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Giving yellow pumpkin seeds (cucurbita pepo) against increased retinol levels in toddlers with stunting

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ABSTRACT

Background

Stunting is a health problem that affects one third of children in developing countries nearly 9 million children under five experience stunting. The lack of micronutrients is a direct cause that results in decreased survival, susceptibility to disease to poverty in adulthood. Giving pumpkin seeds (kuaci) rich in beta-carotene and zinc minerals can improve micronutien deficiency in stunting toddlers.

Objective

To determine the effect of giving pumpkin seeds (cucurbita pepo) on increasing levels of retinol in infants with stunting

Methods

Quasy Experiment design pretest and postets control group design. The research subjects were stunting aged 3-5 years as many as 24 children divided by 2 groups with purposive sampling technique. Blood serum was taken before and after treatment for 28 days. The instrument used is the results of serum blood tests using ELISA Kit. Data analysis using paired test, independent t test, manova test.

Results

Retinol levels before and after treatment in the intervention group were 1.43 + 0.80 vs 2.24 + 1.40 p value 0.176, in the control group 1.53 + 0.61 vs 1.69 + 0.70 p values 0.52 average the average increase in retinol levels in the intervention group and the control group was 0.80 + 1.92 vs. 0.15 + 0.83 with a p value of 0.303.

Conclusions and recommendations

10 gram pumpkin seeds for 28 days are less effective for increasing retinol levels

Keywords: Pumpkin Seeds, Retinol Levels, Stunting Toddler.

INTRODUCTION

Childhood is an important age in the growth of children physically. At that age, the growth of a child is very rapid so that it requires the intake of nutrients according to their needs. The condition of nutritional adequacy is very influential with the condition of health in a sustainable manner in the future [1].

One of the nutritional problems experienced by toddlers is stunting, which is a condition of chronic malnutrition which results in the child's body being categorized as short for his age, and the state of stunting will be clearly seen after a 2 year old child [2].

According to the 2014 World Health Organization (WHO), stunting conditions are found in Asia, which is around 56% compared to around 36% in Africa. Judging from several ASEAN countries, it is known that the prevalence of stunting starts from the highest to lowest, including Indonesia (37.2%), Myanmar (35%), Vietnam (23%), Malaysia (17%), Thailand (16%) and Singapore (4%) [3].

Micronutrient deficiencies in stunting children affect several aspects of immunity, including immune responses to cells and cytokine production. Zn deficiency and serum retinol have been shown to reduce hepatic IGF. Expression of genes to damage the intracellular growth hormone signaling pathway, lack of vitamin A (retinol) is very influential on protein synthesis which can affect cell growth therefore children who are deficient in vitamin A will experience growth failure [4]. This can be seen in the national survey reported by Hellen Keller International (IPR) that toddlers were still found who had retinol levels <20 µg / dl. Surveys in Java island toddlers who have retinol levels <20 µg / dl amounted to 58.41%, while the national survey in 2014 was found to be 14.6% [5]. Based on the results of Suiraoka's research, the levels of vitamin A adequacy were obtained, namely toddlers with vitamin A deficiency experienced stunting as much as 60% with a short category of around 33.3% and a very short category of around 26.7% [6].

Additional food (PMT) is given as much as 3 packs / of which each primary package is 4 pieces so the toddler gets 12 pieces of extra food per day. However, supplementary feeding is still not optimal, reducing the prevalence of stunting, many of which are reported to be associated with less optimal provision of supplementary food. One of them is getting bored with giving 12 pieces of extra food with sweet flavors which must be consumed every day, so biscuits are most likely parents, siblings will be eaten even more likely to be wasted so that a new innovation is needed by utilizing local food that contains zinc and vitamin A levels which are packed as snacks, snacks or snacks that are liked by children at the age of five especially at the age of 3-5 years which will make a child's micronutrient needs met [7, 8].

In this study, pumpkin seeds (cucurbita pepo) were chosen because pumpkin seeds are the highest vegetable protein in zinc and do not have the effect of inhibiting absorption. Pumpkin seeds contain several substances including a type of amino acid, pirazedurina, butyric amino acid, ethylacinparagine, and citrulline as well as the number of other amino acids [9][10]. The content in pumpkin seeds (cucurbita pepo) is the same as contained in food additions to government programs in the intervention of accelerating the stunting program which has been running, some of which are mineral zinc and vitamin A that are needed for vision, growth and increasing endurance [11].

Based on the results of laboratory tests conducted in December 2018 in addition to containing nutrients above pumpkin seeds also contain mineral elements Mg (magnesium) and Zn (zinc), in 100 g pumpkin seeds there are 23.3 mg Zn and 12.30 µg carotene where zinc and vitamin A are essential elements for the growth of all types of plant animals and even humans that have been proven in research conducted by Nina Puspita, 2012 ethanol extract of pumpkin seeds can increase zinc to the quality of spermatozoa of mice. Other contents in 100 g of pumpkin seeds are calories 515.00 cal, protein 30.60 g, fat 42.10 g, carbohydrates 13.80 g, sugar 5.30 g, calcium 54.00 mg, pospor 312.00 mg , iron 6.20 mg, water 5.90 mg where calories, besides that pumpkin seeds have various benefits for health to beauty because they contain anti-oxidants, vitamin B complex, vitamin E, omega 3 fiber to many others [12].

Based on the background above, it is necessary to examine the processing of snack foods (pumpkin) made from pumpkin seeds as an intervention in the fulfillment of micro nutrition against increasing levels of retinol and zinc in stunting toddlers still need to be proven.

Study Objectives

To find out is there any effect of giving pumpkin seeds to the increase in retinol levels in stunting toddlers.

METHODS

This research is a quantitative research with the design of Quasy Experiment with a Pretest and Posttest Desaign Control Group design. In this group, one treatment group was used, namely toddlers with stunting who were given consumption of processed snacks (kuaci) made from pumpkin seeds and food biscuits added to the Ministry of Health program and the control group namely toddlers with stunting were only given biscuits with additional food programs. The number of samples in this study were 24 toddlers with 12 toddlers in the intervention group and 12 toddlers in the control group.

Data Analysis

Data displayed in univariate analysis is frequency distribution of sample characteristics, standard deviation, average value, maximum and minimum values of vitamin A levels.

Bivariate analysis was carried out to determine whether after intervening giving quasi seeds can affect the increase in retinol levels in stunting toddlers. For hypothesis testing in paired groups both in the intervention group and the control group using paired t-test if normal distribution, and using Wilcoxon if the data are not normally distributed. To test the hypothesis between groups used an unpaired t-test if it is normally distributed and uses Mann Whitney if it is not normally distributed.

RESULT

Univariat Analysis

Table 1. Characteristic Distribution of Toddlers

Characteristics of Toddlers	Group				*P value Levene's*
	Intervention		Control		
	N = 12	%	N = 12	%	
Toddler age					
36-47 months	9	75	7	58,3	0,192
48-60 montrhs	3	25	5	41,7	
Gender					
Male	4	33,3	4	33,3	1,000
Female	8	66,7	8	66,7	
Protein intake					
Less	8	66,7	10	83,3	0,073
Enough	4	33,3	2	16,7	
More	-	-	-	-	
Fat intake					
Less	9	75,0	11	91,7	0,029
Enough	3	25,0	1	8,3	
More	-	-	-	-	
Calcium intake					
Less	11	91,7	10	83,3	0,234
Enough	1	8,3	2	16,7	
More	-	-	-	-	
Zink intake					
Less	8	66,7	7	58,3	0,444
Enough	4	33,3	5	41,7	
More	-	-	-	-	
Vitamin A intake					
Less	8	66,7	11	91,7	0,002
Enough	4	33,3	1	8,3	
More	-	-	-	-	

Based on table 1, the age and sex variables in the intervention group and the control group illustrate that three quarters of toddlers are 36-47 months old with female gender. The two data groups are homogeneous / have the same variant p> 0.05.

Three quarters and most toddlers in the intervention and control groups received intake of protein, fat, zinc and vitamin A which was less based on the recommended Nutrition Adequacy Rate. The data group on protein, calcium, zinc intake was homogeneous p> 0.05 and heterogeneous fat and vitamin A intake p <0.05.

Table 2. Distribution of Characteristics of Parents of Toddlers

Characteristics of parents	Group				*P value Levene's*
	Intervention		Control		
	N = 12	%	N = 12	%	
Mother's job					
Working mother	10	83,3	10	83,3	1,000
Mother doesn't work	2	16,7	2	16,7	
Mother's Education					
Primary school	9	75,0	9	75	0,347
Junior high school	2	16,7	3	25	
Senior High School	1	8,3	-	-	
Income					
< Rp. 1.542.000	10	83,3	10	83,3	0,039
> Rp. 1.542.000	2	16,7	2	16,7	
Parenting					
Bad	10	83,3	11	91,7	0,234
Well	2	16,7	1	8,3	

In table 2 shows the results of the frequency distribution of underfive characteristics based on maternal occupation and family income in both the intervention group and the control group most of the mothers worked with income <Rp. 1,542,000, toddlers get poor parenting and 3 of 4 toddlers have elementary school education. This shows that most toddlers are in a bad environment to stimulate growth and development.

Job, education and parenting data groups have the same / homogeneous variant p> 0.05, heterogeneous income data group p <0.05.

Bivariate Analysis

Table 3. Overview of Average Retinol Levels After Given Treatment

Group	Serin Retinol Levels				T	*P value*
	Before		After			
	Mean±SD	Min-Max	Mean±SD	Min-Max		
Intervensi	1,43±0,80	0,39-2,79	2,24±1,40	0.04-2,18	-1,44	0,176
Kontrol	1,53±0,70	0,63-4,48	1,69±1,69	0,66-3,04	-0,66	0,522

Test paired sample t test in the table showed that the value of retinol levels in the intervention group before treatment had a mean value of 1.43 µmol / L + 0.80 µmol / L, the retinol level in the intervention group after the treatment mean value 2.24 µmol / L + 1.40 µmol / L.

Retinol levels in the control group before being given treatment showed a mean of 1.53 +1.69 µmol / L, after treatment in the control group also experienced a change in retinol levels with a mean value of 1.53 µmol / L +1.69 µmol / L. Value of p value> 0.05. So it can be concluded that there is no significant difference in the mean before and after being given pumpkin seeds (kuaci).

Multivariate Analysis

Table 4. Multivariate Analysis Characteristics of Stunting Toddlers based on income, fat intake and vitamin A intake

Independent variable		F	*P Value*	Dependent Variable	*Post hoc*
Family Income	< 1.542.000	1,41	0,265	Retinol levels	0,514
	> 1.542.000				0,101
Fat intake	Less	7,30	0,004		0,001
	Enough				0,361
Vitamin A intake	Less	15,38	0,000		0,000
	Enough				0,099

Based on Table 4. it is known that the income variable does not have an influence on retinol levels where p = 0.265, fat intake variables have an influence on retinol levels, p = 0.004 based on the post hoc test the group most affected by fat intake is the retinol group with p value = 0.001, vitamin A intake affected retinol levels p = 0,000, based on the post hoc test the group most affected by vitamin A intake was the retinol group with a value of p = 0,000.

DISCUSSION

Based on vitamin A intake in this study, most of them got less vitamin A intake in the intervention and control groups. Intake of vitamin A is commonly found in vegetables and fruits, some types of milk also contain high levels of vitamin A. Lack of vitamin A intake will affect the lack of serum retinol in the blood, the incident is in line with research conducted by Elvandari et al, said that there is a significant relationship vitamin A supplementation with serum retinol [13]. With a lack of retinol will result in a decrease in endurance, vision and inhibit growth.

Vitamin A deficit results in increased morbidity in which morbidity is a degree of health in a region, when reduced intake of vitamin A eat immune system will decline and toddlers will be susceptible to this infection which will inhibit the growth of children. This has also been proven in the results of research where there is a correlation between vitamin A supplementation and morbidity, so children who get vitamin A supplementation can reduce infectious disease morbidity. According to Pusparini, if the balanced daily food intake of children does not need to add vitamin A in the form of supplements so the importance of vitamin A intake in the body of a toddler with stunting.

The level of adequacy of less fat in an ingredient in food can be at risk of inhibiting the increase in serum retinol levels, because consuming foods containing fat in children will increase serum retinol as well as adding foods sourced from beta-carotene. The results of this study conducted by Evandari Milliyantri found that there was a relationship between the level of adequacy of fat with retinol [13]. Other research results also prove that adequate fat can increase vitamin A levels in the body especially in the form of retinol [14].

In the multivariate test fat intake and vitamin A affect the increase in retinol levels p = 0.004 and p = 0,000. It can be concluded that fat intake and vitamin A intake are less able to influence retinol levels in stunting infants when given treatment. Retinol is a form of fat-soluble vitamin A so fatty foods are needed. In this study toddlers based on food recall results, most toddlers get fat intake that is less than the recommended Nutritional Adequacy Rate so that the absorption of the pumpkin seeds is also not optimal. Absorption rate is very dependent on the adequacy of consuming fat. Lack of fat intake is most likely due to a lack of knowledge of the mother about the importance of nutrition for child growth. This can also be seen from the poor parenting style of motherhood in terms of feeding.

CONCLUSIONS

Giving pumpkin seeds (cucurbita pepo) weighing 10 grams for 28 days with PMT biscuits 3x40 grams / day in stunting toddlers that: There is an effect of giving pumpkin seeds (cucurbita pepo) increased levels of retinol. There was no significant difference in the increase in retinol levels before and after treatment in stunting infants p = 0.176 vs p = 0.522.

Recommendation Future

The need for scientific development, especially for giving pumpkin seeds as an improvement in micronutrients in an effort to increase zinc levels in stunting toddlers. There needs to be socialization about screening stunting events, especially toddlers, to prevent stunting from improving micronutrient nutrition from locally based foods.

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