



*International Journal of Current Research
and Academic Review*

ISSN: 2347-3215 Special Issue-2 (January-2015) pp. 28-33

www.ijcrar.com



Analysis of nutrients intake on lunch in primary school students: do they meet nutrients standard?

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KEYWORDS

Nutrient intake,
lunch, primary school

A B S T R A C T

Childhood is a time that is susceptible to various diseases caused due to deficiency nutrients. Full day school model for elementary school student with school feeding gives positive contribution by increasing children nutritional status. Some food served in school feeding should generate 1/3 total energy needs of the child (Mahan and Stump, 2004). The purpose of this study was to analyze the nutrients intake on lunch in primary school students. The design of the study is observational analytic method with cross-sectional approach. This study was conducted in the Integrated Islamic Primary School Integrated Bina Ilmi Palembang, South Sumatra, Indonesia. The number of students who participated in this study was 64 students consisting of 32 students who bring lunch from home and 32 students who follow school lunch feeding. Average energy and protein intake of students who bring lunch from home is better than the students who follow school lunch feeding. There are significant differences between the levels of energy and protein sufficiency both group of students ($P < 0.05$). There are significant differences between the levels of nutrition knowledge in both group of students ($P < 0.05$). Students who follow school lunch feeding has a thinner on Body Mass Index (BMI) than students who ate lunches brought from home provision that 21 students (60 %). There was no difference between the nutritional statuses of groups of students ($P > 0.05$). It is need to increase the quality and amount menu on school lunch feeding.

Introduction

School-age children are national investment. The optimal of growth and developments of school-aged children is influenced by the amount and quality of nutrients intake which provided in the diet. Healthy foods are foods which contain all the nutrients needed by body. Balanced diet obtained from a variety

of foods, both animal and vegetable material (Rositawaty, 2007; Rusilanti, 2007).

In addition, childhood is a time that is susceptible to various diseases caused due to deficiency or excess nutrients. According Riyadi (2003) school-age children are in a

period of very rapid growth with a very active physical activity. Therefore, school-age children should get special attention on the food consumed in order to obtain healthy and nutritious food to meet their nutritional needs.

Nutritional disorders could be caused by obesity or malnutrition. Malnutrition found in the school age group can be particularly lead to impaired growth, fatigue, predispose to infection of various disease pathogens and imbalance of energy consumption, due to the energy expended is less than the energy input. The change of diet from a traditional habit in high carbohydrates consume, high in fiber and low fat diet changed to a new habit in low carbohydrates consume, low in fiber and high in fat also supports the nutrition (Almatsier, 2003).

The government has established and organized in the field of nutrition policy for the improvement of the nutritional status of the people in accordance with Law No.7 of 1996 on Food. Yuliati and Santoso (1995) says that implementation of the school meal aims to improve the nutritional status, especially for school children who do not have time for breakfast and did not bring lunch, improve academic performance.

Implementation of school feeding is one of alternative that can be done to overcome the problems associated with food in school-age children. Some food served in school feeding should generate 1/3 total energy needs of the child (Mahan and Stump, 2004) Moreover, to energy needs, keep in mind the variety of food, children 's favorite, and the amount of food provided.

However, there are not all students follow the school lunch feeding, there are students who bring food from home. One of the reasons parents prepare their food for their

children is to make sure that their children get good nutrition.

This could be due to the concerns of parents about snack food that may be consumed by children, even including the fears of food catering provided by the school, both in the aspect of cleanliness and worries the nutrient adequacy of both the food. Bring lunch habits in children when the school provides several benefits, among others, to avoid the interference of hunger and snack habits. It's also prevent children from the dangers of unhealthy snacks and unsafe.

Although, basically the implementation of school feeding activities are expected to eliminate the concerns of parents regarding their children food consumed at school. Besides catering procurement can be a medium to introduce various types of food that may not be preferred by children when served at home.

Based on the above, the authors are interested in examining the energy and nutrient content of the food catering provided by the school and the provision of food provided by the parents, as well as comparing the nutritional status in children who consume foods from school catering to children who consume food supplies from home.

The purpose of this study was to analyze the nutritional quality of the lunch menu and the consumption of energy and protein adequacy level of elementary school students.

Materials and Methods

The design of the study is observational analytic method with crosssectional approach. This study was conducted in November-December 2013 in the Integrated

Islamic Primary School Integrated Bina Ilmi (SD IT Bina Ilmi) Palembang, South Sumatra, Indonesia.

The number of students who participated in this study was as many as 64 students consisting of 32 students who bring lunch from home and 32 students who follow school lunch feeding.

The data characteristics of respondents (date of birth, weight, height) and nutrition knowledge was collected using a questionnaire. Weight were collected using a weight scales *Seca Digital Scales* (accuracy 0.1 kg). Height measured by using *Microtoice Height*. Food consumption data use a *food –weighing* (Rosalind, 2005). Food consumption data obtained from the average food consumption for two days.

Data analysis was performed by descriptive and inferential. Food consumption data is converted into energy and protein by using software *Nutrisurvey*. Measurement of nutritional knowledge was categorized into three groups: knowledge of good nutrition, moderate and less (Ali, 2000).

Measuring the level of nutritional adequacy (% RDI) is done by comparing the content of energy and protein for two days on the lunch menu of students with AKG 2004 in percent. Level of adequacy energy and protein are classified into good (30 % RDA) and less (< 30 % RDI). Measurement of nutritional status carried by body mass index for age (BMI / U) was carried out in all 64 children. Calculation of IMT / U using *AnthroPlus*, by entering data about weight, height and age of children (WHO, 2007) was also done. To determine differences in consumption and energy and protein adequacy level students who bring lunches in schools and the catering is done by t-test.

Result and Discussion

Characteristics of respondents

The percentage of sample in this study was almost the same by gender, where 53.1% female sample and 46.9% male sample. Table 1 illustrates that most of the respondents are at the age of 10 and 11 years (40.6%).

Nutrition knowledge

Table 2 shows that the students who have good knowledge about nutrition dominate by students are taking a lunch catering provided by the school is 13 students (56.5%).

Based on the results of t-test, there are significant differences between the levels of nutrition and knowledge of group of students who bring lunch from home and students who follow school lunch feeding ($P < 0.05$).

Level of energy sufficiency

Based on Table 2 average energy sufficiency level in the group of schools catering wholly examples includes the category of less (100%). This is because the type and amount of food consumed is not as needed.

Based on the results of t-test, there are significant differences between the levels of energy sufficiency group of students who bring lunch from home and students who follow school lunch feeding ($P < 0.05$).

Adequacy of protein levels

Table 2 shows that adequate level of protein is found only in the 23 (71.9%) students who ate lunches brought from home. While protein intake on students who consumed lunch provided by the whole school is 32

students (100%) has less protein intake. Based on the results of t-test, there are significant differences between groups of protein adequacy level students who bring lunch from home and students who follow school lunch feeding ($P < 0.05$).

Nutritional status

Based on Table 2, students who have a low Body Mass Index (BMI) are thinner than students who ate lunches brought from home provision those 21 students (60%). While students who have a Body Mass Index (BMI) is a normal, more numerous found in students who consume school lunch feeding is provided from school is 16 students (66.7 %). As for students who have a Body Mass Index (BMI) more fat is consumed lunch brought from home is 3 students (60 %). Based on the results of t-test, there was no difference between the nutritional status of groups of students who bring lunch from home and students who follow school lunch feeding ($P > 0.05$).

The relationship between energy intakes and protein with nutritional status

The relationship between energy intake and nutritional status examined using Fisher's exact test with a significance value of 0.05 and percentage analysis, the results of the analysis not founded significant relationship between energy intake and nutritional status based on BMI by age. The relationship between protein intake and nutritional status examined using Fisher's exact test with a significant value of 0.05 and percentage analysis, the results of the analysis found no significant association between protein intake and nutritional status based on BMI by age.

Children age 6 to 12 years are included in the final phase of childhood (late childhood)

until the child becomes sexually mature at age 13 years for girls and 14 years for boys (Hurlock, 1980). Therefore, at this age need adequate food intake in terms of both quantity and quality.

Nutritional knowledge is a knowledge about food and nutrition, sources of nutrients in foods, food safety to eat so is not to cause disease and how to process food properly so the nutrients in food are not lost, and how to live healthy (Soekidjo, 2003). The level of nutrition knowledge affects a person's attitudes and behavior in food choices that will ultimately affect the nutritional status.

Implementation of school meals is one alternative that can be done to overcome the problems associated with food in school-age children. School feeding program should be one third of the total energy needs of the child (Mahan and Stump, 2004). Figures based on nutrition needs of school-age. At the age of those substances - nutrients needed quite high. Energy in the body is used for growth and for the synthesis of new compound. One of the functions of carbohydrates as an energy source which is the main function of carbohydrates is to provide energy for the body (Almatsier, 2003).

According to Almatsier (2003), the low nutrient status may be due to direct and indirect causes but one of the immediate cause is the consumption of less food. While not a direct cause of the dominant economic level less include, general education and nutrition education is lacking. According Suhardjo (2003), nutritional status is the state of health of an individual or group that is determined by the degree of physical needs for energy and substances - other substances obtained from food is measured anthropometry physical impact. Adequate nutrition is required each person to achieve

optimal growth. According Almatier (2003), optimal nutritional status occurs when the body gained quite substances - nutrients are used efficiently.

At the age of 6-12 years (school age children) many of which affect their eating habits. New experiences, excitement in the school, a sense of fear that late arriving at

school, causing the child - the child often aberrant breakfast (Moehji, 2009). Soekirman (2000) says that the habit of eating snacks is one which causes the energy consumption of good food, they are low in protein. Because in this age of the child - the children loved to snack, sometimes they deliberately refused breakfast and their snack instead.

Table.1 Age distribution of respondents

Age	n	%	Total
9	10	15.6	15.6
10	26	40.6	56.2
11	26	40.6	96.9
12	1	1.6	98.4
13	1	1.6	100.0
Total	64	100.0	

Table.2 Analysis of variables in study T-test

Variable		Lunch	Siang		Total	%	P Value
	Bring Food Home	%	Catering	%			
Nutrition Knowledge :							0.0363
Good	10	31.2	13	40.6	23	35.9	
Moderate	11	34.4	6	18.8	17	26.6	
Less	11	34.4	13	40.6	24	37.5	
Energy Intake:							0.011
Good	7	21.9	0	0	7	10.9	
Less	25	78.1	32	100.0	57	89.1	
Protein Intake:							0.000
Good	23	71.9	0	0	23	35.9	
Less	9	28.1	32	100.0	41	64.1	
Nutritional Status:							0.118
Underweight	21	65.6	14	43.8	35	54.7	
Normal	8	25.0	16	50.0	24	37.5	
Overweight	3	9.4	2	6.2	5	7.8	
Total	32	50	32	50	64	100	

Conclusively from the results and discussion that has been described can be deduced as:

1. Average energy intake of students who bring lunch from home is better than the

students who follow school lunch feeding.

2. Average protein intake of students who follow schools lunch feeding is less than the recommended daily number.

3. Students who follow school lunch feeding have a thinner Body Mass Index (BMI) than students who ate lunches brought from home (60 %).
4. The absence of a significant association between the intake of energy and protein nutritional status of students who ate a lunch from home.

Suggestion

From the conclusions that have been drawn researchers gave suggestions as follow:

1. To increase energy and protein intake of students, need to increase the quality and amount on school lunch feeding.
2. Required for counseling to parents and students about eating right and healthy to increase nutrition knowledge.

Ethical considerations

Ethical issues (Including plagiarism, Informed Consent, misconduct, data fabrication and/or falsification, double publication and/or submission, redundancy, etc) have been completely observed by the authors.

Acknowledgments

We would like to thank all subjects who volunteered to participate in this study. The authors declare that there is no conflict of interest.

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