

BALANCED NUTRITION AND NUTRITIONAL STATUS OF SCHOOL CHILDREN IN RURAL AREAS OF OGAN KOMERING ILIR DISTRICT SOUTH SUMATRA INDONESIA

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ABSTRACT

To support the growth and development of children and adolescents, a balanced nutritious diet is required. Indonesia issues a balanced nutrition guideline as the government's effort to overcome various nutritional problems in Indonesia. This study aimed to evaluate the relationship among four pillars of balanced nutrition, namely eating a variety of foods, monitoring body weight, hygiene and healthy living habits and physical activity with nutritional status in school children. This study used a cross-sectional method which was conducted in elementary schools in rural areas with a number of sample of 80 schoolchildren with purposive sampling technique. The data were taken directly by means of interviews and anthropometric measurements. Based on the results of the study, there was a relationship between various foods and physical activity with nutritional status, while for the clean and healthy living habits and monitoring of body weight there was no relationship to the nutritional status of school children. There was a relationship between diverse foods and physical activity and nutritional status of schoolchildren in rural areas of Ogan Komering Ilir District.

Key words: *balanced nutrition, nutritional status, schoolchildren, rural areas*

ABSTRAK

Untuk menunjang pertumbuhan dan perkembangan anak dan remaja diperlukan pola makan bergizi seimbang. Indonesia mengeluarkan pedoman gizi seimbang yang merupakan upaya pemerintah dalam mengatasi berbagai masalah gizi di Indonesia. Tujuan penelitian ini adalah untuk mengevaluasi hubungan 4 pilar gizi seimbang yaitu makan beragam, memantau berat badan, perilaku hidup bersih dan sehat serta aktivitas fisik dengan status gizi pada anak sekolah. Penelitian ini menggunakan metode cross sectional yang dilakukan di sekolah dasar daerah pedesaan dengan sampel anak sekolah yang berjumlah 80 orang melalui teknik purposive sampling. Data diambil secara langsung dengan cara wawancara dan pengukuran antropometri. Berdasarkan hasil penelitian didapat data bahwa terdapat hubungan antara makanan beragam dan aktivitas fisik dengan status gizi, sedangkan untuk perilaku hidup bersih dan sehat serta pemantauan berat badan tidak berhubungan dengan status gizi anak sekolah. Terdapat hubungan antara makanan beragam dan aktivitas fisik dengan status gizi anak sekolah di daerah pedesaan Kabupaten Ogan Komering Ilir.

Kata kunci: *gizi seimbang, status gizi, anak sekolah, pedesaan*

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Introduction

An important indicator of the nutritional status and health of the population is internationally recognized growth.¹ Not only is underweight a problem for school children in developing countries,² but also obesity needs attention.³ The prevalence of underweight and overweight is increasing in Indonesia.^{4,5} Most studies show that underweight and obesity have a positive relationship with low physical activity,⁶ diet pattern,⁷ dietary diversity,⁸ high energy intake⁹ and maternal awareness of food intake.¹⁰

To support the growth and development of children and adolescents, a balanced nutritious diet is needed. Several guidelines regarding balanced nutrition have been developed such as the Ten Guidelines for a Healthy Life by the Korean Medical Association (KMA),¹¹ The Food Tower for a Food Guide for Koreans,¹² Dietary and lifestyle recommendations by the American Heart Association (AHA).¹³ However, these guidelines need to be adapted to different age groups and lifestyles for each country.¹⁴ Referring to the principles of the Nutrition Guide for Balanced Diet which was the result of the agreement of the world food conference in Rome in 1992 which is believed to be able to overcome the double burden of nutritional problems, both deficiency and excess nutrition,¹⁵ Indonesia issues a balanced nutrition guideline as to the government's effort to overcome various nutrition problems in Indonesia.¹⁶ Food consumption has to pay attention to the four pillars of the principle, that is consuming a variety of foods, adopting a clean lifestyle, having physical activity and monitoring body weight regularly to maintain normal body weight.^{15, 17}

Ogan Komering Ilir District is one of the priority districts or the location for the implementation of the integrated stunting reduction intervention in 2018-2020.^{18,19,20} School children in the working area of Ogan Komering Ilir District need attention in order to be able to prevent stunting. Their activities tend to watch television, high levels of snack consumption,³ low nutritional intake and unlivable housing are still problems in rural areas. School-age children are a critical period to catch up; failure of interventions in this period can increase the accumulative adverse effects of malnutrition, thereby reducing a country's human development index.²¹ No studies have yet focused on guidelines for balanced nutrition related to nutritional status. Therefore it is necessary to conduct research on the implementation of balanced nutrition and nutritional status of school children in rural areas of Ogan Komering Ilir District. The purpose of this study was to evaluate the relationship among the four pillars of balanced nutrition, that is eating a variety of foods, monitoring body weight, hygiene and healthy living habits and physical activity with nutritional status in school children.

Method

This study used a cross-sectional method which was conducted in rural elementary schools, namely Sirah Pulau Padang Village, Ogan Komering Ilir District, South Sumatra, Indonesia from August to September 2018. The subjects of this study were pupils of grades four, five and six of primary schools using purposive sampling technique as many as 80 pupils. School-age children are a critical period to catch up; failure of interventions in this period can increase the accumulative adverse effects of malnutrition, thereby reducing a country's human development index ²¹. The research data were collected by means of direct interviews and anthropometric measurements. The data obtained by the direct interview were various eating data, monitoring body weight, clean and healthy living habits and physical activity using a questionnaire. Meanwhile, the nutritional status data were obtained through anthropometric measurements.

Measurement of physical activity using the instrument The Physical Activity Questionnaire for Children (PAQ-C) with several modifications adapted to the conditions of the research location. Dietary diversity (DDS) was used to assess food diversity. Dietary diversity score (DDS) was used to measure the nutritional adequacy of children in developing countries ^{22,8}. The data were derived from the interviews with the pupils using the 24-hour food recall form and the DDS form. Based on the measurement of consumption diversity by evaluating the groups of food consumed in different ways. The consumption is said to be diverse if the number of food groups consumed is ≥ 4 and not diverse if the food groups consumed are < 4 .²³ The data on body weight and height were obtained by measuring with microtoise and digital scales (SECA) by trained personnel using standard methods. The anthropometric index used was the Body Mass Index (BMI) for age using the WHO AntrhoPlus software. In this software, the cut-off for normal BMI-for-age is between -2SD and +1SD; it is underweight if the BMI-for-age is less than -2SD, overweight when the BMI-for-age is between +1SD and +2SD, and obesity if the BMI-for-age is greater than +2SD ²⁴.

The data analysis included univariate and bivariate. In this study, the bivariate analysis was carried out to see the relationship between the dependent variable and the independent variable. The variables in this study were examined using the Chi-Square test. Then the data were presented in tabulated and graphic forms. Research Ethics Committee has approved this study of Public Health Faculty, Universitas Sriwijaya based on approval decree number 297/UN9.FKM/TU.KKE/2018.

Results

The clean and healthy behavior of schoolchildren still needs to be considered, such as the habit of washing hands after playing which was still rarely practiced (Table 1). Most schoolchildren did not bathe 3 times a day with clean water and soap. In addition, they were not used to brushing their teeth after eating and before going to bed.

Table 1. Distribution of frequency of clean-living behavior

Statement	Yes		No	
	n	%	n	%
Always wash your hands with soap and clean running water before eating	52	65,0	28	35,0
Always wash your hands with soap and clean running water after defecating and urinating	51	63,8	29	36,3
Always wash your hands with soap and clean running water after playing at home and at school	27	33,8	53	66,3
Always shower 3x a day with clean water and soap	10	12,5	70	87,5
Always brush your teeth after eating with clean water and toothpaste	17	21,3	63	78,8
Always brush your teeth before going to bed with clean water and toothpaste	25	31,3	55	68,8
Wash your hair with clean water and shampoo at least every 2 days	66	82,5	14	5,0
Always buy covered or wrapped meals	45	56,3	35	43,8
Always cover mouth and nose when sneezing	53	66,3	27	33,8
Always wear footwear when leaving the house	68	85,0	12	15,0
Use the toilet to defecate and urinate at home and at school	65	81,3	15	18,8
Always flush the toilet/toilet with clean water after each use	71	88,8	9	11,3
Drink already boiled water/bottled water beforehand	76	95,0	4	5,0

There two activities the schoolchildren do physical activities and sedentary activities. The usual physical activities are romping (Figure 1), playing ball and swimming, riding bicycles, hide and seek, while the sedentary activities are usually using cellular phones and watching TV. Physical activity is usually conducted during school break hours and coming home from school, while sedentary activity is usually carried out at home.

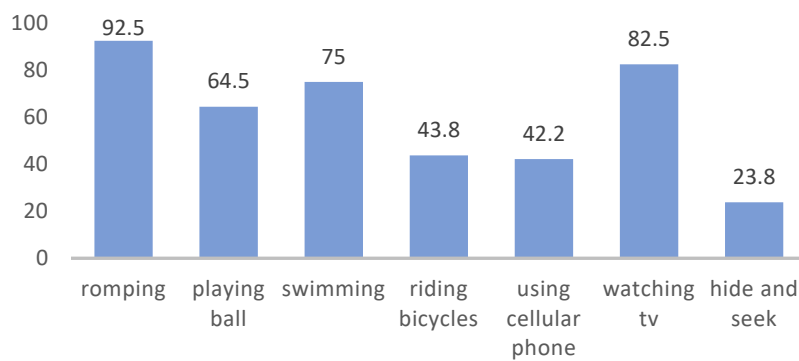


Figure 1. Distribution Frequency of schoolchildren activities

The frequency distribution of food consumption diversity (Table 2) data shows that the foodstuff groups often consumed were staple foods, green vegetables, meat and fish and eggs. Meanwhile, the food groups such as nuts and milk or milk products were rarely consumed by the schoolchildren.

Table 2. Frequency distribution of diversity in food consumption

Food Group	yes		no	
	n	%	n	%
Starchy staple foods	80	100	0	0
green vegetables	59	73,8	21	26,3
fruit and vegetables are sources of vitamin A	44	55,0	36	45,0
other fruits and vegetables	57	71,3	23	28,8
offal	1	1,3	79	98,8
meat and fish	69	86,3	11	13,8
eggs	57	71,3	23	28,8
legumes, nuts and seeds	28	35,0	52	65,0
milk and dairy products	29	36,3	51	63,8

The results of the frequency distribution of food menus commonly consumed were as follows (Figure 2); the types of breakfast frequently consumed are egg rice, *uduk* rice (It is Indonesian style steamed rice cooked in coconut milk dish), fried rice and fried noodles, the side dishes consumed were omelette, fish *pindang* (fish soup), fried fish and fried chicken, vegetables commonly consumed were water spinach, spinach, *katuk* (*Sauropus androgynus*) and cabbage while the fruits usually consumed were mangoes and bananas because they were easy to get.

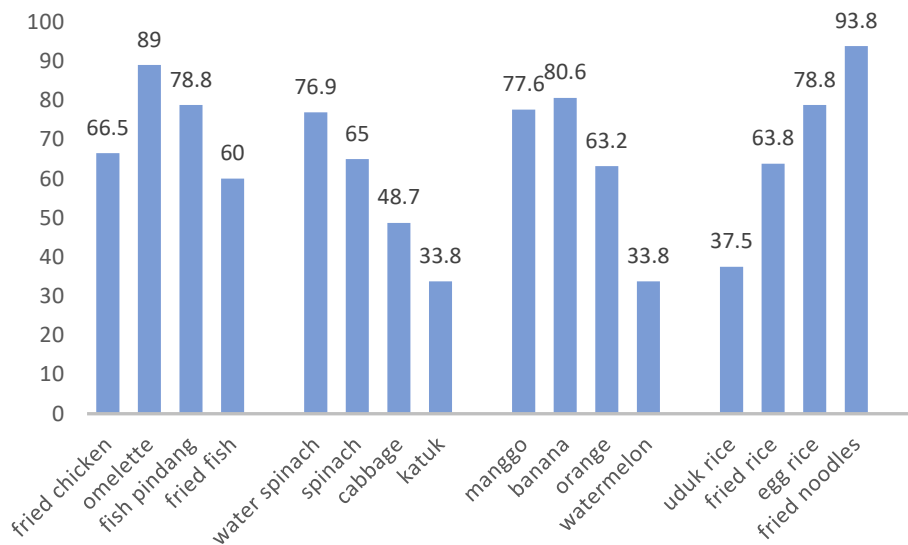


Figure 2. Frequency distribution of menu of side dishes, vegetables, fruits and breakfast

The results of the bivariate analysis (Table 2) show that there was no relationship between monitoring body weight and clean-and living habits and the nutritional status. There was a relationship between physical activity and diverse foods consumption and the nutritional status of school children. Meanwhile, the variable of frequency of eating and breakfast had a significant relationship with the nutritional status, however, the variables of mealtime and water consumption were not statistically related to the nutritional status of schoolchildren.

Table 2. Bivariate Analysis of the Implementation of Balanced Nutrition Guidelines and Nutritional Status

Variable	Nutritional Status				Total		P value	PR (95% CI)
	Malnourished		Normal		n	%		
	n	%	n	%	n	%		
Weight Monitoring								
Irregular	3	16,7	15	83,3	18	100	0,538	0,608 (0,200-1,844)
Regular	17	27,4	45	72,6	62	100		
Clean-living behavior								0,451 (0,182-1,120)
Less	5	14,7	29	85,3	34	100	0,117	
Good	15	32,6	31	67,4	46	100		
Physical Activity								3,805 (1,394-10,385)
Low	16	39	25	61	41	100	0,007	
High	4	10,3	35	89,7	39	100		
Diverse Food								2,333 (1,127-4,829)
Not Diverse	7	46,7	8	53,3	15	100	0,047	
Diverse	13	20	52	80	65	100		
Frequency of eating								2,689 (1,279-5,655)
Less	11	44	14	56	25	100	0,018	
Enough	9	16,4	46	83,6	55	100		
Meal Time								1,615 (0,656-3,981)
Inappropriate	15	28,8	37	71,2	52	100	0,417	
Appropriate	5	17,9	23	82,1	28	100		
Water Consumption								1,293 (0,606-2,758)
Less	9	29	22	71	37	100	0,691	
Enough	11	22,4	38	77,6	43	100		
Breakfast Habits								2,638 (1,222-5,696)
Seldom	12	41,4	17	58,6	29	100	0,022	
Always	8	15,7	43	84,3	51	100		

Discussion

Early detection of changes in growth and development of children is very important, the best method is recording the body weight and height regularly.²⁵ Monitoring the child's growth by measuring the anthropometry and recording the body weight.²⁶ In this study most of the schoolchildren routinely weighed every 6 months at school, the results of this study were in line with the previous study conducted in Jember.²⁷ One of the pillars of balanced nutrition is monitoring body weight regularly to maintain normal body weight.^{15,28} In this study, the majority of students weighed regularly at school once every 6 months. It is better if the weight monitoring is carried out every month in order that the weight of the schoolchildren is still monitored.

Some clean and healthy living behaviors can be done by the schoolchildren both at school and at home, that is washing hands with clean water and soap, brushing teeth regularly, bathing and shampooing regularly, disposing of garbage in its place, weighing body weight and measuring height every month, following sports activities at school, defecating and urinating in the school toilet and getting enough sleep.²⁹ Forming clean and healthy living habits must be started from childhood by instilling good habit values to improve the quality of humans in the future.^{30,31} The results of the study showed that there was no relationship between clean and healthy living habits and nutritional status.

Physical activity is a series of body movements that use energy. Physical activity can improve health parameters in children and adolescents such as physical fitness, body image, body composition, quality of life, etc.³². The World Health Organization (WHO) recommends that children and adolescents aged 5-17 years old undertake 60 minutes of moderate to vigorous physical activity each day such as play, sports, transportation, house chores, recreation, physical education, or planned exercise, in this context of family, school, and community activities.³³ The results of this study indicate that the physical activity of schoolchildren was in accordance with the WHO recommendations; yet, this activity was not carried out regularly. Physical activity of schoolchildren is playing which is done during school break hours and when they come home from school, while at home they only do sedentary activities. Schoolchildren do not do sports activities on a regular basis. The most frequent physical activities are romping, playing ball and swimming. This is in line with the previous study showing that the frequency of physical activity and sports for school children was still low.³² The results of this study also showed that there was a relationship between physical activity and BMI; this is in line with the previous study showing the same results.³⁴

A less diverse diet consisting of plant-based food sources but low in fruit and vegetable sources is one of the major nutritional problems in the diets of developing countries.³⁵ The results of this study showed that there was no relationship between dietary diversity and nutritional status; this is not in line with the previous studies stating that better dietary diversity is related to the nutritional status.⁸ The pupils in this study mostly had proper meal times at breakfast and lunch. But during the evening meal, the majority of students had inappropriate meal times. This is because the majority of respondents followed the family meal schedule at night. Breakfast habits affected the nutrient intake where breakfast was an important activity prior to physical activity on that day.

Conclusion

Based on the results of the study, there was a relationship between diverse foods and physical activity and nutritional status, while for the clean and healthy living habits and monitoring of body weight they were not related to the nutritional status of schoolchildren. It is recommended that schoolchildren can increase physical activity, especially sports and consume more diverse foods.

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Conflict of Interest

There is no conflict of interest in this study.

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