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EFFECT OF FSMP ON WEIGHT GAIN IN SEVERELY UNDERWEIGHT AND STUNTED UNDER-FIVE PATIENTS

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ABSTRACT
Severely underweight in children under five, particularly severely underweight and stunting, remains a major public health issue with long-term impacts on human resource quality. One of the recommended interventions is the provision of Food for Special Medical Purposes (FSMP) in healthcare facilities. This study aimed to determine the effect of the program on weight gain among underweight and stunted under-five patients in the Sakura Inpatient Ward of Bekasi Regional General Hospital. This was a true experimental study with a one-group pretest-post-test design. The sample was obtained through total sampling of all under-five patients aged 0–36 months with severely underweight and stunting who were hospitalized in the Sakura Inpatient Ward from January 2024 to June 2025, totalling 71 patients. Data were analyzed using paired t-tests with a significance level of 5% ($\alpha = 0.05$). There was an increase in the average body weight among severely underweight children from 5.31 kg to 5.63 kg ($\Delta = 0.32$ kg; $p < 0.001$), and among those with both severely underweight and stunting from 4.97 kg to 5.34 kg ($\Delta = 0.37$ kg; $p < 0.001$). The provision of program significantly increased body weight in under-five children with severely underweight, as well as those with combined severely underweight and stunting.

Keywords: body weight; FSMP; severely underweight; stunting; under-five children

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INTRODUCTION

Child health and growth are key indicators of a nation's success in achieving social and economic development. Undernutrition among children under five years old remains a major global issue that affects the quality of human resources. Although the stunting rate in Indonesia has declined over the past decade, its prevalence remains high. National survey data show that the stunting rate decreased from 37.6% in 2013 to 19.8% in 2024 (Kementerian Kesehatan RI, 2024). One of the main indicators of impaired growth and development in children is undernutrition in early childhood, which encompasses multiple dimensions. Severely underweight—both acute and chronic, such as weight loss and wasting—leads to increased risk of illness, mortality, and impairments in physical and cognitive development. The impact extends beyond the individual level to the national economy, through increased healthcare costs and reduced future productivity. Therefore, nutrition-related problems must be addressed and prevented in a comprehensive and sustainable manner(Kementerian Kesehatan RI, 2024). According to data from the Indonesian Ministry of Health (Kemenkes RI) in 2020, approximately 6.7% of children were underweight, and about 1.4% were classified as severely underweight. These figures increased in 2024; based on the 2024 SSGI (Indonesian Nutritional Status Survey) data, 13.9% of under-five children were underweight, and 3% were categorized as severely underweight (Kementerian Kesehatan RI, 2024).

The prevalence of underweight among children under five in West Java Province reached 10.1%, with 1.6% classified as severely underweight. Although these figures are lower than the national average, the absolute number is among the highest due to West Java being the most populous province in Indonesia. These figures have already met the Ministry of Health's Strategic Plan target for wasting, which is set at 7% (Kementerian Kesehatan RI, 2018). In addition, the stunting rate among under-five children in West Java Province in 2024 reached 13%, with 2.9% classified as severely stunted (Kementerian Kesehatan RI, 2024). This figure has met the Ministry of Health's Strategic Plan target for stunting prevalence, which was set at 14% for the year 2024 (Kementerian Kesehatan RI, 2018). According to the 2024 West Java Provincial Health Profile, the prevalence of underweight children (weight-for-age) reached 6.02%, with Bekasi District ranking as the second lowest at 2.52%. Meanwhile, the prevalence of stunting (height-for-age) among under-five children in West Java Province in 2024 was 5.00%, with Bekasi District again ranking second lowest at 1.70% (Dinas Kesehatan Provinsi Jawa Barat, 2024). These figures have met the target set in the Strategic Plan of the Indonesian Ministry of Health; however, the prevalence of nutritional status in Bekasi District increased in 2024 compared to 2023.

One of the efforts to address nutritional problems in children is through the intervention of Processed Food for Special Medical Purposes (FSMP). FSMP refers to processed food that is specifically formulated for medical management and can also serve as a dietary management tool for children with specific medical conditions (Kementerian Kesehatan RI, 2019). According to the Decree of the Minister of Health of the Republic of Indonesia No. HK.01.07/MENKES/1928/2022 on the National Guidelines for Medical Services in the Management of Stunting, children with stunting and various nutritional statuses should be given FSMP either fully or partially (orally or enterally), along with a balanced diet that prioritizes sources of animal protein. Based on the Regulation of the Minister of Health No. 29 of 2019, FSMP may be administered under certain conditions, such as FSMP for growth failure, undernutrition, and severely underweight, in the form of oral nutrition supplements with an energy content greater than 0.9 kcal/mL. FSMP may also be given to very premature infants and very low birth weight (VLBW) infants, in the form of premature formulas containing a minimum of 24 kcal/30 mL and/or human milk fortifiers. Previous studies have shown that many under-five children have not yet received FSMP interventions, highlighting the need for further risk identification and evaluation (Hamzah et al., 2024). One of the direct factors influencing stunting and nutritional problems in under-five children is their nutritional intake (Conway et al., 2020; Stewart et al., 2013). Therefore, this study aims to analyze the effect of FSMP on weight gain in under-five patients with severely underweight and stunting at Bekasi District General Hospital.

METHOD

This study was true experimental research with a one-group pretest-post-test design. The study population included all under-five patients aged 0–36 months with severely underweight and stunting who received Food for Special Medical Purposes (FSMP) in the Sakura Inpatient Ward of Bekasi District General Hospital during the period from January 2024 to June 2025. A total sampling technique was used, resulting in 71 participants. The FSMP intervention, in the form of milk supplementation, was administered during a single episode of hospitalization. The procedures followed the FSMP Standard Operating Procedure (SOP) as outlined in the Decree of the Minister of Health of the Republic of Indonesia No. HK.01.07/MENKES/1928/2022 concerning the National Guidelines for Medical Services in Stunting Management.

Data collection involved measuring body weight using a digital scale and height/length using a measuring board. Data were analyzed using univariate and bivariate methods. Univariate analysis was conducted to describe each variable, while bivariate analysis was used to examine the effect of FSMP on weight gain among under-five patients with severely underweight and stunting, using a paired t-test at a 5% level of significance ($\alpha = 0.05$).

RESULT

Table 1 was derived from a total of 71 under-five patients. The majority of patients were in the 0–5 months age group, comprising 25 individuals (35.2%), followed by the 12–23 months group with 23 individuals (32.4%). Based on nutritional status, 27 patients (38%) were classified as having severely underweight, while 44 patients (62%) had both severely underweight and stunted. Regarding length of hospital stay, most patients (53 individuals or 74.6%) were hospitalized for ≤ 7 days. The three most common primary medical diagnoses were respiratory disorders (20 patients or 28.2%), anemia (15 patients or 21.1%), and diarrhea (14 patients or 19.7%).

Table 1.
Distribution of Characteristics of Under-Five Patients with Severely Underweight and Stunted

Variable	f	%
Age		
0-5 months	25	35.2
6-11 months	15	21.1
12-23 months	23	32.4
24-33 months	8	11.3
Nutritional Status		
Severely Underweight	27	38.0
Severely Underweight and Stunted	44	62.0
Length of stay		
≤ 7 days	53	74.6
>7 days	18	25.4
Medical Diagnosis		
Respiratory Disorders	20	28.2
Anemia	15	21.1
Diarhea	14	19.7
Gastrointestinal Disorders	7	9.9
Observation for Fever/Convulsions/Febrile Seizure	7	9.9
Infection	4	5.6
Pulmonary TB	2	2.8
Others	2	2.8

Table 2 shows that in the group of under-five patients with severely underweight, the mean body weight before the intervention was 5.31 kg, which increased to 5.63 kg after the FSMP intervention, with a mean increase of 0.32 kg. The result of the paired t-test yielded a p-value of <0.001, indicating a statistically significant difference in mean body weight before and after FSMP administration. It can be concluded that FSMP provision had a significant effect on weight gain in under-five patients with severely underweight in the Sakura Inpatient Ward of Bekasi District General Hospital.

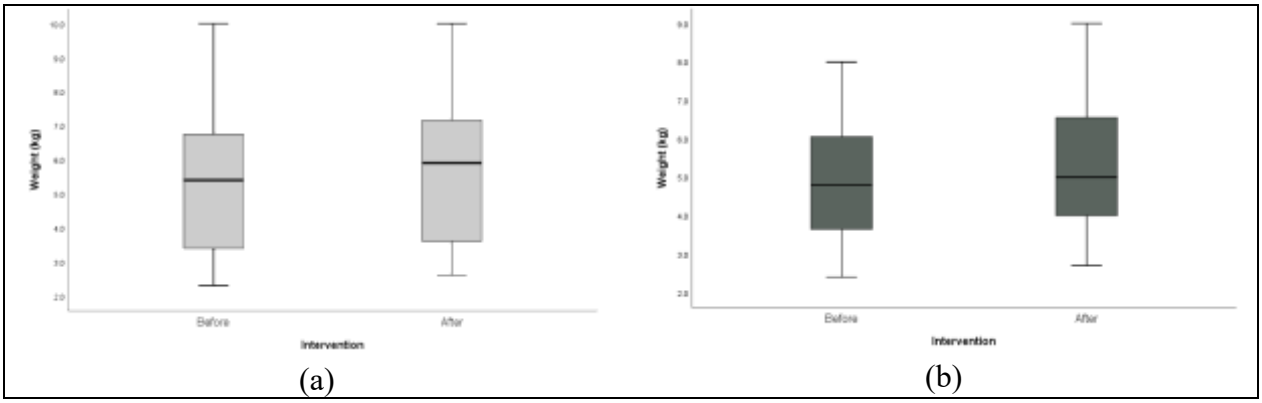
Table 2.
The Effect of FSMP Provision on Weight Gain in Under-Five Patients with Severely Underweight and Stunted in the Sakura Inpatient Ward, Bekasi District General Hospital

Group	Body Weight of Under-Five Children			*p-value*
	Before	After	*Mean Difference*	
Severely Underweight (n=27)	5.31 ± 2.16	5.63 ± 2.14	0.32 ± 0.25	<0.001*
Severely Underweight and Stunting (n=44)	4.97 ± 1.56	5.34 ± 1.66	0.37 ± 0.42	<0.001*

*Significant at $\alpha = 0.05$ using the paired t-test

Table 2 also shows that in the group of under-five patients with both severely underweight and stunted, the mean body weight before the intervention was 4.97 kg, which increased to 5.34 kg after FSMP administration, with a mean increase of 0.37 kg. The result of the paired t-test also yielded a p-value of <0.001, indicating a statistically significant difference in mean body weight before and after FSMP intervention. It can be concluded that FSMP provision significantly contributed to weight gain in under-five patients with severely underweight and stunted in the Sakura Inpatient Ward of Bekasi District General Hospital.

Based on Figure 2, there was an increase in both the median and range of body weight in both groups, with the increase in the group with severely underweight and stunted (b) being smaller compared to the group with severely underweight only (a).



(a) (b)

Figure 2. Body Weight of Under-Five Children Before and After FSMP Intervention
(a) Severely Underweight (b) Severely Underweight and Stunted

DISCUSSION

According to the 2024 Indonesian Nutritional Status Survey (SSGI 2024), 4.2% of under-five children in Indonesia were classified as severely stunted, and an additional 15.6% were stunted (Kementerian Kesehatan RI, 2025). Children often do not experience a single nutritional problem, but may suffer from two or more forms of undernutrition simultaneously, such as stunting and severely underweight. Asmare & Agmas (2022) has been reported that children with wasting are 1.75 times more likely to experience stunting. In terms of prevalence, in Indonesia in 2024, 1.2% of children were classified as severely wasted (severely underweight), and 6.2% were wasted (moderate severely underweight). In this study, 62% of the children were found to have both severely underweight and stunting simultaneously. This is considered relatively high, and indicates the urgent need for appropriate management, as undernourished children require optimal nutrition to support their growth and development.

A range of stunting risk factors, encompassing both health and nutritional status, emerge during the first 1,000 days of life. In this critical window, inadequate nutrition and infectious diseases play a substantial role in increasing the risk of stunting (Pratama et al., 2019). According to Novitasari & Besral (2025) birth weight, birth length, and preterm birth are associated with the incidence of stunting among under-five children in Indonesia. Another study by Abimayu & Rahmawati (2023) found that a history of low birth weight (LBW), short birth length, and being aged 23–59 months were also risk factors for stunting, underweight, and wasting. These conditions suggest that the child has experienced chronic undernutrition beginning in utero. This is a critical concern, as the child must compensate for past nutritional deficits while simultaneously meeting current nutritional needs. In addition, gastrointestinal and respiratory infections are recognized as important contributors to the risk of stunting (Y. Subardi et al., 2025). The first 1,000 days of life are a crucial period for a child's growth and development. Infections occurring during this period, combined with nutritional deficiencies, can increase the prevalence of stunting in children. Stunting during this period not only affect physical growth but also impact long-term quality of life, including cognitive decline, reduced immunity, increased mortality and morbidity, and lower work productivity in adulthood (Prendergast & Humphrey, 2014). Trihono et al., (2015) also stated that stunting contributes to long-term consequences and burdens, such as intergenerational stunting, impaired child development, and increased risk of non-communicable diseases. Therefore, nutritional management for children with underweight and stunting becomes critically important. One of the efforts made is by providing processed food products for special medical purposes (FSMP).

In Indonesia, stunting management is implemented based on Regulation No. HK.01.07/MENKES/1928/2022 concerning the National Guidelines for Medical Services in Stunting Management. At Bekasi Regency Hospital, the stunting intervention program known as Cantingmas has been recognized as an effective innovation in providing nursing care and medical interventions in accordance with standard regulations (A. Y. Subardi et al., 2024). Nutritional management for children with underweight and stunting is crucial during the first 1,000 days of life (Georgiadis & Penny, 2017), but can also be effective in helping children with stunting catch up when provided after 24 months of age (Muliadi & Syafiq, 2021). One such intervention is the provision of processed food for special medical purposes (FSMP).

According to the Indonesian National Agency of Drug and Food Control (BPOM, 2018), food for special medical purposes (FSMP) is defined as processed food specifically formulated for dietary management of individuals with particular medical conditions. In children at risk of or already experiencing nutritional deficiencies, FSMP can be provided as nutritional support for those facing growth failure, undernutrition, or severely underweight. (Sundjaya et al., 2025),stated that FSMP for stunted children may consist of processed foods containing micronutrients, macronutrients, and high calories to support growth, cognitive development, and immune function. According to the Regulation of the Minister of Health No. 29 of 2019 on the Management of Nutritional Problems in Children with Illnesses, FSMP provided for growth failure, undernutrition, and severely underweight is in the form of oral nutritional supplements with an energy content greater than 0.9 kcal/mL. These supplements must be prescribed by a pediatrician and administered under the supervision of a pediatrician (Kementerian Kesehatan RI, 2019).

Based on the study findings, FSMP intervention significantly increased body weight in the group of children with severely underweight, with an average weight gain of 0.32 kg. In the group with both severely underweight and stunting, FSMP also significantly increased body weight, with an average gain of 0.37 kg. Among the two groups, the weight gain was higher in children with both severely underweight and stunting compared to those with severely underweight alone. These results indicate that FSMP is an effective intervention to improve the nutritional status of children with underweight and stunting, as evidenced by the observed increase in body weight. Weight gain reflects improved nutritional intake, which may also help correct prior deficiencies. As the child's weight approaches optimal levels, it can further support overall growth and developmental processes. Hasnur & Presilawati (2022) in a previous study found that FSMP interventions were effective in increasing the average weight and height of children as an effort to improve nutritional status in Banyumas, Central Java. This finding is consistent with Fachdian (2025), who reported a significant association between FSMP in the form of milk and stunting in children. Adequate intake of protein and zinc can serve as protective factors against stunting. Children with sufficient protein intake have a 0.58 times lower risk, while those with adequate zinc intake have a 0.77 times lower risk of experiencing stunting (Vaozia & Nuryanto, 2016).

This study further supports the notion that FSMP is an effective intervention to reduce the prevalence of stunting in under-five children, contributing to efforts toward achieving zero stunting. Nevertheless, the implementation of such interventions demands adequate funding, as evidenced by a similar study that Hasnur & Presilawati (2022), as evidenced by a similar study that found each child requires approximately IDR 1,395,850 for nutritional supplementation. Therefore, government support is essential to ensure the provision of food for special medical purposes (FSMP) in order to achieve zero stunting. Selain itu, this study has a limitation, as the FSMP intervention was evaluated during a single episode of hospitalization, with the intervention period limited to one month. Ideally, FSMP should be administered across three episodes of care. Nonetheless, even within a single episode, FSMP was shown to significantly increase the body weight of children with stunting and underweight. Therefore, it is possible that even greater weight gain could be observed with longer or repeated interventions.

CONCLUSION

FSMP intervention is an effective strategy for reducing the prevalence of stunting and underweight, as demonstrated by its success in increasing children's body weight. A closer look reveals that children with both underweight and stunting experienced greater weight gain than those with underweight alone; however, the weight gain in both groups was statistically significant. These findings highlight the importance of strengthening hospital-based nutrition services and suggest that FSMP can serve as a model for integrated nutrition interventions in other regions with a high burden of stunting.

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