

Alternative fruit and vegetables consumption for 1-3 year old Indonesian children

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Abstrak

Latar belakang: World Health Organization merekomendasikan konsumsi sayur dan buah paling sedikit 400 gr atau 5 (lima) porsi sayur dan buah sehari. Penelitian ini untuk menentukan alternatif jumlah dan jenis anjuran konsumsi sayur dan buah dan kecukupan vitamin A, vitamin C, potasium, asam folat dan serat yang dapat dipenuhi untuk kelompok umur 1-3 tahun anak Indonesia.

Metode: Penelitian menggunakan data konsumsi sayur dan buah dari data Riskesdas tahun 2010. Analisis data menggunakan analisis linier programming untuk memperoleh lima alternatif jumlah dan jenis sayur dan buah untuk anak usia 1-3 tahun.

Hasil: Hasil penelitian menunjukkan bahwa lima jenis buah yang paling banyak dikonsumsi anak usia 1-3 tahun adalah pisang, jeruk, pepaya, apel dan semangka. Lima jenis sayur yang paling banyak dikonsumsi anak usia 1-3 tahun adalah sayur bayam, sayur sop, sayur kangkung, sayur daun singkong, dan sayur asam. Jumlah anjuran konsumsi sayur dan buah untuk anak usia 1-3 tahun adalah 100-200 gram sayuran dan 150-200 gram buah

Kesimpulan: Alternatif anjuran konsumsi sayur dan buah untuk anak usia 1-3 tahun adalah 100-200 gram (1-2 mangkok) sayuran dan 150-200 gram (3-4 potong) buah. (*Health Science Indones 2013;2:74-7*)

Kata kunci: anjuran, konsumsi, sayur, buah, anak usia 1-3 tahun

Abstract

Background: WHO recommends the daily consumption of fruit and vegetables at least 400 grams or 5 servings. Based on national health survey Indonesia in 2007, means of daily portion of fruit and vegetable for Indonesian was less than 5 portion. This study was conducted to assess consumption of fruit and vegetables in 1-3 year old Indonesian children, and adequacy of daily requirement of vitamin A, vitamin C, potassium, folic acid and fiber.

Methods: The study used consumption data from 2010 National Health Survey Indonesia. Using linier programming, we then could present 5 alternatives of combination of fruits and vegetables.

Result: The study found five kind of mostly consumed fruit were banana, orange, papaya, apel, and watermelon. Five mostly consumed vegetables were spinach, vegetable soup, kangkung, cassava leaves, and tamarind dish. The alternative amount of fruit and vegetable consumption for 1-3 year old Indonesian children is 100-200 grams of vegetables and 150-200 grams of fruit.

Conclusion: Alternative fruit and vegetables consumption for 1-3 year old Indonesian children are 100-200 grams (1-2 bowls) grams of vegetables and 150-200 grams (3-4 pieces) of fruit. (*Health Science Indones 2013;2:74-7*)

Key words: guidance, fruit, vegetables, consumption, 1-3 year children

Fruits and vegetables are important for a healthy diet. Eating fruits and vegetables can prevent various diseases. Epidemiological data showed a protective effect of fruit and vegetable consumption against several types of cancer and cardiovascular disease. Less consumption of vegetables and fruits contribute to the burden of non-communicable diseases.¹ In children aged 1-3 years, constipation is a frequent disease caused by less eating fruit and vegetables. Constipation can occur over several days, weeks, even for a few months.

World Health Organization (WHO) recommends consumption of vegetables and fruits at least 400 grams or 5 servings a day. Vegetables and fruits are important sources of nutrients because vegetables and fruits contain vitamins (vitamin C, vitamin B, provitamin A, folic acid, carotenoids), fiber, minerals (potassium, calcium, magnesium, selenium, iron) and phytochemicals.^{1,2}

Currently, Indonesia used WHO recommendation for the consumption of fruit and vegetables. The WHO recommendations can be flexible and adapted

to local conditions because of the wide variability in diet, food availability, food preferences and cultural considerations.³

In Indonesia, the analysis of BPS data of fruit and vegetable consumption per capita per day in 2005 and 2007, showed only 65% and 79% (according to 2000 kcal diet) and 59% and 72% (according to 2200 kcal diet) of the WHO recommendation. In addition, the results of analysis of Riskesdas data Indonesia in 2007, showed that the average consumption of fruit and vegetable per day is less than five servings per day.^{4,5}

Food consumption in children is still highly dependent on the mother or family members. Food consumption is influenced by income, education, maternal occupation, knowledge of nutrition, food availability and eating habits

Studies about the amount and types of alternative consumption of vegetables and fruit per day for 1-3 years old the Indonesian children has not been done. Therefore, this study is done to asses amount and type of fruit and vegetable consumption in 1-3 year old Indonesian children using 2010 Riskesdas data.

METHODS

This analysis used consumption data of National Basic Health Research (Riskesdas) data in 2010 in Indonesia. Riskesdas was a cross-sectional community based study designed mainly to describe health problem of Indonesians and oriented to the evaluation of achievement of health indicator. The Riskesdas study frame population was all households in 33 provinces. Riskesdas data 2010 was community-based health data base. Sample size of Riskesdas data 2010 was 70000 of households in 33 provinces. Sample selection was done by random in two stages. The first stage was election of census blocks and the second stage was election of households.⁵

The election of census blocks has been done by Centre of Statistics of Indonesia. There were 2800 census block and 70000 households. Riskesdas 2010 has collected data from 2798 census block, 25 households were selected by simple random sampling. The election of households has been done by technical manager's districts. There were 25 households from each census blocks. The 25 households were selected by simple random sampling.⁵

All subjects were interviewed using food consumption questionnaires. The interview for children under 10

year old have been accompanied by their mothers. Subjects have interviewed about what kind and how much food consumption 24 hour recall.⁵

For this analysis, the included subjects were 1-3 year old children. This study excluded subjects with higher than upper limits vitamin A, vitamin C, and folic acid. The percentage of fruit and vegetables consumed by 1-3 year old was counted by SPSS computer program. We have conducted linear programming to assess the amount and type of alternative fruit and vegetable consumption for 1-3 year old children. Linear programming is a tool to optimize (minimize or maximize) a linear function of a set of decision variables while respecting multiple linear constraints. The function Y to be optimized by linear programming is called the objective function.⁶ What kind and how many fruit and vegetables were a function to be optimized by linear programming. Vitamin A, vitamin C, potasium, folic acid and fiber were a set of decision variables. Linear programming was conducted five times to obtain five results alternative fruit and vegetable consumption.

There were some steps in linear programming. They were identification of purposes (optimizing of what kind and how many fruit and vegetables consumption for 1-3 year old Indonesian children), identification of decision alternatives (what kind and how many fruit and vegetables consumption), were identification of resources that limits (vitamin A, vitamin C, potasium, folic acid and fiber in fruit and vegetables), determining of the constraint functions (adequacy of daily requirement of vitamin A, vitamin C, potasium, folic acid and fiber), and general model of linier programming.

RESULTS

There were 5136 subjects aged 1 to 3 year old. We found the five mostly consumed fruit were banana, orange, papaya, apel, and watermelon. Five mostly consumed vegetables were spinach, vegetable soup, kangkung, cassava leaves, and tamarind dish.

Table 1. Percentage of kind of fruit and vegetable consumption among 1-3 years old Indonesian children (n=5136)

Vegetable			Fruit		
Name	n	%	Name	n	%
Spinach	858	19.7	Banana	524	66.8
Soup	531	12.2	Orange	50	6.4
Kangkung	475	10.9	Papaya	48	6.1
Cassava leaves	389	8.9	Apel	42	5.4
Tamarind dish	355	8.2	Watermelon	28	3.6

Table 1 shows the percentage of kind of fruit and vegetable consumption for 1-3 year old Indonesian children.

Table 2 shows an alternative consumption type of fruit and vegetables consumption for 1-3 year

old Indonesian children. Alternative of fruit and vegetables consumption for 1-3 year old Indonesian children was 100-200 grams of vegetables and 150-200 grams of fruit.

Table 2. Alternative kind of and how much fruit and vegetables to be consumed for 1-3 years old Indonesian children

Alternative	Type	Weight (gr)	Portion	% RDA*				
				% Vit A	% Vit C	% Fiber	% Potasium	% Folic acid
1	Spinach	100	1	92.1	79.2	55.7	62.4	39.8
	Banana	150	3					
	Papaya	50	0.5					
2	Soup	100	1	92.1	79.2	55.7	62.4	39.8
	Banana	150	3					
	Papaya	50	0.5					
3	Kangkung	150	1.5	88.8	222.5	60	79.4	81
	Banana	150	3					
	Papaya	150	1.5					
4	Spinach	100	1	71.7	119.2	51.4	67.2	65.8
	Banana	150	3					
	Orange	100	1					
5	Soup	100	1	71.7	119.2	55.7	67.2	65.8
	Banana	100	2					
	Orange	150	1.5					

*Recommended Dietary Allowance Indonesia in 2004

DISCUSSION

The results showed the alternative amount and type of fruit and vegetable consumption for 1-3 year old Indonesian children is 1-2 servings of vegetables and 3-4 servings of fruit. A serving of vegetables weighs approximately 100 grams and one serving of fruit weighs approximately 50 grams. Types of vegetables and fruits being as an alternative are the kind of vegetables and fruits commonly and widely consumed by the population of Indonesia. Suggested kinds of vegetable are spinach, vegetable soup, *kangkung*, cassava leaves, and tamarind dish, while alternative type of fruit are bananas, oranges, papaya, apple, and watermelon.

The alternative consumption of vegetables and fruits in this study had sufficed 80 percent of the nutrients of vitamin A, vitamin C, fiber, potasium and folic acid, because 20 percent can be sufficed from nutrients derived from other food sources.

Currently, some countries have a guideline for fruit and vegetable consumption per day in accordance with the conditions of the country. The Greek state, the Netherlands, England, New Zealand, USA, Switzerland, Australia, Japan, Spain, Canada, Mexico,

Argentina, Brazil, Malaysia, Philippines, South Africa and Mauritius are examples of those.⁷

Many countries have adopted the recommendation to eat at least 400 grams fruit and vegetables a day. Experts and organizations incorporate the recommendations in the guidelines for their diet. Some dietary guidelines only contain qualitative messages, such as "Increase consumption of vegetables and fruit", "Eat a variety of vegetables and fruits every day" or "Eat a lot of vegetables and fruits". Those have been applied in Chile, China, Finland, France, Ireland, Norway, Portugal, and Sweden. Guideline of diet in some countries such as Denmark, Germany, or Indonesia give recommendations as portion quantitative terms without definition of what is meant by a portion.⁷

The problem of eating is generally happening in children, including the problem of consumption of vegetable and fruit. Planting of the healthy living habit, included planting of the eating habit must be carried out to preschool children. The result of study of Vegetable and Fruit Consumption in Preschool Children in Semarang showed Variety vegetable and fruit that were consumed in preschool children limited in carrot and citrus fruit. Most of the children (76.6%) were not consuming vegetable every day

and 68.1% children were not consuming fruit every day. Consumption of vegetable in children was average 73.5 grams/day. Consumption of fruit in children was average 58.6 grams/day.⁸

The results of study of Spill et al suggested that increasing the portion of a vegetable served at the start of meal is a useful strategy to increase vegetable intake in preschool children. The use of portion size as a strategy to increase vegetable intake was found to be effective in preschool children who varied in individual characteristics such as body weight and age. Children with a body weight status across a wide range of BMI percentiles responded to the increase in portion size.⁹ Fisher and Kral stated that there was insufficient evidence to suggest a relation between portion size effects and body weight status in children.¹⁰

Childcare providers can promote vegetable consumption in young children by serving large portions of vegetables at the start of a meal. The portion size can influence intake in children and that this effect can be used in a beneficial way to increase the intake of vegetables in children.⁹

In conclusion, the result of this study suggested the alternative fruit and vegetables consumption for 1-3 year old Indonesian children are 100-200 grams (1-2 bowls) grams of vegetables and 150-200 grams (3-4 pieces) of fruit.

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