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The Effectiveness Of Consumption Of Tempeh Nuggets On Weight Gain Of Undernourished Toddlers

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A R T I C L E I N F O

Keywords:

Body Weight,
Toddler,
Nugget Tempe

ABSTRACT

The nutritional status of children under five is an important health indicator, because children under five are a group that is vulnerable to nutritional health.One type of PMT that fulfills these needs is by giving processed tempeh which is modified into the form of nuggets,it is hoped that toddlers will be interested so that they have the will to consume it.This study aims to determine the effectiveness of tempeh nuggets consumption on weight gain of undernourished children under five in the working area of Hutabalang Health Center Central Tapanuli Regency in 2022.This type of research is a quantitative study with a one group pre-post test approach with a quasi-experimental research design as many as 15 undernourished toddlers.The results of the study the average weight of undernourished toddlers before being given tempeh nuggets was 8,5 and after being given tempeh nuggets for 14 consecutive days the average weight of toddlers became 8,9 with the meaning that there was an increase in toddler's weight although not too significant with an average increase in body weight. undernourished toddlers by 0.38 kg.The results of the statistical paired T test showed that the t value was -4.551 with a P-value of 0.000<0.005,meaning that tempeh nuggets were effective increasing the weight of undernourished children under five.It is hoped that mothers who have under-fives with malnutrition provide additional food intake in the form of processed tempeh as a side dish or snack with high protein content so that toddlers quickly recover to their normal weight.

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1. Introduction

The nutritional status of children under five years old (toddlers) is an important health indicator, because children under five are a group that is vulnerable to nutritional health. At this time there is a very rapid growth and development process, namely physical growth and psychomotor, mental and social development, so it is necessary to obtain nutrition from daily food, in the right amount and good quality. The impact caused by malnutrition is not only physical disturbances but also affects intelligence and productivity as adults, because it is a critical period (Indriati & , Sri Achadi Nugraheni, 2015). Good nutritional status is one of the determining factors for the success of health development which is an inseparable part of overall national development. Toddlers are a nutritional vulnerable group that really needs special attention because of the negative impact caused by suffering from malnutrition (Kemenkes RI, 2018). Nutritional problems in Indonesia are still a public health problem, malnutrition and undernutrition in children under five reach 17.7%, in this case it is included in the category of medium prevalence of public health problems. Stunting category very short and short (30.8%) included in the high prevalence. While thin and very thin are included in the serious category (10.2%) (Riskesdas, 2018b).Nutritional problems in Indonesia related to the growth of children under five, namely the problem of malnutrition is still one of the main public health problems. Malnutrition is a health disorder due to a lack or imbalance of nutrients needed for growth, thinking activities, and all things related to life. Malnutrition in children under five also contributes to the high average mortality rate in Indonesia. Undernourished toddlers do not have enough fat and very little muscle. Brain development becomes slow because children experience a

high incidence of disease because the body is not able to fight infection so it can no longer continue its growth and even experiences the worst impact, namely death (Atikah, R. Djoko Nugroho, 2017).

Basic Health Research data in 2018 shows the prevalence of malnutrition in North Sumatra based on an assessment of an imbalance in body weight with age as much as 5.37%, weight with unbalanced height as much as 4.57%. Meanwhile, for the city of Medan itself there are 4.8% for cases of malnutrition in the form of an imbalance in body weight compared to age. For the case of malnutrition, 4.3% of body weight and height are not balanced. Central Tapanuli Regency has the highest prevalence proportion for cases of malnutrition, namely for body weight compared to age as much as 10.33% and in West Nias as much as 12.57%. Then, for the case of malnutrition, the imbalance between body weight and height was the highest in Tapanuli Tengah Regency with 9.17% (Riskesdas, 2018a). Based on data from the Hutabalang Health Center in 2022, there are seventeen children under five experiencing malnutrition. Seeing cases of malnutrition suffered by children under five need to be handled immediately so that toddlers do not experience malnutrition and can worsen their growth and development.

Based on the results of research by (Suyatman et al., 2017) the risk factors for the incidence of malnutrition in children under five, it can be seen that most mothers who provide poor feeding patterns have a greater chance of having children with poor nutritional status (94.5%) compared to having children with good nutritional status (4 ,1%). Undernourished children under five are a vulnerable group that need treatment to improve their nutritional status. One of the handling of the problem of malnutrition is the provision of additional food (MT). The provision of MT can be in the form of local food or biscuits containing 10 vitamins and 7 essential minerals, this is intended so that underweight toddlers do not deteriorate their nutritional status. During this pandemic, MT's logistics must be available for at least three months, and must be immediately fulfilled for the current year. If the local government has not implemented the PSBB, there is no local transmission, and the mobilization of the population between regions is very minimal. the supplementary feeding program is carried out in accordance with the Technical Instructions for Supplementary Food for Toddlers and Pregnant Women (Direktorat Gizi Masyarakat, 2020).

Tempe is a fermented food made from soybeans and a source of protein that is nutritious, cheap and affordable for the community (Ahnan et al., 2021).According to previous research, the provision of supplementary food (PMT) in the form of soybean tempe nuggets for undernourished toddlers for 14 days has an average impact of 0.20 kg of weight gain. Efforts to increase the toddler's weight are by giving PMT which contains high protein and high calories according to the toddler's weight so that it can meet their nutritional needs. The energy content in 100 grams of tempeh is 199.1 calories and the protein content in 100 grams tempeh 19 grams each. Another nutritional advantage of tempeh is its very high amino acid content, up to 85 times that of soybeans (Fitriah et al., 2017).According to (Redi Aryanta, 2020) the nutrients between tempeh in 100 grams of serving are Protein (g) 20.7, Fat (g) 8.8, Carbohydrates (g) 13.5, Fiber (g) 3, 2, Calcium (mg) 155.1, Phosphorus (mg) 323.6, Iron (mg) 4.0. The government's efforts in overcoming the problem of malnutrition are by organizing the Supplementary Feeding Program (PMT) for toddlers. The purpose of PMT is to overcome malnutrition in the under-five age group. PMT is an intervention program for under-fives with malnutrition where the aim is to improve the nutritional status of children and to meet the nutritional needs of children so as to achieve good nutritional conditions and nutritional status according to the child's age. In meeting the nutritional status of children under five, one solution is to develop a formula for the provision of complementary feeding (PMT) to children with higher quality and high nutrition in order to solve the problem of malnutrition and undernutrition in Indonesia who come from poor families. One type of PMT that can be made is processed tempeh nuggets.

This is in line with the results of (Irwan, T. Mery, Kadir S., 2020) research on the effectiveness of providing PMT Modif based on local wisdom to improve the nutritional status of undernourished and stunting toddlers stating that before the intervention, all toddlers experienced malnutrition with an average body weight in the modified PMT group of 8.438 kg ± 1, 1451 and in the Modif PMT group 8.725 kg ± 1.2303. After the intervention, there was an increase in the average weight of children under five in the Modified PMT group to 9,088 kg ± 1.1740 with the conclusion that the modified PMT was effective in improving the nutritional status of undernourished children under five in the Paguyaman Community Health Center, Boalemo Regency. Modified PMT is more effective than Modified PMT in improving the nutritional status of undernourished children under five.

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2. Methods

2.1 Research Type and Design

This type of research is a quantitative research with a one group pre-post test approach. The research design used is quasi-experimental, and the design used is one group pre-test and post-test.

2.2 Research Place and Time

This research was conducted in the Work Area of the Hutabalang Health Center. The research was carried out from March 2022.

2.3 Population and Sample

The population in this study were all undernourished children aged 2-3 years in the working area of the Hutabalang Health Center as many as 15 toddlers. The sample in this study was taken with the total population technique where all the population was sampled.

2.4 Data Collection Procedure

The data collection method was carried out through primary data, which is data obtained from direct observation, namely data on the weight of undernourished children under five before and after being given Tempeh Nugget and secondary data is data obtained from nutrition reports at the Hutabalang Health Center as well as other related reports and books. -reference book.

2.5 Data analysis method

The data obtained will be analyzed by univariate and bivariate analysis. The univariate analysis used in this study is percentage analysis. Furthermore, the data is tabulated, then processed using the SPSS program. Bivariate analysis is to analyze the research variables in order to test the research hypotheses and to see the influence between the research variables. In this study, the analysis was carried out by statistical testing, namely the paired t-test to determine the effect of the dependent variable on the independent variable. The data were analyzed by using a statistical test, namely paired sample t-test to see the difference in the effectiveness of the consumption of Tempe Nugget on increasing the weight of undernourished children under five before and after treatment, paired t-test (paired t-test).

3 Results And Discusion

3.1 Characteristics of Respondents

Characteristics of respondents can be seen from the age and education and occupation of pregnant women who suffer from anemia in Tugala Village are housewives.

Table 1.
Distribution Of Respondents

Age	Frequency	Percent
26-30	4	26,7
31-45	11	73,3
Education		
SMP	9	60,0
SMA	6	40,0
Work		
IRT	12	80,0
Farm workers	3	20,0

Based on table 1, it is known that the majority of respondents are aged 31-45 years, namely 11 respondents (73.3%) with the most education being junior high school as many as 9 respondents (60.0%) and the majority of respondents working as IRT as many as 12 respondents (80%).

Table 2.
Distribution Of Respondents By Age Under Five With Malnutrition In The Working Area Of The Hutabalang Public Health Center Central Tapanuli Regency

Age(Months)	Frequency	Percent
24,0	1	6,7
25,0	4	26,7

26,0	2	13,3
27,0	2	13,3
29,0	1	6,7
30,0	3	20,0
34,0	1	6,7
36,0	1	6,7
Total	**15**	**100,0**

Based on table 2, it is known that there are more malnourished toddlers aged 25 months, namely 4 toddlers (26.7%) and 3 toddlers aged 30 months (20.0%).

Table 3.
Distribution Of Toddler Body Weight Before And After Giving Tempe Nugget To Undernourished Toddlers In The Working Area Of The Hutabalang Public Health Center

Weight Before Treatment	Weight After Treatment	Mean Before	Mean After	t	Pvales
8,3	8,9				
7,2	7,2				
7,5	8,2				
9,5	9,8				
6,2	7,4				
10	10				
9,9	10,2				
9,5	9,9	8,587	8,967	-4,551	0,001
7,5	7,8				
9,6	9,8				
8,8	9,1				
9	9,7				
8,7	8,9				
8,2	8,2				
8,9	9,4				

Based on table 3, it is known that the average weight of undernourished toddlers before being given tempeh nuggets is 8,587 and after being given tempeh nuggets for 14 consecutive days the average weight of toddlers becomes 8,967 with the meaning that there is an increase in toddler's weight although it is not too significant with an average an increase in the weight of undernourished children under five by 0.38 kg. The results of the statistical paired T test show that the t value is -4.551 with a P-value of 0.000 <0.005, meaning that tempeh nuggets are effective in increasing the weight of undernourished children under five in the working area of the Hutabalang Public Health Center, Central Tapanuli Regency in 2022.

The results showed that the average weight of undernourished children before consuming soybean tempe nuggets was 8,587 kg with the lowest body weight of 6.2 kg and the highest body weight of 10.0 kg, after consuming soybean tempe nuggets 8,967 kg with the lowest body weight of 7.2 kg. and the highest body weight was 10.2 Kg with an average weight gain of 0.38 Kg. Respondents who experienced weight gain were 12 respondents and those who did not experience weight gain were 3 respondents. This is in line with the results of (Sarmana et al., 2021) research on the Effect of Giving Tempe Biscuits on Weight and Height Increase in Toddlers where the average height before the intervention was 104.31cm and after the intervention was 105.05 cm for the average height before the intervention. is 17.25 kg and after intervention 17.64 kg. Based on the results of bivariate analysis, it was found that there was an effect of giving tempe biscuits on changes in height with a p-value of 0.01 and body weight at toddlers with a p-value of 0.0001. This is due to the sufficient need for energy and protein which is one way to reduce cases of malnutrition. It is known that the energy content of tempeh is 201 cal/100 b BDD, 20.8 grams of protein, 8.8 grams of fat, 13.5 grams of carbohydrates (Alvina & Hamdani, 2019). The results of the statistical test on measuring the effectiveness of tempeh nugget consumption on weight gain of undernourished toddlers obtained p value of 0.000 (p value <0.05), then Ha was accepted and Ho was rejected, meaning that tempeh nugget consumption was effective in increasing the weight of undernourished toddlers in the region. Hutabalang Health Center in 2022.

Tempe protein is easily digested so that protein can be used to increase weight and height in toddlers. Tempe made from soybeans shows a deficit of the amino acid pair methionine-cystine,

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overall contains high nutritional elements: 25% protein (17 grams protein/100 grams), 5% fat, 4% carbohydrates and 60% water, a source of vitamins B12 which is quite high, low in fat and free of cholesterol, in tempe biscuits also found calcium as much as 21.356 mg. It was found in a study on giving tempeh biscuits to toddlers which was carried out for 4 weeks, it was reported that the weight and height of toddlers experienced enhancement. Additional food can be in the form of snacks made by the mother or from factory processing. Making healthy snacks is cheap and easy, but creativity is needed to make a snack that is interesting and liked by children, for example tempeh balls from processed tempeh biscuits (Sarmana et al., 2021)

In line with (Salma,Haniarti, 2021) research on weight gain of undernourished toddlers by giving high nutritional food made from tempeh and cauliflower where toddlers are made into the experimental group before giving high nutritional food made from tempeh and cauliflower with a mean number of 9.04 and after doing this. treatment the mean number reached 9.16 in 1 month there was an increase of 0.12. While toddlers who were used as the control group with a mean number of 9.81 in 1 month reached 9.87, there was an increase of 0.063. This indicates that the control group also experienced weight gain but not as significant as the experimental group. In contrast to the effectiveness research in the working area of the Simomulyo Public Health Center, Surabaya. There was no significant difference in the nutritional status of children under five based on weight/weight before and after the provision of supplementary food (MT) for recovery (p=0.585). However, after 3 months of receiving Supplementary Feeding (MT) Recovery, there was an increase in the percentage of children under five with normal nutritional status from 65.8% to 68.4% (Putri & Mahmudiono, 2020). One of the factors that can affect the nutritional status of toddlers is the mother's knowledge of nutrition which will affect a person's nutritional status. Nutritional knowledge is knowledge related to food and nutrients. Mother's attitude and behavior in choosing food to be consumed by toddlers is influenced by various factors, including a person's level of knowledge about nutrition so that it can affect a person's nutritional status. Lack of knowledge of maternal nutrition can be one of the determinants of the nutritional status of toddlers because it determines the attitude or behavior of mothers in choosing food to be consumed by toddlers (Rosdiana, Nilam Fitriani Dai', 2021)

4 Conclusion

The average body weight of undernourished toddlers before being given tempeh nuggets was 8,587 and after being given tempeh nuggets for 14 consecutive days the average toddler's weight became 8.967 with the meaning that there was an increase in toddler's weight even though it was not too significant with an average increase in the weight of undernourished toddlers. less by 0.38 kg. The results of the statistical paired T test show that the t value is -4.551 with a P-value of 0.000 <0.005, meaning that tempeh nuggets are effective in increasing the weight of undernourished children under five in the working area of the Hutabalang Public Health Center, Central Tapanuli Regency in 2022.(Direktorat Gizi Masyarakat, 2020).

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