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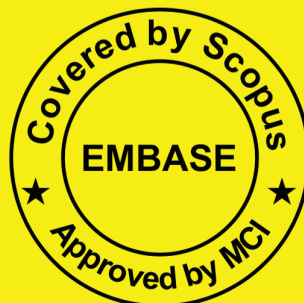
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Balanced Nutrition Services to Early Childhood Improving Children's Nutritional Status

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Abstract

Chronic malnutrition is caused by poverty, improper care, and parents' ignorance of the nutritional needs of children. Providing a balanced menu is a kind of solution that can be applied to overcome nutritional problems in children. Balanced nutrition services are carried out in early childhood to improve children's nutritional status. This research was conducted in Bangli District, Gianyar Regency, and Denpasar City, using a randomized pre and posttest control group design with a total sample of 88 children (38 controls and 50 intervention groups). Nutritional status was assessed by comparing weight with age using anthropometric standards based on Z-Score. The results of this study indicate that the intervention group experienced a decrease in the number of children with less weight (25.00%) and an increase in the number of children with good nutritional status (2.22%), while in the control group there was no change in nutritional status. . The results of the independent sample t test showed that there were significant differences in the pre-data in the control group and intervention ($p < 0.05$) while the post-data showed no significant differences ($p > 0.05$). Analysis of differences in body weight in the control and intervention groups showed that there were significant differences ($p < 0.05$). Balanced nutrition services in early childhood can significantly improve their nutritional status.

Keywords: *balanced nutrition services, early childhood, nutritional status*

Introduction

Preschool age is a golden period because the physical and psychological development is hurried that its nutritional needs must be fulfilled and balanced. Nutritional problems occur in toddlers, especially malnutrition, are the effects of maternal conditions during pregnancy, fetal period, infancy, including diseases suffered during infancy. This situation can hamper children's development with negative impacts that will take place in subsequent lives such as intellectual decline, susceptibility to disease, decreased productivity to cause poverty and the risk of giving birth to babies with low birth weight. Every parent certainly wants a balance between physical growth and optimal mental

development in their children.

Data from WHO showed that underweight cases in preschoolers in the world were 15.7% and overweight 6.6%¹. Nationally, the prevalence of malnutrition in 2013 was 5.7% and malnutrition was 13.9%². The results of Riskesdas from 2007 to 2013 showed that underweight cases in Indonesia increased from 18.4% to 19.6%, Riskesdas 2010 and 2013 showed that births with Low Birth Weight (LBW) <2500 grams decreased from 11.1% to 10.2%³. The trend of nutritional problems in Bali in 2015-2017 showed a case of malnutrition decreased from 9.0% in 2015 to 8.6% in 2017, with the highest prevalence in Buleleng Regency 14.4%⁴.

Chronic malnutrition is caused by poverty, inappropriate parenting, and ignorance of parents regarding children's nutritional needs. The results shown that children's cognitive abilities were not developing optimally, children easily get sick and have low

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competitiveness. The first thousand days of a child's life are crucial that determine their future, and in that period Indonesian children faced serious growth disorders. The problem is, over 1000 days, the adverse effects of malnutrition are very difficult to treat. To overcome the incidence of malnutrition, especially mothers, need to be educated to understand the importance of nutrition for pregnant women and children under five years old/toddler.

The results from Ariati, et.al., (2018) get malnutrition cases in Bali Province were still high at 35.85% of children with underweight status and 3.77% over weight⁵. Malnutrition cases in children with a Weight / Age index found in pre-school children are high enough that needs special attention. Children are the most valuable assets for the future of our nation.

Based on those description, giving a balanced nutrition service for early childhood is carried out and the knowledge of balanced nutrition is given to parents so that parents can provide a balanced menu by utilizing local food and food diversification to reduce malnutrition in Bali.

Material and Method

This study is a quasi-experimental design with different subjects (randomized pre and posttest control group design)^{6,7}. This design was a parallel design, there were 2 groups of samples (control and intervention group). The study was conducted for two months from October to November 2018 in Bangli and Gianyar Regency as intervention group and Denpasar city as a control group with consideration:

1) There were still high malnutrition cases in the regency based on Bali Nutrition Problem Trend data for 2015-2017 (Bali Provincial Health Office, 2017) and the results of preliminary studies that have been conducted.

2) The location was easily accessible by researchers.

3) Availability of early childhood education institution, which the management has been ready to provide additional food for their students.

Determination of early childhood education institution as a place for multistage random research side due to: first selected 3 regencies/ cities as random research sites, then from the three districts one early childhood education institution was chosen for which

the management has been ready to provide additional food for their students. According to this method, the institution which has been selected such as Yudistira PAUD in Gianyar Regency and Handayani PAUD in Bangli Regency as intervention group, then Swadarma PAUD in Denpasar City as a control group.

Giving Balanced nutrition services in early childhood is a service in the form of counseling and education about Balanced Health and Nutrition to the parents and followed by making food menus for school children by utilizing local food followed by supplementary feeding and monitoring the development of children's nutritional status with index Weight/Age (W/A). Nutritional status with a W/A index was assessed by comparing the child's weight with age then compared to the standard.⁸ Descriptive data analysis includes age, sex, and body weight of the sample analyzed descriptively by means of the mean and standard intersections. The data homogeneity test was carried out by the Levene test at the level of confidence $\alpha = 0.05$. If the data in the Control and Intervention Groups were homogeneous, then the analysis of the Independent Sample t-Test, and if were not homogeneous, then used the Man-Whitney difference test at the level of confidence $\alpha = 0.05$. To compare nutritional status data (in the Control Group with the Intervention Group (O1 with O3 and O2 with O4), if the data were homogeneous, a parametric statistical test is performed (Independent Sample t-Test) and if not-homogeneous, a non-parametric statistical tests (Man Whitney at significance level $\alpha = 0.05$).

Results

Characteristics of Samples

The samples observed were 88 children with characteristics as shown below in Figure 1, 2 and 3.

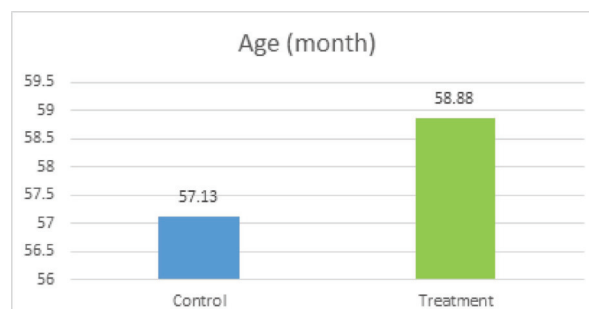


Figure 1. Characteristics of samples based on age

According to Figure 1, the average of samples in the Control Group was 57.13 months and in the Intervention

Group was 58.88 months.

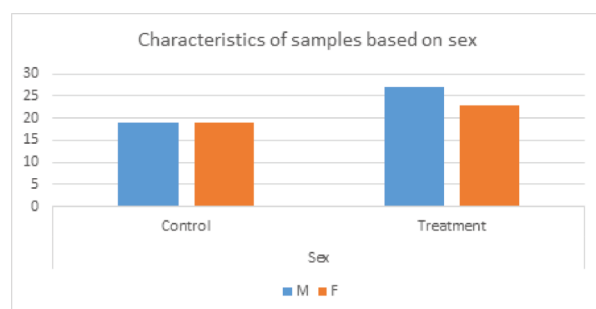


Figure 2. Characteristics of samples based on sex

The data in Figure 2 shown that male and female sex in the Control Group and Intervention Group were the same, while in the Intervention Group, male was more than female.

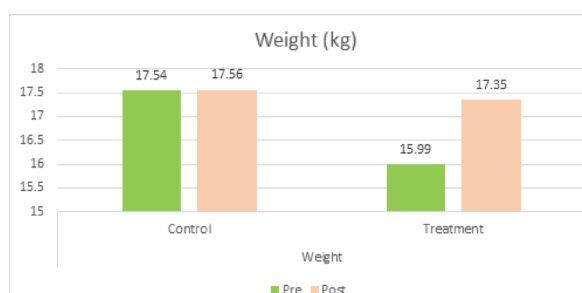


Figure 3. Characteristics of samples based on weight

According to Figure 3, it has shown that the weight in the Control Group increased by 0.11%, while in the Intervention Group there was a greater increase of 8.51%.

Nutritional Status of Students based on Index W/A

Nutritional status assessment with weight/age index showed no change in children's nutritional status in the Control Group between pre and post, while in the Intervention Group there was change significantly. Nutritional status data of the samples based on weight/age Index were presented in Table 1.

Table 1. Nutritional status of samples based on Weight/Age index

Num	Nutritional Status	Control				Intervention			
		Pre		Post		Pre		Post	
		n	%	n	%	n	%	n	%
1	Over weight	3	7,89	3	7,89	1	2,00	1	4,00
2	Good Nutrition	32	84,22	32	84,22	45	90,00	46	92,00
3	Under weight	3	7,89	3	7,89	4	8,00	3	6,00
4	Malnutrition	0	0,00	0	0,00	0	0,00	0	0,00
	Total	38	100,00	38	100,00	50	100,00	50	100,00

The data in Table 1 showed most of the samples had good nutritional status ie 84.22% in the Control Group and 92.00% in the Intervention Group. In the Control Group, there were samples with overweight and underweight each one 3 children (7.89%) and no cases of malnutrition were found. In the Intervention Group there was a decrease in the number of samples with underweight by 25%, from 4 people to 3 people. There was an increase in the number of samples with a good nutritional status of 2.22%, namely from 45 to

46 children, and there was no change in children with overweight, only 1 children.

Effect of Balanced Nutrition Services on Sample Nutritional Status

Sample homogeneity test and Independent Sample t-Test/ Man-Whitney data on the Control and Intervention Groups as shown in Table 2.

Table 2. Homogeneity test and Independent Sample t-Test/ Man-Whitney analysis Children weight in control n intervention groups

Weight		Mean±SD	Homogeneity (p) t/Z	Differential test	
				p	
Pre	Control	17,54±3,32	0,422	2,161	0,034
	Intervention	15,99±3,36			
Post	Control	17,56±3,34	0,479	0,282	0,778
	Intervention	17,35±3,36			
Difference	Control	0,04±0,09	0,000	-8,120	0,000
	Intervention	1,37±0,67			

Data on body weight homogeneity test results in the Control and Intervention Groups by using Levene Test at the level of confidence $\alpha = 0.05$ showed $p \geq 0.05$, indicated that the data in both groups were homogeneous, then followed by Independent Sample t-Test at the level of confidence $\alpha = 0.05$. Where as in the control group and intervention differences in weight gain $p < 0.05$, the data in the two groups were not homogeneous so that it continued with the Man-Whitney test at the level of confidence $\alpha = 0.05$.

The results of differential test were pre data in the Control Group and Intervention obtained a value of $p < 0.05$, which showed a significant difference in the child's body weight data in the Control Group and Intervention. The body weight average of samples in the Control and Intervention Groups was not the same, this can be seen from the difference in mean pre body weight in the Control group (17.54 kg) and pre in the Intervention Group (15.99 kg). Post data (after intervention) in the Control Group and Intervention got a value of $p \geq 0.05$ which showed no significant difference. The mean data of body weight in the Control Group (17.56 kg) and in the Intervention Group (17.35 kg) were the same. The child's body weight increased significantly after being treated (8.51%). While the analysis of the difference in body weight in the Control and Intervention Groups obtained a p value of < 0.05 , indicated that there was a significant difference in the data of the sample weight in the Control Group and Intervention. Those shown that giving balanced nutrition services can increase child's weight.

Discussion

Children's Nutritional Status

Nutrition intake obtained from food consumed is useful for brain growth (intelligence) and physical growth. Physical growth was assessed by measuring the nutritional status of children, can be seen from their general appearance (weight and height), physical, motoric, functional, emotional and cognition signs. Based on anthropometric measurements, healthy children will get older, gain weight, and height are associated with adequate intake of macronutrients, calcium, magnesium, phosphorus, vitamin D, iodine, and zinc⁹.

Nutritional status assessment in this study used body weight and age measurement, then compared with anthropometric standards based on Z-Score value. Assessment of nutritional status with weight/age index found that most of the samples (in the Control and Intervention Groups) were of good nutritional status. The same was reported by Sa'diya (2015) who found that most of the samples studied were of good nutritional status (76.4%)¹⁰. Kumala (2013) who examined the relationship between feeding patterns and nutritional status of children aged 1-3 years in Sidomulyo Godean Sleman Yogyakarta also reported that most of the samples examined were of good nutritional status (80%)¹¹.

B. Effect of Balanced Nutrition Services on Sample Nutritional Status

A good diet consists of consuming quality foods, namely consumption of healthy and varied foods, and

adequate food consumption in terms of quantity followed by applying the right eating behavior. If this is applied, it will produce a normal nutritional status of the child¹². Analysis of the difference in body weight in the Control Group and Intervention group obtained a p value of <0.05 which indicated that there was a significant difference. It showed that giving balanced nutrition services in early childhood can improve children's nutritional status.

Nutritional status is an expression of the state of balance in the form of certain variables¹³. It mentioned that nutritional status as an expression of the state of balance from consumption of food to nutritional needs. Research by Sari, et al., (2016) found that there was a significant relationship between diet and nutritional status of children aged 3-5 years in the work area of the health center Nangalo Padang¹⁴. Other research that revealed the relationship between consumption patterns and nutritional status was stated by Sa'diya (2015) found that there was a relationship between diet and nutritional status of preschool children at PAUD Tunas Mulia Village in Claket, Pacet District, Mojokerto District, Myrnawati and Anita (2016) who examined the effect of nutritional knowledge, socioeconomic status, lifestyle and diet on children's nutritional status, and there was a positive direct influence on diet on the nutritional status of early childhood¹⁵. These studies showed that the eating patterns have a major influence on the growth and nutritional status of children, so that they must get serious attention from parents and the government if we want the children to grow up healthy and optimally.

Playing and schooling at this early age make children often delay their eating time, often asks for food only before going to bed when he is too tired to move all day and just hungry at night. The attention of parents in providing food to children is very important so that children's nutritional intake is fulfilled and according to their needs. At this age the child also starts playing a lot with his friends so they will catch the disease easily. It is necessary to instill diverse and nutritious eating habits and a clean lifestyle. The percentage of the type of food consumed must also be in accordance with the RDA, which is 50-70% of carbohydrates, 15-30% of fat, 10-15% of protein, the rest are vitamins and minerals¹⁶. The principle of early childhood food 4-6 years is the same as adult food, it's just that it needs to be considered an interesting presentation then children are happy and interested in eating.

Conclusion

Giving balanced nutrition services in early childhood are considered to increase child's weight significantly. The evidence has been shown by the analysis of the differential tests, that there were significant differences ($p < 0.05$) between the body weight before and after intervention in the Control Group and Intervention Group. Further study in balanced nutrition service program for early childhood is needed to continue and develop to achieve 100% children with good nutritional status.

Conflict of Interest: All of the authors contributed to writing this paper and declare no conflict of interest.

Etichal Clearence: Ethical Clearance obtained from the Ethic Committee, Health Polytechnic of Denpasar, Ministry of Health of Indonesia and respondent assignment.

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