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Fortification of Moringa Leaves to Fulfill the Nutritional Needs of Stunting Toddler

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Abstract
Nutritional problems are a classic health problem that recurs every year, especially in developed countries and including Indonesia. One of the nutritional problems faced by Indonesia is that there are still stunting cases experienced by toddlers. The problem of stunting is a hotly discussed issue considering that the impact of stunting incidents that are not immediately addressed can have an impact on reducing the quality of life of Indonesian people. The culture of parents to prepare food according to what they consume for stunted toddlers and not to worry about the toddler's short height are two problems that cause stunting in Indonesia. One effort that can be made to overcome the problem of stunting is to ensure that stunted toddlers have a good appetite. When a stunted toddler's appetite increases, the problem of stunting will soon be resolved properly. The aim of this study was to analyze the effectiveness of giving churros made using Moringa leaf flour to increase the height of stunted toddlers. The research design used was pre-experimental. The samples in this study were taken from three working areas of the public health unit in Sooko District, Gondang District and Jatirejo District. The variable studied was the toddler's height. Data analysis tests were carried out using the Mann-Whitney test. From the results of the Mann-Whitney test, a significance value of 0.022 < 0.05 was obtained, so it can be concluded that giving churros made using Moringa leaf flour is effective in increasing height in stunted toddlers

Keywords : Churros, Moringa, Toddlers, Stunting

Introduction

The problem of fulfilling nutrition and nutrition is a classic problem experienced by many people in various parts of the world, especially in poor and developing countries and one of them is also a classic problem in Indonesia (Rahmadhita, 2020). Stunting is a chronic nutritional problem that occurs due to insufficient nutritional intake over a long period of time. This causes growth disorders characterized by height that is not appropriate for age. Stunting can occur from the time the fetus is still in the womb and only appears when the child is two years old (Archda & Tumangger, 2019). The consequences of stunting can increase morbidity and mortality during infancy, lower cognitive and psychological function during school years and difficulty in concentrating. Stunting can also be detrimental to long-term health and in adulthood can affect work productivity, risk of obesity and trigger metabolic syndrome, hypertension, coronary heart disease, stroke and type 2 diabetes mellitus (Dasman, 2019). Facts on the ground show that stunting is often considered a normal condition that occurs in toddlers. Many people have the perception that toddlers who are short, thin and rarely eat do not need special attention as long as the toddler they have is not sick. This is what makes the stunting problem in Indonesia even more difficult to overcome

The results of the 2022 Indonesian Nutritional Status Study conducted by the Ministry of Health of the Republic of Indonesia involving a sample of 334,848 infants and toddlers in 486 regencies/cities in 33 provinces in Indonesia, found that there was a trend towards a reduction in stunting conditions, where in 2019 there were 27. 7 percent of babies and toddlers in Indonesia experience stunting, decreasing to 21.6 percent of babies and toddlers in 2022. Then regarding wasting data, it is reported that there will be an increase in 2022 to 7.7 percent from 7.4 percent in 2019. For babies and toddlers with underweight status, it was reported that in 2019 it was 16.3 percent, rising to 19.1 percent in 2022. Then for toddlers with overweight status, it was reported that there was a decreasing trend, where in 2019 it reached 4.5 percent,

down to 3.5 percent in 2022 (Kemenkes RI, 2022). In the annual report, the Mojokerto Regency Government stated that the number of stunted toddlers in the Mojokerto Regency area was 1,286 toddlers. The three areas with the highest incidence of stunting in Mojokerto Regency are the working area of the Sooko Health Center, Mojokerto Regency, the working area of the Gondang Health Center, Mojokerto Regency, and the working area of the Jatirejo Health Center, Mojokerto Regency (Pemkab Mojokerto, 2023).

Stunting is basically a condition where a toddler experiences failure in the growth process due to inadequate nutritional intake and nutrients needed by the body in the chronic category. This condition is usually experienced at toddler age and tends to occur in the first thousand days of life or better known as the first 1000 days of life (Panatariono & Puspitasari, 2022).

According to the Regulation of the Minister of Health of the Republic of Indonesia Number 2 of 2020 concerning Child Anthropometric Standards (2020) stated that stunting can also be called a condition where a toddler's height is shorter when compared to other toddlers of the same age and gender. Experts also define stunting as a condition of failure to grow due to chronic malnutrition and as an illustration of the effects of malnutrition experienced by toddlers over a long period of time (Haskas, 2020). According to the world health organization WHO (World Health Organization), stunting is a natural alarm raised by the body of a toddler which indicates a disruption in the growth and development of the toddler due to the unfulfilled nutritional and nutritional needs required during the toddler's growth and development period. Stunting that occurs in toddlers is also possible due to repeated infections in toddlers. A common sign that can be found in stunted toddlers is not achieving body length (PB) according to the toddler's gender and age. If anthropometric measurements are taken, stunting is established when the toddler's body length or height is less than -2 SD (Standard Deviation) on the toddler's growth chart. However, it needs to be understood carefully that not all short toddlers always experience stunting because these conditions are quite different and a correct understanding of stunting and shortness is needed (Susanti, 2022). Stunting and shortness both result in a body that is not too tall. However, stunting and shortness are different health conditions, so they require different treatment. In simpler language, stunting is short, but short is not necessarily stunting. Stunting is a condition where toddlers fail to grow and develop due to malnutrition when they are in the womb until they are born into the world, but the condition of stunting is seen after the baby is 2 years old (Helmyati et al., 2020).

According to UNICEF, basically a child's nutritional status can be influenced by direct and indirect factors, direct factors related to stunting, namely the child's characteristics in the form of male gender, low birth weight, food consumption in the form of low energy intake and low protein intake, factors Other direct factors include the health status of acute respiratory infections and diarrhea (UNICEF Indonesia, 2019). Parenting patterns do not provide exclusive breast milk, health services in the form of incomplete immunization status, and family characteristics in the form of parents' occupation, parents' education and family economic status are indirect factors that influence the incidence of stunting (Nirmalasari, 2020). The problem of stunting is also a complex health problem to solve considering the many factors that influence the incidence of stunting. Family economic problems, parents' level of knowledge about nutrition and stunting, the prospective bride and groom's unpreparedness for marriage, parents' history of stunting, and several other factors make it increasingly difficult to solve the stunting problem in Indonesia (Wahyuni & Fithriyana, 2020)

The national program for handling stunting is being promoted by the government of the Republic of Indonesia through the establishment of five pillars of stunting prevention as outlined in the National Stunting Strategy. The Stunting National Strategy is a government document that provides a strategic design for interventions to accelerate stunting prevention that are measurable within the framework of existing policies and institutions. With the National Strategy, it is hoped that all parties at various levels will understand their respective roles and work together to accelerate the prevention of stunting. Apart from that, the parties can also ensure that there is support for gender equality. The Stunting National Strategy explains the Five Pillars of Stunting Prevention which refer to the Vice President's Decree at the Ministerial Level Meeting on stunting on 9 August 2017. The Five Pillars are: 1) commitment and vision of the country's highest leadership, 2) national campaign focusing on understanding behavior change, 3) political commitment and accountability, 4) convergence, coordination and consolidation of national, regional and community programs, encouraging food security policies and 5) monitoring and evaluation. Apart from that, the Ministry/Agency responsible for accelerating stunting prevention efforts, priority areas and strategies for

accelerating stunting prevention, as well as preparing a national stunting campaign strategy were also determined (Kemenko PMK, 2019).

One real effort that can be made to accelerate stunting management and at the same time improve nutritional intake for stunted toddlers is to utilize local commodities/plants that are easily found in the community. One of the local plants that has been proven to be able to overcome and solve the problem of stunting is Moringa leaves (Fertiasari et al., 2022). Moringa leaves, which are called a superfood, have been clinically proven to be able to repair body organs experiencing developmental delays and at the same time optimize growth and development in stunted toddlers. This is because Moringa leaves contain various nutrients and antioxidants which play an important role in treating stunting. Moringa leaves can be consumed directly in the form of Moringa leaf vegetables or processed as a food ingredient. However, on the other hand, not all stunted toddlers like and are interested in consuming Moringa leaf vegetables. In order to overcome this problem, it is necessary to have food fortification based on Moringa leaves to attract the interest of stunted toddlers themselves (Z. Suhaemi et al., 2021)

Moringa churros mix is a Moringa leaf-based food fortification aimed at overcoming the problem of stunting toddlers. The choice of churros products was made considering that currently churros are a food/snack that is on the rise and is liked by almost all ages because of its unique and crunchy taste. Churros, which is a typical Spanish food and has become a trend in Indonesia, can be used as a medium and method to improve nutrition and nutrition for toddlers with stunting. By relying on local Indonesian wisdom, namely using Moringa leaves, the nutrients contained in Moringa leaves can be optimally received by toddlers considering that toddlers tend to like snacks that are attractive to them (stunted toddlers) and tend to refuse if they have to be asked to consume vegetables. The addition of Moringa leaves in making churros will increase the nutrients contained in the churros food itself (Letiora et al., 2020)

This study aims to analyze the effectiveness of providing kelorina churros mix on changes in height of stunted toddlers in the Mojokerto Regency area, East Java Province, Indonesia

Materials And Methods

The research design used was pre-experimental with a static group comparison design approach. The population in this study were all toddlers with stunting in the Mojokerto Regency area under the working area of the Sooko Health Center, Mojokerto Regency, Gondang Health Center, Mojokerto Regency, and Jatirejo Health Center, Mojokerto Regency. The samples in this study were stunted toddlers in the working area of Sooko Health Center, Mojokerto Regency, Gondang Health Center, Mojokerto Regency, and Jatirejo Health Center, Mojokerto Regency, totaling 60 respondents who were divided into two research groups. The sampling technique used was stratified random sampling. The variable in this research is the height of stunted toddlers.

Research data was collected 2 times. The initial data collected from each respondent is then used as initial data (pre-test). In the control group, data collection was carried out twice. The interventions given to the control group followed standard stunting management interventions such as providing additional food, health monitoring and participating in stunting management programs carried out at Posyandu and Community Health Centers. In the treatment group, apart from receiving additional food and participating in all programs at the Posyandu and Puskesmas, research respondents from the treatment group were also given intervention to consume 100 grams of kelorina churros mix every day which was given for a period of 2 months. After two months of intervention, each research group had their height measured again and used as final data (post-test). During the research activities, the researcher together with the person in charge of the stunting program from Sooko Health Center, Mojokerto Regency, Gondang Health Center, Mojokerto Regency, and Jatirejo Health Center, Mojokerto Regency, routinely communicated and monitored the condition of the research respondents. Next, the data that has been obtained is subjected to analysis tests. Data analysis tests were carried out using the Wilcoxon test and the Mann-Witney test. If the results of the Mann-Witney test show significance (p value) $< \alpha$ (0.05), then the research hypothesis is accepted, which means that giving the chlorine churros mix is effective in increasing the weight of toddlers with stunting in the Mojokerto Regency area

Result

1. Nutritional status of stunted toddlers from the control group

   Table 1. Nutritional status of stunted toddlers from the control group

No	Classification	Z Score (pre-test)		Z Score (post-test)	
		Frequency	Percentage (%)	Frequency	Percentage (%)
1	Very short	11	36,7	6	20,0
2	Short / stunting	19	63,3	24	80,0
	Total	30	100	30	100

Source: Primary data, 2023

From the results of initial data collection in the control group, it was found that the majority of research respondents had nutritional status in the short/stunting category, 19 respondents (63.3%) and a small number of research respondents had nutritional status in the very short category, 11 respondents (36.70%). Furthermore, for 2 months, research respondents from the treatment group were also given PMT through the accelerated stunting control program in Mojokerto Regency. From the results of the final data collection, it was found that the majority of research respondents in the control group had nutritional status in the short / stunting category, namely 24 respondents (80.0%) and a small number of research respondents had nutritional status in the very short category, namely 6 respondents (20.0%).

From the results of descriptive testing, it was found that the average Z Score (pre-test) value for stunted toddlers from the control group was -2.86370, which was smaller than the average Z Score (post-test) value for stunted toddlers from the control group, which was -2.59407. This also shows that there is an increase in the nutritional status of stunted toddlers which is assessed based on height. From the results of research data analysis, it was found that all research respondents from the control group experienced an increase in nutritional status as assessed using the Z Score during the 2 month period of carrying out research activities with an average increase in nutritional status of 15.50. Based on the results of the Wilcoxon Signed Rank Test calculation, the Z value obtained is -4.782 with a p value (Asymp. Sig 2 tailed) of 0.000 where the p value (Asymp. Sig 2 tailed) is less than the research critical limit of 0.05 so it can be It was concluded that there was a significant difference between the measurement of nutritional status assessed using the Z Score in the control group from the results of the initial measurement (pre-test) and the final measurement (post-test)

2. Nutritional status of stunted toddlers from the treatment group

Table 2. Nutritional status of stunted toddlers from the treatment group

No	Classification	Z Score (pre-test)		Z Score (post-test)	
		Frequency	Percentage (%)	Frequency	Percentage (%)
1	Very short	12	40,0	2	6,7
2	Short / stunting	18	60,0	28	93,3
	Total	30	100	30	100

Source: Primary data, 2023

From the results of initial data collection in the treatment group, it was found that the majority of research respondents had a nutritional status in the short / stunting category, 18 respondents (60.0%) and a small number of research respondents had a nutritional status in the very short category, 12 respondents (40.0%). Furthermore, for 2 months, research respondents from the treatment group, apart from being given additional food through the accelerated stunting control program in Mojokerto Regency, research respondents were also given additional intervention in the form of consuming kelorina churros mix for a period of 2 months. From the final data collection results, it was found that almost all research respondents in the treatment group had a nutritional status in the short / stunting category, namely 28 respondents (93.3%) and a small number of research respondents had a nutritional status in the very short category, namely 2 respondents (6.7%)

From the results of descriptive testing, it was found that the average Z Score (pre-test) value for stunted toddlers from the treatment group was -3.07527, which was smaller than the average Z Score (post-test) value for stunted toddlers from the treatment group, which was -2.39153. This also shows that there is an increase in the nutritional status of stunted toddlers which is assessed based on height. From the results of research data analysis, it was found that all research respondents from the treatment group experienced an increase in nutritional status as assessed using the Z Score during the 2 month period of carrying out research activities with an average increase in nutritional status of 15.50. Based on the results of the

Wilcoxon Signed Rank Test calculation, the Z value obtained is -4.783 with a p value (Asymp. Sig 2 tailed) of 0.000 where the p value (Asymp. Sig 2 tailed) is less than the research critical limit of 0.05 so it can be It was concluded that there was a significant difference between the measurement of nutritional status assessed using the Z Score in the treatment group from the results of the initial measurement (pre-test / before giving the intervention to consume Moringa churros mix) and the final measurement (post-test / after giving the intervention to consume Moringa churros mix)

3. The effectiveness of providing kelorina churros mix on changes in nutritional status in stunted toddlers

Table 3. Mann Whitney U Test Mean Rank

Z Score	Research Group	N	Mean Rank	Sum of Ranks
	Treatment Group	30	36,13	1084,00
	Control Group	30	24,87	746,00
	Total	60		

Source: Primary data, 2023

From the results of testing the mean rank or average ranking of each group, it was found that the average Z Score value in the treatment group (36.13) was higher than the average Z Score value in the control group (24.87)

Table 4. Effectiveness of providing kelorina churros mix on changes in nutritional status in stunted toddlers

	Z Score
Mann-Whitney U	281,000
Wilcoxon	746,000
Z	-2,499
Asymp. Sig (2-tailed)	0,022

Source: Primary data, 2023

From the results of the Mann-Whitney test on nutritional status which was assessed based on the Z Score value in the two research groups (control group and treatment group), the U value was 281 and the W value was 746. From the results of the conversion to Z value, the score was -2.4999. From the results of the Mann-Whitney test, a significance value (p value) of 0.022 <0.05 was obtained, so it can be concluded that there is a significant difference between the two research groups, or in other words, it can be concluded that giving kelorina churros mix has proven to be more effective in improving nutritional status in stunting toddlers / improving the nutritional status of stunting toddlers

Discussion

1. Nutritional status of stunted toddlers from the control group

From the results of initial data collection in the control group, it was found that the majority of research respondents had nutritional status in the short/stunting category, 19 respondents (63.3%) and a small number of research respondents had nutritional status in the very short category, 11 respondents (36.70%). Furthermore, for 2 months, research respondents from the treatment group were also given PMT through the accelerated stunting control program in Mojokerto Regency. From the results of the final data collection, it was found that the majority of research respondents in the control group had nutritional status in the short / stunting category, namely 24 respondents (80.0%) and a small number of research respondents had nutritional status in the very short category, namely 6 respondents (20.0%)

Stunting is basically a condition where a toddler experiences failure in the growth process due to inadequate nutritional intake and nutrients needed by the body in the chronic category. This condition is usually experienced at toddler age and tends to occur in the first thousand days of life or better known as the first 1000 days of life (Panatariono & Puspitasari, 2022).

According to the Regulation of the Minister of Health of the Republic of Indonesia Number 2 of 2020 concerning Child Anthropometric Standards (2020) stated that stunting can also be called a condition where a toddler's height is shorter when compared to other toddlers of the same age and gender. Experts also define stunting as a condition of failure to grow due to chronic malnutrition and as an illustration of the effects of malnutrition experienced by toddlers over a long period of time (Haskas, 2020). According to the world health organization WHO (World Health Organization), stunting is a natural alarm raised by the body of a toddler which indicates a disruption in the growth and development of the toddler due to the unfulfilled

nutritional and nutritional needs required during the toddler's growth and development period. Stunting that occurs in toddlers is also possible due to repeated infections in toddlers. A common sign that can be found in stunted toddlers is not achieving body length (PB) according to the toddler's gender and age. If anthropometric measurements are taken, stunting is established when the toddler's body length or height is less than -2 SD (Standard Deviation) on the toddler's growth chart. However, it needs to be understood carefully that not all short toddlers always experience stunting because these conditions are quite different and a correct understanding of stunting and shortness is needed (Susanti, 2022)

Handling stunting in Indonesia is currently being seriously promoted by the government of the Republic of Indonesia. This is because stunting that occurs in toddlers will have an impact on the quality of human resources when the toddlers grow up. The impact of stunting can be divided into two, namely short-term impacts and long-term impacts. The short-term impact is the feeling of inferiority experienced by toddlers due to the stunting/short stature they experience (Sumartini, 2020). When toddlers do not have high self-confidence, this condition can have an impact on delays in achieving various growth and development of the toddler itself. Gross motor skills, fine motor skills, language skills and several other abilities may not be achieved by toddlers with stunting. When stunted toddlers become teenagers, their cognitive abilities and concentration abilities will decrease. This condition will certainly have an impact on the decline or low learning achievement of the students themselves. Apart from that, toddlers with stunting may be easily attacked and infected with various types of diseases because their body's immunity is not optimal. Apart from short-term impacts, stunting is also possible to cause long-term impacts such as increasing the risk of blood sugar disease or better known as diabetes mellitus, increasing the risk of heart disease, cancer, stroke and various other types of health problems caused by suboptimal growth and development. various organs in the body. Apart from that, toddlers who experience stunting when they reach old age can result in disability

In an effort to overcome the problem of stunting that is occurring, the Government of the Republic of Indonesia has begun to promote upstream and downstream programs to handle stunting in Indonesia. At the policy-making level, the government sets rules, guidelines and prepares funding to overcome the stunting problem. Furthermore, through the Ministry of Health of the Republic of Indonesia, the Indonesian government formed a task force for the identification and early detection of stunting incidents in toddlers. The members of this task force involve elements of provincial and district governments throughout Indonesia, health workers including health cadres in the community and involve elements from education in Indonesia as inventors of efforts to overcome the problem of stunting. The real programs carried out include Community Health Centers and Posyandu which carry out activities to monitor the growth and development of toddlers through routine weighing activities, measuring height and weight, as well as filling out the Healthy Towards Card to see and obtain information on stunting incidents in toddlers. Apart from that, the government also programs activities to provide vitamin A to toddlers which is carried out in February and August every year

Various efforts have been made by the government of the Republic of Indonesia, resulting in the condition of stunting in Indonesia decreasing in the number of stunting incidents even though new cases of stunting have also been discovered. This cannot be separated from the role of the various elements involved in the program to accelerate stunting handling, where these elements routinely carry out early detection, health checks, provide additional food to stunted toddlers through posyandu as well as routine health education activities. When all these elements are in synergy, controlling stunting incidents becomes easier to do

2. Nutritional status of stunted toddlers from the treatment group

From the results of initial data collection in the treatment group, it was found that the majority of research respondents had a nutritional status in the short / stunting category, 18 respondents (60.0%) and a small number of research respondents had a nutritional status in the very short category, 12 respondents (40.0%). Furthermore, for 2 months, research respondents from the treatment group, apart from being given additional food through the accelerated stunting control program in Mojokerto Regency, research respondents were also given additional intervention in the form of consuming kelorina churros mix for a period of 2 months. From the final data collection results, it was found that almost all research respondents in the treatment group had a nutritional status in the short / stunting category, namely 28 respondents (93.3%) and a small number of research respondents had a nutritional status in the very short category, namely 2 respondents (6.7%)

One of the accompanying interventions that is currently being developed to overcome the problem of stunting in Indonesia and at the same time as an effort to accelerate the reduction in the incidence of stunting

is the use of one of Indonesia's typical plants, namely moringa, through food fortification efforts. Research conducted has proven that giving Moringa leaves has been proven to be useful in helping to fulfill the nutrition and nutritional needs of toddlers with stunting. Research conducted by Rustamaji & Ismawati (2021) regarding the acceptability and nutritional content of Moringa leaf biscuits as an alternative snack for stunted toddlers, it was found that biscuits mixed with Moringa leaves can be used as an alternative snack to improve the nutritional status of stunted toddlers. The results of this research are also supported by research conducted by Muliyati & Hutagaol (2020) regarding the formulation of biscuits as a source of energy and protein from moringa leaf flour (moringa oleifera) and eel fish bones (anguila sp) for stunted toddlers where from the results of the research conducted it was found that food fortification from moringa leaves and eel fish, helps stunted toddlers in meeting their nutritional needs and nutrients needed by the body.

Moringa leaves, which have long been synonymous with a mystical impression, have begun to be replaced by research and studies conducted on the nutritional content of Moringa leaves. The contents of Moringa leaves such as antioxidants (vitamin C, beta carotene, quercetin, and chlorogenic acid) and various other nutrients will help stunted toddlers fulfill their body's needs. The benefits of Moringa leaves for health are influenced by the nutrients contained in them. Apart from antioxidants, Moringa leaves also contain vitamins and minerals, including Vitamin B6, Vitamin B2, Vitamin C, Vitamin A, iron and magnesium. A bowl of Moringa leaves (± 21 grams) contains 2 grams of vegetable protein (Chalik, 2023). Other research that has been carried out also proves that 100 grams of dried Moringa leaves contain twice as much protein as yoghurt, contain vitamin A seven times higher than carrots, have a potassium content three times higher than bananas, have a calcium content four times higher from milk, and has a vitamin C content seven times higher than oranges. Moringa leaves also contain vitamin B6, iron, magnesium, and riboflavin B2. The diverse content of Moringa leaves is what makes Moringa leaves get the nickname as a superfood ingredient, namely a functional food that has high nutritional value and is rich in antioxidants which are beneficial for the body, including improving the fulfillment of nutritional needs in the body

3. The effectiveness of providing kelorina churros mix on changes in nutritional status in stunted toddlers

From the results of the data analysis it can be concluded that there are significant differences between the two research groups or in other words it can be said that giving kelorina churros mix has proven to be more effective in improving the nutritional status of stunted toddlers / improving the nutritional status of stunted toddlers

The results of this research are supported by research conducted by Muliawati & Sulistyawati (2019) regarding giving moringa aleifera extract as an effort to prevent stunting in toddlers. From the results of the research conducted, it was found that the results of moringa leaf extract (moringa oleifera) could increase body height by 0.342 cm with a prediction of 16.2% while 83.8% was likely caused by other factors. The results of the multivariate analysis show that the best model is that if the Moringa oleifera leaf extract variable is controlled by the maternal education variable, it can increase the toddler's height by 0.476 cm with a prediction of 34.1%. Research conducted by Oyeyinka & Oyeyinka (2018) about moringa oleifera as a food fortificant: recent trends and prospects, results found that the moringa oleifera plant is a plant that has great potential to be explored in food. The use of moringa leaf powder (moringa oleifera), moringa seed powder (moringa oleifera), moringa flower powder (moringa oleifera) in various food applications such as in the fortification of amala (stiff dough), ogi (corn porridge), bread, biscuits, yoghurt, cheese and in making soup and other things, it is proven to help stunted toddlers fulfill the nutritional needs required by the body during the period of growth and development

The mechanism for increasing the height of stunted toddlers in this study can be explained using 2 pathways, namely the pathway to meeting nutritional needs and the pathway to increasing appetite. On the path to increasing appetite, it can be explained that toddlers who experience stunting are often reluctant to consume food prepared by their parents. Monotonous or fixed types of food often make toddlers reluctant to eat their food. When this food is changed to biscuits such as churros, this change in type of food will attract and stimulate the appetite of stunted toddlers. Toddlers are happier if asked to eat cookies with chocolate topping or something similar compared to eating rice and vegetables. When a stunted toddler's appetite has been formed or at least a stunted toddler has an interest in consuming certain foods, then it can be ensured that the stunted toddler will have nutritional intake that comes from the food they consume. When a stunted toddler already has an appetite or is interested in certain foods such as churros, parents can add Moringa leaves to the churros themselves. When churros are mixed with Moringa leaves, the nutrients contained in Moringa leaves will also enter the body of a stunted toddler when the toddler consumes the Moringa churros mix

Food development or food fortification is a method that can be applied as an accompanying therapy in programs to accelerate the handling and prevention of stunting in Indonesia. Apart from being able to be shaped into churros, Moringa leaves can also be combined with other types of food that stunted toddlers like. A mother of a stunted toddler must have high sensitivity to the condition and preferences of their toddler. This is important considering that when stunted toddlers already like certain foods, they will voluntarily and happily consume that particular food. Toddlers basically don't like it when they have to consume certain vegetables provided in their food. Processing vegetables such as Moringa leaves into new forms of food tends to increase toddlers' interest in certain types of food. When a stunted toddler already has this interest, the stunted toddler will automatically become enthusiastic about consuming Moringa leaves that have been food fortified

Providing kelorina churros mix as an intervention to overcome the problem of stunting is not without obstacles. In practice, stunted toddlers often refuse to consume kelorina churros mix products because they are bored with the type of snack they consume. Both mothers of stunted toddlers and health workers must be aware of conditions like this, remembering that when toddlers feel bored with certain types of food, mothers of stunted toddlers or health workers must innovate again to increase the appetite of stunted toddlers. Mothers of stunted toddlers and health workers must know that the use of Moringa leaves to overcome stunting is a new innovation that can be applied to improve the nutritional status of stunted toddlers. Apart from processing it in the form of churros, mothers of toddlers or health workers can fortify Moringa leaves in various forms of food such as pudding, jelly or other types of food that are liked by stunted toddlers. When a stunted toddler has an appetite, the toddler will consume various types of food prepared by the toddler's parents. When this appetite has emerged, it is possible to overcome the problem of stunting experienced by toddlers and the lack of nutrition needed by toddlers during the growth and development period can be corrected and resolved more quickly

This research has directly proven that giving churros mixed with Moringa leaves in the form of Moringa churros mix has been proven to be effective in improving the nutritional status and nutritional adequacy needed by toddlers with stunting. Further development and more intensive research is still needed to further develop the potential of Moringa leaves. Future researchers can try to apply various other innovations to ensure that Moringa leaves can be consumed and accepted by toddlers with stunting in order to speed up stunting management programs in Indonesia and at the same time prevent a decline in the quality of Indonesia's human resources caused by stunting during toddlerhood

Conclusion

1. Based on the results of the Wilcoxon Signed Rank Test calculation, the Z value obtained is -4.782 with a p value (Asymp. Sig 2 tailed) of 0.000 where the p value (Asymp. Sig 2 tailed) is less than the research critical limit of 0.05 so it can be concluded that there is a significant difference between the measurement of nutritional status assessed using the Z Score in the control group from the results of the initial measurement (pre-test) and the final measurement (post-test)
2. Based on the results of the Wilcoxon Signed Rank Test calculation, the Z value obtained is -4.783 with a p value (Asymp. Sig 2 tailed) of 0.000 where the p value (Asymp. Sig 2 tailed) is less than the research critical limit of 0.05 so it can be It was concluded that there was a significant difference between the measurement of nutritional status assessed using the Z Score in the treatment group from the results of the initial measurement (pre-test / before giving the intervention to consume Moringa churros mix) and the final measurement (post-test / after giving the intervention to consume Moringa churros mix)
3. From the results of the Mann-Whitney test, a significance value (p value) of 0.022 <0.05 was obtained, so it can be concluded that there is a significant difference between the two research groups, or in other words, it can be concluded that giving kelorina churros mix has proven to be more effective in improving nutritional status in stunting toddlers / improving the nutritional status of stunting toddlers

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References

1. Archda, R., & Tumangger, J. (2019). *Hulu-hilir penanggulangan stunting di Indonesia*.
2. Chalik, I. (2023). *Daun Kelor Miliki Kandungan Protein Berfungsi Cegah Stunting*. 6–9. https://bengkulu.bkkbn.go.id/daun-kelor-miliki-kandungan-protein-berfungsi-cegah-stunting/#:~:text=Dari daunnya yang kecil terdapat,otak anak akibat kekurangan gizi".
3. Dasman, H. (2019). Empat dampak stunting bagi anak dan negara Indonesia. *The Conversation*, *1*.
4. Fertiasari, R., Asta, H., & Kristiandi, K. (2022). Pelatihan Tepung Beras Fortifikasi Guna Menurunkan Kejadian Stunting di Desa Tebas Kabupaten Sambas. *Indonesia Berdaya*, *3*(4), 1039–1044.
5. Haskas, Y. (2020). Gambaran Stunting di Indonesia. *Jurnal Ilmiah Kesehatan Diagnosis*, *15*(2), 154–157.
6. Helmyati, S., Atmaka, D. R., Wisnusanti, S. U., & Wigati, M. (2020). *STUNTING: Permasalahan dan Penanganannya*. UGM PRESS.
7. Peraturan Menteri Kesehatan Republik Indonesia Nomor 2 Tahun 2020 Tentang Standar Antropometri Anak, 1 (2020). http://hukor.kemkes.go.id/uploads/produk_hukum/PMK_No__2_Th_2020_ttg_Standar_Antropometri_Anak.pdf
8. Kemenkes RI, K. K. R. I. (2022). *Buku Saku Hasil Survei Status Gizi Indonesia (SSGI) Tahun 2022 - Badan Kebijakan Pembangunan Kesehatan | BKPK Kemenkes*. https://www.badankebijakan.kemkes.go.id/buku-saku-hasil-survei-status-gizi-indonesia-ssgi-tahun-2022/
9. Kemenko PMK, K. K. B. P. M. D. K. R. I. (2019). Strategi Nasional Percepatan Pencegahan Anak Kerdil (Stunting) Periode 2018-2024. In *Sekretariat Wakil Presiden Republik Indonesia*.
10. Letiora, J. A. S., Sineke, J., & Purba, R. B. (2020). Tingkat Kesukaan Bubuk Daun Kelor untuk Formula Makanan Balita Stunting. *Jurnal GIZIDO*, *12*(2), 105–112.
11. Muliawati, D., & Sulistyawati, N. (2019). PEMBERIAN EKSTRAK MORINGA OLEIFERA SEBAGAI UPAYA PREVENTIF KEJADIAN STUNTING PADA BALITA The Use of Moringa Oleifera Exctract to Prevent Stunting in Toddler. *Jurnal Kesehatan Madani Medika*, *10*(2), 123–131.
12. Muliyati, H., & Hutagaol, I. O. (2020). Formulasi Biskuit Sumber Energi Dan Protein dari Tepung Daun Kelor (Moringa Oleifera) dan Tulang Ikan Sidat (Anguila Sp) untuk Baduta Stunting. *Ghidza: Jurnal Gizi Dan Kesehatan*, *4*(1), 11–21. https://doi.org/10.22487/ghidza.v4i1.30
13. Nirmalasari, N. O. (2020). Stunting Pada Anak: Penyebab dan Faktor Risiko Stunting di Indonesia. *Qawwam*, *14*(1), 19–28.
14. Oyeyinka, A. T., & Oyeyinka, S. A. (2018). Moringa oleifera as a food fortificant: Recent trends and prospects. *Journal of the Saudi Society of Agricultural Sciences*, *17*(2), 127–136. https://doi.org/10.1016/j.jssas.2016.02.002
15. Panatariono, T. A., & Puspitasari, Y. (2022). Determinants Factors of Stunting in Together in East Kambingan Village and Talang Village , Saronggi District , Sumenep. *Journal for Quality in Public Health*, *6*(1), 164–176.
16. Pemkab Mojokerto, P. K. M. (2023). Kabupaten Mojokerto Dalam Angka 2023. In *Jurnal Penelitian Pendidikan Guru Sekolah Dasar* (2022nd ed.). https://mojokertokab.bps.go.id/publication/download.html?nrbvfeve=NGRiMDE3YmQ0ZDJkY2Q4YzgxODNiOWJh&xzmn=aHR0cHM6Ly9tb2pva2VydG9rYWIuYnBzLmdvLmlkL3B1YmxpY2F0aW9uLzIwMjMvMDIvMjgvNGRiMDE3YmQ0ZDJkY2Q4YzgxODNiOWJhL2thYnVwYXRlbi1tb2pva2VydG8tZGFsYW0tYW5na2EtMjA
17. Rahmadhita, K. (2020). Permasalahan Stunting dan Pencegahannya. *Jurnal Ilmiah Kesehatan Sandi Husada*, *9*(1), 225–229.
18. Rustamaji, G. A. S., & Ismawati, R. (2021). Daya terima dan kandungan gizi biskuit daun kelor sebagai alternatif makanan selingan balita stunting. *Jurnal Gizi Unesa*, *01*(01), 31–37.
19. Sumartini, E. (2020). Studi Literatur : Dampak Stunting Terhadap Kemampuan Kognitif Anak. *Jurnal Seminar Nasional*, *Vol.2*, *No.*, 127–134.

20. Susanti, D. F. (2022). Mengenal Apa itu Stunting ? *Direktorat Jenderal Pelayanan Kesehatan Kementerian Kesehatan Republik Indonesia*, 1. https://dinkes.karanganyarkab.go.id/?p=3713
21. UNICEF Indonesia, U. N. C. F. I. (2019). Kerangka Aksi untuk gizi Ibu dan Makanan Pendamping Asi. *Unicef Indonesia*. https://www.unicef.org/indonesia/id/media/2686/file/Kerangka-Aksi-Gizi-Ibu-2019.pdf
22. Wahyuni, D., & Fithriyana, R. (2020). Pengaruh Sosial Ekonomi Dengan Kejadian Stunting Pada Balita Di Desa Kualu Tambang Kampar. *PREPOTIF : Jurnal Kesehatan Masyarakat*, *4*(1), 20–26. https://doi.org/10.31004/prepotif.v4i1.539
23. Z. Suhaemi, Husmaini, E. Yerizal, & N. Yessirita. (2021). Pemanfaatan Daun Kelor (Moringa oleifera) dalam Fortifikasi Pembuatan Nugget. *Jurnal Ilmu Produksi Dan Teknologi Hasil Peternakan*, *9*(1), 49–54. https://doi.org/10.29244/jipthp.9.1.49-54