Quality of consumption and nutritional status of preschool children

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ABSTRAK

Latar Belakang: *Usia prasekolah di Indonesia berkisar antara 3-6 tahun yang dimana pada masa ini telah memasuki masa growth plateau. Pada usia inilah kebiasaan anak mulai terbentuk, salah satunya adalah kebiasaan makannya. Hasil Riskesdas 2018 balita di Indonesia memiliki prevalensi status gizi sangat kurus, gizi buruk 10.2% dengan rincian 3.5% sangat kurus, status gizi kurang 6.7%, dan gizi lebih 8%. Salah satu faktor yang mempengaruhi status gizi adalah asupan makanan dan saat ini masih banyak orang yang beranggapan bahwa anak bisa makan apa saja tanpa memperhatikan kualitasnya.*
Tujuan: *Menganalisis hubungan antara kualitas konsumsi terhadap status gizi anak prasekolah di Kelurahan Sukabumi Selatan.*
Metode: *Desain penelitian yang digunakan adalah penelitian cross sectional dengan sampel 47 anak prasekolah dari TK An Nurmaniyah dan RA Al Ma'mur. Teknik analisis data menggunakan uji Chi Square. Pengumpulan data dilakukan dengan menggunakan Food Record 3x24 jam yang akan dianalisis menggunakan metode Diet Quality Index - International (DQI-I) dengan bantuan Microsoft excel 2013 dan untuk status gizi diukur menggunakan timbangan berat badan digital dan microtoise.*
Hasil: *sebanyak 91,5% anak usia prasekolah dalam penelitian ini memiliki kualitas konsumsi yang rendah dan sebanyak 57,4% berstatus gizi normal dengan pendapatan orang tua dalam kategori lebih dari 4 juta sebanyak 51,1%. Hasil penelitian menyatkan bahwa tidak ada hubungan antara kualitas konsumsi dengan status gizi anak prasekolah di Kelurahan Sukabumi Selatan (p=0.298, p>0.05). Hal tersebut dikarenakan ada faktor lain selain kualitas konsumsi yang mempengaruhi status gizi anak prasekolah, seperti status infeksi, pola konsumsi rumah tangga dan akses pangan.*
Kesimpulan: *Dapat disimpulkan bahwa kualitas konsumsi tidak berhubungan dengan status gizi anak prasekolah di Kelurahan Sukabumi Selatan*

KATA KUNCI: *anak prasekolah; DQI-I; kualitas konsumsi; status gizi*

ABSTRACT

Background: *Preschool age in Indonesia ranges from 3-6 years which in this period has entered a growth plateaua. At this age that children's habits begin to form, one of which is eating habits which include eating habits. The results of Riskesdas 2018 under five years in Indonesia have a prevalence*

of very thin nutritional status, of 3.5% for malnutrition, 6.7% for underweight nutritional status, and 8% obesity. One of the many factors that affect nutritional status is food intake and currently, there are still many people who think that children can eat everything without regardless of the quality.

Objectives: *To analyze the relationship between quality of consumption on the nutritional status of preschool children in Kelurahan Sukabumi Selatan.*

Methods: *This research using a cross-sectional design with the sampels are 47 preschool children from An Nurmaniyah Kindergarten and RA Al Ma'mur. Data analysis technique using Chi Square test. Data was collected using a 3x24 hours Food Record which will be analyzed using the Diet Quality Index - International (DQI-I) method with the Microsoft Excel 2013 and nutritional status was measured using a digital weight scale and microtoise.*

Results: *Most of preschool-aged children in these two kindergartens have low quality of consumption as much as 91.5% and have normal nutrition status as much as 57.4% with their parents' income in the category of more than 4 million as much as 51.1%. The result stated there is no relationship between the quality of consumption and the nutritional status of preschool-aged children in Kelurahan Sukabumi Selatan. (p=0.298, p>0.05). This is because any other factors besides the quality of consumption that affect the nutritional status of preschoolers, such as infection status, household consumption patterns and access to food.*

Conclusion: *It can be concluded that the quality of consumption is not relationship between the nutritional status of preschool children in Kelurahan Sukabumi Selatan.*

KEYWORDS: *DQI-I; nutritional status; preschool children; quality of consumption.*

INTRODUCTION

WHO stated that there are 3 groups of nutrition problems in the world, malnutrition (stunting and underweight), malnutrition in the cause of micronutrients, and excess nutrients (overweight up to obesity). According to the results of Riskesdas (2018), toddlers in Indonesia take in a percentage of 10.2% undernourished and 8% over nutrition. One of the factors that can affect the nutritional status of preschool-aged children exist as the child's food intake, both in terms of quantity and quality of consumption (2). Preschool-aged children tend to act on the tastes of their families and their environment, postpone their meal time due to the fact that they chose to play and prefer snacks rather than the main meals provided at home (3).

The majority of parents have a less attention to the quality of food both for their children and families. Usually, parents give the food for their children based on their preferences. They only focus to the food quantity for their children not to the quality like the variation, nutritional balance, and moderation of food which is just as important to help child's growth and development as provisions for their future.

On the part of research from Agustia & Sitasari (2013), Victory disclosed that preschool-aged children who are classified as having malnutrition status would have a great risk of becoming short in adulthood, and according to Dietz, preschool-aged children who have overweight status are at risk of obesity and high blood pressure in their adulthood (4). In order to prevent that, it can be said that in preschool period it is necessary to monitor children's food, but apart from the quantity of food that needs to be considered, the quality of consumption also needs to be monitored. This study assesses the quality of a person's consumption based on 4 things which include: 1. The variation of food, 2. Adequacy of food consumed, 3. Nutritional

values of moderation, and 4. The balance ratio of the food consumed (5).

On the basis of preliminary survey, in this kindergarten children have a variety and composition of food dishes that do not vary everyday, food processing that does not vary, high consumption of low-nutrient food but high in calories and there are still parents who claim to be less concerned with the food their children eat in the meaning of they still give food which their children like, less concerned of the variety of food and the processing. For example, often the combination of packed meal that are brought are nuggets with rice, friend chicken with rice, light snacks for instance chips, biscuits, cilor, sausages, and other fried food.

Based on the explanations above, the researchers are interested to conduct research about "The Relationship between the Quality of Consumption Quality and Nutritional Status of Preschool Children in Kelurahan Sukabumi Selatan".

MATERIALS AND METHODS

This used quantitative research using cross-sectional studies. The time of research were from March 2021 to August 2021 which was held out in 2 research places, there are An-Nurmaniyah Kindergarten and Al Ma'mur Kindergarten in Kelurahan Sukabumi Selatan. The population in this research are 54 people from 33 students in Al Ma'mur Kindergarten and 21 children in An-Nurmaniyah Kindergarten. The sampling technique used the purposive sampling method until finally reached samples of 47 children. The inclusion criteria that were enforced in this study: children were present when the study took place, children aged 4-6 years, children with student status in Al Ma'mur and An-Nurmaniyah Kindergarten with the following exclusion criteria: the respondent decided to stop during the study, transferred children in the middle of the study, the child was sick. The data collected were sample's characteristics age, gender, parent's income,

and consumption quality and nutritional status. Sample's characteristics using google form questionnaire, 3x24 hours Food Record form to measure the quality of consumption and accompanied by the attachment of Food Photograph and nutritional status which measures height and weight using a digital weighing scale and microtoise.

Data processing is carried out using particular nutritional calculation and statistics software. The consumption quality data is processed using Diet Quality Index – International (DQI-I) through Microsoft Excel 2013, with low consumption quality if DQI-I score <60. Data on the weight and height is processed into nutritional status data based on BMI/U according to the Z-score of Permenkes 2020 where the nutritional status is said to be abnormal if the Z-score is <-2 SD and >+1 SD and the nutritional status is said to be normal if the Z-score ≥-2 SD ≤+1 SD (6). For bivariate using Chi Square Test. This research has an Ethical Approval with number: 0099-21.099/DPKE-KEP/FINAL-EA/UEU/IV/2021 issued by the Ethics Commission of Esa Unggul University.

RESULTS AND DISCUSSIONS

Frequency Distribution of Subject Characteristics, Quality of Consumption and Nutritional Status. The children mostly from Al Ma'mur Kindergarten as much as 57.4% and dominated by female sex as much as 53.2%, 6 years olds as much as 57.4%, with their parents' income in the category of more than 4 million as much as 51.1%. Most of preschool-aged children in these two kindergartens have low quality of consumption as much as 91.5% and have normal nutrition status as much as 57.4%. Boys tend to have a higher food intake when compared to girls, but girls tend to have a higher pattern of food acceptance and appetite than boys (7). Parents's income also influences the choice of the type and quality of food consumed

(8).   At the age of 4-6 years, children go through a change in terms of eating patterns where children's consumption is still regulated by their parents because they're still dependent on their parents and family. Therefore, mothers have a big role in regulating their family's food consumption (9). The quality of consumption in this study was seen from 4 aspects, not only the type or variation or diversity but also from the adequacy, the total score of moderation and the balance ratio of macronutrients and fatty acids. The results showed that 91.5% of children had low consumption quality based on the total variation, adequacy, moderation, and nutrinitional balance.

Tabel 1. Frequency Distribution of Subject Characteristics, Quality of Consumption and Nutrition Status

Subject Characteristics	Frequency	%
School Origin		
An Nurmaniyah Kindergarten	20	42.6
Al Ma'mur Kindergarten	27	57.4
Age		
4 Years Old	1	2.1
5 Years Old	19	40.4
6 Years Old	27	57.4
Gender		
Female	25	53.2
Male	22	46.8
Parent's Income		
<Rp. 4.000.000	19	40.4
≥Rp. 4.000.000	28	59.6
Quality of Consumption		
Low	43	91.5
High	4	8.5
Nutritional Status		
Abnormal	20	42.6
Normal	27	57.4

The results of this study are in line with the research conducted by Wahyuningsih et al. (2020) which states that 100% of children in Kasepuhan Ciptagelar are classified as having low consumption quality and as many as 95.45% of children in Kasepuhan Sinar Resmi are classified as having low consumption quality (10). This is also proven by the research of Prasetyo et al. (2013) which states that the majority of children aged 2-6 years have low consumption quality, especially in micronutrients including calcium, vitamin C, vitamin B9, and vitamin A (11).

Overview of Quality of Consumption Based on the Category

Based on the consumption quality assessment method used in this study, the quality of consumption is classified as good if it's characterized by the variety and variation in the menu composition of the dishes consumed. It means that one meal must consist of 4 food groups, such as carbohydrates, side dishes, vegetables and fruits with various types of food. In addition, they must consume food in sufficient quantities, do not consume foods that contain high fat and high energy but eat foods that are low in nutrients and have a balanced ratio of both macronutrients and fatty acids.

When compared to children with low quality of consumption, the average total score of variation is 13.70±3.75 from a maximum score of 20, with a 10.81±2.60 moderation total score from a maximum score of 40, and a 0.51±1.32 nutritional balance score from a maximum score of 6. Whereas children with high quality of consumption produce the average total variation score of 18.00±2.45 from a maximum score of 20, with a 27.25±3.78 average total adequacy from a maximum score of 40, and a 16.50±3.00 moderation total score from a maximum score of 30, along with a 1.00±1.16 nutritional balance from a maximum score of 6.

If observed from the food record result, there are children with high quality of consumption who do not consume 1 food group/day but mostly consume ≥1 serving of meat/poultry/fish/egg, dairy product/nuts, carbohydrate, fruit, vegetable with at least 2 different protein sources every day. In contrast to children with low quality of consumption

Tabel 2. Overview of quality of consumption based on the category

Component	Quality of Consumption			
	Mean±SD		Min-Max	
	low	high	low	high
Total variation	13.70±3.25	18.00± 2.45	4-20	15-20
Variety – food groups (type)	9.98±2.76	13.5± 1.732	3-15	12-15
Variety – protein sources (type)	3.72±1.18	4.50± 1.35	1-5	3-5
Total adequacy	18.67±4.67	27.25± 3.78	10-28	24-31
Vegetable group (portion)	2.40±1.56	2.25± 2.22	0-5	0-5
Fruit group (portion)	0.77±1.15	4.00± 1.16	0-3	3-5
Carbohydrate group (portion)	4.14±1.25	5.00± 0	0-5	5-5
protein (%)	5.00±0.00	5.00± 0	5-5	5-5
fiber (gr)	1.14±0.52	2.00± 1.16	1-3	1-3
iron (mg)	2.30±1.15	2.50± 1.92	1-5	1-5
calcium (mg)	1.42±0.93	2.00± 2	1-5	1-5
vitamin C (mg)	1.51±1.08	4.50± 1	1-5	3-5
Total moderation	10.81±2.60	16.50± 3	6-18	12-18
Total fat (%)	0.21±0.77	2.25± 1.5	0-3	0-3
Saturated fat (%)	0.97±0.46	1.50± 1.32	0-3	0-3
Cholesterol (mg)	3.98±2.24	6.00± 0	0-6	6-6
Sodium (mg)	5.93±0.46	6.00± 0	3-6	6-6
Empty calorie food (%)	0.63±1.54	0.75± 1.5	0-6	0-3
Total nutrinitional balance	0.51±1.32	1.00± 1.16	0-6	0-2
Macronutrient ratio (%)	0.47±1.29	1.00± 1.16	0-6	0-2
Fatty acid ratio (%)	0.05±0.31	0.00± 0	0-2	0-0
Total score	43.7±7.57	62.75± 2.22	26-60	61-66

where every day most do not consume 1-2 food groups/day and some even do not consume 4 food groups/day and most of the children in this group consumed 2 different protein sources every day but there are some who consumed 1 protein source/day. However, even so, when viewed again, all children, both childrenwith low and high quality of consumption, still have scores that are far from the maximum score, therefore it can be said that the majority of children have low consumption quality scores. Meanwhile in the Pedoman Gizi seimbang have stated that it is better for a person to eat variety of foods in appropriate portions (12). Food groups that commonly consumed by children with high consumption quality are tofu, tempeh, fish, eggs, chicken and their products, meat, rice, bread, carrots, corn, beans, potatoes, spinach, oranges, papaya and bananas. Meanwhile the foods that are included in the moderation category that are commonly consumed are nuggets, sausages, fried chicken, sweets, powdered drinks, and ciki. The processing method that is often used are fried, sauteed and boiled. On the other hand, the food groups that commonly consumed by children with low consumption quality are tofu, tempeh, fish, eggs, chicken and their products, shrimp, squid, milk, rice, bread, carrots, potatoes, spinach, mustard greens, papaya, bananas, oranges, grapes and dragon fruit. Foods that are included in the moderation category that commonly consumed are nuggets, sausages, fried meatballs, ice cream, chocolate bars, biscuits, pizza, and ciki. The processing method used in this group are fried, sauteed, baked, baked and boiled, but the most commonly used is deep fried.

Based on the adequacy score, children with high quality of consumption tend to have higher scores than children with low quality of

consumption, especially in the groups of fruit, carbohydrates, fiber, iron, calcium and vitamin C. However, based on the maximum score of the adequacy assessment there are still many children whose nutritional adequacy is not fulfilled. Especially in the adequacy of fruits, which is dominated by children who are accustomed to not consuming fruits and vegetables in one day. This indicates that the adequacy of fiber, adequacy of iron, calcium and vitamin C are still quite low. One of the causes is the surrounding environment which also affects the quality of consumption, the availability of unhealthy food at near from home can reduce fiber consumption (9). Meanwhile in the AKG (2019), it is recommended to consume as much as 20 grams of fiber/day, 10 milligrams of iron/day, 1000 milligrams of calcium/day, and 45 milligrams of Vitamin C/day for children aged 4-6 years (13).

The conclusion is the results of this study are in line with the research of Wahyuningsih et al. (2020) which revealed that children tend to prefer food consumption from the carbohydrate and protein groups rather than the vegetable, fruit, and dairy groups (10). Whereas the body does not only need carbohydrates and protein, but it also needs other nutrients. According to researchers at this age, the habit of consuming fruits and vegetables must be accustomed so that children grow up to have these habits in the future because the Pedoman Gizi Seimbang stated that vegetables and fruits are sources of various vitamin, mineral, and dietary fiber that act as body antioxidants, helping improve digestion and help reduce the risk of constipation and obesity later in life. In addition, there is calcium nutrition that plays an important role in bone formation, height growth, and reduces the risk of fractures and osteoporosis in old age. Therefore, calcium is one of the important minerals that must be fulfilled at children's age (14).

Furthermore, the average moderating score of children with high consumption quality is higher than children with low consumption quality. It means that children with low consumption quality consume more foods that are low in nutrients but high in consumption of foods that are high in fat, especially saturated fat, cholesterol and sodium. This is indicated by the way of processing food that is often used which is the technique of frying with food ingredients such as nuggets, sausages, chicken, tofu, tempeh, eggs, and others as well as frequent consumption of snacks such as ciki, biscuits, wafers, chocolate, ice cream, ice powder in a package, and others. In fact, when the habit of consuming foods that are high in energy content but low in nutrients that are more than the nutritional needs per day is allowed from preschool age, it can increase the total energy intake than it should until it can eventually trigger the emergence of a non-communicable disease, such as obesity, heart disease, high blood pressure, and other.

The last is the assessment of nutritional balance, starting from the assessment of the balance of the ratio of macronutrients such as protein, fat and carbohydrates. It was found that 86% of children with low consumption quality and 50% of children with high consumption quality had macronutrient ratios that were still not balanced. Whereas at this time children need a balance of nutrients to help the body grow and develop optimally (15). Macronutrients such as carbohydrates, proteins, and fats are contributors to energy sources for the body, so the balance of macronutrients must be considered. Unbalanced and uncontrolled macronutrients can lead to abnormal nutritional status such as overnutrition or undernutrition. When the body lacks energy, the body will use the glucose that has been stored into glycogen to be converted into energy. If this keeps happening until the glucose reserves have been exhausted, then what happens next is that the body will use fat to get energy until the body's fat reserves run out. When the glucose reserves from carbohydrates and fats have been exhausted, it is protein that will be used by the body as a source of energy (16).

Based on the assessment of the balance of fatty acid ratios, it was found that 97.7% of

children with low consumption quality and all high quality children had an imbalance in the fatty acid ratio, where most children still used saturated fatty acids compared to unsaturated fatty acids. In this study, all children with high consumption quality consumed foods that were high in total fat, cholesterol, and saturated fat (SFA) such as palm oil and fried foods like nuggets, sausages, chicken, fish, fried tofu and tempeh, pizza. This causes an imbalance in the ratio of fatty acids as measured by PUFA/SFA or MUFA/SFA. PUFA and MUFA are good fatty acids that can be function as protective for our bodies. These fatty acids are important nutrients in the preschool period because they play an active role in their growth and development, especially in their brain intelligence (17).

Tabel 3. Relationship between Quality of Consumption and Nutritional Status

Quality of Consumption	Nutritional Status				total		p-Value
	abnormal		normal				
	n	%	n	%	n	%	
Low	17	36.2	26	55.3	43	91.5	
High	3	6.4	1	2.1	4	8.5	0.298
Total	20	42.6	27	57.4	47	100	

Relationship between quality of consumption and nutritional status

The results showed that children with low quality of consumption consist of 55.3% children with normal nutritional status and 36.3% of children with abnormal nutritional status, whereas children with high quality of consumption consist of 2.1% children with normal nutritional status and 6.4% children with abnormal nutritional status. The p-value obtained is 0.298; p>0.05 which means that the p-value results indicate that there is no significant relationship between the quality of consumption and the nutritional status of preschool children in Kelurahan Sukabumi Selatan.

The results showed that the majority of children had normal nutritional status, this happened because of the income of their parents, where the majority of children came from families with incomes above 4 million which it could be said that the family was able to prepare and provide food to fulfill the food needs of their children. There is also an easy access to food in this research area, quite a lot of food stalls, snack shops, grocery shop and vegetable sellers as well as markets that are close to this environment so that it can be said that families are able to supply their food needs. This is in accordance with a research by Firna et al., (2018) which reveals that food access and food consumption are indicators that have a direct and indirect effect on health through changes in nutritional status (18).

However, when the relationship between consumption quality and nutritional status was analyzed statistically, it turned out to be an insignificant value, this is presumably because most of the subjects in this study had low consumption quality. This is also supported by a statement according to UNICEF (1990) where the nutritional status of children is not only influenced by the intake and quality of consumption, but the nutritional status of children has many factors such as infection status, availability and patterns of household consumption, parenting patterns, health services in the environment, food purchasing power, food access, and others.

Besides, most of the research subjects who had low consumption quality in this study

had good nutritional status. According to the researcher, based on the results of the food record for 3 days (2 days in weekdays and 1 days in weekend) it is because the majority of children with normal nutritional status often to eat foods that are low in nutrients but high in energy, so most children with normal nutritional status have low quality of consumption. Although most of the children in this study consumed a fairly varied diet, the level of nutritional adequacy and the balance of the ratio of macronutrients and fatty acids was still relatively low. This can be caused by the influence of various factors such as sufficient purchasing power, availability of high-energy and low-nutrient foods in several types of fast-food and high-energy-low-nutrient snacks around the environment, family knowledge about poor nutrition, and also genetic factors.

In the case of children with abnormal nutritional status but having a high quality of consumption, it can be happen because the child has consumed a variety of foods, so that the adequacy score is quite high, especially in the consumption of carbohydrates and protein groups, where a high total moderate score is indicated by consumption low in cholesterol and sodium. For this reason, children with abnormal nutritional status can also have a consumption quality score > 60 and if this continues to be maintained, it is possible that in the future their nutritional status can change for the better, because children who have good consumption quality tend to have poor nutritional status (10).

In the future research is expected to accompany other factors such as infection status, availability and patterns of household consumption, parenting patterns, health services in the environment, food purchasing power or food access to identify determinants of nutritional status in preschool children.

CONCLUSIONS AND RECOMMENDATIONS

This study proves that there is no significant relationship (p = 0.298; p>0.05) between the quality of consumption and the nutritional status of preschool children in Kelurahan Sukabumi Selatan. This is presumably because most of the subjects in this study had low consumption quality but had good nutritional status. This is because children with low consumption quality with good nutritional status often consume fried foods or foods low in nutrients but high in energy, which can cause the child's daily calorie needs to be fulfilled and it can be a reason why the quality of consumption of most children with normal nutritional status classified as low. However, the influence of various factors such as sufficient purchasing power, the availability of high-energy and low-nutrient foods such as several types of fast-food and high-energy low-nutrient snacks around the environment, family knowledge about poor nutrition, and other genetic factors need to be considered. For this reason, researchers can provide education to parents and teachers through counseling about the importance of quality food intake for preschool children.

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