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Original Research

Effectiveness of the NETES (Niat Engsun Tuntas cEgah Stunting/My Intention to Prevent Stunting Completely) Program to Prevent Stunting

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ABSTRACT

Background: Stunting was described as a toddler whose height was lower than the standard height for children of the same age, which was a characteristic that indicates repeated and long-term nutritional problems. The negative impact in the long term was decreased cognitive ability and learning achievement, body immunity, and a high risk of diabetes, obesity, heart and blood vessel disease, cancer, stroke, and disability in old age. The prevalence of stunting in Plaosan Subdistrict increased from 2021 by 7.54%, in 2022 by 7.91% and in 2023 by 8.52%. The "NETES" (Niat Engsun Tuntas cEgah Stunting/My Intention to Prevent Stunting Completely) program was one of the stunting management programs in Plaosan Subdistrict, implemented by giving one egg every day for 90 days to children under five at risk of stunting. This research aims to determine effectiveness of the NETES program to prevent stunting. **Methods:** Research design was ex post facto. The population were all children under five years old who were at risk of stunting, sample size 90 taken by total population. The independent variable was the NETES program and the dependent variable was stunting. The instruments used Endo brand stadiometer and Endo brand infantometer, observation sheets for egg feeding and body height. Analysis by the Wilcoxon Signed Rank test. **Results:** The results showed median HAZ value before the NETES program was –2.3 and after the NETES program was -1.8. Z value = 3.8541 and p value = 0.0001162 so it can be concluded that there is a difference HAZ value between before and after the implementation of the NETES program. **Conclusions:** Giving one egg a day for 90 days is effective to prevent stunting. It is recommended that the implementation of the NETES program can be continued and be applied in other areas.

Keywords: NETES program; one egg per day; stunting

1. INTRODUCTION

Stunting or a short child is described as a toddler whose height is lower than the standard height for toddlers his age. one of the characteristics that indicates repeated and long-term nutritional problems. Failure to meet micronutrient

requirements, an unsupportive environment and inadequate provision of care are factors responsible for and affecting the growth conditions of nearly 200 million children under 5 years of age.[1]

The prevalence of stunting according to the results of the 2023 Indonesian Health Survey (SKI) has decreased from 21.6% to 21.5%.[2] This decline in the prevalence of stunting has occurred successively over the last 10 years (2013-2023). However, this figure still does not meet the 2020-2024 RPJMN target of 14% in 2024 and the WHO standard is below 20%.[2] The stunting rate based on toddlers measured in 2023 in East Java Province is 5.1%,[3] and in Magetan Regency it is 7.3%.[4] The prevalence of stunting in the Plaosan Community Health Center area increased in 2021 by 7.54%, in 2022 by 7.91% and in 2023 by 8.52%. The stunting risk figure in 2023 is 6.2%. Plaosan sub-district was a highland area, located at an altitude of 874 meters above sea level.[5] Mountainous areas, deltas, and flooded areas biologically tend to have low iodine concentrations. Inadequate dietary iodine consumption and associated deficiencies in thyroid hormones lead to a group of unfortunate consequences called iodine deficiency disorders. Iodine deficiency disorders will affect the growth and development of children.[6] Stunting is a process that can affect a child's development from the early stages of conception to the third or fourth year of life, and in toddlers it can have short-term impacts, including disruption of brain development, intelligence, physical growth disorders and metabolic disorders in the body. The bad impacts in the long term are decreased cognitive abilities and learning achievement, decreased immunity so that people get sick easily, and a high risk of developing diabetes, obesity, heart and blood vessel disease, cancer, stroke, and disability in old age, as well as poor work quality. uncompetitive which results in low economic productivity.[7]

Causes of stunting include infection, hormonal factors, genetics, low parental knowledge in parenting, poverty, low environmental sanitation, low food accessibility at the family level, especially in poor families, and low family access to basic health services, also related to nutritional deficiencies (micronutrients). and macronutrients). Several nutrients are related to stunting, such as protein, iron, zinc, calcium, and vitamins D, A and C.[7] According to the Indonesian Ministry of Health stunting was caused by direct factors from household and family factors, and indirect factors from society including politics, economics, health and health services, education, social culture, agricultural and food systems, water, sanitation and environment.[8] Reducing stunting rates requires support and participation from the community, private organizations/institutions, and universities, through stunting awareness community movements for the prevention and eradication of stunting. One solution can be done by providing additional food (PMT). Additional food provided can be in the form of family food based on local food.[1] One example of local additional food for babies and children was eggs. The eggs were a common food around the world that provides approximately 150 kcal/100 g, >50% of adequate intake of critical micronutrients, and high-quality protein, and are more affordable than other animal-derived foods. Eggs are a rich source of choline , which plays an integral role in neurotransmitters, cell membrane signalling, and lipid metabolism. Recent evidence suggests that the early introduction of one egg per day for six months markedly improved growth in young children.[9] In Plaosan District, Magetan Regency, the Plaosan District Head with the Stunting Reduction Acceleration Team.

launched the "NETES" program (Niat Engsun Tuntas cEgah Stunting/My Intention to Prevent Stunting Completely), namely by providing eggs to children under five at risk of stunting for 90 days. The eggs were obtained from laying hen farmers voluntarily, as a form of community support and participation to reduce stunting in their area, with proportions adjusted to the number of chickens. Plaosan sub district had abundant livestock potential. This egg provision is carried out every 10 days by health workers together with cadres, while also evaluating the child's height. This program has started in October 2023 for phase I, and phase II from April to June 2024.

The impact of stunting in the long term is very detrimental. Preventing children from becoming stunted was easier. The eggs were a cheap food ingredient, easy to obtain, and contain micronutrients for growth. The aim of this research was to determine the effectiveness of the NETES program by providing one egg every day for 90 days to prevent stunting in children at risk of stunting.

2. METHODS

2.1 Study Design

The research design was ex post facto research. Research location in Plaosan subdistrict. The research period was July to December 2024. The population were all children under five years old who were at risk of stunting, with sample size 90 taken by total population. The independent variable was the NETES program and the dependent variable was stunting. The instruments for collected of data used Endo brand stadiometer and Endo brand infantometer, observation sheets for egg feeding and body height. Data analysis by the Wilcoxon Signed Rank test.

Design of research was ex post facto research. The research was conducted after the NETES program of providing one egg for 90 days was completed. Researchers did not intervene in any form. This research aims to determine the effectiveness of the NETES program that has been implemented to prevent stunting. The research location is in Plaosan sub-district, Magetan district. The population of this study is all babies aged more than or equal to 6 months and children up to 2 years old who are at risk of stunting. The risk of stunting is determined based on the Z score value of length/height according to the child's age (HAZ) in February 2024 with a limit of – 1.8 SD to – 2 SD. A sample size of 90 children was obtained from the entire population.

Implementation of the NETES program began by determining targets for babies and children at risk of stunting in February 2024. Measurement of length/height as initial data before intervention and distribution of 10 eggs in stage 1 was carried out on March 22 2022 at Posyandu (Pos Pelayanan Terpadu/Integrated Service Post) by health cadres and health workers from the Plaosan Public Health center. Body length/height measurements are carried out using a stadiometer for children over 2 years old and an infantometer for children aged 1-2 years. Determining the HAZ (Height of Age Z score) value using the Anthrocal application.

Distribution of 10 eggs and measurement of length/height stage 2 on 1 April 2024, Stage 3 on 11 April 2024, Stage 4 on 21 April 2024, Stage 5 on 1 May 2024, Stage 6 on 11 May 2024, Stage 7 on 21 May 2024, Stage 8 on 31 May 2024, Stage 9 on 7 June 2024. The final number of eggs given is 90 eggs for 90 days.

Primarily data was managed and processed in Microsoft Excel file. Data analysis by statistical test Wilcoxon Signed Rank test.

2.3 Ethical clearance

This study was approved by the Komisi Etik Penelitian Kesehatan (KEPK), Politeknik Kesehatan Kemenkes Surabaya with the reference no. EA/2969/KEPK-Poltekkes_Sby/V/2024.

3. RESULTS

3.1 Description of Research Location

Plaosan District is one of the sub-districts in Magetan Regency which is located in the westernmost region bordering Karanganyar Regency, Central Java. The position is at the foot of Mount Lawu with a height of approximately 874 m above sea level so it is considered a plateau. The area is 66.09 km^2 consisting of 2 sub-districts and 13 villages. Most of the population's livelihood is farming in the fields and some are livestock breeders.

3.2 Characteristics of NETES Program Targets

The target of the NETES program is children aged under two years (6-23 months) who are in the category at risk of stunting, coming from 15 villages, a total of 90 children. Most of the children were 12-24 months old and male. The distribution of NETES targets by age group and gender is as follows (Table 1)

Tabel 1. Distribution of NETES program targets by age group and gender

Characteristic		Frequency	Percentage
Age	6-11 months	11	12.22
	12-23 months	79	87.28
	Total	90	100.00
Gender	Male	51	56.67
	Female	39	43.33
	Total	90	100.00

3.3 Implementation of NETES Program

Providing 10 eggs to NETES targets was given in 9 stages. One egg should be consumed every day, and every 10 days the child's length/height should be measured. The stages of egg division and the results of measurements of length/height according to age (HAZ) can be read in the following Table 2.

Table 2. Stages of egg distribution and evaluation of body length/height according to the target age of the NETES program

Stages	Date	Minimum value	Maximum value	Median
1	22 March 2024	-10.8	2.29	-2.08
2	1 April 2024	-10.9	2.35	-2.04
3	11 April 2024	-11.0	2.36	-1.84
4	21 April 2024	-11.1	2.02	-1.96
5	1 May 2024	-11.1	2.43	-1.84
6	11 May 2024	-11.1	2.26	-1.85
7	21 May 2024	-10.8	2.34	-1.85
8	31 May 2024	-10.9	2.18	-1.89
9	7 June 2024	-10.3	2.07	-1.76

3.4 Body Length/Height According to Age Before and After Implementation of the NETES Program

Measurement of body length/height according to age before implementing the NETES program was carried out at the first stage of giving eggs, and at the end of the program ten days after the ninth stage with the following results in Table 3.

Table 3. Body Length/Height According to Age Before and After Implementation of the NETES Program

	Minimum	Maximum	Median
Before	-10.83	2.29	-2.1
After	-10.34	2.07	-1.8

4. DISCUSSION

The Plaosan District area of Magetan Regency is a mountainous area because it is at the foot of Mount Lawu, East Java. According to Abbag, et al that Mountainous areas, deltas and flooded areas biologically tend to have low iodine concentrations. Inadequate dietary iodine consumption and associated deficiencies in thyroid hormones lead to a group of unfortunate consequences called iodine deficiency disorders. Iodine deficiency disorders will affect the growth and development of children.[6]

The geographical conditions of Plaosan District may influence the incidence of stunting in children under five. So, to find out the iodine levels of water and soil in Plaosan sub-district, cross-program collaboration with environmental health and cross-sector collaboration with the Environmental Service is needed.

Most NETES program targets are 12-24 months old. Children at this age have started to consume various types of food as complementary foods for breast milk. The quality and quantity of complementary foods for breast milk greatly influences growth. Risk factors for stunting in children aged 12-24 months are more related to diet, hygiene and disease. Signs and symptoms of stunting when children reach the age of 12-14 months, differences in height and physical development begin to become more clearly visible. Babies 13-24 months old need more diverse and frequent complementary foods compared to babies aged 6-12 months old. Babies should get food from at least five food groups each day, including dairy products, meat, fish, fruits, and vegetables.[10]

Most of NETES' program targets are male. In accordance with research results by Yuningsih and Perbawati,[11] the majority of toddlers who are stunted, either short or very short, are boys. Men need more energy and protein than women. Men are more capable of doing heavy work that women cannot do. Girls are less likely than boys to experience stunting and stunting during infancy and childhood, and in most developing countries, including Indonesia, baby girls are more likely to survive than baby boys. Boys are more likely to experience stunting and/or being underweight than girls. The results of this study support the research of Riza Savita and Fitra Amelia that male toddlers have a

tendency to be stunted one time compared to female toddlers.[12]

The NETES program is one of the Plaosan District programs to prevent stunting. This program is implemented by providing one egg every day for 90 days to be consumed by children under five who are at risk of stunting. The eggs distributed were obtained from breeders in Plaosan District who were willing to participate in this program. The egg distribution process is carried out by health cadres in stages every ten days, while length/height measurements are also carried out. Monitoring the health of children under five, especially the side effects of allergies to eggs, is carried out by pediatricians. Egg processing is not specified but is left to the family according to the child's taste.

According to Kemenkes RI 2022, indirect factors that influence the occurrence of stunting are community and social factors, including agricultural and food systems, especially the availability of food with high micronutrient content.[8] The provision of egg assistance from the Plaosan District government for children at risk of stunting is an effort to increase the availability of food ingredients that contain high levels of micronutrients.

Monitoring results up to the completion of the NETES program showed that there were no children experiencing allergic effects to eggs. According to the American Heart Association (AHA), healthy and normal people can consume one egg per day or two egg whites per day as part of a healthy diet.[19] So, the NETES program is a safe program to implement.

Determination of stunting in the NETES program uses body length/height indicators. Length/height measurements for NETES program targets use standardized tools, namely an infantometer for children aged 6-12 months and a stadiometer for children aged over 12 months, provided the child can stand and cooperate. Z-score calculator for growth parameters using the AnthroCal app.

According to (Indonesian Ministry of Health, 2022) in the National Guidelines for Stunting Management Medical Services it is explained that when measuring body length/height you must pay attention to many things that can affect the accuracy of the measurement results. Starting from preparation, selecting and how to use tools, how to read the results[8]

During Toddler Posyandu activities, it was often found that cadres did not pay attention to things that could influence the measurement results. For example, the child's footwear is not removed, the baby's legs are not straight or the soles of the baby's feet are not at the elbow position on the board, the child's head, back and heels are not attached to the stadiometer board, the headboard does not touch the child's crown, the reader's eyes not parallel to the boundary line read.

In this study, observations of the implementation of height measurements were not carried out, the measurement results data were already available, so the possibility of error could not be known.

The research results showed that there was a difference in the median HAZ value before and after the implementation of the NETES program, and showed an increase. It can be concluded that the NETES program is effective in preventing stunting.

The results of this study support research of Sartikah, 2023 with research results showing differences in height in stunted toddlers after saluri (one egg a day).[13] Research by Bolton, 2019 that giving animal product food once a day can reduce the prevalence of stunting by 3.3% and giving it twice a day can reduce the prevalence of stunting by 7.1%.[14] Research by Asare et al. that animal-source foods (ASF) a suitable complementary food to improve growth in 6 to 24 months children especially if based on eggs.[15] But the results of this study do not support the research of Hannah Ricci, et al. that relying solely on interventions from daily egg consumption is not enough to solve the problems of growth, development and nutritional status of infants and young children in low-socio economic communities. Additional approaches and interventions are needed to be considered to improve the effects of egg consumption, such as diet, food diversity, and strategies to improve nutrient absorption and bioavailability.[16]

Eggs are an animal product that is high in protein, cheap and easy to obtain. Eggs contain many micronutrients that babies and children need to grow, rich in iron, protein, fat, vitamins A, D, E and B12, folate and a source of choline which plays an important role in baby's brain development. The egg yolk is a source of iron which can increase hemoglobin levels in babies aged more than 6 months. The iron in eggs plays an important role in helping the process of forming new cells, supporting optimal growth, while protein as a building material is very necessary for babies and toddlers to make new cells and is an element that forms

various body organ structures such as bones, muscles, teeth and others.[17]

Consuming food sources of animal protein during this critical period can improve growth, cognitive function and nutritional status of children. The long-term effect of consuming food sources of protein is to improve the nutritional status of toddlers. Apart from that, eggs are a food source that has a lot of nutritional content.[18]

One egg every day can prevent stunting, so efforts are needed to support all children under five to consume eggs every day. Cross-sector cooperation between the health sector and other sectors such as animal husbandry, agriculture, industry and trade services need to be increased, as does community participation, especially laying hen breeders. To prevent children from getting bored when consuming eggs, parents must be able to make innovations in processing eggs.

What was the study limitations? Limitations in this research are the ex post facto research design. The intervention has been implemented so that the validity of the length/height measurement data obtained cannot be known during the measurement process. Several things can influence the inaccuracy of the results that cadres may make. The growth of a child's length/height does not only influence food intake, in this study other factors that could influence a child's growth were not controlled. So, to know that giving one egg for 90 days is effective in increasing the HAZ value, control variables and precise measurements of body length/height are needed.

5. CONCLUSION

The NETES program in the form of providing one egg every day for 90 days is effective in preventing stunting in children under five in Plaosan District. The NETES program should be continued, especially for children who are still at risk of stunting, to prevent stunting. The NETES program by providing one egg every day for 90 days is effective in preventing stunting in children under five at risk of stunting in Plaosan sub district. There is increase in the median Z score for length/height for age (HAZ) after giving eggs. The validity of the data from measuring the child's length/height will determine the results of this research, so it is recommended that health workers and health cadres who measure the child's length/height pay attention to the correct measurement tools and methods.

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Conflict of Interest

The authors declare no conflict of interest.

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