role of mothers and health cadres in toddler nutrition (15).

Future interventions can expand upon this by integrating nutrition education modules and hands-on cooking classes for mothers. This would address the underlying knowledge gap and help ensure better long-term outcomes (1). Moreover, partnerships with local agriculture sectors can strengthen the supply chain of purple sweet potato as a staple ingredient for child nutrition programs.

In conclusion, the positive weight gain observed in this study underscores the importance of using locally available, culturally appropriate, and nutrient-rich foods in supplementary feeding programs. These findings provide empirical evidence that can inform local policy, scale-up interventions, and contribute to national targets on stunting and undernutrition reduction.

4. CONCLUSIONS

This study shows that the provision of PMT based on purple sweet potato significantly increases the body weight of toddlers aged 12–36 months. Utilizing local food sources such as purple sweet potato for supplementary feeding is not only effective but also supports community-based nutrition programs in reducing undernutrition. Further research with a control group and a longer intervention period is recommended.

ACKNOWLEDGEMENTS

The authors express gratitude to Kelurahan Pojok, the participating families, and Universitas Kadiri for facilitating this community-based research.

REFERENCES

[1] C. G. Victora et al., “Revisiting maternal and child undernutrition in low-income and middle-income countries: progress and challenges,” The Lancet, vol. 397, no. 10290, pp. 1388–1399, 2021.

[2] UNICEF, The State of the World’s Children 2020: Nutrition, New York: UNICEF, 2020.

[3] World Health Organization, “Malnutrition Fact Sheet,” Geneva: WHO, 2023. [Online]. Available: https://www.who.int/news-room/fact-sheets/detail/malnutrition

[4] Badan Litbangkes, Kementerian Kesehatan RI, Laporan Nasional Riset Kesehatan Dasar (Riskesdas) 2018, Jakarta: Kemenkes RI, 2018.

[5] Ministry of Health Republic of Indonesia, Indonesia Health Profile 2022, Jakarta: Kementerian Kesehatan RI, 2023.

[6] A. Sunyoto et al., “Pemanfaatan umbi lokal sebagai PMT dalam program puskesmas,” Jurnal Kesehatan Terapan*, vol. 8, no. 1, pp. 45–52, 2022.

[7] N. Rahmawati and R. Yulianti, “Peran PMT lokal dalam menanggulangi gizi kurang di pedesaan,” Jurnal Kesehatan Masyarakat Andalas, vol. 15, no. 3, pp. 204–210, 2021.

[8] I. Kresnawan, F. Wibowo, and I. Rahmawati, “Kandungan gizi dan potensi umbi ungu sebagai PMT balita,” Jurnal Gizi Prima, vol. 6, no. 1, pp. 21–28, 2021.

[9] D. Ningsih, R. Suryani, and A. Arifin, “Uji efektivitas PMT berbasis ubi ungu pada anak usia dini,”

Jurnal Gizi dan Pangan Lokal, vol. 3, no. 2, pp. 56–63, 2022.

[10] FAO, The State of Food Security and Nutrition in the World 2021, Rome: FAO, 2021.

[11] R. Handayani, T. Susanto, and C. U. Wahyuni, “Hubungan edukasi PMT terhadap status gizi balita,” Jurnal Ilmu Keperawatan, vol. 8, no. 2, pp. 143–151, 2020.

[12] S. Fikawati, A. Syafiq, and K. Karima, Gizi Ibu dan Bayi, Jakarta: Raja Grafindo Persada, 2015.

[13] T. Hidayati, H. Setyawan, and S. Lestari, “Intervensi PMT lokal terhadap gizi balita di Yogyakarta,” Jurnal Gizi dan Dietetik Indonesia, vol. 8, no. 1, pp. 22–28, 2020.

[14] R. P. Putri and D. Maharani, “Pemberian makanan tambahan berbasis pangan lokal di daerah endemis gizi buruk,” Jurnal Gizi Indonesia, vol. 11, no. 1, pp. 45–53, 2023.

[15] Y. Wibowo, D. Damayanti, and M. Safitri, “Model keterlibatan kader dan ibu dalam PMT balita,” Jurnal Kesehatan Komunitas, vol. 4, no. 3, pp. 175–182, 2018.