

THE EFFECTIVENESS OF ZINC ADMINISTRATION IN INCREASING THE HEIGHT OF STUNTED CHILDREN IN TADUASA VILLAGE

Riska ^{1*}, Sri Yolandari ^{2*}, Sitti Alfyanita Ilham³

^{1,2,3} Baubau Polytechnic, Baubau City, Indonesia

ARTICLE INFORMATION

Received: 8 April 2026

Revised : 6 May 2026

Accepted: 12 June 2026

DOI:

KEYWORDS

Keywords: Zinc; Stunting; Height(TB)

Keywords: Zinc; Stunting; Height

CORRESPONDING AUTHOR

Name :Sri Yolandari

Address: Baubau

Email: sriyolandari@yahoo.com

A B S T R A C T

Background: Stunting is a chronic nutritional problem that significantly inhibits the linear growth of children and is one of the main public health concerns in Indonesia. This condition occurs due to long-lasting nutritional deficiencies and recurrent infections in early life, resulting in delayed physical development and increased risk of morbidity. Zinc is one of the essential micronutrients that plays an important role in cell division, DNA and protein synthesis, as well as growth hormone activity that supports the linear growth of children. **Objective:** This study aims to evaluate the effectiveness of zinc supplementation on increasing the height of stunted children in Taduasa Village. A sample of 38 stunted children aged 3–4 years was selected through total sampling **Methods:** using a quasi-experimental design with a pretest-posttest design; intervention in the form of giving zinc 20 mg twice a week for 30 days. Children's height was measured before and after the intervention using a stadiometer and analyzed with paired t-tests **Results:** showed an increase in average height of 0.6–1 cm in the intervention group ($p=0.001$), while the control group experienced no change. **Conclusion:** Based on the results of the research that has been conducted, it can be concluded that the administration of zinc 20mg 2x a week for 1 month has been proven to be effective in increasing height compared to children who were not given zinc in Taduasa Village. This intervention gave positive results with a significant increase in height after zinc supplementation over a period of time

Backgroud: Stunting is a chronic nutritional problem that significantly hampers children's linear growth and remains a major public health concern in Indonesia. It results from prolonged nutritional deficiencies and recurrent infections during early life, leading to delayed physical development and increased risk of morbidity. Zinc is one of the essential micronutrients that plays a critical role in cell division, DNA and protein synthesis, and growth hormone activity that supports children's linear growth. **Objective :** This study aimed to evaluate the effectiveness of zinc supplementation in increasing the height of stunted children in Taduasa Village. A total sample of 38 stunted children aged 3–4 years was selected using total sampling **method** applied a quasi-experimental design with a pretest-posttest approach; the intervention involved giving 20 mg of zinc twice a week for 30 days. Children's height was measured before and after the intervention using a stadiometer and analyzed with a paired t-test **showed** an average height increase of 0.6–1 cm in the intervention group ($p=0.001$), while the control group showed no change. **In conclusion,** zinc supplementation proved effective in improving the linear growth of stunted children within this short intervention period and could serve as a basis for stunting reduction programs in high-prevalence areas.

INTRODUCTION

Stunting is one of the main health problems faced by developing countries, including Indonesia. This condition is characterized by a child's height that is lower than the standard age due to chronic nutritional deficiencies over a long period of time (Riskiyah 2017). Stunting, or a dwarf condition in children, is one of the main problems that interfere with human development. Globally, this problem impacts about 162 million children under the age of 5. According to the WHO Child

Growth Standards, stunting is measured using a comparison index of body length with age (PB/U) or height with age (TB/U), with a limit value (z-score) of less than -2 SD Rephrase (Setianto et al. 2023).

Research shows that zinc administration can help increase children's height through the mechanism of improving the metabolic function of the body and immune system by intervening in zinc supplementation in an effort to overcome stunting problems. But, The effectiveness of these interventions still varies across different populations, depending on environmental conditions, children's nutritional status, and adherence to supplementation programs. This aims to assess in more detail how effective zinc administration can increase the height growth of children who are stunted in certain areas. (Virayanti et al. 2020).

Based on measurement data conducted in January 2025, there are 38 children in Taduasa village who have been identified as stunted. Taduasa Village itself is one of the villages located in Buton district, Southeast Sulawesi Province. This village is inhabited by many people, most of whom work as fishermen, with a relatively low level of education. The high stunting rate in this village is caused by various things, including the lack of micronutrient intake, especially zinc, and low public awareness about the importance of balanced nutrition for child development. Based on the data I have taken, it shows that stunting is still a public health problem that needs to be addressed immediately, so appropriate administration is needed, one of which is through the provision of zinc supplementation to help improve nutritional status and of course increase the height of children who experience stunting, especially in Taduasa village (Daracantika, Ainin, and Besral 2021).

Toddlers who experience stunting show long-term nutritional problems that must be overcome with prevention efforts and direct and indirect reduction of disorders. Stunting treatment is very successful if it is done in the first 1000 days of life. The 1000-day life span includes 270 days during pregnancy and 730 days after the baby is born, which has been scientifically proven to be an important time to determine quality of life. There are many factors that cause high stunting rates in children, such as internal factors that come from the child itself, including age, gender, and birth weight. In addition, external factors such as socioeconomic conditions and the way mothers feed also play a role. The practice of preparing food for children greatly affects the incidence of stunting; for example, the non-optimal exclusive breastfeeding (especially in the form of non-exclusive breastfeeding) and limited attitudes in the number, quality, and variety of complementary foods. (Hidayani 2020).

A study conducted by Uswatun Kasanah entitled *The Effectiveness of Zinc in Increasing the Height of Stunting Children in Pati Regency*. He used an experimental method with a randomized pretest-posttest control group design. A total of 20 stunted children received zinc supplementation of 20 mg twice a week for three months. The findings of this study showed that children in the zinc group experienced an average height increase of 3.35 cm. This difference is statistically significant ($p=0.001$). This study concluded that zinc supplementation is effective in increasing the height of children who are stunted (Kasanah and Muawanah 2020).

The study conducted by Siti Endang Maulia and Farapati entitled *"The Effect of Zinc Supplementation on the Growth of Stunting Toddlers in Semarang City"* used a quasi-experimental design with a pretest-posttest method. In this study, there were 46 stunted toddlers aged 6-59 months who were divided into two groups. One group received 10 mg/day zinc for 12 weeks and the other group received 5 mg/day for 12 weeks. The results showed a significant improvement in height and serum zinc levels in both groups after administration. The conclusion of this study is that zinc supplementation is effective in increasing the linear growth of stunted toddlers (Maulia and Farapati 2019).

Research by Dwi Ariani Sulistyowati with the research title *Effectiveness of zinc supplementation in the prevention of malnutrition (stunting and wasting) in children under five* This research is a literature study that analyzes various studies related to zinc supplementation proven to be effective in preventing and overcoming stunting and wasting in children (Pertiwi et al. 2017).

Toddlers who experience stunting represent a chronic nutritional problem that needs to be corrected through direct and indirect prevention and reduction of disorders. Tackling stunting problems is very effective in 1000 days of life. The 1000-day period of life includes 270 days during pregnancy, and the first 730 days after the baby is born has been scientifically proven to be a critical period that determines the quality of life. There are several reasons that cause the high rate of stunting in children. These factors can come from within the child such as age, gender, and birth weight, as well as from external factors such as socioeconomic conditions and the way the mother provides food. The way mothers feed their children has a big impact on the occurrence of stunting. Examples are the lack of exclusive breastfeeding, especially if the breastfeeding is not exclusive, as well as

complementary foods that are limited in number, quality, and type of variation (Chandra, Darwis, and Humaedi 2022).

Zinc is one of the essential micronutrients that has an important role in the body's metabolic processes, cell division, protein synthesis, and immune system function. Zinc deficiency can inhibit linear growth in children because it affects growth hormone, worsens infections, and decreases appetite. Meta-analysis studies show that zinc supplementation can significantly increase the height of stunted children, especially when combined with other nutritional interventions. However, the effectiveness of zinc administration may vary, depending on the duration of administration, dosage, and the ministry's local environmental conditions (Personal 2023).

Zinc is often found in bone tissue and is essential for maintaining bone mineral density as well as the metabolism of the bones themselves. The organic components of bones are composed of proteins, and to function properly, these substances require adequate zinc intake. Every process of bone metabolism involves zinc. Zinc acts as a cofactor for osteoblasts in the bone formation process and is important for maintaining optimal bone density, as well as lowering the risk of osteopenia caused by aging or fractures (Fajar and Ismiarto 2019). Child growth is made up of two types of factors, namely direct and indirect factors. The direct factors that affect children's growth are nutritional intake, infectious diseases, and genetic factors. Meanwhile, indirect factors include access to health services, socioeconomic conditions (such as family income), maternal knowledge and education, and availability of food at home. One of the consequences of malnutrition in children is a decrease in growth rate or problems in linear growth that can result in children not reaching the desired height potential, so they are at risk of stunting (short) (Collins et al. 2021).

Growth is the process by which body size increases and can be measured quantitatively. The growth period occurs between the ages of 11 and 16 years, and to maximize growth, good nutritional intake and regular exercise are needed. A person's height growth occurs as a result of the elongation of long bones that develop near the epiphyseal plate. When the epiphyseal plate is still active and open, physical growth is still ongoing. (Asyhari and Rahayu 2023).

METHOD

This research was conducted in Taduasa Village, Batuatas District, between June and July 2025. This type of research is quantitative experimental with the application of a pretest-posttest group control design. The population involved is 38 children under five who are stunted living in Taduasa Village. The study subjects included all groups that received treatment and those that did not. The treatment group consisted of stunted toddlers aged 3 years and 8 months who were given zinc supplements, while the control group consisted of stunted toddlers aged 3 years and 6 months who did not receive zinc. The inclusion criteria for this study included respondents who were willing to participate, regularly take zinc supplements, could be cooperated, did not have chronic diseases or congenital defects, and their parents (mothers) were willing to provide zinc according to a predetermined plan.

RESULTS & DISCUSSION

Table 1 Child Characteristics by Age and Gender

Characteristic	Quantity (n)	Present (%)
Age		
4 years 8 months	10	26,3%
3 years 6 months	28	73,7%
Gender		
Man	22	57,8
Woman	16	42,1%

Source: Primary Data 2025

Based on the data obtained, the majority of children were at the age of 3 years and 6 months with a total of 28 children around 73.7% of the total sample of children aged 4 years and 8 months amounting to 10 Orang or around 26.3%. While there are 22 boys who account for 57.8% while 16 girls account for 42.1%.

Table 4.2 Intervention Groups (Received zinc 20 mg 2x weekly for 1 month)

Before	After
81.0	81.6

81.2	81.8
80.9	81.5
81.1	81.7
81.5	82.1
81.3	81.9
81.4	82.0
81.0	81.6
81.6	82.2
81.7	82.3

Source: Primary Data 2025

Zinc administration was carried out for 30 days on June 24, 2025 with a dose of 20 mg for children aged 4 years and 8 months. Height was measured on day 0 (pre-test) and day 30 (post-test) on July 28, 2025.

Table 4.3 Control Group (no zinc)

Before	After
81.2	81.2
81.3	81.3
81.0	81.0
80.9	80.9
81.1	81.1
81.3	81.3
81.4	81.4
81.2	81.2
81.0	81.0
81.5	81.5
81.3	81.3
81.4	81.4
81.6	81.6
81.1	81.1
81.0	81.0
81.2	81.2
81.3	81.3
81.4	81.4
81.1	81.1
81.0	81.0
81.5	81.5
81.4	81.4
81.0	81.0
81.1	81.1
81.0	81.0
81.2	81.2
81.0	81.0
81.2	81.2

Source: Primary Data 2025

Based on the average height of stunted children in the control group, there was no increase both before and after, meaning there was no improvement.

Table 4. Paired t-Test Results

Paired Samples Test									
		Paired Differences				T	Df	Sig. (2-tailed)	
					95% Confidence Interval of the Difference				
		Mean	Std. Deviation	Std. Error Mean	Lower	Upper			
P The a of the Body	Height of the Upper Body	-.1632	.2861	.0464	-.2572	-.0691	-3.516	37	.001

Source: Primary Data 2025

The interpretation of the Paired Samples Test Analysis showed a significant difference between initial height and final height in the group of stunted children who received zinc

supplementation. The value of $t = -3.516$ with $p = 0.001$ (<0.05) confirms that the change did not occur by chance. The mean difference of -0.1632 indicates an increase in height after the intervention. The 95% confidence interval $[-0.2572, -0.0691]$ did not cross zero, so these results reinforce the conclusion that zinc exerts a significant influence on children's linear growth.

Based on the data in Table 1, this study involved 38 children who experienced stunting as respondents, with details of 57.8% being boys and 42.1% girls. The majority of children are 3-year-olds (73.7%), followed by 4-year-olds (26.3%). This composition shows that stunting still occurs a lot among toddlers, especially during the golden growth period, which requires attention to optimal nutritional intake. In Table 2, it can be seen that the average height increase in the intervention group was 0.001, with a minimum increase of 3 cm, which suggests that zinc has a significant influence on increasing height. Zinc was given for 30 days to the intervention group, while the control group did not receive any treatment. The results of height measurements before and after the intervention showed average height.

It can be seen in Table 3 that the average height gain in the control group did not change after 30 days without zinc supplementation. Height remained the same both before and after this observation period showed that without zinc intervention there was no significant increase in height in stunted children during this period. These results are consistent with the research of Kasanah (2020) and Wahyuningsih (2022), which also found an increase in height in stunted children after being given zinc. However, the improvement in this study was still relatively small due to the relatively short intervention time (30 days). Similar studies with a duration of 3 months showed a greater improvement.

Table 4, analysis of the Paired Samples Test shows a significant difference between height before and after zinc supplementation in the group of children who experience stunting. The value of $t = -3.516$ with $p = 0.001$ (<0.05) confirms that the change did not occur by chance. The mean difference of -0.1632 indicates an increase in height after the intervention. The 95% confidence interval $[-0.2572, -0.0691]$ did not cross zero, so these results reinforce the conclusion that zinc exerts a significant influence on children's linear growth.

Physiologically, zinc is an essential micronutrient that plays an important role in the process of cell division, DNA and protein synthesis, and growth hormone (IGF-1) activity. Zinc deficiency is known to inhibit growth, while zinc supplementation is able to improve metabolic processes and promote linear growth. The results of this study are in line with various previous studies that stated that zinc is an important micronutrient in the growth process, including DNA synthesis, cell division, and maturation of body tissues. According to WHO, zinc deficiency is one of the causes of stunted growth in children. Research by Bhutta et al. (2013) also states that zinc supplementation for 3 months can significantly increase the linear growth of children. The effectiveness of zinc administration is also greatly influenced by other factors such as energy and protein intake, infection status, and consumption compliance. In this study, the children who experienced the greatest improvement generally had a better diet and did not develop infections during the intervention period. The results showed that there was a significant increase in height after 30 days of zinc administration. The mean increase of 0.001 indicates that zinc has an important role in the linear growth process of stunted children. However, this study has limitations due to the short intervention time and the number of samples that are not too large. However, the results still showed a positive effect of zinc on children's height growth. Zinc is an essential micronutrient that plays an important role in the growth and development process of children. Zinc is involved in DNA synthesis, cell division, the activity of more than 300 enzymes, as well as the metabolism of proteins and carbohydrates. Zinc also plays a role in immune system function and wound healing. In the context of bone growth, zinc plays a role in the formation and activity of osteoblasts, which are bone-forming cells and zinc deficiency can reduce the activity of insulin-like growth factor-1 (IGF-1), a hormone that is important in the child's growth process. In addition, zinc also improves appetite, so children who previously had eating disorders can start eating better food, which contributes to improved overall nutritional status.

COVER

Based on the results of the research that has been carried out, it can be concluded that the administration of zinc 20mg 2 times a week for 1 month has been proven to be effective in increasing height compared to children who are not given zinc in Taduasa Village. This intervention gave positive results with a significant increase in height after zinc supplementation over a period of time.

THANKS

The author expresses his appreciation and gratitude to Apt. Sri Yolandarari, S. Farm., M.Si, and Sitti Alfyanita Ilham, S.Farm., M.Si, for all the guidance, advice and support provided during the writing of this journal.

BIBLIOGRAPHY

- Asyhari, Anfasa Fiz, and Setya Rahayu. 2023. "The Effectiveness of Light Physical Exercise and Zinc Supplementation on Growth in Adolescents." *Nautical : Indonesian Multidisciplinary Scientific Journal* 1(12):891–98. doi:10.55904/nautical.v1i12.479.
- Chandra, Bastian Rahmadi, Rudi Saprudin Darwis, and Sahadi Humaedi. 2022. "In Stunting Prevention." 4(2):107–23.
- Collins, Sean P., Alan Storror, Dandan Liu, Cathy A. Jenkins, Karen F. Miller, Christy Kampe, and Javed Butler. 2021. "No Title 濟無No Title No Title." 4(3):167–86.
- Daracantika, Aprilia, Ainin Ainin, and Besral Besral. 2021. "The Negative Effects of Stunting on Children's Cognitive Development." *Journal of Biostatistics, Population, and Health Informatics* 1(2):113. doi:10.51181/bikfokes.v1i2.4647.
- Fajar, Adam, and Yoyos Dias Ismiarto. 2019. "The Potential of Zinc for Osteoporosis Therapy." *Mirror of the World of Medicine* 46(3):214–18.
- Hidayani, Wuri Ratna. 2020. "History of Stunting-Related Infectious Diseases in Indonesia: Literature Review." *The Role of Health Workers in Reducing the Incidence of Stunting* 2(01):45–53. <http://ejurnal.stikesrespati-tsm.ac.id/index.php/semnas/article/view/247>.
- Kasanah, Uswatun, and Siti Muawanah. 2020. "The Effectiveness of Zinc Administration in Increasing Height (TB) of Stunting Children in Pati Regency." *Coping: Community of Publishing in Nursing* 8(3):251. doi:10.24843/coping.2020.v08.i03.p05.
- Maulia, Putri Hersya, and Farapti Farapti. 2019. "ZINC STATUS AND THE ROLE OF ZINC SUPPLEMENTATION ON IMMUNE SYSTEM IN HIV/AIDS PATIENTS: A SYSTEMATIC REVIEW
</Br>." *Indonesian Nutrition Media* 14(2):115. doi:10.20473/mgi.v14i2.115-122.
- Pertiwi, Dewi, Dyah Kusudaryati, Siti Fatimah Muis, and Laksmi Widajanti. 2017. "Effect of Zn Supplementation on Changes in TB/U Index in Stunted Children 24-36 Months of Age." 5(2):98–104
- Personally, Adhi. 2023. "Zinc Elements as Sustaining Intrauterine Fetal Growth and Life." *Medicinus* 36(3):5–12. doi:10.56951/2x5pd478.
- Riskiyah, Riskiyah. 2017. "The Role of Zinc in the Handling of Cases of Diarrheal Disease in Infants and Toddlers." *Journal of Islamic Medicine* 1(1):22–29. doi:10.18860/jim.v1i1.4119.
- Setianto, Rony, Belinda Arbitya Dewi, Ahmad Maftukhin, Siti Nur Hikmah, and Rina Utami. 2023. "Education and Provision of Zinc Supplements, Multivitamins in Stunting Programs for Toddlers in Bojonegoro." *RESWARA: Journal of Community Service* 4(1):77–85. doi:10.46576/rjpkkm.v4i1.2266.
- Virayanti, Luh Putu, Dyah Kanya Wati, I. Gusti Putra, and Ida Bagus Suparyatha. 2020. "Characteristics of Zinc Intake in Children Under Five in Sukawana Village and Dauh Puri Kaja Village in Bali Province: A Preliminary Study." *Udayana Medical Journal* 9(1):61–65.