Journal of Indonesian Specialized Nutrition | e-ISSN: 3032-3878
Vol. 03 No. 03, 2025

THE RELATIONSHIP BETWEEN LOCAL FOOD-BASED RECOVERY FEEDING AND OTHER FACTORS ON WEIGHT GAIN IN CHILDREN 12-59 MONTHS OF AGE AT PUSKESMAS CIMPAEUN, DEPOK CITY, INDONESIA, IN 2025

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Abstract

Background: Malnutrition among children aged 12-59 months remains a major challenge in Indonesia, including in Depok City. Local Food-Based Supplementary Feeding (PMT) is one of the government's intervention efforts to improve or recover children's nutritional status. This study aims to determine the relationship between the provision of Local Food-Based Recovery PMT and other factors on toddler weight gain at the Cimpaeun Health Center in Depok City in 2024. **Methods**: This study used a cross-sectional design as a quantitative approach. The sample consisted of 71 toddlers aged 12-59 months who were purposively selected. Data were collected through questionnaires and secondary data from the health center. **Results:** The results showed that 60.6% of toddlers experienced adequate weight gain after participating in the Local PMT program. There was a significant relationship between the appropriateness of the provision of local PMT and weight gain (p = 0.027; OR = 4.464; 95% CI: 1.155-17.252).

There was a significant relationship between infection and weight gain (p = 0.015). Meanwhile, variables such as diet, mother's education, knowledge, parenting, posyandu visits, and PHBS did not show a significant relationship with toddler weight gain. **Conclusions:** There are strong relationship between the provision of an appropriate local food-based recovery PMT as well as the health condition of the child and under-five children's weight gain. Other factors such as infection may encourage more attention from parents, which contributes to children's nutritional recovery.

Keywords: Local food-based recovery feeding, toddlers, weight gain, nutritional status

Introduction

Malnutrition among children under five years old remains a major public health challenge in Indonesia. Growth monitoring is an essential strategy to detect early nutritional problems and ensure optimal child development. According to the World Health Organization (WHO), regular assessment of weight-for-age and height-for-age is necessary to prevent growth faltering, which may lead to wasting, stunting, and underweight conditions.[1] Children with inadequate weight gain are more susceptible to infections and reduced immunity, which further increases the risk of morbidity and mortality.[2] Experts agreed that providing adequate amounts of critical nutrients during this critical periods is one of the success key to a better children's health.[3]

Despite several national interventions, the prevalence of malnutrition in Indonesia is still concerning. Based on the 2018 Basic Health Research [4] , the prevalence of wasting among

children under five was 10.2%, which is classified as high by WHO standards. Although the 2022 Indonesian Nutrition Status Survey (SSGI) reported a decline to 7.7%, this figure remains above the expected threshold.[5] More recent data from the 2023 Indonesian Health Survey (SKI) even showed an increase in wasting prevalence to 8.5%, while stunting and underweight remained prevalent at 21.5% and 15.9%, respectively.[6] These findings indicate that nutritional problems continue to persist, and strengthened interventions are required to meet the national target of reducing wasting and stunting.[4–6]

One of the government's nutrition intervention strategies is the implementation of Local Food-Based Supplementary Feeding (PMT). This program aims to improve the nutritional intake of children by providing additional food prepared from locally available ingredients that are affordable, culturally acceptable, and nutritionally balanced. Local food-based PMT not only supports children's weight gain but also contributes to food security and community empowerment. Previous studies have shown that locally adapted feeding programs can positively influence nutritional status in young children, especially when combined with parental education and regular health monitoring.[7,8]

Given the continuing burden of child malnutrition and the strategic role of supplementary feeding, it is important to evaluate the effectiveness of local food-based recovery feeding and other associated factors in promoting weight gain. Therefore, the objective of this study is to analyze the relationship between the provision of local food-based supplementary feeding (PMT) and other influencing factors on weight gain among children aged 12–59 months in Cimpaeun Public Health Center, Depok City in 2025.[8–10]

Method

This study employed a cross-sectional design with a quantitative approach to examine the relationship between local food-based supplementary feeding (PMT) and other risk factors and weight gain among children under five years old. The research was conducted at Cimpaeun Public Health Center, Depok City, in 2025. The study population comprised children aged 12–59 months who were registered as PMT beneficiaries at Cimpaeun Public Health Center. The sample size was determined using the sample size estimation formula for cross-sectional studies, with a minimum requirement of 71 subjects. Sampling was conducted using purposive sampling based on inclusion and exclusion criteria. Inclusion criteria consisted of children aged 12–59 months who participated in the PMT program during the study period, while exclusion criteria were children with congenital abnormalities or chronic diseases affecting growth.

Data were collected using both primary and secondary sources. Primary data were obtained through structured questionnaires administered to mothers or caregivers to assess factors such as feeding practices, maternal education, knowledge, parenting, hygiene behaviors, and history of infections during the same period as the PMT participation (September – November 2024). Secondary data was extracted from the health center's medical and nutritional records, which captured the relationship between PMT participation (categorized as "yes," "no," or "sometimes") and children's weight gain status ("increased" or "not increased") as part of the ongoing PMT Pemulihan intervention program implemented by the Puskesmas. Therefore, this study aimed to capture the increment of children's weight at the same time with all related factors.

Secondary data were collected from medical and nutritional records at the health center to obtain information on children's anthropometric measurements and PMT participation. The research instrument consisted of standardized questionnaires and monitoring forms adapted from the Technical Guidelines for Local Food-Based Supplementary Feeding by the Indonesian Ministry of Health. The validity and reliability of the questionnaire were tested prior to the main study, ensuring its appropriateness for field use. The validity test results indicated that all questionnaire items demonstrated acceptable levels of validity. Using the r-table value of 0.279 as the threshold, all calculated item–total correlation (r-count) values exceeded the r-table criterion. For the Local Food-Based PMT Recovery variable, both items showed high validity with r-count values of 0.941 and 0.960. The Dietary Pattern construct presented r-count values ranging from 0.369 to 0.716 across 10 items, indicating that each item was valid. The Infection variable likewise met validity requirements, with r-count values between 0.464 and 0.612. In addition, the constructs of Mother's Knowledge, Mother's Parenting, and Posyandu Visit History demonstrated strong validity, with r-count values ranging between 0.687 and 0.972 across all items. These results confirm that the entire set of items used in the questionnaire is valid and suitable for further analysis. Furthermore, reliability testing was performed to determine the internal consistency of each instrument using Cronbach's Alpha. The results showed that all variables achieved Cronbach's Alpha values above the minimum acceptable threshold of 0.70, indicating a high level of reliability, indicating adequate instrument consistency. Collectively, the results of the validity and reliability assessments confirm that the questionnaire used in this study is both valid and reliable.

Data analysis was carried out in two stages. Univariate analysis was conducted to describe the characteristics of respondents and the distribution of study variables. Bivariate analysis was performed using the chi-square test to determine the relationship between local food-based supplementary feeding and weight gain, as well as other influencing factors. Statistical significance was set at $p < 0.05$ with 95% confidence intervals. All the statistical analysis was done using SPSS version 22 software.

Ethical approval for this study was obtained from the Research Ethics Committee of the Faculty of Public Health, Universitas Indonesia (Ket-174/UN2.F10.D11/PPM.00.02/2025). Informed consent was obtained from all respondents prior to data collection.

Results

A total of 71 children aged 12–59 months participated in this study. The average age of respondents was 32.4 months, with a balanced proportion of boys (52.1%) and girls (47.9%). The majority of respondents' mothers had completed at least secondary education, and most families were classified within low-to-middle socioeconomic status.

Table 1 presents the distribution of children based on weight gain status after participating in the local food-based supplementary feeding (PMT) program. More than half of the respondents (60.6%) experienced adequate weight gain, while 39.4% showed inadequate weight gain.

Table 2 shows the relationship between PMT consumption and weight gain. There was a significant relationship between the adequacy of PMT intake and weight gain ($p = 0.027$; OR = 4.464; 95% CI: 1.155–17.252). Children who did not finish the provided PMT were more likely

to experience inadequate weight gain compared to those who consumed it completely. It was also illustrated the relationship between infection history and weight gain. The results indicated a significant association (p = 0.015), where children with a history of infection during the intervention period were more prone to inadequate weight gain compared to those without infection.

Other variables, including feeding practices, maternal education, maternal knowledge, parenting style, posyandu visit frequency, and hygiene practices, did not show significant associations with weight gain (p > 0.05). Compared to previous national reports, the proportion of children with adequate weight gain in this study (60.6%) is relatively consistent with the outcomes of similar PMT interventions reported by the Indonesian Ministry of Health, which showed effectiveness in improving child growth when PMT was consumed consistently. However, unlike some studies that identified maternal knowledge and feeding practices as strong determinants of child nutritional outcomes, the present study did not find significant associations for these factors. This discrepancy may reflect contextual differences in community health services, cultural practices, and levels of parental support in Depok City.

Table 1. Distribution of Weight Gain among Children (n= 71)

Variable	Mean	Median	SD	Min-Max
Maternal age (years)	31	30	5,594	21-42
Child age (months)	38,8	40	11,681	18-59
Childbirth weight (kg)	3	3	0,4371	1,6-4
Childbirth length (cm)	48	48	3,802	37-67
Gestational age (weeks)	38	38	1,925	33-49
Initial body weight at the start of Local Food-Based Recovery Supplementary Feeding (kg)	10,2	10,2	1,7335	6,4-13,4

Final body weight after Local Food-Based Recovery Supplementary Feeding (kg)	9,8	10,2	1,8061	6,8-14,4
Initial body height at the start of Local Food-Based Recovery Supplementary Feeding (cm)	85,6	88,3	9,3416	64-104
Final body height after Local Food-Based Recovery Supplementary Feeding (cm)	87,6	90	8,3767	65-106
Total		71		

Variabel		**n**	**%**
Weight Gain	Body weight did not increase:		
	Achieve	7	9,8
	Not achieve	1	1,4
	Underweight (Weight-for-age)		
	Achieved	31	43,6
	Not achieved	15	21,1
	Undernutrition (Weight-for-height)		
	Achieved	5	7
	Not achieved	12	16,9
	Total Increased:	43	60,5
	Total Not Increased:	28	39,4
Sex	Boy	39	54,9
	Girl	32	45,1
Local Food-Based Recovery Supplementary Feeding (PMT)	Not fully consumed	53	74,6
	Fully consumed	18	25,4
Feeding Practices	Severely Inadequate	18	25,4
	Inadequate	23	32,4
	Adequate	30	42,3
Infection	Infection	19	26,8
	No Infection	52	73,2
Maternal Education	Low	18	25,4
	High	53	74,6
Maternal Knowledge	Low	28	39,4
	High	43	60,6
Parenting Practices	Low	32	45,1
	High	39	54,9
History of Posyandu Visits	Low	11	15,5
	High	60	84,5

Clean and Healthy Living Behavior	Low	34	47,9
	High	37	52,1
Total		71	100

Table 2. Relationship between Local Food-Based PMT Consumption and Weight Gain Adequacy (n = 71)

Variables		Adequate (%)	Inadequate (%)	Total n (%)	OR (95% CI)	p-value
PMT Consumption	Not consumed completely (<mean)	28 (52,8)	25 (47,2)	53 (100)	4,464 (1,155 – 17,252)	0,027*
	Consumed completely (≥ mean)	15 (83,3)	3 (16,7)	18 (100)		
	Total	43 (60,6)	28 (39,4)	71 (100)		
Infection History	Positive infection (if during the intervention the child experienced one or more infectious diseases) (< mean)	16 (84,2)	3 (15,8)	19 (100)	0,203 (0,53-0,779)	0,015*
	Negative infection (if during the intervention the child did not experience infectious disease) (≥ mean)	27 (51,9)	25 (48,1)	52 (100)		
	Total	43 (60,6)	28 (39,4)	71 (100)		
Feeding Practices	Severely Inadequate (0-10)	3 (16,7)	15 (83,3)	18 (100)	2,895 (0,682-12,279)	0,149
	Inadequate (11-20)	14 (60,9)	9 (39,1)	23 (100)	0,372 (0,122-1,140)	0,083
	Adequate (21-30)	11 (36,7)	19 (63,3)	30 (100)	1	-
	Total	28 (39,4)	43 (60,6)	71 (100)		
Maternal Education	Low (Elementary School, Junior High School or equivalent)	4 (22,2)	14 (77,8)	18 (100)	0,345 (0,100-1,188)	0,101
	High (Senior High School or higher: Diploma, Bachelor)	24 (45,3)	29 (54,7)	53 (100)		
	Total	28 (39,4)	43 (60,6)	71 (100)		
Maternal Knowledge	Low (<mean)	15 (39,5)	23 (60,5)	38 (100)	1,003 (0,368-2,606)	0,0983
	High (≥ mean)	13 (39,4)	20 (60,6)	33 (100)		
	Total	28 (39,4)	43 (60,6)	71 (100)		
Parenting Practices	Low (<mean)	13 (40,6)	19 (59,4)	32 (100)	1,095 (0,421-2,848)	0,853
	High (≥ mean)	15 (38,5)	24 (61,5)	39 (100)		
	Total	28 (39,4)	43 (60,6)	71 (100)		
History of Posyandu Visits	Low (8 times/year)	6 (54,5)	5 (45,5)	11 (100)	2,073 (0,566-7,589)	0,323
	High (≥ 8 times/year)	22 (36,7)	38 (63,3)	60 (100)		
	Total	28 (39,4)	43 (60,6)	71 (100)		

Clean and Healthy Living Behavior	Low (<mean)	13 (38,2)	21 (61,8)	34 (100)	0,152	(0,40-	0,843
	High (≥ mean)	15 (40,5)	22 (59,5)	37 (100)	0,579)		
	Total	28 (39,4)	43 (60,6)	71 (100)			

*level of significance $p < 0.05$

Discussion

This study confirmed that adequate consumption of local food-based supplementary feeding (PMT) and infection status were significantly associated with weight gain among children aged 12–59 months. Children who consumed PMT completely were more likely to experience adequate weight gain, while those with infection had a higher risk of inadequate growth. These findings highlight that nutritional intake and child health status are key determinants of short-term weight gain.[10,11]

Infections were found to have a detrimental effect on child growth. This finding is consistent with the biological mechanism in which infectious diseases increase metabolic demands, reduce appetite, and impair nutrient absorption, ultimately contributing to growth faltering. A study in Jakarta also emphasized that recurrent infections during the first five years of life significantly delay weight gain and increase the risk of undernutrition.[12] The unique finding of this study was that even a single infectious episode during the intervention period had a noticeable impact on growth outcomes. This suggests that children with borderline nutritional status are highly vulnerable, and short-term infections may hinder the effectiveness of nutritional interventions such as PMT. These results underscore the importance of integrating infection prevention and treatment with feeding programs to maximize child growth outcomes.[13]

Interestingly, several other variables including feeding practices, maternal education, maternal knowledge, parenting practices, posyandu visits, and clean and healthy living

behavior did not show significant associations with weight gain. In this study, we found only 60,6% or 3 among 5 mothers had a good knowledge on feeding practice / child's nutrition. A data taken from 2.155 randomly-selected-mothers in Indonesia, found much higher mother with good knowledge especially regarding to nutrition and feeding services in Posyandu.[14] The previous findings might be a consideration to also strengthen the nutrition and feeding practice education to mothers in Ciampaeun.

Feeding practices were not significantly related to child weight gain in this study. This may be due to the relatively homogenous feeding patterns among respondents, where most children already received complementary feeding according to age. Studies found no association between general feeding practices and short-term weight changes, emphasizing that specific interventions such as supplementary feeding may have a stronger impact.[15,16] Maternal education did not correlate with child growth in this study. Although education is often linked to better health-seeking behavior, previous research in West Java found that maternal education was not always a determinant of child nutritional status when community-based programs provided strong external support.[17] This suggests that institutional support can reduce disparities caused by maternal education.

Maternal knowledge also showed no significant relationship with weight gain. One possible explanation is that knowledge alone does not always translate into practice, as highlighted by a study in Makassar which reported that maternal knowledge of nutrition was high but did not consistently influence dietary practices due to economic and cultural constraints.[18,19]

Parenting practices were not significantly associated with weight gain. Parenting style

may influence long-term development rather than short-term weight changes. A study in West Java similarly reported that parenting practices had stronger association with cognitive and psychosocial outcomes than immediate nutritional status. [20,21]

History of posyandu visits was also not related to child weight gain. Although posyandu plays a vital role in monitoring child growth, a study in East Nusa Tenggara noted that visit frequency was not sufficient unless accompanied by effective counseling and follow-up actions. This indicates that service quality may be more important than the number of visits alone.[15,22]

Clean and healthy living behavior did not show a significant relationship with weight gain in this study. This may be because clean and healthy living behavior practices require long-term implementation to influence health outcomes, whereas this study focused on short-term weight gain. A study in Semarang also observed that household hygiene did not immediately affect weight gain, but had a stronger impact on reducing recurrent infections in the long run.[12,23]

Taken together, these findings suggest that in the short term, nutritional interventions such as PMT and the presence or absence of infection are the dominant factors influencing child weight gain, while other socio-behavioral variables may play a more significant role in the long-term nutritional trajectory.

The strength of this study lies in its comprehensive assessment of multiple determinants of child growth using both primary and secondary data. Nevertheless, the cross-sectional design limits causal interpretation as it captures all variables within the same period, and the reliance on caregiver recall may introduce reporting bias. In this study, we found

strong relationship within some expected variables. However, the causal association only can be captured by having an experimental study design. Therefore, future longitudinal studies are needed to capture the long-term effects of maternal and behavioral factors on child nutritional outcomes.

Conclusion

This study confirms that there is a relationship between consumption of local food-based supplementary feeding (PMT) and accident of infection with weight gain among children aged 12–59 months in Depok City. The findings advance current knowledge by emphasizing the importance of program compliance and child health conditions in determining nutritional outcomes, while showing that maternal factors may play a lesser role in this context. These results strengthen the rationale for integrating local food-based PMT with infection control measures as part of community nutrition programs. Future research should explore the long-term impact of PMT on child growth and development as well as identify strategies to ensure adherence and sustainability.

Acknowledgment

The author gratefully acknowledges the health workers and cadres at Cimpaeun Public Health Center, Depok City, West Java, Indonesia for facilitating the data collection.

Conflict of Interest

There are no conflict interest of this publication.

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