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EFFECTS OF PROVIDING SUPPLEMENTARY FOODS OF DUCK EGGS AND UHT MILK ON THE PHYSICAL GROWTH AND BODY WEIGHT OF STUNTED CHILDREN

Marina*, Rini Harini, Dian Horiwati, Sri Dewi Andini, Ayu Rohmawati, Resa Nurindah
Sarjana Kebidanan, Sekolah Tinggi Ilmu Kesehatan Abdi Nusantara, Jl.Swadaya No. 7, Jatibening, Pd Gede, West Java 17412, Indonesia
*Marinawinner90@gmail.com

ABSTRACT
Stunting is a global health problem that affects children's physical growth and cognitive development. In some areas of Serang Regency, the prevalence of stunting remains high, requiring effective nutritional interventions. Objective: To analyze the effect of supplementary feeding in the form of duck eggs and UHT milk on the growth and weight of stunted children. Method: This study used a quasi-experimental design with a one-group pre-post test approach. Conducted in Padarincang District, Serang Regency, in 2024. A sample of 125 stunted children was determined using total sampling technique. Data was collected using observation sheets and analyzed with paired t-test. Results: A significant increase was found in the weight and height of stunted children after the intervention, where body weight increased significantly (p-value = 0.017) and t-value = -2.425, while height also increased significantly (p-value = 0.006) and t-value = -2.774. Conclusion: The consumption of two duck eggs and UHT milk has been proven to be effective in increasing the weight and height of stunted children. Therefore, parents are encouraged to provide sufficient sources of animal protein to support optimal child growth.

Keywords: duck eggs; height; UHT milk; weight

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INTRODUCTION

Stunting remains a major public health problem worldwide, especially in low- and middle-income countries, including Indonesia. Stunting is a condition of chronic malnutrition that causes impaired physical growth and cognitive development in children, making them shorter than their peers and potentially affecting their intelligence and future productivity. According to the Indonesian Ministry of Health (2024), the prevalence of stunting in Indonesia is 6.1% (Kemenkes RI, 2022), while in Serang Regency, the prevalence of stunting is quite significant and is spread across several villages, including Padarincang, Bakung, Sumber Batu, Nanggung, and Pudar. The main cause of stunting is inadequate nutritional intake during pregnancy and the early stages of a child's life. The short- and long-term consequences of stunting include impaired brain development, increased susceptibility to infection, metabolic disorders, and a higher risk of developing non-communicable diseases such as diabetes and cardiovascular disease later in life (Megananda et al., 2024). In addition, children who experience stunting tend to have lower academic achievement and reduced economic productivity as adults. Addressing stunting requires a comprehensive approach, including early nutritional interventions, improved maternal health, and access to quality food sources (Mediana & Pratiwi, 2017).

Duck eggs are high in nutrients and protein (13.1 g) and fat (14.3 g), and UHT milk is a source of calcium and nutrients essential for bone growth. Children who consume adequate amounts of animal protein have better growth outcomes than those who rely solely on plant-based diets (Mediana & Pratiwi, 2017; Putri et al., 2018). Another study Sartika (2024) shows that giving one egg per day to stunted children significantly increases their height and weight. In addition, calcium plays a significant role of up to 70% in growth, especially in the development of healthy bones (Winarno, 2017). Therefore, milk consumption is highly recommended for school-age children to support optimal height growth (Rumondor et al., 2019).Previous studies have shown that supplementary feeding programs with high-protein foods such as eggs and milk can significantly increase the weight and height of stunted children. However, the specific effects of duck egg and UHT milk consumption on child growth have not been extensively studied in depth (Adhi et al., 2018; Putri et al., 2018). So that this study aims to analyze the effect of supplementary feeding in the form of duck eggs and UHT milk on the growth and weight of stunted children in various villages in Serang Regency.

METHOD

The design of this research is a quantitative study with a Quasi-Experimental design using a one-group pre-post test approach. The independent variable in this study is the provision of duck eggs and UHT milk, while the dependent variable is the physical growth and body weight of stunted children. The research instrument used is an observation sheet. The population in this study includes all toddlers who are stunted in Padarincang District, Serang Regency in 2024. The sampling technique used the total sampling method, with a sample size of 125 children, consisting of 24 children in Padarincang, 28 children in Bakung, 25 children in Sumber Batu, 24 children in Nanggung, and 25 children in Pudar. The data processing technique was carried out through several stages, namely editing, coding, data entry, and tabulation. Furthermore, the data was analyzed using paired sample t-test analysis.

RESULT

Table 1.
The effect of supplementary feeding (SF) with duck eggs and UHT milk on increasing the body weight of stunted children (n= 125)

	Body weight (BB) in stunted children		Std. Deviasi	t	*P-value*
	Mean	Std. Deviasi			
Pree	37.7872	38.3746	142.123	-2.425	0.017
Post	68.6112	154.894			

Based on Table 1, the results of the Paired Sample t-Test analysis show that there is a significant increase in body weight after the supplementary feeding intervention (SFI) with duck eggs and UHT milk in the body weight of stunted children. The average body weight before the intervention was 37.7872, while after the intervention it increased to 68.6112. The value of t = -2.425 with a p-value = 0.017 (<0.05) indicates that this difference is statistically significant. This means that supplementary feeding with duck eggs and UHT milk is effective in increasing the body weight of stunted children.

Table 2.
The effect of supplementary feeding (SF) with duck eggs and UHT milk on increasing the height of stunted children (n= 125)

	Height (TB) in stunted children		Std. Deviasi	t	*P-value*
	Mean	Std. Deviasi			
Pree	73.9984	67.8566	176.6342	-2.774	0.006
Post	117.820	192.34723			

Based on Table 2, the results of the Paired Sample t-Test analysis show that there is an increase in the average height of stunted children from 73.9984 before the intervention to 117.820 after the intervention. The t-value = -2.774 with p-value = 0.006 (< 0.05) shows that this difference is statistically significant, meaning that supplementary feeding (SF) with duck eggs and UHT milk has a significant effect on increasing the height of stunted children.

DISCUSSION

Supplemental Feeding (SF) with Duck Eggs and UHT Milk on Stunted Children's Weight Gain

The results of this study have shown that supplementary feeding (SF) with duck eggs and UHT milk has been proven to provide a significant increase in weight in stunted children (p = 0.017). This means that the use of eggs and UHT milk as affordable and nutrient-rich interventions to overcome stunting. This result is in line with previous research by Suta et al (2023) that long-term supplementation of whole eggs significantly improves growth and nutritional biomarkers in primary school-age children, further supporting the effectiveness of eggs in reducing malnutrition. Milk has also been shown to have a positive impact on weight gain in stunted children, making it an important source of nutrition in efforts to improve children's nutritional status and growth. A study in Uganda by Mbabazi et al (2023) found that milk protein supplementation in lipid-based nutrient supplements (LNS) led to significant increases in weight (+0.21 kg) and height (+0.56 cm) among stunted children.

Research indicates that the high-quality protein and micronutrients found in eggs and milk contribute to improved growth outcomes in children. For instance, a study highlighted that regular consumption of these foods correlates with reduced growth retardation and lower risks of anemia among children (Wu et al., 2021; Yang et al., 2020). Furthermore, interventions involving egg and milk supplementation have demonstrated positive effects on lean body mass and overall physical fitness in rural populations (Zhao et al., 2021). Milk and egg-based snacks were effectively integrated into children's diets, leading to notable improvements in linear growth and dietary diversity (Ara et al., 2022). Combined supplementation of eggs and milk has been shown to significantly enhance weight gain and mitigate vitamin deficiencies in children, thereby playing a crucial role in interventions aimed at reducing stunting. Eggs are a rich source of high-quality protein and essential micronutrients, which are vital for child growth and development (Ara et al., 2022; Mekonnen et al., 2022).

Other studies have also confirmed that milk consumption is positively correlated with improved growth metrics, such as height and weight, in children from low sociodemographic backgrounds (Miller et al., 2020). Furthermore, the inclusion of eggs, a rich source of protein and essential micronutrients, complements the nutritional profile provided by milk, thereby addressing protein-energy malnutrition, which is prevalent among children under five (Ji et al., 2024). While some studies indicate that milk and egg consumption can improve growth metrics in children, the overall impact on stunting is often minimal when considered in isolation from other nutritional and socio-economic factors (Naila et al., 2021). Moreover, the

effectiveness of specific nutritional interventions is often contingent upon addressing broader determinants such as poverty, education, and health services, which play critical roles in child nutrition and growth outcomes (Nugroho et al., 2023; Picauly et al., 2023).

Supplementation with Duck Eggs and UHT Milk on Increasing the Height of Stunted Children

Based on the results obtained through the Paired Sample t-Test analysis, it shows that there is an increase in the average height of stunted children before and after the intervention which is statistically significant. For example, Herawati et al. (2020) demonstrated that supplementation with eel biscuits led to height improvements in stunted children aged 36-60 months, highlighting the effectiveness of targeted nutritional interventions (Herawati et al., 2020). Supported by the results of research by Suta et al (2023) that long-term whole egg supplementation significantly improves child growth, supporting its use as a cost-effective strategy to overcome stunting (Suta et al 2023). In addition, Iannotti et al (2017) conducted a randomized controlled trial in Ecuador, where young children were given one egg per day for six months (Iannotti et al 2017).

Duck eggs are rich in essential nutrients, including proteins and fats, which are crucial for child development. Studies indicate that energy and protein intake are directly associated with stunting; children with inadequate energy intake are at a higher risk of stunting (Fikawati et al., 2021). A systematic review of intervention studies confirms that animal-based foods, especially milk and eggs, are the most effective dietary strategy for improving the height and weight of stunted children (Larson et al., 2023). Further by Megananda et al (2024) found that milk supplementation has a significant impact on increasing the weight and height of stunted toddlers (Megananda et. al., 2024). Continued by Mahfuz et al (2020) also found that daily supplementation with eggs, cow's milk, and micronutrients significantly increased linear growth in malnourished children.

Another thing to consider is that it is known that children's growth is not solely influenced by the consumption of duck eggs and UHT milk because growth is a multifaceted process that is influenced by various factors. Research shows that inappropriate infant and young child feeding practices, including the timing and quality of complementary foods, are important contributors to stunting (Indria Nuraini et al., 2022; Nurbaya et al., 2023). Moreover, factors such as the prevalence of infectious diseases, maternal knowledge, and socioeconomic status also play significant roles in child growth outcomes (Begashaw & Yohannes, 2020; Nurbaya et al., 2023).While protein-rich foods like eggs can support growth, their impact is limited if not accompanied by adequate overall nutrition and health interventions (Damanik et al., 2020; Simbolon et al., 2023). The complexity of stunting necessitates a comprehensive approach that goes beyond mere supplementation, addressing underlying issues such as dietary diversity and maternal education (Marni et al., 2021; Wiyono et al., 2023). Thus, while supplementary feeding can be beneficial, it is insufficient alone to combat stunting effectively (Ramadhanty, 2024).

CONCLUSION

Based on the results of the research that has been obtained, it is concluded that supplementary feeding (PMT) with duck eggs and UHT milk significantly increases the body weight and height of stunted children, meaning that animal protein intake contributes to the growth of stunted children. Other factors such as diet and health conditions also need to be taken into account in evaluating nutrition interventions.

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