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Research Article

The Effect of Supplementary Feeding (PMT) with Broiler Chicken Eggs on the Weight of Stunted Toddlers

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Abstract

Nutritional problems remain a major health concern in Indonesia. According to UNICEF (2024), one in five toddlers experiences stunting, with Natuna Regency showing a prevalence of 18%, higher than the provincial rate of 15.4%. The Serasan Health Center implemented an innovation program called "Pedok Bilis & Bubur Nasi," requiring stunted toddlers to consume two chicken eggs daily. This study aimed to determine the effect of providing additional food (PMT) using broiler chicken eggs on the body weight of stunted toddlers. The research employed a quasi-experimental one-group pretest–posttest design with 14 toddlers selected through purposive sampling. Weight measurements were taken before and after a 14-day intervention and analyzed using the Wilcoxon test at a 0.05 significance level. Results showed an increase in average body weight from 11.66 kg to 11.97 kg with p = 0.009 (<0.05), indicating a significant effect. Broiler chicken egg supplementation is a simple, effective, and affordable nutritional intervention recommended for primary health care to help reduce stunting rates.

Keywords: supplementary feeding, broiler chicken eggs, stunting

INTRODUCTION

Stunting, a form of chronic malnutrition characterized by impaired growth and development in children, remains a persistent public health issue in many developing countries, including Indonesia. According to the 2022 Indonesian National Survey on Nutritional Status (SSGI, 2022), the national prevalence of stunting is 21.6%, with significant regional variation. In the Riau Islands Province, where Serasan Health Center is located, the prevalence is slightly lower at 15.4%, while Natuna Regency, home to the study's target population, has a prevalence of 18%. These statistics underscore the ongoing challenge of tackling stunting, particularly in rural and underserved areas. Stunting not only affects physical growth but also has long-term consequences for cognitive development, school performance, and future productivity (UNICEF, 2024). Therefore, addressing stunting is crucial to ensuring the well-being of Indonesia's future generations.

The Indonesian government has launched various nutritional programs to combat stunting, one of the most prominent being the Supplementary Feeding Program (PMT). This program aims to provide additional nutrients to children in the form of fortified food or micronutrient supplementation. In Natuna Regency, a local innovation, the "Pedok Bilis & Bubur Nasi" program, has been implemented in which toddlers diagnosed with stunting are given two broiler chicken eggs daily. This dietary intervention aims to improve the protein intake of these children, as adequate protein is essential for proper growth and development, especially in the critical early years of life. Eggs, particularly broiler chicken eggs, are an affordable and easily accessible source of high-quality animal protein, essential amino acids, and vital micronutrients such as vitamins A, D, and B12, all of which are crucial for the development of young children (Febriyeni et al., 2023; Larson et al., 2024).

While the importance of eggs in promoting child growth is widely acknowledged, particularly in the context of malnutrition and stunting, there is limited scientific research evaluating the specific effects of broiler chicken egg supplementation in Indonesia. Existing studies have demonstrated the positive effects of protein-rich foods on childhood growth, but the evidence for the direct impact of egg consumption on stunting in Indonesian toddlers remains inconclusive (Mi et al., 2022). The lack of empirical evidence from local contexts leaves a gap in understanding the effectiveness of this intervention, particularly in rural areas where the prevalence of stunting is higher.

Broiler chicken eggs are a particularly valuable source of protein for children suffering from stunting due to their ability to provide high-quality protein and essential amino acids in a digestible form. Protein is an essential building block for children's physical and cognitive development, and deficiencies in protein can lead to stunted growth and development (Wells & al., 2023). Moreover, the micronutrients found in eggs, such as vitamin D and omega-3 fatty acids, play a crucial role in enhancing the immune system, improving bone health, and supporting brain development (Larson et al., 2024). Given the nutritional benefits of eggs, their inclusion in the PMT program is a promising approach to address the nutritional deficiencies contributing to stunting in children.

Despite the potential benefits of the "Pedok Bilis & Bubur Nasi" program, there is a need for scientific evaluation to determine its effectiveness. Studies such as those by Rahmawati et al. and Ferial & Irawan suggest that supplementary feeding, particularly involving protein-rich foods like eggs, can lead to significant improvements in children's nutritional status and weight gain (Ferial & Irawan, 2024; Rahmawati et al., 2022). These findings are consistent with global studies that have shown the positive effects of protein supplementation on stunted children (Mi et al., 2022). However, localized studies in Indonesia, especially in regions like Natuna, are limited, and there is a need for more rigorous evaluations to validate the effectiveness of this specific intervention.

This study seeks to fill this gap by evaluating the effect of broiler chicken egg supplementation on the weight gain of stunted toddlers in Natuna Regency. The research will use a quasi-experimental design, comparing the weight of children before and after receiving the supplementation over a 14-day period. By providing empirical evidence on the impact of this intervention, the study aims to contribute to the growing body of knowledge on effective strategies for combating stunting in Indonesia and to support the continued implementation and expansion of the PMT program in rural areas.

The significance of this study extends beyond its immediate implications for improving the nutritional status of stunted toddlers. By demonstrating the effectiveness of a locally available and cost-effective intervention, the research could inform broader policy recommendations for addressing stunting in Indonesia. Moreover, the findings could serve as a model for other regions facing similar challenges, providing valuable insights into how targeted nutritional interventions can reduce the prevalence of stunting and improve child health outcomes across the country.

METHODS

This study employed a quasi-experimental design with a one-group pretest-posttest approach to assess the impact of supplementary feeding (PMT) using broiler chicken eggs on the weight of stunted toddlers. A purposive sampling technique was utilized to select 14 stunted toddlers from the working area of the Serasan Health Center in Natuna Regency, Indonesia. Purposive sampling was chosen due to its ability to select participants who meet specific criteria, ensuring that the sample closely represents the population under study (Etikan et al., 2016).

Before and after the intervention, the toddlers' body weight was measured using a digital baby scale. The measurements were taken at two points: prior to the intervention (pretest) and after the 14-day PMT intervention (posttest). This allows for the comparison of weight changes over the course of the intervention. The primary objective was to evaluate whether the supplementation of two broiler chicken eggs daily would result in a significant increase in the weight of the toddlers, thereby improving their nutritional status.

The intervention was administered by trained nutrition staff at the Serasan Health Center. The toddlers received two broiler chicken eggs daily, as part of a structured feeding program, and their daily consumption was closely monitored to

ensure adherence to the intervention protocol. The feeding program was designed to provide a reliable source of high-quality protein and essential nutrients, which are known to support growth and development in young children, particularly those affected by stunting (Mi et al., 2022; Wells & al., 2023).

Data analysis was performed using the Wilcoxon signed-rank test, which is appropriate for comparing paired data from the same group before and after the intervention (Mann & Whitney, 1947). This non-parametric test is used when the data does not follow a normal distribution, which is common in health-related studies with small sample sizes. A significance level of 0.05 ($\alpha = 0.05$) was set to determine whether there was a statistically significant difference in the toddlers' body weight before and after the intervention. The results of the analysis provided insight into the effectiveness of broiler chicken egg supplementation as a strategy for improving the nutritional status of stunted children in the region.

RESULT AND DISSCUSSION

The average weight of toddlers before the intervention was 11.66 kg, and after the intervention, it increased to 11.97 kg. The Wilcoxon test results showed a p-value of 0.009 (<0.05), indicating a significant weight gain following the supplementary feeding (PMT) of broiler chicken eggs. This finding demonstrates that the consumption of animal-based protein from eggs plays a crucial role in improving the nutritional status of stunted toddlers within a relatively short period.

Table 1. Frequency Distribution of Respondent Characteristics at Serasan Health Center, Natuna Regency

No	Respondent Characteristics	Frequency	%
1	Age (WHO)		
	a. 12 – 35 months (toddler)	4	28.57
	b. 36 – 59 months (pre-school)	10	71.43
	Total	14	100
2	Gender		
	a. Male	6	42.86
	b. Female	8	57.14
	Total	14	100
3	Nutritional Status (WHO)		
	a. Severely Underweight	4	28.57
	b. Underweight	6	42.86
	c. Normal Weight	4	28.57
	Total	14	100
4	Health Status		
	a. Healthy	12	85.71
	b. Sick	2	14.29
	Total	14	100

As shown in Table 1, the majority of respondents were in the 36 – 59-month age group (pre-school toddlers), accounting for 71.43%. Regarding gender, more female respondents (57.14%) were included. The majority of respondents were categorized as underweight (42.86%) based on their nutritional status. In terms of health condition, most respondents (85.71%) were in good health.

Table 2. Frequency Distribution of Weight of Stunted Toddlers Before and After Supplementary Feeding (PMT) with Broiler Chicken Eggs

No	Weight (WHO)	Before		After	
		Frequency	%	Frequency	%
1	5 – 7.9 kg	1	7,14	0	0
2	8 – 10.9 kg	4	28,58	5	35,71
3	11 – 13.9 kg	8	57,14	6	42,86
4	14 – 16.9 kg	1	7,14	3	21,43
Total		14	100	14	100

Table 2 shows that before the PMT intervention with broiler chicken eggs, the majority of respondents had a weight in the range of 11 – 13.9 kg, accounting for 57.14%. After the intervention, the majority of respondents still fell within the same weight range (11 – 13.9 kg), but this decreased to 42.86%.

Table 3. Weight Changes in Stunted Toddlers After Supplementary Feeding (PMT) with Broiler Chicken Eggs

No	Weight Change	Frequency	%
1	Increased	11	78.57
2	Stayed the same	1	7.14
3	Decreased	2	14.29
Total		14	100

Table 3 indicates that after the PMT intervention with broiler chicken eggs, 78.57% of the respondents experienced weight gain.

Table 4. Impact of Supplementary Feeding (PMT) with Broiler Chicken Eggs on Weight of Stunted Toddlers (n=14)

Weight of Toddlers	Frequency	Median	Mean	Minimum Value	Maximum Value	P-Value
Before	14	11.45	11.66	7.90	14.30	
After	14	11.90	11.97	8.20	14.50	0.009

Table 4 shows the difference in the weight of toddlers before and after the PMT intervention with broiler chicken eggs. The average weight of toddlers before the intervention was 11.66 kg, with a median of 11.45 kg, a minimum value of 7.90 kg, and a maximum value of 14.30 kg. After the intervention, the average weight increased to 11.97 kg, with a median of 11.90 kg, a minimum value of 8.20 kg, and a maximum value of 14.50 kg. Statistical analysis revealed a p-value of 0.009 ($p < 0.05$), indicating a significant difference in weight before and after the intervention. Therefore, it can be concluded that the PMT with broiler chicken eggs had a significant impact on increasing the weight of stunted toddlers.

Discussion

Age

The majority of toddlers in this study were in the 36–59 months age range (71.43%). The pre-school years represent a critical period for growth, as energy and protein requirements increase due to higher activity levels. According to the World

Health Organization (Organization, 2024), the prevalence of stunting is higher in children above 24 months, mainly due to the transition from breastfeeding to family foods. These findings are consistent with those of Maryuni et al., which show that the risk of stunting significantly increases in the 24–59 months age range (Maryuni et al., 2024). Therefore, the pre-school years are a crucial period for preventing stunting through adequate nutritional interventions.

Gender

The majority of respondents were female (57.14%). According to Candra, male children are at a higher risk of stunting due to higher energy needs (Candra, 2020). However, research by Hasanah found no significant gender differences in stunting prevalence (Hasanah, 2023). The differences in proportions observed in this study were likely influenced more by the distribution of the stunting population in the study area rather than biological factors.

Nutritional Status

The majority of toddlers in this study were categorized as underweight (42.86%). This condition reflects a long-term deficit in energy and protein, which can hinder growth (Febriyeni et al., 2023). These findings highlight the importance of nutritional interventions, such as supplementary feeding, to improve children's nutritional status.

Health Condition

Most of the respondents were in good health (85.71%). According to UNICEF (2024), repeated infections such as diarrhea and respiratory tract infections (RTI) can worsen children's nutritional status. Since the majority of toddlers in this study were healthy, the improvement in their weight was more strongly influenced by nutritional intake than by health conditions. This underscores the effectiveness of supplementary feeding (PMT) as a strategy for improving nutritional status.

Weight Before and After PMT Intervention

The average weight of toddlers before the intervention was 11.66 kg, and after the PMT intervention, it increased to 11.97 kg. This weight gain indicates an improvement in nutritional status after the 14-day intervention. These findings are consistent with Syaripah et al., who found weight gain in toddlers following two weeks of egg consumption (Syaripah et al., 2024). Eggs are a source of local animal protein, in line with the guidelines set by the Directorate of Nutrition, which recommend their inclusion in PMT programs for toddlers (Kemenkes, 2018).

Effect of Broiler Chicken Egg Supplementation (PMT)

The Wilcoxon test analysis revealed a p-value of 0.009 (<0.05), indicating a significant difference in weight before and after the intervention. A total of 78.6% of toddlers experienced weight gain. These results align with studies by Susanti et al. and Rahmawati et al., which demonstrated the effectiveness of egg supplementation in increasing the weight of underweight children (Rahmawati et al., 2022; Susanti et

al., 2016). The slight weight loss in a small number of respondents was attributed to infection-related conditions (e.g., RTI, chickenpox), as explained by Cono et al., who noted that infections reduce appetite and nutrient absorption (Cono, 2021). This highlights the importance of monitoring health status during the implementation of nutritional programs. Overall, the provision of broiler chicken eggs in PMT played a significant role in improving the growth of stunted children due to their high protein content, which is easily absorbed by the body. PMT also supports efforts to prevent malnutrition in children aged 6–59 months, in accordance with the recommendations of the Ministry of Health and WHO.

CONCLUSION

This study demonstrates a significant effect of supplementary feeding (PMT) with broiler chicken eggs on the weight gain of stunted toddlers in the working area of Serasan Health Center, Natuna Regency ($p = 0.009$). The results indicate a meaningful improvement in the nutritional status of the children, with the average weight increasing from 11.66 kg to 11.97 kg after the 14-day intervention. Broiler chicken eggs, rich in high-quality protein and essential micronutrients, proved to be an effective, affordable, and easily applicable nutritional intervention for primary health services. These findings suggest that the inclusion of broiler chicken eggs in PMT programs could be a sustainable and practical solution to combat stunting, particularly in rural areas where malnutrition rates are high.

Recommendations for Future Research

Future research should focus on expanding the study to include a larger sample size and diverse geographical locations to strengthen the generalizability of these findings. Longitudinal studies are recommended to assess the long-term impact of broiler chicken egg supplementation on both the physical and cognitive development of stunted children. Furthermore, future studies should explore the combined effects of broiler chicken eggs with other nutrient-dense foods to create more comprehensive and multi-faceted nutritional interventions. Additionally, considering the role of health factors, such as infections, in influencing the success of nutritional programs would provide a deeper understanding of the challenges in improving child nutrition and combating stunting.

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