

School Lunch: Menu Variation, Suitability of Portion Standards and Nutrient Analysis and RDA Percents in Integrated Islamic Elementary School (SDIT)

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Abstract—Organizing lunch at school must be able to contribute one-third of the total energy needs of children. Interrelated components determine foodservice systems, that is in the form of menu planning which underlies all of the activities in the food service system. The purpose of this research was to identify variations in food ingredients, variations in processing techniques and suitability of food portions and nutritional analysis of the lunch menu at integrated Islamic elementary school (SDIT IQRA 2) in Bengkulu. This study was an observational study with a cross-sectional approach. A total of 23 lunch menu in SDIT IQRA 2 were collected with questionnaire and food weighed. The result showed that during the 5-day menu cycles, the variety of food menu items on side dishes, vegetables, and fruits. The served were varied, while the variety of processing techniques of the lunch menu on side dishes and vegetables served did not vary, and all of the lunch portions were not appropriate with the standard portion of lunch of school children. Menu variations and variations of processing techniques were not varied. The nutritional contribution of the lunch menu at SDIT IQRA 2 on the energy content was 468.5 kcal (74.36% from total calorie), protein 15.41 grams (91.74% from total protein), fat 11.79 grams (56.11% from total fat), and carbohydrate 86.96 grams (100.2% from total fat)

Keywords— Lunch, Menu Variation, standard portion suitability, Nutrient Analysis

I. INTRODUCTION

The age of school children is an investment of the nation because they are the next generation that will determine the quality of the nation in the future. Efforts to improve the quality of human resources must be carried out early, systematically and continuously. The right feeding determines the optimal process of school-age growth and development among them in quality and quantity [1]. An elementary school in Indonesian has developed a longer learning time (full day) that provides food service, such as snack and lunch (school feeding). Lunch has a contribution 1/3 of the total energy needs.

Children of school age groups (6-12 years) are one of the groups that are susceptible to have nutritional problems. According to Basic Health Research 2010, about 44.4% of school children had an energy consumption level of less than 70% of the RDA. As many as 59.7% of school-aged children have a protein consumption level of less than 80% of Indonesian RDA.

Children spend more time at school so they need to have adequate nutrition that can be obtained from school catering. The implementation of food in schools is one alternative that can be done to overcome food-related problems in school children. Based on WFP (World Food Program) data in 2010, the school feeding program was successful in increasing the level of children's achievement in learning from 54% to 73%. The implementation of food at this school aims to improve nutritional status, especially for school children who do not have breakfast and bring supplies, improve academic performance, as a nutritional education material for school children and get used to choosing nutritious foods [2].

SDIT IQRA 2 is the biggest school catering and one of two schools that provide lunch for students. The lunch provided not only for the elementary student but also for junior and senior high school student. SDIT IQRA 2 requires students to have brunch and lunch at school.

II. METHOD

This research used a descriptive method with a cross-sectional design conducted at the integrated Islamic elementary school (SD IT IQRA 2) Bengkulu. Samples were 23 children consisting of 10 girls (2.3%) and 13 boys (2.99%) aged 7-12 years. The menu variation data and the standard suitability of the portion of the school children's food menu obtained from lunch observations interviewed with cooks and students using questionnaires and taken from the documentation. Menu variations are done in five days lunch observation on variations in food ingredients and variations in processing techniques. The nutrient of Menu is the amount of nutrients content of energy, protein, fat, and carbohydrates from the menu that is served at lunchtime as measured by Food Weighing method for three days to represent five days menu cycles. Nutrient analysis using Indonesian Food Composition Table then compared with Indonesian RDA.

III. RESULTS

Halalan Thoyyiban catering is under the AL-Fida Foundation which is a semi-commercial food service in the form of catering services, established with the aim to prosper the staff, employees and school children of the Al-

Fida Foundation. Catering services are addressed to Al Fida staff, schools, banquets and parties. The number served at lunch amounts to 1000 school children. Students are served as many as 184 people for lunch and snacks as many as 877 people a day. Catering menu planning was made by the catering manager using the 5-day menu cycle guideline. The food organization of the AL-Fida Foundation was carried out by 30 workers, namely one driver, one driver helper, and 28 cooks. Catering services provided to students of SD IT IQRA '2 served with a container (lunch box). School lunch consists of one main meal, namely staple food, side dish, vegetables, and fruit.

A. Overview of Dish Variations

Variation in the dish is a composition of the lunch menu in the form of staple food, side dish, vegetables and fruits with a comparison to the existing menu cycles catering by observing the menu served every day and then seen the suitability between variations in food ingredients, variations in processing techniques 5-day menu cycle made by catering.

1. Variations of food ingredients (VFI)

Food ingredients on the lunch menu during the 5-day menu cycle were staple food in the form of rice, side dish (chicken meat, eggs, fish), vegetables (carrots, cabbage, beans, kale, cauliflower, melinjo leaves, long beans, corn, jackfruit, mustard greens, chayote) and fruit (watermelon, snack fruit, banana). Food ingredients that are often used in the 5-day menu cycle are sided dish: (chicken meat, fish), vegetables (long beans, carrots, cabbage), fruit (watermelon, banana).

Variations in dishes are related to customer satisfaction so that a varied menu in each dish would not make consumers feel bored [3]. In the meantime, the opinions of school children who used catering state said that the menu served by the catering is easy to remember and the menu is the same every week. This can reduce the energy intake of school children in consuming lunch served by catering every day.

Variations in dishes consist of variations in food ingredients and variations in processing techniques. The variation of food ingredients, by comparing the 1st day with the next four days, and continues for four days later. If the 1st day of the food ingredients is chicken compared to the second day which service fish and the third day was an egg, then, the fourth day was fish, these variations were good called the food varies. However, if the fifth day does not vary due to using the same food as the first day, chicken, then next day was fish and so forth. Repeaters occurred because each day the AL-Fida foundation stores food by the food ingredients available in the market. As a result, sometimes menu change did not match the menu cycle. Food ingredients that were widely used were chicken, fish, and eggs that are used once in a week.

2. Variation in Processing Techniques (VPT)

The type of lunch menu processing used in catering during the 5-day menu cycle is, deep frying (frying with lots of oil), pan-frying (frying with medium oil), sautéing, sowing, rolling. Processing is often used in the 5-day lunch menu cycle, on the processing of side dishes on average by deep frying (frying with a lot of oil) and pan frying (frying with medium oil) while the average vegetable processing by boiling (boiling with boiling water), Stewing (starting the

seasoning and then adding coconut milk/water) and sauté (sautéing). The variety of food ingredients on the side dish, vegetables and fruit served varies, while the variation in processing the lunch menu on side dishes and vegetables served did not vary during the five-day menu cycle (Monday to Friday).

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A variation in processing techniques used to process animal dishes was deep frying (with oil). Processing techniques in vegetables use a lot of sautéed techniques while in fruit processing, the fruit is given with the skin such as bananas and snake fruit while the watermelon is cut. Catering parties often use processing techniques, namely, sauté (sauté), stewing (boiling), boiling (boiling with boiling water) and deep frying (with oil).

The menu variations are based on variations in food ingredients, namely, animal side dishes vary on day 3 and do not vary day 1,2,4,5, vegetables vary every day, and fruit varies on day 3 and does not vary on day 1,2, 4,5 while variations in processing techniques, namely animal side dishes, vegetables, and fruits do not vary every day. Variations in food ingredients and variations in processing techniques, vary if there is no use of food ingredients and processing the same dish in one menu cycle each time the presentation.

B. Food Portion Suitability

The portion of food obtained by food weighed (weighing) which is weighing the food that will be consumed by school children for a portion of lunch dishes. The dishes that weighed were stapled foods, side dish, vegetables, and fruits.

Table 1. Lunch Portion Standard at SDIT IQRA Catering

Age	Staple food	Side dish	vegetable	fruit
7-9 years	100	70	50	50

Based on Table 1 it is known that the portion of food made by the catering uses the standard portion of children aged 7-9 years (grades 1-3) while the age of 10-12 years (grades 4-6) is not made standard portions. From table 2 showed that all portions of food, both from staple foods, side dish, vegetables, and fruits were not matched with the standard portion of school children's lunch.

Table 2. Portion Suitability of the five Day Menu Cycle

No	Dish	Variable	Menu Cycle				
			1	2	3	4	5
1	Staple food	standard portion	100	100	100	100	100
		realization	155	150	155	150	145
2	Side dish	standard portion	70	70	70	70	70
		realization	42	49	50	40	55
3	vegetables	standard portion	50	50	50	50	50
		realization	40	36	43	36	30
4	fruit	Standard portion	50	50	50	50	50
		realization	26	74	23	29	25

The suitability of food portions at SD IT IQRA's two lunch dishes with catering services shows that staple food, animal side dishes, vegetables, and fruits were not consistent with standards. As for the provision of dishes carried out by the catering party, the portion of staple food is more than standard while the portion of side dishes and fruit is less than the standard while the portion of vegetables is less close to the predetermined portion standard.

Side dishes are a source of protein that functions as a builder and maintainer of body tissue cells and cannot be replaced by other nutrients. If in the growing period the shortage of protein-sourced foods can cause kwashiorkor in children. Then the child's growth and development can be disrupted due to the lack of side dish portion requirements [4].

The portion of food provided by the catering to each child is different; there were children who get less and excess portions, due to uneven distribution, the menu is served to meet the nutritional needs of school children. Therefore the energy requirements obtained from lunch are not always fulfilled the daily needs. Then it can lead children's learning concentration decrease. Therefore children lack focus in receiving the knowledge provided [5].

The purpose of determining the portion and calculating the needs of a person that is needed in a day is done so that there is no reduction and excess in food handling. The portion of food that is less than the standard portion can affect the quality of the provision of food ingredients to school children because the food provided is not suitable so that it experiences severe deficiencies or excesses caused by unequal methods of treatment [6].

The provision of food that has been facilitated can meet the nutritional needs of children in improving learning achievement while the catering process carried out in IQRA'2 SD IT is an alternative used to avoid food problems in school children, with this activity expected to assist parents in donating children's energy needs 1/3 of their daily needs. Then the lunch portion of the catering should be by the portion so that the nutritional needs of school children are enough.

Nutritional intake of school children for five days following lunch catering is an average age of 7-12 years. ≤ % lunch needs so that the required food intake is not enough 1/3 of a day's energy needs. This happens because the food processing is carried out in large quantities resulting in the

distribution is not adjusted to the existing portion. The nutrients contribution of the lunch menu accepted by the children less compared with the needs. The proportion of portions provided by the catering in the lunch menu catering service has not met the standards portion.

C. Nutrient analysis

1. Energy

Based on the results of food weighing carried out for three days, the average energy content on the menu was 399,55 kcal (63,42% of daily needs). The highest average energy content served on the second day was 468.5 kcal (74.36% of daily needs) and the smallest on the third day was 344.9 kcal (54,68% of daily needs).

A menu planner should consult with parents to get information about food recipes that most children like. Provision of energy and nutrient needs for children in schools is 30% of the daily needs in lunch [2].

The portion given in elementary school is not sufficient from the standard portion that is determined so that the energy intake provided is not sufficient for the needs of elementary school children menus such as fried chicken, fried fish, and a large portion of rice. At the time of the study, the highest energy content on the second day of this was due to the large portion of rice which reached 150 grams and fried fish by 35 grams.

If energy intake is insufficient, this will affect optimal activities of primary school-age children and also susceptible to diseases and malnutrition problems. A cross-sectional food consumption survey was performed on 1,840 Swedish children had to result the children received about 27% of their daily energy intake from school meals [7].

The previous study about the nutritional contribution of mid-day meal to dietary intake of school children in Ludhiana district of Punjab, India showed that the energy provided from school feeding did not fulfill the daily requirement for children. The calorie of the menu range from 350-386 kcal below the RDA of 450 kcal [9].

2. Protein

Based on the results of food weighing carried out for three days, the average protein content on the menu was 11,16 gr (47,27% of daily needs). The highest protein average served on the first day 15.41 gr (91.72% of daily needs from RDA), and the smallest is on the third day which is 7.99 gr (47.99% of daily needs).

Based on nutritional adequacy rate (2013), protein requirements in SDIT IQRA 2 are insufficient at 30% or 630 kcal from 2100 kcal.

The average protein obtained in SDIT IQRA 2 is in the excellent category, which is 15.41 gr (91.72%) from the AKG lunch standard of 16.8 gr (30%). The regular menu used in elementary school and has a contribution to the full nutritional value of protein is animal side dishes such as (chicken and fish).

The portion given in elementary school is not sufficient from the standard portion specified so that the protein intake provided is not sufficient for the needs of primary school children. The presentation of food at SDIT IQRA 2 is also not varied in every student because of the lack of menu variation and only serving menus like chicken fried, fried fish, and lots of rice. At the time of the study the results of the highest protein content on the first day of this

was due to the large portion of rice which reached 135 grams and the menu of chicken seasoning was 48 grams.

The contribution of protein from lunch to all age groups, both men and women, is categorized as good (> 80%), the protein provided by schools is mostly derived from animal side dishes. Protein fulfillment is essential because these substances function as sources protein in elementary school children whose function cannot be replaced and can also improve the condition of elementary school children to become healthier. A cross-sectional food consumption survey was performed on 1,840 Swedish children had to result the children received about 31% of their daily protein intake from school meals [7].

The previous study about the nutritional contribution of mid-day meal to dietary intake of school children in Ludhiana district of Punjab, India showed that the protein provided from school feeding did not fulfill the daily requirement for children. The protein of the menu was 11,9 grams below the RDA of 12 grams [9].

3. Fat

Based on the results of food weighing carried out for three days, the average fat content on the menu was 9,88 gr (56,45% of daily needs). The highest average fat content served on the first day which is 11.79 gr (65,24%), and the smallest is on the third day which is 8.67 gr (36,70%).

Fats also play an important role as structural and functional components of cell membranes. Fat is also a source of high energy supply, and as a fat-soluble vitamin solvent [8] Inadequate fat intake will result in fat deficiency and reduced growth of elementary school children, significant needs should be increased to meet the needs of elementary school children so that there is no malnutrition in elementary school children. A cross-sectional food consumption survey was performed on 1,840 Swedish children had to result the children received about 29% of their daily fat intake from school meals [7]

4. Carbohydrate

Based on the results of food weighing carried out for three days, the average carbohydrate content on the menu was 66,39 gram (70,25% of daily needs). The highest average carbohydrate content served on the second day which is 86.96 gr (92,02% of daily needs), and the smallest was on the first day which is 53.35 gr (56,45% of daily needs).

The highest carbohydrate average obtained in SDIT IQRA 2 is in the excellent category, which is 100.2 gr (100.2%) from the AKG standard of lunch, which is 86.7 gr (30%). The portion given in elementary school is insufficient from the standard portion specified so that the carbohydrate intake provided is not sufficient for the needs of primary school children. The presentation of food at SDIT IQRA 2 is also not varied in every student due to lack of menu variation and only serving menus like chicken fried, fried fish, and lots of rice. At the time of the study, the results of the highest carbohydrate content on the second day of this was due to the large portion of rice which reached 150 grams and the fish nuggets menu.

Carbohydrates have an essential role in the body, especially elementary school children, that is to provide energy for the body, some carbohydrates in the body are in the circulation of blood as glucose for immediate energy

needs, some are stored as glycogen in the liver and muscles, carbohydrates are essential for elementary school children as energy reserves [4].

A cross-sectional food consumption survey was performed on 1,840 Swedish children had to result the children received about 24% of their daily carbohydrate intake from school meals [7].

The overall nutritional quality of lunch is terrible. Most of the food consumed by students come from home. Lunch from school has fewer nutrients than food brought from home. This shows that improving school-age eating habits requires support from the school [10].

IV. CONCLUSION

The variations in vegetable food ingredients were varied while variations in processing techniques show that everything did not vary. The suitability of the lunch menu portion showed that the portion served did not consistent with the standard portion set for the portion of children aged 7-12 years. The energy content from school lunch was 468.5 kcal (74.36%), the protein was 15.41 gr (91.74%), fat was 11.79 gr (56.11%), and carbohydrate content in SDIT IQRA 2 was 86.96 g (100.2%)

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