Jurnal Maternitas Kebidanan, Vol 10, No. 1, April 2025
ISSN 2599-1841

# The Effect Of Processed Mackerel On Increasing The Weight Of Toddlers In Bogor And Cianjur Districts

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## ABSTRACT

According to WHO, malnutrition problems can be grouped into wasting, stunting, underweight, and micronutrient deficiencies. Wasting is a condition when a person's weight per height is low. WHO data in 2020 showed that the prevalence of toddlers experiencing wasting globally was 45.4 million toddlers (8%). Indonesia is still the second country with the highest wasting cases in the world with a prevalence of wasting toddlers of 7.7% (UN, 2022, SSGI 2022). The government has tried to overcome the problem of malnutrition in toddlers with a program to provide additional food made from local ingredients (DitGiziKIA, 2022). Some of the local food sources that are high in protein are mackerel and snakehead fish. The purpose of this study was to determine the effect of processed mackerel on increasing the weight of toddlers in Bogor and Cianjur Regencies in 2025. who was given intervention? The results of this study are that providing additional food-processed mackerel is proven to increase the weight of toddlers by an average of 275 grams/week.

***Keywords:*** mackerel, nutrition, toddler weight

## INTRODUCTION

*Sustainable Development Goals*(SDGs) in the second point indicator have targeted Zero Hunger. This target aims to end hunger, ensure access to nutritious food, and achieve food security. Specifically, this indicator is targeted to eliminate all forms of malnutrition by 2030, including achieving the internationally agreed target for stunting and wasting children under 5 years of age by 2025 and meeting the nutritional needs of adolescent girls, pregnant and lactating mothers, and the elderly. In line with these global goals, improving the nutritional status of toddlers needs to be a shared focus (Bappenas, 2022).

Nutritional status is a health condition that describes the balance between a person's nutritional needs and intake. Good nutritional status indicates that the body is getting enough nutritional intake so that it can function properly and reduce the risk of disease. Toddler nutritional status is the condition of the child's body which is the result of food use. Good toddler nutritional status is very important to support

the growth and development of children. Toddler nutritional status is measured based on body weight (BW), height, and age. Assessment of toddler nutritional status is carried out by comparing the results of these measurements with child anthropometric standards (Ministry of Health of the Republic of Indonesia, 2020).

According to WHO, malnutrition problems can be grouped into 4, namely wasting, stunting, underweight, and micronutrient deficiencies. According to WHO, wasting is a condition when a person's weight per height is low. Wasting is one of the nutritional problems that can develop rapidly and is often caused by a lack of food intake, High incidence of infectious diseases, Inaccessibility, or difficulty in accessing health services. Stunting is a developmental disorder in children characterized by a child's height that is shorter than the established child growth standard. Stunting is measured by length or height that is less than minus two standard deviations (SD) from the child growth standard. Underweight is a toddler who has a Body Mass Index (BMI) value below 18.5. BMI is calculated by dividing body weight (kilograms) by the square of height (meters). Meanwhile, micronutrient efficiency in toddlers is a condition when children do not get the intake of vitamins and minerals according to their needs (WHO, 2021).

WHO data in 2020 showed that the global prevalence of toddlers experiencing wasting was 45.4 million toddlers (8%) (WHO, 2021). Indonesia is still the second country with the highest wasting cases in the world with a prevalence of toddler wasting of 7.7%, up 0.6% from the previous year. (United Nations, 2022, SSGI 2022. Based on data from the West Java Province EPPGBM, the prevalence of toddlers with wasting was 3.54% in 2022 and increased to 4.18% in 2023. Meanwhile, the prevalence of toddler wasting in Bogor Regency in 2023 was 4.3%. (West Java Provincial Health Office, 2023)

Wasting is not just a condition of a child being thin. This condition can cause medical complications such as decreased appetite, dehydration, high fever, anemia, sepsis, decreased consciousness, and death. UNICEF states that 1 in 5 deaths of children under five are caused by wasting (UNICEF 2022). Under normal circumstances, nutrients are used by children as a source of energy and for growth and development. When nutritional intake is insufficient, children's immunity decreases, making them more susceptible to disease. When sick, there can be a loss

and decrease in the absorption of nutrients, whereas there is an increased need for nutrients to fight disease and pursue normal growth and development. This traps children in a "vicious cycle of malnutrition and disease" that continues to haunt their quality of life even into adulthood (Johns Hopkins Bloomberg School of Public Health, 2022).

Toddlers with wasting (undernutrition and poor nutrition) have a three times higher risk of stunting and toddlers with malnutrition have a 12 times higher risk of death compared to toddlers with good nutrition. Toddlers with undernutrition and/or poor nutritional status are very susceptible to infection due to low immune systems, experience impaired physical and brain development and risk of experiencing degenerative diseases in adulthood and even death. Factors that directly cause undernutrition and poor nutrition are failure to provide exclusive breastfeeding, inadequate food provision, frequent illness in toddlers, clean and healthy living behavior, and incomplete immunization status. However, the main cause of malnutrition is a lack of nutritious food intake according to the needs of each age group of children. This lack of intake can occur due to the unavailability of good-quality food ingredients (Ministry of Health of the Republic of Indonesia, 2023).

Monitoring the nutritional status of toddlers can be seen from several indicators, namely weight, height/length, head circumference, and upper arm circumference. Monitoring toddler weight gain every month using the KMS curve and comparing it to other growth indicators is one of the most appropriate ways to prevent nutritional problems, especially wasting. This problem can start with early symptoms, one of which is that the child's weight does not increase according to the minimum weight gain on the KMS curve. Weight gain according to the curve is an important indicator for early detection of malnutrition problems in toddlers. (Ministry of Health 2020)

One of the most basic efforts in preventing nutritional problems in toddlers is by providing proper food. Exclusive breastfeeding from birth to 6 months of age, without other foods and drinks, even water, because breast milk contains all the essential nutrients needed to support optimal growth and development of infants. After 6 months, quality complementary foods in sufficient quantities, types, and

frequencies are given to toddlers, followed by breastfeeding until the child is 2 years old or older (UNICEF, 2023).

The guidelines for feeding according to the contents of my plate state that after 6 months of breastfeeding, toddlers should start to be given food with a complete menu of carbohydrates, animal protein, fat, fiber, and other micronutrients. At toddler age, it is recommended that complementary foods given to breast milk are not only complete but also high in animal protein (Ministry of Health of the Republic of Indonesia, 2023).

The government has attempted to address the problem of undernutrition in toddlers with a local food supplement program (Local PMT). The Local Food Supplement Program (PMT) from the Ministry of Health (Kemenkes) is a program that aims to improve the nutritional status of pregnant women and toddlers, as well as reduce stunting rates in Indonesia, which is carried out simultaneously throughout Indonesia in 2023. What is meant by local food is the criteria that the food provided must be acceptable in terms of shape, and taste, and is usually consumed daily, the shape and taste of the food are varied, the food provided does not smell sharp, spicy, too sour, sweet, or salty and the provision of local additional food takes into account the norms and beliefs that apply to the local community. However, because the target for toddlers is prioritized in cases of stunting, not all wasting toddlers get access to this Local PMT (DitGiziKIA, 2022).

One of the local food sources that is high in protein is mackerel. Mackerel has a fairly high nutritional value which is included in the important economic fish and this fish has a fairly delicious and savory taste so that it is widely favored by the community. Mackerel has a fairly high nutritional content, namely 100 g of mackerel meat contains 21.30 g of protein and 3.40 g of fat. In addition, mackerel also contains essential unsaturated fatty acids, namely omega 3 and omega 6 which are important for the body (Azmi, et al., 2025). Research conducted by Yusnidaryani et al. in 2023 showed that giving mackerel biscuits plus chocolate flavor for 21 days had a significant effect on increasing height (p-value 0.001) and weight (p-value 0.000) in two-year-old stunted babies (Yusnidaryani, et al., 2023).

## METHOD

The method in this case study is to use a qualitative study, with a literature review case study. This case study was conducted directly on 4 toddlers. for 7 days. After the intervention, it is expected that there will be an increase in body weight in the participating toddlers according to the target weight gain on the growth curve of children aged 0-5 years as described in the KIA Book.

This research will be conducted in Bogor and Cianjur Regency from the third week of December to February 2025. Participants in this study were toddlers aged 24-48 months in Bogor and Cianjur Regency in the period of January 2025. Sampling was carried out using a purposive sampling technique. The data in this study came from primary data derived from the results of weighing toddlers before, during, and after the intervention of providing processed mackerel food for 7 days of intervention.

## RESULTS AND DISCUSSION

Interventions in the form of providing additional food and measuring body weight have been carried out according to schedule. Measurements are carried out in the right way so that the results are accurate and can be used to determine the nutritional status of toddlers. In this study, digital or manual scales were used specifically for toddlers that have adequate capacity and high accuracy according to standards (Ministry of Health, 2020)

From the results of the intervention and measurements carried out on 4 respondents for 7 days, the characteristics of the respondents and the average weight gain pattern of the respondents can be seen in the following table:

Table 1. Respondents' Weight Gain

| No respondents | Age | BB Pre Intervention | BB Post Intervention | BB Increase |
|---|---|---|---|---|
| A – 01 | 36 months 13 days | 10.7 kg | 11 kg | 300 gr |
| A – 02 | 31 months 2 days | 9.6 kg | 9.8 kg | 200 gr |
| A – 03 | 24 months 21 days | 9 kg | 9.2 kg | 200 gr |
| A – 04 | 33 months 7 days | 10.6 kg | 11 kg | 400 gr |

Based on Table 1, it can be seen that the average weight gain of respondents is 275 grams. From the table, it can also be seen that the characteristics of respondents in this study based on age are toddlers aged between 24 months 10 days - 36 months 13 days with an average age of 30 months. This is following the theory according to the Ministry of Health in 2020 that toddlers are children who have entered the age of over one year which is calculated to be 12-59 months old which is often referred to as children under five years old.

Respondent characteristics based on body weight are an average body weight of 9.7 kg, which when plotted on the growth curve is between -3 SD to -2 SD so they have malnutrition status. Toddler body weight is a measure of the body mass of a child aged 0 to 5 years. This weight measurement is used to assess the nutritional status and health of the child. Age-appropriate body weight is an important indicator in the growth and development of children, which can affect their long-term health (WHO, 2019). Based on the Ministry of Health in 2020, the criteria for toddlers with malnutrition are if their weight after being plotted on the BB/U curve is in the area of -3 SD - <-2SD.

Based on the WHO growth chart in the KIA Book, the target weight gain for toddlers aged 24-48 months is 200 grams/month. If divided into weekly time targets, the expected weight gain is at least 50 grams/week. Judging from this target, it can be seen that all respondents who were given the intervention showed weight gain that exceeded the target within 7 days, namely with the lowest increase of 200 grams and the highest weight gain of 400 grams.

However, all respondents after the intervention were still in a state of malnutrition. This is because the intervention period was only carried out for 7 days, while to see significant weight gain, a minimum of 1 month is needed according to the target set by the WHO growth curve (Ministry of Health 2020). In addition, several respondents also had a history of frequent illnesses which could affect the difficulty in gaining weight. The results of the study also obtained data that several respondents were rarely weighed at the integrated health post so they were not exposed to interventions such as giving Vit A, deworming tablets, and complete immunization. This is following the theory according to UNICEF in 2022 that several factors that can affect weight gain in toddlers apart from nutritional

fulfillment are the presence of infectious diseases, immunization status, and Vit A supplementation (UNICEF, 2022).

Weight gain shows that processed foods made from mackerel can increase the weight of toddlers with malnutrition. This is following a study conducted by Risda et al. in 2025 regarding the provision of additional food-processed mackerel sausage, the results of which showed that the provision of mackerel sausage and peanut formulations gave significant results in increasing body weight in toddlers with malnutrition with an average difference in body weight of the intervention group of 0.453 kg and the control group of 0.142 kg (p = 0.002) (Risda et al., 2025). Mackerel can increase the weight of malnourished toddlers because mackerel contains calories, protein, and fat. The calorie content of mackerel is 125 kcal/100 gr serving. Mackerel contains high protein, which is 21.30 g per 100 gr serving. Mackerel also contains more fat, which is 3.4 gr/100 gr serving. (Dit Gizi KIA, 2020).

This follows the theory that the three food components most needed by children to gain weight are energy or calories, protein, and fat. Protein plays a role in the formation of body cells and helps increase muscle mass, which is important in increasing the weight of toddlers. In addition, protein deficiency can slow down the metabolism process and absorption of other nutrients (Sudarmo % Widyastusi, 2020). Fat provides calorie-dense energy, which is very beneficial for toddlers who need extra calories to gain weight (Arisman, 2020). Carbohydrates are the main source of energy for the body. Consuming sufficient carbohydrates will provide the energy needed for daily activities, as well as support weight gain by providing sufficient calories (Hermana, 2020).

From the research results above, it is quite clear to the researcher that providing additional processed food made from mackerel to toddlers aged 24-48 months with poor nutritional status for 7 days has been proven to increase the toddler's weight beyond the target weight gain on the WHO growth curve.

## CONCLUSION AND SUGGESTIONS

From the results research conducted can conclude that providing additional food processed from mackerel has been proven to be effectiveInfluence on Toddler

Weight Gain in Bogor Regencyand Cianjur in 2025 with an average weight gain of 275 grams/week.

Parents are expected to focus more on providing staple foods with the frequency and portion that suit their needs and reduce the provision of snacks that do not meet nutritional standards. Parents are also advised to routinely provide additional processed mackerel food to their toddlers. Given that mackerel has been proven to provide faster results in weight gain, parents can focus more on providing processed mackerel as a source of protein and healthy fats for their children. For toddlers to be more interested in consuming these additional foods, parents are advised to vary the way the fish is processed and served, such as making fish nuggets, fish soup, or a mixture of fish and vegetables to make it more attractive to children.

Health facilities, especially health centers and hospitals, need to consider introducing and scaling up a supplementary feeding program based on mackerel and snakehead fish in the Bogor and Cianjur districts. This program can be implemented through collaboration with communities and mothers' groups to ensure that toddlers receive appropriate supplementary feeding. Health services need to provide further training for health workers on the nutritional benefits of mackerel, as well as how to monitor toddlers' weight development regularly. This will support the success of nutritional interventions carried out at the community level.

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