

Eating Habits of Carbohydrate and Protein Sources in Elementary School Children during the Pandemic

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ABSTRACTS

Elementary school children are children aged 6-12 years and had eating habits depend on their social life at school. Feeding habit in children consisted of mother's beliefs about feeding, child feeding practices, and children's eating behavior. children who consumed unhealthy food, such as snacks, relatively experienced low energy or calorie, while children with high consumption of unhealthy food tended to have a significant effect on experiencing health problem. The purpose of this study is to describe the eating habits of elementary school students from carbohydrate and protein sources during the pandemic. This study is a correlational study using a cross-sectional design. The population in this study were elementary school students at Mutiara Elementary School, Garuda Village, Andir District with a total of 95 students as respondents. The data collection tool in this study used a questionnaire. Data were analyzed descriptively. Carbohydrate sources that are often consumed by students are rice (100%), noodles (56.8%) and bread (53.7%). Sources of animal protein that are often consumed are chicken meat (74.7%) and chicken eggs (94.7%). Meanwhile, the most consumed vegetable protein was tofu (81.1%) and tempeh (67.4%). The food consumed by school-age children is less diverse. It is important for schools to provide education about the provision of diverse foods.

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1. Introduction

Elementary school children are children aged 6-12 years, physically stronger, have individual characteristics and are active and do not depend on their parents (Gunarsa, 2006). At this school age children's eating habits depend on social life. Sometimes school-age children are also lazy to eat due to stress or illness and tend to prefer to eat together with school friends (Hidayat, 2005). Biologically, stress does not only have an impact on the appearance of physical illness, but also affects children's eating patterns, such as eating unhealthy foods, eating the wrong portions, or eating times that are often late so they don't pay attention to their eating patterns and activities and ultimately lead to weight gain (Nisa *et al.*, 2016).

Feeding habit in children consisted of mother's beliefs about feeding, child feeding practices, and children's eating behavior. One of the habits for other child feeding practices was children's eating behavior, for both healthy and unhealthy food, according to mothers' beliefs. The high amount of food commonly sold by sellers in society, at both schools and other places, such as snacks and fast food, attracts children to eat unhealthy food. A study conducted by Rivami (2017) mentioned that children who consumed unhealthy food, such as snacks, relatively experienced low energy or calorie, while children with high consumption of unhealthy food tended to have a significant effect on experiencing stunting.

Children's eating behavior consisted of two domains, namely, children's refusal to eat and children's acceptance to eat. The low of children's eating behavior was a significant correlation with the incidence of stunting. The proportion of children refusing to eat food is higher than to accept food could put them in the risk of stunting, because the nutritional needs for growth and development are insufficient (Biondi, 2007).

The programs that are more directed at efforts to change behavior, cultivate a healthy lifestyle through health promotion activities. Because this problem can be overcome by regulating nutritional intake and good physical activity. The government has also prepared health service facilities, health workers and a surveillance system for obesity cases at the grassroots level through posyandu, puskesmas and school health units (Nirmala, 2010).

Many of dietary patterns and food preferences are formed during childhood and adolescence, and these habits are rooted in familial and school practices. Previous study has suggested that school could play an important role in shaping student's healthy eating habits as many students, especially those from low-income families, have their lunches prepared by the school cafeterias (Larson *et al.* 2011). School cafeteria policy and human and financial resources have positively influenced childhood weight issues, primarily through healthy eating and physical activity (Sharma 2006). Schools should ensure that only nutritious foods and beverages are provided in school cafeterias and other venues, and nutrition education should be part of a comprehensive health education curriculum (Kubik *et al.* 2003; Brown and Summerbell 2009).

This study aims to describe the eating habits of elementary school students from carbohydrate and protein sources during the pandemic. The results of this study are expected to be the basis for policies on nutrition education and food provision in schools during the teaching and learning process.

2. Materials and Methods

This study is a correlational study using a cross-sectional design. The data collection tool in this study used a questionnaire. The population in this study were elementary school students

at Mutiara Elementary School, Garuda Village, Andir District with a total sample of 95 upper-class students (grades 4, 5, and 6). The selection of research subjects was based on the inclusion criteria in this study, namely students who were enrolled in the dapodik at the time of the study, did not suffer from chronic and congenital diseases, and were willing to be respondents in this study. Meanwhile, the exclusion criteria were students who did not collect the complete questionnaire.

The questionnaire used in this study consisted of two parts. The first part consists of student characteristics (name, address, gender, age, parental education, parental occupation, and family income level); second, related to physical activity data, the second part contains questions about children's eating behavior using the Food Frequency Questionnaire (FFQ) to see students' eating frequency. The eating behavior analyzed in this study is food sources of carbohydrates, animal and vegetable protein. Carbohydrate sources consist of rice, noodles, bread, cereals, corn, cassava, sweet potatoes, and taro. Sources of animal protein consist of beef, mutton, chicken meat, duck meat, gizzard, liver, lungs, intestines, chicken eggs, duck eggs, quail eggs, catfish, mujair, carp, mackerel, salted, and milkfish. Meanwhile, vegetable protein sources include soybeans, green, ground, feathers, tofu, tempeh, and oncom. All data were analyzed descriptively using a frequency distribution table

3. Results and Discussion

The characteristics of respondents in this study are described in table 1 as follows:

Tabel 1. The Characteristics of respondents

No.	Variable	Total (n=95)	Percentage
1	Gender		
	- Male	44	46.3
	- Female	51	53.7
2	Father's Education		
	- Graduated from Elementary School/equivalent	13	13.7
	- Graduated from Middle School/equivalent	24	25.3
	- Graduated from Senior High School/equivalent	54	56.8
	- Graduated from bachelor/3-year diploma	4	4.2
3	Mother's Education		
	- Graduated from Elementary School/equivalent	20	21.1
	- Graduated from Middle School/equivalent	29	30.5
	- Graduated from Senior High School/equivalent	41	43.2
	- Graduated from bachelor/3-year diploma degree	4	4.2
	- Graduated from master degree	1	1.1

No.	Variable	Total (n=95)	Percentage
4	Father's Occupation		
	- Unemployed	2	2.1
	- Civil servants	3	3.2
	- Businessman	30	31.6
	- Laborer	46	48.4
	- Others	14	14.7
5	Mother's Occupation		
	- Unemployed	69	72.6
	- Civil servants	2	2.1
	- Businessman	14	14.7
	- Laborer	6	6.3
	- Others	4	4.2
6	Income level		
	- Less than the UMR	66	69.5
	- More than equal to UMR	29	30.5

Some of the respondents were female students (53.7%) with the education of the father (56.8%) and the mother (43.2%) were high school graduates/equivalent. Most of the parents' occupations are laborers (48.4%) and housewives (72.6%). Most families have income levels below the minimum wage (69.5%).

Tabel 2. Overview of Carbohydrate Eating Habits

No	Variable	Total	Percentage
1	Rice		
	- Often	95	100
2	Noodles		
	- Rare	41	43.2
	- Often	54	56.8
3	Bread		
	- Rare	44	46.3
	- Often	51	53.7
4	Cereal		
	- Rare	82	86.3
	- Often	13	13.7
5	Corn		
	- Rare	90	94.7
	- Often	5	5.3
6	Cassava		
	- Rare	84	88.4
	- Often	11	11.6
7	Potato		
	- Rare	89	93.7
	- Often	6	6.3
8	Taro		
	- Rare	95	100

Rice is the staple food of the Indonesian population, so it is consumed every day. All respondents stated that they often eat rice. Other carbohydrate sources that are also frequently consumed are noodles (56.8%) and bread (53.7%). Meanwhile, other food sources are rarely consumed by school-age children.

Instant noodles are high in carbohydrate, fat and salt, yet low in fibre, vitamins, and minerals (Gulia et al., 2014; Park, Lee, Jang, Chung, & Kim, 2011). One study among over 10,000 Korean adults found an association between instant noodles consumption and a higher prevalence of metabolic syndrome in women (Shin et al., 2014). Children from low and intermediate SES groups consumed noodles on a daily basis while carers from the high SES group referred to noodles as the occasional food or as their last option (Rahmi, et al. 2018). A study with primary school children in Vietnam reported that 50% of these children consumed at least one packet of noodles weekly, with a mean of 2.9 portions weekly (Huong, Brouwer, Nguyen, Burema, & Kok, 2007). Several researchers have acknowledged that the increasing trend of noodles consumption in Asia provides a window of opportunity to improve micronutrient intake through fortification of wheat flour – the main ingredient in instant noodles – or through the seasonings inside the noodle packet (Bronder et al., 2017; Gulia et al., 2014). Belgium and New Zealand make bread as a food that helps reduce the incidence of iodine deficiency in children by adding iodized salt in bread produced in those countries and it is reported that bread contributed 51% of total iodine intake in the food-only model, providing a mean iodine intake of 35 g/day in New Zealand and fortification of bread with iodized salt corrected iodine deficiency in Belgian children (Jones et al 2016; Vandevijvere et al 2021). Bread is a food ingredient that goes through a fermentation process so that it is rich in carbohydrates, protein, dietary fiber, containing less fat and gluten, and enriched with lactic acid, vitamins, and minerals, and can help digestive problems because it contains high fiber (Hor et al 2021). The unique and attractive form of whole wheat bread can also increase consumption of whole wheat bread in children (Kleef et al 2014).

Tabel 3. Overview of Eating Habits of Animal Protein Source

No	Variable	Total	Percentage
1	Beef		
	- Rare	86	90.5
	- Often	9	9.5
2	Lamb		
	- Rare	94	98.9
	- Often	1	1.1
3	Chicken meat		
	- Rare	24	25.3
	- Often	71	74.7
4	Duck meat		
	- Rare	95	100
5	Gizzard		
	- Rare	83	87.4
	- Often	12	12.6
6	Liver		
	- Rare	88	92.6

No	Variable	Total	Percentage
	- Often	7	7.4
7	Fried chicken lung		
	- Rare	95	100
8	Fried chicken intestines		
	- Rare	93	97.9
	- Often	2	2.1
9	Chicken eggs		
	- Rare	5	5.3
	- Often	90	94.7
10	Duck eggs		
	- Rare	94	98.9
	- Often	1	1.1
11	Quail eggs		
	- Rare	80	84.2
	- Often	15	15.8
12	Catfish		
	- Rare	89	93.7
	- Often	6	6.3
13	Tilapia fish		
	- Rare	89	93.7
	- Often	6	6.3
14	Gurame fish		
	- Rare	93	97.9
	- Often	2	2.1
15	Mackerel		
	- Rare	88	92.6
	- Often	7	7.4
16	Goldfish		
	- Rare	82	86.3
	- Often	13	13.7
17	Salted fish		
	- Rare	86	90.5
	- Often	9	9.5
18	Milkfish		
	- Rare	95	100

From Table 3, it can be shown that the animal protein sources that are often consumed by students are chicken meat (74.7%) and chicken eggs (94.7%). Poultry meat is the main commodity consumed by many Indonesians to meet their animal protein needs, followed by beef (Rusdiana S & Maesya A 2017). Chicken meat contains 18 essential amino acids needed by the body and plays a role in repairing damaged cells and the growth of cells in the body, in addition, a study shows that poultry meat reared in highlands such as the city of Bandung has better quality (Qurniawan et al 2016; Yogyakarta Agricultural Technology Research Center 2007). In addition to poultry meat, children aged 6 months-12 years who live in urban areas consume more eggs when compared to children living in rural areas who consume more marine fish as a fulfillment of their protein intake (Sumedi et al 2013). Eggs are known as a cheap source of animal protein, delicious in taste, easy to serve and contain 8 types of amino acids

that have fast digestion, fat, carbohydrates, calcium, phosphorus, vitamin A and vitamin B (Suswono & Sedyaningsih 2010).

Tabel 4. Overview of Eating Habits of Vegetable Protein Source

No	Variable	Total	Percentage
1	Soy beans		
	- Rare	94	98.9
	- Often	1	1.1
2	Mung beans		
	- Rare	87	91.6
	- Often	8	8.4
3	Peanuts		
	- Rare	94	98.9
	- Often	1	1.1
4	Tofu		
	- Rare	18	18.9
	- Often	77	81.1
5	Tempeh		
	- Rare	31	32.6
	- Often	64	67.4
6	Oncom		
	- Rare	94	98.9
	- Often	1	1.1
7	Edamame		
	- Rare	94	98.9
	- Often	1	1.1

Based on table 4, it shows that the vegetable proteins that are often consumed are tempeh (67.4%) and tofu (81.1%). Tofu and tempeh are made from soybeans which contain isoflavones which help reduce the risk of heart disease and lower blood cholesterol levels (Koswara 2006). Tempe is known as a fermented food that has an umami taste and as a result of the fermentation process tempe produces other nutrients such as specific bioactive peptides are produced as a result of hydrolysis of soybean proteins (Glycinin and Conglycinin) with respective health benefits such bioactive peptides may act like regulatory compounds and exhibit bioactive properties such as anti-hypertensive, antimicrobial, antioxidant, anti-diabetic and anticancer activities (Sanjukta S & Rai AK 2016; Amin MNG et al 2020).

Descriptive results show that students eat less variety. Eating a variety of foods consisting of staple foods, side dishes, vegetables, fruits and water became one of the important points in the Balanced Nutrition Message which was socialized in the Regulation of the Minister of Health of the Republic of Indonesia Number 41 of 2014 concerning Guidelines for Balanced Nutrition (Ministry of Health of the Republic of Indonesia). Indonesia 2014). In essence, humans need up to 45 types of nutrients that must be obtained from food so they need to eat a variety of foods (Suryana A 2008). A study shows that the food consumption of the Indonesian people is quite diverse and it would be even better if it could reduce rice consumption and increase the consumption of tubers, animal foods, vegetables and fruit significantly to reach the Hope Food Pattern (PPH) (Ariani M 2010).

Parents having infants and preschoolers played an important role in deciding which food consumed by their children, responding to the children's desire to eat, and deciding the sufficient amount of food for their children. Besides, the children had already had a desire to eat food they like or dislike (Birch, Fisher, Grimm-thomas, Markey, Sawyer, & Johnson, 2001). The children's desire to choose food will allow the possibility of children to have eating behavior that is not appropriate with the efforts to fulfill the children's optimum nutrition. On the other hand, parents should have a good ability to control the feeding to their children (Rahma). Initiating improperly feed weaning food positively and directly correlated with stunting in children (Abeway, Gebremichael, Murugan, & Assefa, 2018).

Characteristics of respondents indicate that most have incomes below the minimum wage. Money appeared to be an important issue in the decision-making to provide healthier food in the low and intermediate Socio-Economic Status (SES) mothers. They would not have enough money to buy healthy food/ingredients (Hardcastle & Blake, 2016; Petrunoff et al., 2014). The mothers decide to put quantity over quality when money is limited (Dammann & Smith, 2009).

The combination of individual, environmental, and policy-level interventions need to achieve substantial positive changes in healthy behavior. Children's healthy eating habits can only be formed by collaborative efforts among families, schools, communities, and policymakers. Each community needs to start a conversation about childhood obesity by bringing together schools, faith and community-based organizations, businesses, and so on (Jung, et.al).

4. Conclusions

Elementary school children get the main source of carbohydrates from rice (100%) and other carbohydrate sources that are often consumed are noodles (56.8%) and bread (53.7%). Meanwhile, sources of animal protein that are often consumed by students are obtained from chicken meat (74.7%) and chicken eggs (94.7%), while vegetable protein sources are obtained from consuming tempeh (67.4%) and tofu (81.1%).

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