ANALYSIS OF DIFFERENCES IN NUTRITIONAL STATUS IN TODDLERS WITH UNDERNUT NUTRITION WHO RECEIVE ADDITIONAL FOOD IN THE FORM OF BISCUITS WITH FOOD-BASED PMT LOCAL AT BANDARAN COMMUNITY HEALTH CENTER

Dewi Qomariyah[1], Sulis Diana[2], Dhonna Anggreni[3]
[1,2,3] STIKES Majapahit Mojokerto
Email Corresponding Author:
diana.sulis6@gmail.com

ABSTRACT

The government's efforts to address malnutrition in children under five include providing supplementary food in the form of biscuits and locally sourced supplementary foods. The purpose of this study is to identify the differences in the nutritional status of malnourished children who receive biscuit-based supplementary food compared to those receiving locally sourced supplementary food in the working area of UPT Puskesmas Bandaran, Pamekasan Regency.

This research employed an observational analytic study design with a retrospective approach. The population consisted of all undernourished children, using a total sampling technique (346 children). The statistical significance of tested using the Independent Mann Whitney test, as the data did not follow a normal distribution.

The results indicated that, before and after the provision of biscuit-based supplementary food, there was an increase in normal nutritional status to 73.4%, with an average weight gain of 243.1 grams. Meanwhile, the provision of locally sourced food resulted in a significant increase in normal nutritional status to 99.5%, with an average weight gain of 870.7 grams.

The Independent Mann Whitney test showed a Sig. (2-tailed) value of < 0.001, indicating a significant difference between the two groups. It can be concluded that there is a significant difference in the nutritional outcomes between children who receive biscuit-based supplementary food and those receiving locally sourced supplementary food. Locally sourced supplementary food is more effective in improving normal nutritional status compared to biscuit-based supplementary food, due to better acceptance and a more balanced nutritional composition in local ingredients.

Keywords :Malnutrition, Biscuit-Based Supplementary Food, Local Supplementary Food

INTRODUCTION

The background of this study is based on the high prevalence of nutritional problems in toddlers in Indonesia, such as wasting at 7.7% and stunting at 21.6% according to SSGI 2022. These nutritional problems are caused by several factors, including lack of nutritional intake, repeated infections, inappropriate parenting

patterns, and limited access to health services and nutritious food. In the Bandaran Health Center area, cases of malnutrition in toddlers continued to increase from 203 cases in 2020 to 230 cases in 2022, even though biscuit-based PMT had been provided between 2020 and 2022.

Although biscuit-based PMT has been implemented, its effectiveness is considered less than optimal, as evidenced by the increase in cases of malnutrition. This situation is similar to Putri's (2020) study which found that biscuit-based PMT at the Simomulyo Health Center did not show a significant difference in the nutritional status of toddlers before and after the intervention. In 2023, the Bandaran Health Center tried to change its strategy by providing local food-based PMT, considering the great potential of local resources, especially sea fish, in an area where the majority of the population are fishermen.

The local food-based PMT program was conducted for 90 days for 209 malnourished toddlers, with the support of the Non-Physical Special Allocation Fund (DAK). This program consists of preparation, implementation, and control and evaluation stages. The preparation stage includes target setting, socialization, and cooperation with third parties for the provision of food ingredients. The implementation stage includes menu preparation, purchasing food ingredients, providing additional food, nutrition education, and cooking demonstrations. The final stage involves monitoring and evaluation to measure the success of the program. The results of the evaluation of the local food-based PMT program are still being processed, but this study is expected to identify changes in the nutritional status of toddlers before and after receiving PMT, as well as comparing the effectiveness of PMT made from biscuits and made from local food.

RESEARCH METHODS

The type of research used in this study is analytical observational with a retrospective approach. Analytical observational research is conducted without direct intervention on the research subjects, aiming to explain a condition or situation that has occurred. The retrospective approach means that the effect variable is measured first, then the cause variable that has occurred in the past is analyzed, for example an event that occurred a year earlier (Notoatmodjo, 2012).

The research location was in the Bandaran Health Center Working Area, Pamekasan Regency, with an implementation time from February to May 2024.

The subjects of this study included the entire population of toddlers with malnutrition status (BB/TB <-2 SD) in the Bandaran Health Center Working Area, namely 158 toddlers receiving PMT biscuits in 2022 and 188 toddlers receiving PMT made from local food in 2023, with a total population of 346 toddlers. The sampling technique used the total sampling method, where the entire population that met the inclusion and exclusion criteria were used as research samples. The independent variable in this study was the provision of additional food (PMT) in the form of biscuits and made from local food, while the dependent variable was the nutritional status of toddlers as measured by the weight to height indicator (BB/TB).

The data analysis process was carried out through several stages, namely data cleaning to identify and correct data errors, coding to change data in the form of letters into numbers, scoring to give values to raw data, and tabulation to present data in tabular form. Data analysis was carried out using univariate and bivariate methods. Univariate analysis was used to describe the characteristics of the variables studied, while bivariate analysis used the Mann-Whitney test to determine the significant difference between the provision of PMT biscuits and PMT made from local food on the nutritional status of toddlers. Statistical tests were carried out with a significance level of 0.05. In addition, a normality test was carried out to ensure that the data distribution was normal or not before the hypothesis analysis.

RESEARCH RESULT

Supplementary Food (MT) in the form of biscuits and local food reflects important information about the program's targets. Based on the study, there were differences in the distribution of gender and age range of recipients. The data showed that 57.6% of male toddlers and 42.4% of female toddlers received MT biscuits, while 49% of males and 51% of females received local MT. Most toddlers were in the age range of 11 months to less than 60 months, both recipients of MT biscuits and local MT.

Meanwhile, the monitoring form for the use of MT biscuits at the Bandaran Health Center, Pamekasan Regency in 2022 showed positive results. All toddlers (100%) received MT every month, and the majority (80.4%) reported giving MT every day. Most toddlers (64.6%) liked MT, and there were no health complaints after consuming it. In addition, the majority of parents or caregivers provided MT according to the instructions given (74.7% in toddlers aged 11-59 months). For MT made from local food, data from 2023 showed that all toddlers (100%) ate MT, with 84% consuming a full portion. Only a few toddlers did not eat for various reasons, such as being full or sick. Children's health was generally good during the program, with a small number suffering from illnesses such as diarrhea, cough, cold, or fever.

1. **Nutritional status of toddlers before and after receiving MT in the form of biscuits at the Bandaran Health Center, Pamekasan Regency**

   Based on the results of measuring the nutritional status of toddlers before and after the provision of Additional Food (MT) in the form of biscuits for 3 months, significant improvements were seen. At the beginning of the provision, as many as 25.3% of toddlers had poor nutritional status and 74.7% were malnourished. After one month, there was a decrease in the number of toddlers with malnutrition to 14.6%, while toddlers with malnutrition decreased to 62%. The percentage of toddlers with normal nutritional status began to appear at 23.4%. In the second month, nutritional status continued to improve. The percentage of toddlers with malnutrition decreased to 11.4%, malnutrition to 46.8%, and those with normal nutrition increased to 41.8%. After three months, toddlers with malnutrition decreased drastically to 5.1%, while 73.4% of toddlers had achieved normal nutritional status. Meanwhile, the Average Body Weight based on the Z Score Value (Anthropometric Index) before and after Receiving Additional Food Biscuits at the Bandaran Health Center UPT, namely:

Table 1. Average Body Weight Based on Z Score Value

	N	Range	Min	Max	Mean	Std. Deviation
BB sebelum	158	13,90	3,80	17,70	11,058	2,951
BB sesudah	158	12,80	5,30	18,10	11,301	2,789
Zscore sebelum	158	4,15	-6,15	-2,00	-2,7540	,6128
Zscore sesudah	158	3,10	-3,21	-,11	-1,5908	,6047
Valid N	158					

Based on the table above, it shows that there was an average increase in body weight of 243.1 grams after giving additional biscuits. Although this change is small, it shows a positive effect of the intervention on body weight. Meanwhile, the average Z-score value before giving additional biscuits ranged from -6.15 to -2.00 with an average of -2.75. This shows that the average target body weight before the intervention was in a malnutrition status. And, the Z-score value after giving additional biscuits ranged from -3.21 to -0.11 with an average of -1.59.

2. **Nutritional status of toddlers before and after receiving MT in the form of Local Food Ingredients at the Bandaran Health Center, Pamekasan Regency**

In the provision of MT made from local food, the data showed more significant results compared to the provision of biscuits. At the beginning of the intervention, 98.9% of toddlers had malnutrition, while 1.1% of toddlers had severe malnutrition. After the first month, the nutritional status improved with no more toddlers with severe malnutrition and only 57.4% were still malnourished. As many as 42.6% of toddlers had achieved normal nutrition. In the second month, toddlers with malnutrition continued to decrease to 49.5% and toddlers with normal nutrition increased to 50.5%. By the end of the third month, almost all toddlers (99.5%) had achieved normal nutritional status, with only 0.5% experiencing malnutrition.

Meanwhile, the average body weight based on the Z Score (Anthropometric Index) before and after receiving additional biscuit food at the Bandaran Health Center UPT, namely:

Table 2. Average Body Weight Based on Z Score Value

	N	Range	Min	Max	Mean	Std. Deviation
BB Sebelum	188	8,50	6,50	15,00	10,017	1,773
BB Sesudah	188	7,60	7,70	15,30	10,888	1,661
Z Score Sebelum	188	4,04	-6,05	-2,01	-2,4583	,376
Z Score Sesudah	188	3,00	-2,01	,99	-,0810	,363
Valid N (listwise)	188					

Based on the table above, it shows that there was an average increase in body weight of 870.7 grams after giving local food supplementary food, this shows a positive effect of the intervention of giving local food supplementary food. While the average Z-score value before giving local food supplementary food ranged from -6.05 to -2.01 with an average of -2.45. This shows that the average target body weight before the intervention was in a malnutrition status. And, the Z-score value after giving biscuit food supplementary food ranged from -2.01 to -0.99 with an average of -0.88. This shows that the average body weight after the intervention shows an increase in nutritional status to normal nutritional values and shows significant improvements in weight changes to be more consistent after giving food supplementary food.

3. Differences in nutritional status in malnourished toddlers who receive MT in the form of biscuits and MT made from local food.

The following are the differences in nutritional status between undernourished toddlers and toddlers with normal nutritional status who receive MT in the form of biscuits and MT made from local food, namely:

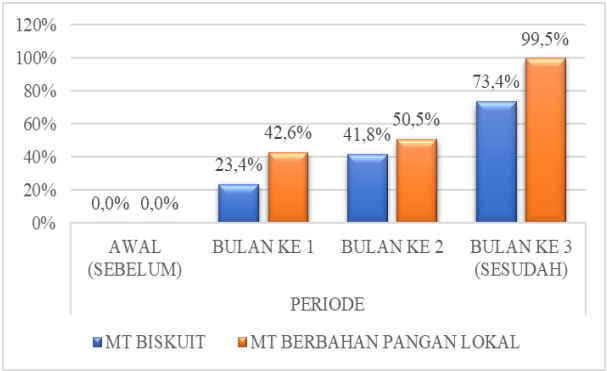


Figure 1.Differences in nutritional status in malnourished toddlers who receive MT in the form of biscuits and MT made from local food

The analysis showed significant differences in the effectiveness of the two types of MT. In toddlers who received MT biscuits, the decline in malnutrition status occurred gradually, but there were still toddlers who remained malnourished until the end of the period (5.1%). In contrast, MT made from local food managed to eliminate cases of malnutrition since the first month. Toddlers who received MT biscuits showed improvement, but not as fast as toddlers who received MT local food. In the third month, 73.4% of toddlers given MT biscuits achieved normal nutritional status, while in MT local food, 99.5% of toddlers had achieved normal nutritional status. These results indicate that interventions with MT made from local food are more effective in the long term.

Based on the results of the Statistical Test using the Independent Mann Whitney test, the SIg.(2-tailed) value <0.001 was obtained, so we reject the null hypothesis. This means that there is very strong evidence to state that there is a significant difference between the two groups tested, so it can be concluded that there is a significant difference between the nutritional value of toddlers who receive PMT biscuits and Local PMT.

Statistical Test Results using Independent Mann Whitney from the rankings of two different groups, namely by considering the number of samples, group 2 (Toddler group given MT made from local food) has more samples (188) compared to group 1 (Toddler group given MT biscuits) which is 158, but the average ranking is higher shown by group 2. The second group / (with an average ranking of 249.49) has a much higher ranking compared to the first group / (with an average ranking of 83.08). This shows a significant difference in the distribution of ranks between the two groups. The large difference in the average ranking indicates that the values in group 2 are substantially higher compared to the values in group 1. This could mean that the intervention or condition represented by group 2 gives better results. In addition, the number of ranks (Sum of Ranks) also shows the total distribution of ranks for each group, which is higher in the second group compared to the first group. This could mean that the second group has a consistently higher or

greater score in the measurements tested. The following is a graph of the averageAverage Z Score of Toddler Nutrition

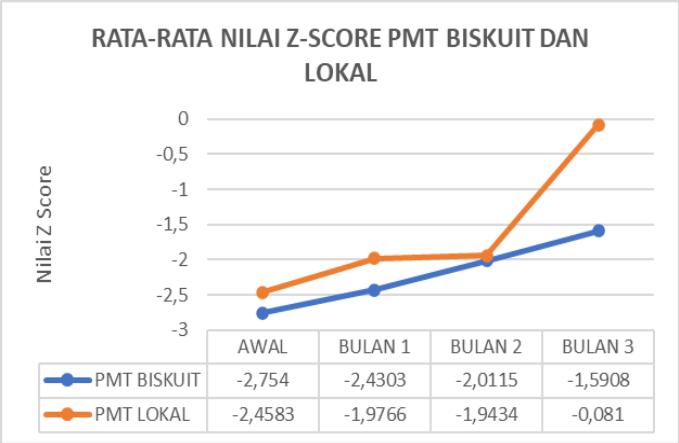


Figure 2.Average Z Score of Toddler Nutrition

Based on the diagram above, it shows that in the first month, both types of PMT showed almost the same increase in the nutritional value of toddlers, with PMT Biscuits slightly higher, in the second month PMT Biscuits continued to show an increase, while Local PMT experienced a significant decline. This may be due to factors such as food acceptance, food quality, or distribution problems, and in the third month there was a significant spike in the nutritional value of toddlers receiving Local PMT. This indicates the higher effectiveness of Local PMT in the long term. PMT Biscuits experienced a slight decline but remained more stable compared to the previous month.

DISCUSSION

1. **Nutritional Status of Toddlers Before and After Providing Additional Food (MT) Biscuits**

Based on research, giving MT in the form of biscuits shows good results in improving the nutritional status of toddlers, especially from the "bad" and "less" categories to "good". This increase is due to the nutritional content in biscuits, which are enriched with important micronutrients such as iron, calcium, vitamin A, vitamin D, and zinc, which are essential for the growth and development of toddlers (Hartono & Djuwita, 2021). In addition, the calories in biscuits help meet the energy needs of toddlers, which are important for achieving normal nutritional status.

However, there are some toddlers who are still malnourished and lacking at the end of the biscuit-giving period. Factors such as parental non-compliance in providing biscuits according to schedule, toddlers' taste preferences, and parental knowledge about the importance of consistent biscuit consumption also affect the results of this program. Research by Rini et al. (2017) and Hosang (2017) supports this finding, where non-compliance causes some toddlers to remain in malnutrition even though they have received PMT biscuits. This shows that the factor of toddler acceptance of the taste of biscuits and the consistency of providing additional food play an important role in the success of the nutrition improvement program (Sari & Yanti, 2019).

Therefore, researchers argue that providing biscuits as additional food has been proven to have a positive impact on improving the nutritional status of toddlers, especially because of its balanced nutritional content. However, the obstacles that arise related to parental non-compliance in providing biscuits according to schedule and the lack of knowledge about the importance of additional food indicate that the aspect of parental education is also very important. Providing additional food is not only about providing nutrition, but also about how to educate and build correct consumption habits. The factor of toddler acceptance of the taste of additional food cannot be ignored either, because children who do not like certain foods tend to refuse to consume them, which ultimately has an impact on the effectiveness of the nutritional improvement program.

Such nutrition improvement programs should be designed with a more comprehensive approach, including socialization to parents about the importance of consistency in providing additional foods and how to ensure that their children consume these foods voluntarily. The role of parents as supervisors and guides is crucial, because non-compliance and lack of understanding can reduce the effectiveness of additional biscuits that have been formulated with good nutrition. In addition, diversification of additional foods or more varied flavor choices may help increase toddlers' acceptance of this program.

2. Nutritional Status of Toddlers Before and After Providing MT Made from Local Food

Providing supplementary food (MT) made from local food has shown more effective results in improving the nutritional status of toddlers compared to processed biscuits. In my opinion, this success is not only due to the rich nutritional content of local ingredients such as sea fish, but also because toddlers accept foods that are more familiar to their tastes. Taste and texture factors do greatly influence whether toddlers will happily consume the food regularly, so that their daily nutritional intake can be met. This shows the importance of the relationship between supplementary food and local eating habits. These factors are important because if toddlers like local MT, they are more likely to consume it regularly, so that nutritional intake increases (Sari & Yanti, 2019).

In addition, the use of easily accessible local food ingredients, such as coastal sea fish, provides economic and sustainability benefits. By utilizing locally available resources, the program is not only more affordable but also more easily accepted by the community. This makes the program more effective in the long term, because the ingredients used are easily available and in line with everyday eating patterns.

Local MT using easily accessible ingredients such as sea fish, is a food ingredient rich in protein, Omega-3, vitamin D, B12, and other minerals that are important for the growth and development of toddlers (Ministry of Health of the Republic of Indonesia, 2023). Sea fish is also an economical local food source in coastal areas, making it easier to obtain and in accordance with the eating habits of the local community. The use of local food ingredients supports better nutritional status because the nutrients contained are more balanced compared to processed biscuits, which although nutritious, may be less balanced in terms of macronutrient and micronutrient composition (Rahayu, 1992).

3. Differences in Nutritional Status of Toddlers Who Receive MT Biscuits and MT Made from Local Food Ingredients

The results of statistical analysis showed a significant difference between toddlers who received MT biscuits and those who received MT made from local food. The results of the Mann Whitney test showed that toddlers who received MT made from local food experienced a better increase in nutritional status compared to toddlers who received MT biscuits. This indicates that although biscuits provide stable nutritional improvements, their effects tend to diminish over time. In contrast, supplementary foods made from local food show more significant results in the long term, although it takes longer to provide positive effects (Almatsier, 2009; Hardinsyah & Drajat, 2002).

Researchers argue that toddlers' better acceptance of local foods, as well as the more balanced nutritional content of fresh ingredients, are the main factors why local supplementary foods are more effective. Fresh foods from local ingredients such as sea fish have better nutrient absorption compared to processed foods such as biscuits (Almatsier, 2009). This is in line with the finding that local MT showed a more drastic increase at the end of the period, while biscuits tended to experience a decrease in effectiveness in the last months of the program.

Based on these facts, theories, and opinions, it can be concluded that the use of local food ingredients in PMT is more effective than processed biscuits in improving the nutritional status of toddlers who are malnourished. PMT programs need to consider consistency of provision, compliance, and education to parents to ensure optimal results.

CONCLUSION

Based on the results of the study, it can be concluded that the Supplementary Feeding (PMT) program, both in the form of biscuits and local food ingredients, has a positive impact on the nutritional status of toddlers. The provision of biscuits showed a significant increase with an average weight gain of 243.1 grams and an increase in the Z-score value to -1.59, which indicates an improvement in nutritional status towards normal. The provision of Supplementary Feeding from local food ingredients showed more significant results with an average weight gain of 870.7 grams and a Z-score value reaching -0.810, which also indicates an improvement in nutritional status towards normal. The results of the statistical test revealed a significant difference between the two types of interventions, where PMT from local food ingredients was more effective than biscuits in improving the nutritional status of toddlers.

SUGGESTION

Suggestions are given to the Bandaran Health Center and further researchers. For the Health Center, it is recommended to conduct regular monitoring of toddlers receiving PMT, to ensure the effectiveness of the program and adjust the type of PMT to local eating habits, thereby increasing the sustainability of the program. For further researchers, it is recommended to deepen the study of factors that influence the acceptance of additional food made from local food, including aspects of taste and community perception, in order to increase the effectiveness of future nutrition improvement programs.

BIBLIOGRAPHY

Achmad, D Sediaoetama. (2010). Nutritional Science. Jakarta: Dian Rakyat.

Almatsier, S. 2009. Basic Principles of Nutritional Science. Jakarta: PT Gramedia Pustaka Utama.

Anggraeni, DM & Saryono. 2013. Qualitative and Quantitative Research Methodology in the Health Sector. Yogyakarta: Nuha Medika

Indonesian Ministry of Health. 2010. Indonesian Health Profile. Jakarta: Indonesian Ministry of Health

Ministry of Health of the Republic of Indonesia. 2011. Guidelines for the Implementation of Additional Food Provision. Jakarta: Ministry of Health.

Ministry of Health of the Republic of Indonesia. 2011. Recovery for Malnourished Toddlers (Operational Health Assistance). Directorate General of Nutrition and Maternal and Child Health. Jakarta: Ministry of Health.

Ministry of Health of the Republic of Indonesia. 2017. Technical Guidelines for Providing Additional Food for (Toddlers-School Children-Pregnant Women. Indonesia. Jakarta: Ministry of Health of the Republic of Indonesia.

Ministry of Health of the Republic of Indonesia. 2019. Technical guidelines for additional food for toddlers and pregnant women. Directorate General of Nutrition and Maternal and Child Health. Jakarta: Ministry of Health.

Putri, Arum Sekar Rahayuning,. 2020. Effectiveness of Providing Additional Food (PMT) for Recovery on Toddler Nutritional Status in the Simomulyo Health Center Work Area, Surabaya. Putri and Mahmudiono. Amerta Nutr (2020).58-64 Published Online: 15-03-2020. Doi: 10.20473/Amnt. v4i1.2020.58-64 Joinly Published By Iagikmi & Universitas Airlangga.

Ministry of Health of the Republic of Indonesia. 2023. Technical Instructions for Providing Supplementary Food (PMT) Made from Local Food for Toddlers and Pregnant Women. Jakarta: Ministry of Health.

Putri Ariani, A. 2017. Nutritional Science Equipped with Nutritional Status Assessment Standards andList of Food Ingredients Composition. Yogyakarta: Nuha Medika.

Ministry of Health of the Republic of Indonesia. 2020. Regulation of the Minister of Health of the Republic of Indonesia Number 2 of 2020 Concerning Children's Anthropometric Standards. Jakarta: Ministry of Health

PERSAGI, PA (2009). Nutrition Dictionary. In PA PERSAGI, Nutrition Dictionary "K" (pp. 111-112). Jakarta: PT. Kompas Gramedia Utama.

Rahayu, WP 1992. Fermentation Technology of Fishery Products. Department of the Center for Inter-University Food and Nutrition, Bogor Agricultural University. Bogor

Refni. 2021. The Effect of Providing Supplementary Food (PMT) on Nutritional Status in Undernourished Toddlers (Aged 12-59 Months) at the Ujung Gading Health Center, West Pasaman Regency in 2020. Perintis Indonesia University. Diploma IV Nutrition Study Program Supariasa IDN. Nutritional Status Assessment First Edition

Letter of Acceptance

IJNMS
International Journal of Nursing and Midwifery Science

No. 710/IJNMS/2024 21/Oktober/2024

To
Dewi Qomariyah

Dear author/s,

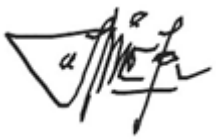
I have Pleasure to inform you that your following 'Original Article has been accepted for publication in International Journal of Nursing and Midwifery Science (IJNMS) with the title:

"**Analysis of differences in nutritional status in toddlers with undernut nutrition who receive additional food in the form of biscuits with food-based PMT local at Bandaran Community Health Center**"

Dewi qomariyah

It will be published in Volume 9 issue 1, January 2025. It is further mentioned for your information that our journal is a double-blind peer reviewed indexed international journal.

With regards



Lasiyati Yuswo Yani