The Effects of MISUKE For Underweight Children

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Abstract

Background : Malnutrition problems such as underweight was unhealthy (pathological) conditions that arise from not enough eating or consuming less energy and protein for a certain period of time. The results of monitoring the nutritional status of toddlers (0-59 months) in 2018 from Basic Health Research with WAZ Index, 17,6% children in underweight status. MISUKE (vegetable oil, milk & soybean) is a nutrient-dense supplement made from vegetable oil, skim milk and soybeans which are a high source of energy and protein but in small volume and in powder form.

Objective : The aims of this study was to determine the effect of MISUKE formula on the nutritional status of underweight children.

Methods : This research design was quasi-experimental research with pretest and posttest approaches. Samples taken by 30 underweight children under five. This research was carried out in working area of Sudiang Raya Health Center in Makassar city.

Results : The results showed that there was an increase in body weight before and after consume MISUKE around 0.25 grams with a p value of 0,000, besides that there was a significant increase in energy and carbohydrate intake after giving misuke with p values respectively (0,000 and 0.001), and for There was also an increase in fat protein intake, but not significantly with p values (0.56) and (0.51), respectively. Thus, MISUKE can be used as an alternative food for malnourished children.

Conclusion : MISUKE formulation used consists of 12 grams of vegetable oil, 6 grams of skimmed milk, 12 grams of soy bean flour, 4 grams of granulated sugar. The nutritional value of MISUKE is 190.8 kcal energy, 6.5 grams of protein, 14.5 grams of fat, and 10.7 grams of carbohydrates, while the change in nutritional status for weight before ranging from 10.48 grams and the increase of 0.25 grams after MISUKE treatment with an average body weight range of 10.73.

Keywords*: MISUKE, Nutritional Status, Toddler, Underweight, Vegetable Oil*

Introduction

Nowadays, nearly three of ten toddlers are malnourished, caused by insufficient eating habits containing lack of calories and protein, which will cause protein and calorie deficiencies or combination of both. Various policies and strategies involved to reduce malnutrition in children such as additional feeding but have not provided optimal results. One of the right solutions to meet the nutritional needs of children that there is no malnutrition is to prepare

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nutrient dense foods[1].

The result of Riskesdas (2018) the number of children who are still malnourished (WAZ Index) is 13.8%, while in South Sulawesi province the number of malnourished children (WAZ Index) is 18.6%[2]. The results of Nutritional Status Monitoring (PSG) Makassar province of South Sulawesi in 2016 the number of children who are still malnourished (WAZ Index) as much as 28%[3]. This suggests that the prevalence of malnutrition is still above the national prevalence Previous research has shown that nutrient-dense foods in the form of food formulas are very well given to malnourished children. That Formula contains high nutrition, small volume which is easy to give to malnourished children and accelerate to weight gain[1]. One of the formula foods is oil, milk, nuts in the form of nutrient dense additions with a small volume and in the form of powders whose composition consists of: vegetable oil, skimmed milk, tolo beans also plus granulated sugar and mineral mix with nutrient energy content of 175 kcal[4].

In this study was carried out the manufacture of nutrient dense formula with modification of vegetable oil, skimmed milk and soy beans (MISUKE). The based reason of this study because soybeans are the local food that contains the highest plant protein among other pods. The composition of MISUKE used in this study is vegetable oil 12 grams, skimmed milk 6 grams, soybeans 12 grams and granulated sugar 4 grams.. The aims of research to find out the effect of MISUKE formula on the nutritional status of malnutrition children.

Materials and Methods

The research design was quasi ekxperiment with pretest and postest design,conducted in Sudiang Raya as working area of Public Health Center in Makassar City. The subject of the study was all toddlers who were underweight based on WAZ Index who were live in the working area of Sudiang Raya Health Center in Makassar City. Total sample in this research was 30 underweight children. The types of data collected is age, body weight and nutritional intake. Before given treatment toddlers are assessed their nutritional status and intake based on food recall 24 hours. Next steps was MISUKE treatment for one month (30 days). After the treatment completed the sample was reassessed their nutritional status and intake. Processing data by displaying basic status data in the form of average maximum and minimum values. The effect of MISUKE treatmeny by analysis data with Paired T Test if the data is distributed normally and if not distributed normally then wilcoxon test is carried out at alpha 5%.

Result

The production of MISUKE formula consists of the composition of vegetable oil 12 grams, skimmed milk 6 grams, soy bean flour 12 grams and granulated sugar 4 grams, all ingredients weighing 34 grams. The nutritional value of misuke in one serving weighing 34 grams consists of 190.8 kcal energy, 6.5 grams of protein, 14.5 grams of fat and 10.7 grams of carbohydrates.

1. Characteric sample

The sample in this study was underweight children in Sudiang Raya as work area of Public Health Center with 30 samples selected by randomly simple.

Tabel 1: Distribution Based on Age of Underweight Children in working area of Sudiang Raya Health Center

Karakteristik Sample	N	%
Age (Year)		
1 year old	7	23.3
2 years old	10	33.3
3 years old	8	26.7
4 years old	5	16.7

Source : Primary Data 2020

Based on table 1, distribution age of 30 samples shows that most of the sample of underweight children is 2 years (33.3%), and the least is from the sample of underweight children is 4 years old (16.7%.).

2. Body Weight changes before and after MISUKE treatment

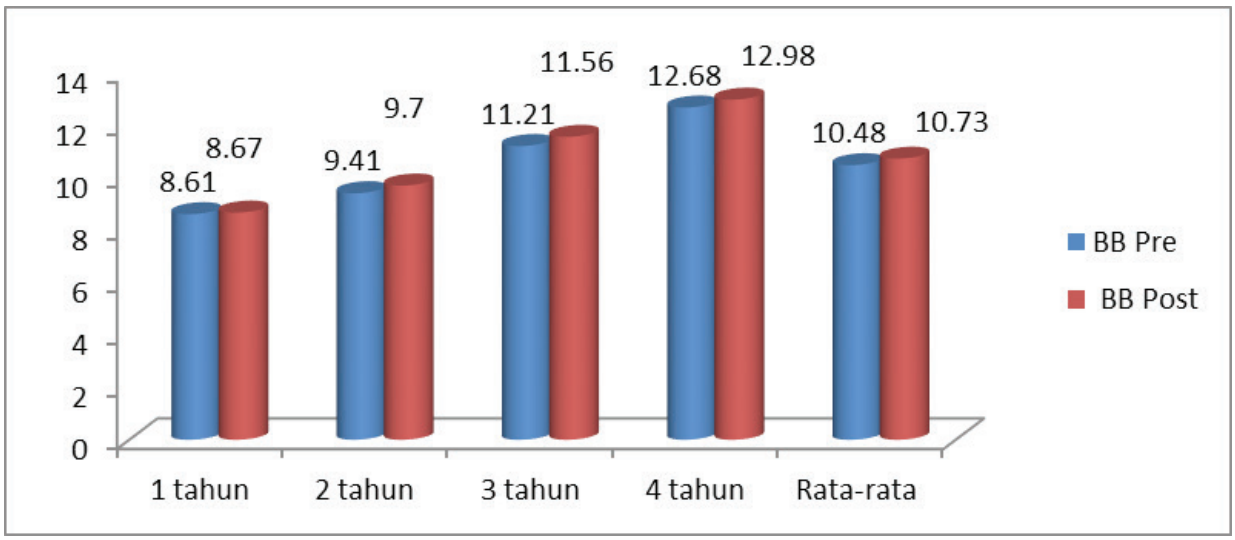

Figure 1. weight changes before and after the administration of misuke

In figure 1, shows that body weight before and after treatment of MISUKE. First, doing the normality test and shows that the data is not distributed normally. The next test to see the changes before and after MISUKE treatment was to use *Wilcoxon* which showed that the average weight of the sample before and after the intervention occurred a significant increase (0.000 < 0.05). The average of initial body weight of about 10.48 kilograms increased to 10.73 kilograms and the average increase ranged from 0.25 kilo grams within 1 month (30 days) of MISUKE treatment.

3. Changes in nutrient intake before and after of MISUKE treatment

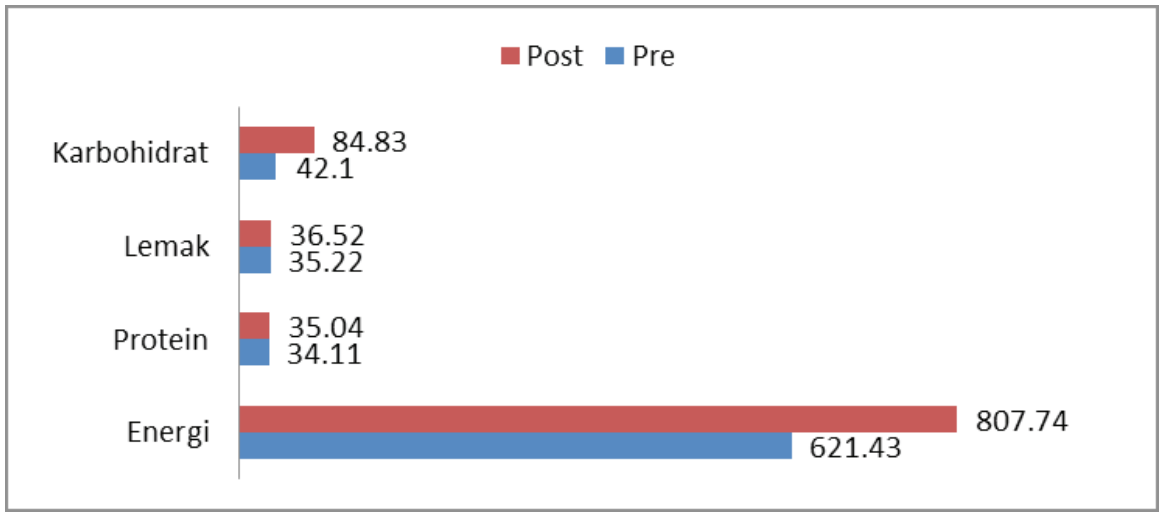

Figure 2. Average nutrient intake before and after the administration of misuke

In figure 2 shows nutrition intake of energy before and after MISUKE treatment. Firstly, test normality data and shows that the data is distributed normally. The next test to see the changes before and after treatment was to use the Paired T Test which showed that the average energy intake of samples before and after MISUKE treatment there was a significant increase (0.001 < 0.05). The average increase in energy intake before that was only 621.43 kcal, and increased after MISUKE treatment to 807.74 kcal

Intake protein before and after MISUKE treatment, firstly test normality and shows that the data is distributed normally. The next test to see the changes before and after treatment was to use *paired t-tests* that showed that the average protein intake of samples before and after MISUKE treatment had no significant changes (0,56 > 0.05). For fat intake before and after MISUKE treatment, firstly test normality and shows that the data is not distributed normally. The next test to see the changes before and after treatment was to use *wilcoxon* which showed that the average fat intake sample before and after MISUKE treatment had no significant changes (0,51 > 0.05).

In figure 2 above shows carbohydrate intake before and after MISUKE treatment, firstly normality test and shows that data is not distributed normally. The next test to see the changes before and after treatment was to use *wilcoxon* which showed that the average intake of carbohirathad a difference in samples before and after treatment increase in carbohydrate intake (0.00< 0.05).

Discussion

MISUKE is an intersting food made from certain ingredients where the main raw material is soy beans in the form of flour, with comparisons from various other mixed ingredients such as oil, skimmed milk, and sugar that obtain high nutritional value. Consuming MISUKE can be one alternative to increasing the weight of underweight toddlers. The nutritional value of MISUKE itself has energy of 190.8 kcal protein 6.5 grams, fat 14.5 grams, and carbohydrates 10.7 grams with a weight 34 grams/portions.

The results of this research, show that MISUKE products are able to increase body weight of children by 0.25 kilograms within a month (30 days). This research is in line with research conducted by Niyibituronsa, Kyallo and Mugo, 2014[5] which provided pure soy flour intervention in malnourished children in

Rwanda with an average weight gain of 0.5 kilograms within three months of intervention. A considerable increase in weight with the treatment of MISUKE compared to the treatment of pure soy bean flour due to the manufacture of MISUKE products in addition to using the basic ingredients of soybean flour, also using oil, skimmed milk, and granulated sugar.

Modification of skimmed milk, oil, and granulated sugar adds nutrients to the product where soy flour provides protein, and oil and milk contribute to the fulfillment of fat sources. Based on AKG, 2019 the standard weight for children aged 1-3 years is 13 kilograms, and for 4 years is 19 kilograms[6], the treatment of MISUKE can increase the body weight so that it is blinded a longer time to reach normal weight. For energy intake, the results of this study showed an average change between the intake before and after the treatment of MISUKE from 621.43 to 807.74 kcal. The change in body weight due to the increase is due to the additional foods misuke has qualified in terms of type, quantity, and nutritional value. This is in line with the research conducted[7] by giving a mixture of soybeans with corn that was made as an additional food for malnourished toddlers, in addition to increased calorie intake, carbohydrate intake also had a significant difference before and se already given. This research is in line with research conducted by Fatmah, 2018 which shows that there is a correlation between weight gain and increased carbohydrate intake, after the treatment of soybean biscuits with a mixture of dates[8].

For protein and fat intake also increased, but the increase was no difference between before and after given MISUKE. Protein intake only increased by 0.9 grams and fat intake increased by 1.3 grams. The increase in protein value in the study occurred due to the protein content in MISUKE about 6.5 grams, but malnourished children are less usually less consuming protein and have not met the adequacy of AKG for children aged 1-4 years about 20-25 grams per day[6].

Changes in body weight before and after treatment of MISUKE there was a significant increase. According to the theory of weight gain experienced by children aged 1-3 years is 2-2.5 kg/year and for toddlers aged 4-6 years range from 0.7-2.3 kg/year[9]. In this study attainment of weight loss 0.25 kilo grams in amonth, if an upgrade occur for a year then the increase will be around 3 kg/year so that this increase indicates higher weight than the theory. This research was aligns with research by Pradhita, 2012 that gave PMT with a month-long trial of 17 tuberculosis toddlers aged 12-59 months. The results showed changes in weight before and after intervention in children aged 12-59 months. There is a change in nutritional status based on WAZ Index before and after treatment MISUKE due to the content contained on MISUKE suitable for malnourished toddlers in increasing their body weight[10].

Conslusion

The results showed changes in weight before and after intervention in children aged 12-59 months. There is a change in nutritional status based on WAZ Index before and after treatment MISUKE due to the content contained on MISUKE suitable for malnourished toddlers in increasing their body weight.

Suggestions

It is recommended to give MISUKE more than 1 (one) month to see the maximum body weight gain results. It is also necessary to provide nutritional child feeding to change the behavior of the mother in child feeding.

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References

1. Sigianti S. Nutrient-Dense Foods Healthy Solutions to Overcome Malnutrition in Children, Nutrition Science, Denpasar, 2011. Denpasar: Nutrition Science, Denpasar; 2011.
2. Ministry of Health. Basic health research (Riskesdas). Indonesia: Ministry of Health, Indonesia; 2018.
3. Health SSP. Optimizing the First 1000 Days of Life Movement to Support Improving the Nutritional Status of Mothers and Children in 6 Focus Districts and South Sulawesi Province. South Sulawesi: South Sulawesi Provincial Health Office; 2016.
4. Hariani N. Misuka (Peanut Milk Oil), Nutrition Installation of Sanglah Hospital Denpasar, 2019. Denpasar: Nutrition Installation of Sanglah Hospital Denpasar; 2019.
5. Niyibituronsa, M., Kyallo, F. M. and Mugo CW. Improving the nutritional status of malnourished children using soybean products in Rwanda',. African J Food, Agric Nutr Dev. 2014;14(4):9136–53–9153.
6. Ministry of Health I. Nutritional Adequacy Rate. Indonesia: Ministry of Health, Indonesia; 2019.
7. Karakochuk C et al. Treatment of moderate acute malnutrition with ready-to-use supplementary food results in higher overall recovery rates compared with a corn-soya blend in children in southern Ethiopia: An operations research trial. Am J Clin Nutr. 2012;4(94):911–6.
8. Fatmah. Impact of date-tempeh biscuit on the nutritional status of stunted and wasted toddlers. Pakistan J Nutr. 2018;17(11):542–549.
9. Arisman. Nutrition in the Life Cycle. Jakarta: EGC, 2009. Jakarta: EGC Kedokteran; 2009.
10. Pradhita IA. The Effect of Giving Tempe Biscuits on the Nutritional Status of Tuberculosis Toddlers in Selected Districts of East Jakarta. Univ Indones. 2012;