International Journal of Allied Medical Sciences and Clinical Research (IJAMSCR)

ISSN:2347-6567

IJAMSCR |Volume 7 | Issue 3 | Jul - Sep - 2019
www.ijamscr.com

Research article *Medical research*

Effectiveness of bilih (*mystacoleucus-padangensis*) nugget against serum retinol levels in toddlers stunted aged 36-60 months

Eva Zulisa[1*], Soeharyo Hadisaputro[2], Sulistiyani[3]

[1]*Poltekkes Kemenkes Semarang/ Semarang, Indonesia*
[2]*Poltekkes Kemenkes Semarang/ Semarang, Indonesia*
[3]*Fakultas Kesehatan Masyarakat Universitas Diponegoro/Semarang, Indonesia*

***Corresponding Author: Eva Zulisa**
Email id: zulisaeva1988@gmail.com

ABSTRACT

Background

Stunted in the world is still categorized as a public health problem because the percentage is more than 20%. Stunting is influenced by one of them because of the low appetite of children so that there is less nutrition. Giving certain micronutrients can increase appetite and improve nutritional status. Vitamin A is an essential micronutrient againts to protein synthesis and cell growth. This study aims to analyze the effect of bilih nugget againts serum retinol levels in toddlers stunted aged 36-60 months.

Methods

Quasi-experimental with Nonequivalent control group design. A sample of 24 toddlers in Desa Siwuluh was divided into two groups, among which 12 toddlers were given bilih nugget (intervention group) and 12 toddlers were given a placebo (control group) for 14 days. Blood serum was taken before and after intervention. The instrument of retinol serum tests using RBP ELISA with *High Performance Liquid Chromatography* (HPLC). Analysis of *Paired t test* and *Independent t test*.

Results

The average level of retinol before and after intervention was 2.84 mmol/L to 3.83 mmol/L. In the control group, the average level of retinol before and after was 1.59 mmol/L to 1.85 mmol/L. *Paired t test* showed that there was influence of bilih nugget in increasing serum retinol levels of stunting toddlers aged 36-60 months (p-value < 0.05). *Independent t test* showed no significant difference between serum retinol levels in the intervention group and the control group (p-value > 0.05).

Conclusions and Recommendations

Bilih nuggets contain retinol which is 0.446 mg. 200 grams of bilih nugget for 14 days has fulfilled daily vitamin A requirements for toddlers.

Keywords: *Nugget*, Bilih Fish, Retinol Serum, Vitamin A, *Stunted*

INTRODUCTION

In the year two thousand and seventeen there were 22.2% or 150.8 million children in the world experiencing stunted growth. Although this percentage has decreased compared in the year two thousand there were 32.6% or 198.4 million toddlers stunted, but stunting conditions in the world are still categorized as public health problems because the percentage is more than 20% (1). Recorded from 83.6 million toddlers stunted in Asia, the proportion includes South Asia (58.7%), Southeast Asia (14.9%), East Asia (4.8%), West Asia (4.2%) and Central Asia (0.9%). According to the World Health Organization (WHO) it is known that Indonesia is a country with the prevalence of toddlers stunted ranked third in the Southeast Asia region. The average prevalence toddlers stunted in Indonesia from 2005 to 2017 it was 36.4% [1, 2].

Stunting is associated with an increased risk of morbidity and mortality [3]. Stunting cases predicted in 2025 will increase to 127 million if there is no effort to decrease [4]. The main target of the National Medium-Term Development Plan (RPJMN) for 2015-2019 is to reduce the percentage of toddlers stunted by 28% [5].

The effort to reduce stunting by the government is through integrated specific nutrition interventions [5]. Nutrients that affect growth and development in addition to macro nutrients such as protein, carbohydrates and fats, there must also intake of micronutrients such as vitamins and minerals [6].

Vitamin A is an essential micronutrient againts to protein synthesis and cell growth. In addition, it also serves to maintain health and survival through the immune system [6]. The prevalence of vitamin A deficiency (serum retinol level < 0.70 mmol/L) in children under five, which is 11.4% [7]. According to the results of a study in Vietnam, 10.7% of children aged 12-72 months had vitamin A deficiency (< 0.70 mmol/L) [8]. Another study found 41.2% of children had serum retinol levels between 0.70-1.04 mmol/L as an indication of marginal (suboptimal) vitamin A status, which suggests children are vulnerable to vitamin A deficiency [9].

Foods that contain lots of vitamin A can be obtained from vegetable and animal sources. Vegetable food is high in protein, but it turns out that types of nuts contain anti-nutritional compounds such as trypsin, hemaglutin/ lectin, oligosaccharides and phytic acid [6]. Local food which has agro-socio-economic advantages and nutritional value, namely bilih fish (*Mystacoleuseus-padangensis*) [10]. Bilih fish contains Zn 17.3 mg, Ca 22 mg, Re 129.3 mcg, 13% protein, 4.62% fat and 132 kcal carbohydrates [11]. Based on previous research by Yuniritha (2013) found that bilih fish extracts carried out toxicity tests on experimental animals were categorized as practically non-toxic and could be used as an innovation for processed food additives for toddlers in the form of nugget formula [12].

Based on above background, the researchers were interested in conducting a study entitled the effect of bilih nugget against serum retinol levels in toddlers stunted aged 36-60 months.

SCIENTIFIC CLASSIFICATION

The taxonomical classification is mentioned below

- Division : *Actinopterygii*
- Family : *Cyprinidae*
- Ordo : *Cypriniformes*
- Genus : *Mystacoleucus*
- Species :*Mystacoleucus padangensis*

METHODS

This research is a quantitative research with Quasi Experimental Nonequivalent Control Group Design. A sample of 24 toddlers in Desa Siwuluh was divided into two groups, among which 12 toddlers were given bilih nugget (intervention group) and 12 toddlers were given a placebo, which was a biscuit from the ministry of health (control group) for 14 days.

Data Analysis

Before bivariate analysis, the analysis prerequisite test was carried out including the normality test and homogeneity test. The normality test in this study used the *Shapiro-Wilk* test. Homogeneity test using *Levene* test. Data variance in this study is homogen and normally distributed. The bivariate analysis used was a paired t-test to determine the difference in mean before and after treatment in each group, and determine the average difference between the intervention groups compared with control group using the Independent

t test. Statistical data analysis was performed with a confidence level of 95% and significance level (p-value < 0.05), which will be explained in the table below as follows:



Fig.1 : ***Mystacoleucus padangensis***

RESULT

Table 1. Mean Differences in Retinol Serum Levels Toddlers Stunted Aged 36-60 Months Before and After in Intervention Groups and Control Groups

Variabel	Group		p-*value* [b]
	Intervention	Control	
Retinol serum			0,257
Before			
Mean ± SD	2,84±0,695	1,59±0,702	
After			
Mean ± SD	3,83±1,583	1,85±1,082	
Difference			
Mean ± SD	-0,99±1,439	-0,25±1,641	
p-*value*	0,037 [a]	0,602 [a]	

[a] *Paired t test*

[b] *Independent t test*

Based on Table 1 shows that the mean serum retinol levels of toddlers stunted aged 36-60 months before being given the intervention of bilih nugget was 2.84 mmol/L, while after being given intervention was 3.83 mmol/L. The results of statistical tests using *Paired t test* found differences in the average serum retinol levels before and after intervention (p-value < 0.05), which means that there is an effect of bilih nugget in increasing serum retinol levels in toddlers stunted aged 36-60 months.

Serum retinol levels in the control group before given the biscuits showed a mean of 1.59 mmol/L, while after being given intervention was 1,85 mmol/L. The results of statistical tests using *Paired t test* found not differences in the average serum retinol levels before and after intervention (p-value > 0.05), which means that there is no influence the bilih nugget in increasing serum retinol levels of toddlers stunted aged 36-60 months.

Independent t test showed that p-value between the intervention group and the control group was 0.257 (p > 0.05), which mean there was no significant difference in serum retinol levels between the intervention group and the control group.

DISCUSSION

The results showed that subjects had an average serum retinol level before intervention within the

normal range above 0.7 mmol/L. The cause of serum retinol levels pre-above the normal limit was because both groups had received vitamin A capsules in February, so it was thought to be associated with stable pre serum retinol levels in both groups. Some experts say that giving vitamin A capsules can provide enough vitamin A intake for three months, so the availability of retinol reserves in the liver is relative sufficient [13].

However, serum retinol levels after treatment increased from pre serum retinol in the intervention group, because bilih nugget containing retinol 0.446 mg or equivalent to 446 mcg, where the daily intake of adequate vitamin A for children aged 36-60 months was 400 - 450 mcg [14].

Vitamin A deficiency affects the development of epithelial cells and the ability of the immune system which results in high morbidity in toddlers stunted [15].

This research is relevant to the research conducted by Dahro (2010) which found that the rise and fall of serum retinol levels depends on the intake of vitamin A. Therefore, the rise and fall of one nutrient is not followed by the rise and fall of other nutrients even though some studies have found vitamin A deficiency occurs together with zinc deficiency [13].

CONCLUSIONS

Giving bilih fish (*Mystacoleucus-padangensis*) nugget weighing 200 grams for 14 days in toddlers stunted proves there is an effect of bilih nugget in increasing serum retinol levels in toddlers stunted aged 36-60 months.

Recommendation

Parents who have toddlers stunted in order to provide a formula bilih nugget for children's supplementary menu and monitor physical growth as children age.

Others Researcher can conduct research by combining other biochemical examinations related to the detection of micronutrient deficiencies such as examination of zinc serum in toddlers.

REFERENCES

[1]. UNICEF, WHO, World Bank. *Levels and Trends in Child malnutrition*. Midwifery.4, 2018. Available from: *https://www.who.int/nutgrowthdb/estimates2017/en/*

[2]. WHO. World Health Statistics: *Child Stunting Data Visualizations Dashboard*. Geneva, 2018.

[3]. Trihono, Atmarita, Dwi Hapsari T, Anies I, Nur H.U, Teti T IN. *Pendek (Stunting) di Indonesia, Masalah dan Solusinya*. I. M. Sudomo, editor. Jakarta: Badan Penelitian & Pengembangan Kesehatan; 2015. 204 p. Available from: *http://perpustakaan.bppsdmk.kemkes.go.id//index.php?p=show_detail&id=3124*

[4]. WHO. *Global Nutrition Targets 2025, Stunting Policy Brief*. *Global Nutrition Targets 2025: Stunting Policy Brief*. WHO/NMH/NHD/14.3. Geneva; 1–12, 2014. p. Available from: *http://apps.who.int/*

[5]. Direktorat Jenderal Bina Gizi Masyarakat. *Kebijakan dan Strategi Pencegahan dan Penanganan Stunting. In: Kebijakan dan Strategi Pencegahan dan Penanganan Stunting*. Jakarta: Kemenkes RI; 2018. p. 1–48. Available from: *www.kemkes.go.id*

[6]. Agung I.G.A.A, Sumantra I.K WI. *Pangan, Gizi dan Kesehatan Masyarakat.* 1st ed. Denpasar: UNMAS Press; 1–188, 2016.

[7]. S H. *Studi Masalah Gizi Mikro di Indonesia*. Bogor; 2006.

[8]. Nhien N Van, Khan NC, Ninh NX, Huan P Van, Hop LT, Lam NT, et al. *Micronutrient deficiencies and anemia among preschool children in rural Vietnam*. Asia Pac J Clin Nutr. 17(1), 2008, 48–55.

[9]. West KP. *Proceedings of the XX International Vitamin A Consultative Group Meeting: Extent of Vitamin A Deficiency among Preschool Children and Women of Reproductive Age*. J Nutr. 132(0022), 2002, 2857–66.

[10]. Arsil P. *Kajian Pemanfaatan Sumber Daya Ikan Bilih di Danau Singkarak Provinsi Sumatera Barat*. Bandung: ITB; 2008.

[11]. Yuniritha E, Juffrie M, Ismail D, Pramono S. *The Analysis of Nutrient, and Acute Toxicity Test Extracts of Billih Fish (Mystacoleucus-padangensis) as Local Food Quality for Zinc Supplementation*. Food Sci Qual Manag. 33, 2014, 97–104.

[12]. Yuniritha E. *Uji Toksisitas Akut Sirup Zink Ekstrak Ikan Bilih (Mystacoleucus-padangensis) Terhadap*

Mencit Galur Swiss. Semin Ilm Nas Kesehat. 119–24, 2013.

[13]. Dahro AM, Suharno D M. *Kadar Zn serta Hubungannya dengan Vitamin A dan Ferritin pada Ibu Hamil, Ibu Melahirkan dan Ibu Menyusui*. J Kesehat Masy. 1(2), 2012, 617–26.

[14]. Kementerian Kesehatan Republik Indonesia. *Angka Kecukupan Gizi (AKG) yang Dianjurkan Bagi Bangsa Indonesia*. Jakarta; 2014.

[15]. Zile M. *Function of vitamin A in vertebrate embryonic development*. J Nutr. 131(3), 2001, 705–8.

How to cite this article: Eva Zulisa, Soeharyo Hadisaputro, Sulistiyani. Effectiveness of bilih (mystacoleucus-padangensis) nugget against serum retinol levels in toddlers stunted aged 36-60 months. Int J of Allied Med Sci and Clin Res 2019; 7(3): 779-783.

Source of Support: Nil. **Conflict of Interest:** None declared.