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The Effect of Providie Supplementary Feeding of Lelor Nuggets on Weight Gain of Toddlers with Malnutrition Status

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ABSTRACT

Background : The state of the body as a result of food consumption and the utilisation of nutrients as an energy source is known as nutritional status. Protein Energy Deficiency (PEM) continues to be the main cause of nutritional issues in Indonesia generally. In Kedu District, malnutrition was present in 275 instances (7.85%). The purpose of this study is to determine the effect of supplemental feeding in the form of leel nuggets on weight gain in toddlers with undernourished status.
MethodsThe type and design of this research uses a quasi- experimental study design, by providing intervention group treatment. Because this research was carried out by comparing two groups, namely the experimental group and the control group. The population in this study were all 32 toddlers with poor nutritional status and very poor nutritional status. The sampling technique in this research is total sampling. So the number of samples is 32 respondents.
Result : Toddlers' weights before and after consuming Lor nuggets for a period of 14 days differed. In children with low nutritional status, lelor nuggets had a stronger influence on weight increase than PSF biscuits, with a mean difference between before and after the intervention of 0.4313 and 0.2438, respectively.Giving kids more food, like lelor nuggets, has the effect of making them heavier if they are malnourished. Toddlers who are malnourished are more likely to gain weight when given extra food along with their lelor nuggets. Body weight (Lelor Nugget Mean 0.4313, Standard Deviation 0.3860) before and after consumption. The body weight mean and standard deviation were 0.2065 and 0.2438, respectively, before and after consuming SFP Biscuits.
Conclusions : Supplementary feeding of Lelor Nuggets is more influential in increasing the weight of toddlers with less nutritional status.

Keywords : Lelor Nuggets, Malnutrition, PSF (Provide Suplementary Food)

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Background. The majority of malnutrition cases occur in Asian and African countries. Protein deficiency, iron anemia, diseases due to iodine deficiency, vitamin A deficiency, and obesity in big cities are still the main causes of nutritional problems in Indonesia. This shows that Indonesia has not been fully able to overcome the problem of malnutrition (Furkon, 2016).

Worldwide, there are 149.2 million (22%) children under the age of 5 who are stunted, 45.4 million (6.7%) children who are malnourished, and 38.9 million (5.7%) children who are overweight (UNICEF & WHO, 2021). With a malnutrition prevalence of 17.1% in 2022, Indonesia is in third position. According to Riskesdes 2018, 13.8% of Indonesian toddlers with Nutritional Status (Weight/Age) reported being malnourished, an increase from the previous year.

Based on the Central Java Health Profile, (2021) the prevalence of undernutrition is 13.7% and the results of SSGI in 2022 the prevalence of undernutrition status is 17.1%, Central Java province is ranked 18th out of 35

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provinces in Indonesia with a prevalence of 17.6%. This means that nutritional problems in Indonesia need to be addressed to prevent a high increase in nutritional problems, where the prevalence target in Indonesia is 17.1%. In Temanggung Regency based on SSGI 2022, the prevalence of kurag nutrition based on Weight/Age is ranked 13 out of 36 cities/regencies is 18.8% (Ministry of Health, 2022). Kedu Health Center is one of the health center in Temanggung Regency with a working area of 14 villages. Based on data from the Temanggung Regency Health Office, in 2022 it was found that there were 275 (7.85%) cases of undernutrition in Kedu District. Kedu Health Center ranks 3rd out of 26 puskesmas for cases of undernutrition. Where the first three ranks are the main priority scale, problems that need to be addressed immediately so as not to worsen and reduce the number of cases of undernutrition.

The government offers PSF in the form of packaged biscuits as one of the efforts to combat the problem of malnutrition in toddlers. A minimum of 160 calories, 3.2-4.8 grams of protein, 4-7.2 grams of fat, and 240 grams of weight gain per month for children aged 1-3 years are contained in four pieces (40 grams) of primary packaged biscuits (Ministry of Health, 2022). The success of malnutrition treatment is sometimes hampered by several factors, such as the fact that some malnourished toddlers cannot receive these biscuits due to restrictions on currently available food packages. Therefore, to solve the problem of supplementary feeding for malnourished toddlers, additional innovative approaches to food development are needed. This includes the use of basic ingredients that are easily available and come from the local area that do not require complicated cooking techniques, as well as attractive shapes and high protein content.

In an effort to meet the nutritional needs of toddlers, high-protein PSF is given according to body to increase weight. A low protein-energy ratio (PER) in the diet can lead to underweight and malnutrition. This is the reason behind toddlers' need for adequate animal protein intake.

Therefore, meeting the needs of animal protein in toddlers in accordance with the accessibility of local animal protein sources should be the main goal in the prevention of underweight, malnutrition, and unstable weight. (Kementerian Kesehatan Republik Indonesia, 2022).

Supplemental feeding for underweight toddlers uses locally available food sources to provide foods high in protein and energy. The burning of fat, protein, and carbohydrates produces energy. Protein is essential for development and growth. Only if the right amino acids are available for maintenance and growth will muscle growth or increase occur (Siregar 2014).

Protein serves as a protein builder, helping the formation of new cells, maintenance of injured cells, and growth and maintenance of body tissues. About three-quarters of dry muscle, including body tissues, is made up of protein in the form of lean body mass. In addition to muscles and other organs, protein is an important part of a regulatory substance such as hormones, enzymes and blood plasma (Almatsier et al. 2013). The child's protein needs during growth increase with the age of the child. At the age of 6-8 months protein needs 5 grams per day, 9-11 months (7.5 grams / day), age 12-23 months (13.75 grams /day), age 24-59 months (35 grams/day) (Kementerian Kesehatan Republik Indonesia, 2022)

Animals that live in water such as tilapia, cork, and catfish are examples of types of animal protein with high protein concentrations. Among the community, catfish (Clarias gariepinus) is one of the most popular fishery commodities. Its advantages include rapid growth, good environmental adaptation, delicious taste, excellent nutritional value, and affordable price (Aryana et al., 2022).

Catfish are known to have many benefits for children. The high content of leucine and lysine in catfish distinguishes it from other animal products. Leucine (C6H13NO2) is an essential

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amino acid that is essential for child development and maintaining nitrogen balance. In addition, leucine also helps the synthesis and breakdown of muscle proteins. One of the nine amino acids necessary for tissue growth and repair is lysine. Children's growth and development depend on lysine, a vital amino acid. 201; Ubaidillah & Hersulistyorini.

Based on a preliminary study conducted at the Kedu health center, there was a lack of nutritional status as many as 275 children and according to data from the health office ranked 3rd out of 26 health center. Nutritional status is less and very lacking in Karangtejo Village, Kedu Health Center area, showing 32 children under five have less nutritional status 28 and nutritional status very less 4 children. So to be considered other alternative food innovations for malnourished toddlers. In Kedu sub-district, catfish are also easy to get and affordable prices for the community. Especially in Karangtejo village there is a program from the village, namely catfish farming using buckets.

The author aims to determine the impact of lelor nuggets on the nutritional status of toddlers in the working area of the Kedu Health Center by measuring the nutritional status of toddlers before and after supplementary feeding. This is based on all the descriptions that have been submitted above.

Methods. This study used a quasi-experimental research design with an intervention group, because in this study there were two groups, namely the experimental group and the control group. The nutritional status of toddlers was the dependent variable in this study, with lelor nuggets and PSF biscuits as independent variables. Explain lelor nugget in here.

The population in this study were all 32 toddlers with poor nutritional status and very poor nutritional status. The sampling technique in this research is total sampling. So the number of samples is 32 respondents.

In order to collect data for the study, the researchers divided the 16 respondents into two groups: an experimental group and a control group. PSF biscuits were given to each study sample according to the guidelines. Researchers also studied all experimental groups as well as control groups. The group that received the Lelor Nugget intervention became known as the experimental group. The group that only received the PSF Biscuit intervention as an intervention was referred to as the control group. Intervened by giving additional food of lelor nuggets to the experimental group, and giving PSF biscuits to the control group for 2 consecutive weeks. After the intervention, researchers took data by measuring body weight and then evaluating whether there was an increase, decrease or no change. Univariate data analysis with the percentage of each variable, bivariate analysis using the Wilcoxon test.

Result and Discussion.

Table 1.Frequency distribution of toddler weight identification before and after consuming lelor Nuggets

Group	Mean	Standard Deviation
Body Weight before consumption of lelor nuggets	9.906	1.7453
Body Weight after consumption of Lelor nuggets	10.337	1.8421

It was found that the weight of toddlers before and after consuming lego nuggets increased by an average of 9.906 to 10.337 and standard deviation from 1.7453 to 1.8421. So it can be concluded that there is weight gain before and after consuming melon nuggets.

Weight gain before and after consuming melon nuggets powered by research (Syadiyah & Cahyaningtyas, 2019), there is a difference between the treatment group and the control group with p = 0.05 after giving Moringa leaf pudding. When toddlers with malnutrition are given moringa leaf pudding – up to 100 grams every morning and evening for three weeks – their weight increases regularly.

This weight gain is caused by the nutritional content contained in PSF made from catfish and Moringa leaves which are needed by infants and toddlers. As is known, Moringa

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leaves are plants that have many health benefits because they are rich in vitamins, minerals, and other compounds that help normal growth and development of children (Par'i, 2017).

One type of fish that contains high protein and is beneficial for toddler growth and development is catfish, which can also be consumed by toddlers who are malnourished or underweight. Compared to other animal proteins, catfish have a higher concentration of protein. Catfish actually have a higher nutritional value if processed properly. Children are usually offered catfish in the form of fried catfish, which not all of them want to eat. Toddlers will be happy to eat catfish if processed into catfish nuggets and mixed with moringa leaves (Rahayu et al., 2019).

Table 2. Frequency distribution of toddler weight identification before and after consuming PSF biscuits

Group	Mean	Standard Deviation
Body Weight before PSF biscuit consumption	10.381	1.2534
Body Weight after consumption of PSF biscuits	10.625	1.3902

It was found that the weight of toddlers before and after consuming SFP Biscuits increased by an average of 10.381 to 10.625 and standard deviation from 1.2534 to 1.3902. This is in line with research (Refni, 2021) which shows that provide supplementary feeding (PSF) improves the nutritional condition of malnourished children at the Ujung Gading

Health Center, West Pasaman Regency in 2020 (p = 0.000) aged 12-59 months. PMT is the provision of supplementary foods, such as biscuits with unique recipes and vitamin and mineral fortification, to infants and toddlers who fall into the underweight category and are between 6 to 59 months old. This supplement is used together with complementary foods for infants and children aged 6-24 months.

A minimum of 160 calories, 3.2-4.8 grams of protein, and 4-7.2 grams of fat are found in each main package (4 pieces/40 grams) of Supplemental Food for Toddlers. Ten different vitamins (A, D, E, K, B1, B2, B3, B6, B12, and folic acid) and seven different minerals (Iron, Iodine, Zinc, Calcium, Sodium, Selenium, and Phosphorus) are added to the Supplemental Meal for Toddlers. (Patel, 2019) One way to increase toddlers' access to nutritious food and meet their needs in overcoming nutritional problems is to provide supplementary food (PSF) or nutritional supplementation. Because data from the 2014 Total Diet Survey (SDT) shows that the daily consumption of toddlers is still less than their needs in terms of nutritional adequacy (Refni, 2021).

Table 3. Differences in toddler weight before and after consuming lelor nuggets

	Mean	Standard Deviation	Sig.
Body Weight before-after consuming lelo nuggets	0.4313	0.3860	0.000

The paired T-Test yielded a p value of 0.000 (p≤0.005) before and after consuming the molor nuggets. Thus, it can be said that toddler weight changes before and after consuming lelor nuggets for 14 days.

This is in line with research (Musa & Ansokowati, 2020) which shows that moringa nuggets can affect changes in toddler weight (p-value 0.000 <0.05). The average weight gain was 0.38 kg before and after the moringa nugget intervention, according to the study's conclusions.

Proteins are made up of amino acid molecules. Nitrogen (N), oxygen (O), hydrogen (H), and carbon (C) are the main components of amino acids. Amino acids consist of an amino group (NH2), a carboxylic group (COOH), and other groups. Peptide bonds allow amino acids to function as components of proteins. Amino acids can be divided into two categories: essential and non-essential. Essential amino acids are amino acids that the body needs to make proteins but cannot produce on its own; As a result, these amino

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acids must come from an outside source (food). Lysine, leucine, isoleucine, methionine, phenylalanine, threonine, tryptophan, valine, histidine, and arginine are amino acids that are considered essential. The body can synthesize non-essential amino acids from other amino acids, including proline, glutamine, glutamate, aspartic acid, alanine, and asparagine (Suprayitno & Sulistiyati, 2017).

According to (Suprayitno & Sulistiyati, 2017) that protein has benefits for growth, hormone manufacture and enzymes in the body's metabolism. If the body lacks protein, it causes the formation of body tissues, maintenance of cells and also tissues and body metabolism to be disrupted and susceptible to infection, as well as a decrease in food intake which is a factor in children being stunted in growth including decreased child weight. If this goes on for a long time, it can reduce the nutritional status of children under five. Vice versa, if the child's protein intake is as needed, then the child's growth runs optimally and the child's nutritional status will be good.

Animals that live in water have the highest protein content compared to other animals, such as tilapia, snakehead fish, and catfish. This is the rationale behind toddlers' need for adequate animal protein intake. Therefore, meeting the animal protein needs of toddlers in accordance with the accessibility of local animal protein sources should be the main goal in the prevention of underweight and malnutrition. (Aryana et al., 2022).

Leucine (C6H13NO2), an amino acid found in catfish, is essential for infant development and maintaining nitrogen balance in the body. In addition, leucine is also beneficial for the synthesis and breakdown of muscle proteins. Meanwhile, one of the nine amino acids necessary for tissue growth and repair is lysine. By itself, lysine helps the production of tissues, hormones, antibodies, enzymes, collagen, and aids calcium absorption. Children's growth and development depend on lysine, a very important amino acid. Because it works together with arginine, glycine, and ornithine to activate growth hormone (HGH, or human growth hormone), lysine is an important amino acid that is thought to have a direct relationship with growth. Increased muscle growth, fat burning, and immune system regulation are all due to this growth hormone (Ubaidillah & Hersulistyorini, 2010).

Table 4. Differences in toddler weight before and after consuming PSF biscuits

	Mean	Standard Deviation	Sig.
Body Weight before-after consuming PSF biscuits	0.2438	0.2065	0.000

The result of the Paired T-Test test with p-value before and after consuming PMT biscuits is 0.000 (p≤0.005), as shown by the table above. Thus, it can be said that there is a difference in body weight in toddlers before and after consuming PMT biscuits for 14 days.

This is in line with research (Refni, 2021), which found that PMT has an impact on the nutritional status of underweight toddlers (p = 0.000). The purpose of supplementary feeding which is an intervention program for malnourished toddlers is to meet the nutritional needs of children and improve the nutritional status of children so that children can achieve a good nutritional state and in accordance with their age.

According to research (Muliyati, 2019), toddler weight differs significantly before and after giving PMT biscuits. This shows the impact of energy intake on increasing children's weight during 90 days of giving PSF biscuits to malnourished toddlers.

Recovery supplements provided contain nutrients that can help increase the fulfillment of toddler intake, so that the intake level in a day is mostly met. Recovery is the provision of additional food to overcome the problem of malnutrition, recovery PMT is given for 90 days (Ministry of Health RI, 2017). Consistent feeding of biscuits contributes to the fulfillment of appropriate nutritional needs, which when combined with adequate food consumption, can improve nutritional status. If given

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appropriately, PMT Recovery can help malnourished toddlers to meet calorie and protein needs, so as to improve their nutritional conditions (Mariyam et al, 2017).

Table 5. Differences in toddler weight gain before and after the intervention of lelor nuggets and PSF biscuits

	Mean	Standard deviation	Sig.
Body Weight before-after intervention	0.3375	0.3190	0.000

The intake of PSF biscuits and leor nuggets obtained a p-value of 0.000 (p≤0.005) based on the table above. These findings suggest that consuming PSF biscuits versus lelor nuggets differs significantly in terms of weight gain.

Table 6. Effect of lelor nuggets and PSF biscuits

	Mean	Standard Deviation	Sig.
Body Weight before-after given lelor nuggets	0. 4313	0.3860	0.000
Body Weight before after giving PSFbiscuits	0.2438	0.2065	0.000

This is in line with research (Sholikhah 2022) stating that there is a close relationship with animal protein in children's growth due to the presence of protein amino acids that function to synthesize several hormones. One of them is thyroid hormone which can accelerate the growth and development of the body. There is also Human Growth Hormone (HGH) or known as growth hormone which is influenced by amino acids in animal protein.
This is in line with research (Sholikhah 2022) stating that there is a close relationship with animal protein in children's growth due to the presence of protein amino acids that function to synthesize several hormones. One of them is thyroid hormone which can accelerate the and development of the body. There is also Human Growth Hormone (HGH) or known as growth hormone which is influenced by amino acids in animal protein.

Since catfish contains essential amino acids that are essential for children's growth, the combination of catfish and moringa in lelor nuggets helps children with poor nutritional status to gain weight. In addition, an amino acid that helps the synthesis and breakdown of muscle proteins is leucine. Meanwhile, one of the nine amino acids necessary for tissue growth and repair is lysine. Children's growth and development depend on lysine, a very important amino acid. The protein composition of Moringa leaves is three times that of egg protein, 25 times of iron and vitamin C found in spinach, 12 times of calcium, and twice of milk protein. Especially for protein intake in the body, this combination is very appropriate for additional food ingredients for toddlers who experience malnutrition (Ernawati et al., 2017).

Conclusion and Suggestions. Giving additional food biscuits is proven to increase the weight of toddlers with less weight, with a p value of 0.000. Statistically, the provision of lelony nugget supplements and PMT biscuits has an effect on increasing the weight of malnourished toddlers with a p value of 0.000.

But clinically Supplementary Feeding of Lelor Nuggets is more influential in increasing the weight of toddlers with less nutritional status. Body weight before and after taking Lelor Nuggets Mean 0.4313 and Standard Deviation 0.3860. While body weight before and after consuming PMT Biscuit Mean 0.2438 and Standard Deviation 0.2065.

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