The pattern of food consumption and nutritional status of primary school students based on socio economic aspects

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Abstract. Food is a basic need that is the right of every human being. Food quality determinants are the diversity of food, nutritional balance and food security. During childhood growth requires adequate nutrient intake to grow optimally and not susceptible to disease. The aim of the research is to know the pattern of food intake, food diversification and nutritional status of elementary school children in Tanete Riattang Barat sub-district, Bone regency, South Sulawesi and also to analyze the correlation between socioeconomic characteristic with food culture and nutrient sufficiency level that impact on elementary school children in Tanete Riattang Barat sub-district, Bone regency, South Sulawesi. This research uses a quantitative method. The locations are in three elementary schools in Tanete Riattang Barat Subdistrict, Bone Regency, South Sulawesi. The results of this study were the most significant consumption level of elementary school children is in the oily fruit seed group. At the time of diversification food reached an adequate category and most children had normal nutritional status. There is a significant correlation between socioeconomic and children's food consumption patterns in the types of grain, animals, oil and fat, sugar, vegetables and fruits, and other types of food and there is no significant correlation with the types of tubers, nuts oily nuts and seeds. Then between socio-economic and nutritional adequacy of children showed a significant relationship.

1. Introduction

Food is a basic need that is the right of every human being and is one of the determinants of the quality of human resources. The determinants of food quality are the diversity of food types, nutritional balance and food security. It is realized that nutritional imbalances due to food consumption that is less diverse will have an impact on the emergence of nutritional problems, both malnutrition and more.

In this regard, various policies and programs have been taken by the government to increase the quantity and quality of food consumption. Some government policies such as Presidential Instruction No. 14 of 1974 concerning "Improving the People's Food Menu, the 1988 GBHN on increasing food production, UU NO. 7 TH 1996 concerning food security, PP 68/2002 concerning Food Security Article 9 which states about public awareness to consume various ingredients with the principle of balanced nutrition.
Some of the policies above have not provided optimal results in the context of diversifying food consumption. Until now, Indonesia still faces the problem of quality food consumption as indicated by the score of Expected Food Patterns (EFP) and the fragility of food security. Based on data Susenas 2016 the EFP score has only reached 85.24, where the ideal score is 100. While the indicator of weak food security at the household level is indicated by (a). Population prone to food insecurity (consumption < 90% of AKG). Of these, 32.73 million of them are very vulnerable populations (consumption of < 70% AKG); (b). Kids Under five are still quite large at 4.66 million in 2015 [1].

The highest prevalence of shortness and emaciation occurred in the group of children aged 6-12 years. More than a third (36.5%) of school-aged children in Indonesia are relatively short, which is an indicator of chronic malnutrition. The social service office of South Sulawesi noted that the three regions had the poorest population, namely Bone Regency, Gowa Regency and Makassar City. Of the three, Bone Regency occupies the top position with the highest number of poor people. Based on data from the national team for the acceleration of poverty reduction, the number of poor people in Bone Regency is 314,569 people from 80,157 households. Bone Regency there are eight sub-district and the largest population is in Tanete Riattang Barat Sub District and there are 1,887 poor people.

According to the health office in Bone Regency, the number of nutritional cases in Bone Regency in 2017 was found to be 581 under normal or a warning status for elementary school children or 5%, with the distribution of findings in 38 public health center (Puskesmas). At Puskesmas Watampone, there were 7 cases of malnutrition. Nutrition data collection at the health office focuses on elementary school children aged 6-7 years. While the growth and development period of the body and brain of children is at the age of 6-12 years. Children who have not fulfilled nutrition at that time will make children unable to grow optimally and susceptible to disease. Especially in Tanete Riattang Barat Sub District which has 34 Elementary Schools and 6,526 students. The purpose of this study is to determine the pattern of food consumption, food diversification and nutritional status of elementary school children in Tanete Riattang Barat Sub District, Bone Regency, South Sulawesi. The second is to analyze the relationship between socio-economic characteristics and food culture and the level of nutritional adequacy that affects elementary school children in Tanete Riattang Barat Sub District, Bone Regency, South Sulawesi.

2. Methods
The research method used was cross sectional because this study of independent and dependent variables will be observed at the same time. Whereas to describe the factors related to nutritional status are reviewed prominently. For first research purposes, regarding the pattern of food consumption, food diversification and nutritional status of elementary school children in Tanete Riattang Barat sub-district, Bone Regency, South Sulawesi, the analysis used was descriptive data analysis. For the second study, regarding the relationship between socio-economic characteristics and food culture and the level of nutritional adequacy that affected elementary school children in Tanete Riattang Barat Sub District, Bone District, South Sulawesi, were analyzed using bivariate correlation. Bivariate analysis is an analysis carried out on two variables that are thought to be related or correlated [2].

The relation of socioeconomic and food consumption trend was analyzed with Spearman correlation model. The level of relationship correlation between those variables was calculated by using a Spearman rank test.

The following are guidelines for giving interpretations and analysis of correlation coefficients according to [3]:

- 0.00 - 0.199 = very low
- 0.20 - 0.399 = low
- 0.40 - 0.599 = medium
- 0.60 - 0.799 = strong
- 0.80 – 1.000 = very strong
The analysis used in knowing the relationship between nutritional adequacy and socioeconomic is Binary Logistic Regression. Binary logistic regression is used when there are only two possible response variables, in this study using enough and not enough. Getting the data needed, the following are the methods and measuring instruments for each variable:

a. Nutritional status
Nutritional status is a condition that shows a person's nutritional state. The method used to determine nutritional status is the measurement of body weight using tread scales with an accuracy of 0.1 kg and height measurements using a height gauge (microtome) with the accuracy of 0.1 cm while measuring the grip of the hand using a hand dynamometer. Then put in the BMI formula (Body Mass Index).

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BMI = \frac{BW}{(BH)^2}
\]  

Information:
BW : Body Weight in kilograms (kg)
BH : Body Height in meters (m)

b. Food consumption pattern
The pattern of food consumption is a variety of information that provides an overview of the frequency of consumption and the type of food consumed. The tool used is the food frequencies & recall questionnaire 7x24 hours which refers to food classification according to the FAO (Food and Agriculture Organization).

c. Food diversification
Food diversification is the diversity of food consumption. In measuring food diversification using a questionnaire based on the calculation of Expected Food Patterns (EFP) which refers to the results of the National Food Nutrition Widyakarya X.

d. Nutritional adequacy
Adequacy of nutrition is adequate daily nutrient consumption to meet nutritional needs. The tool used to measure nutritional adequacy is a Basal Metabolism Rate (BMR) calculator and nutrisurvey application that refers to FAO (Food and Agriculture Organization).

e. Socioeconomic characteristics
The socioeconomic characteristics of parents include the employment status of parents to fulfill their needs, the level of education that has been followed by people formally old, and wages earned by parents from working in a government, private, and entrepreneurial institution Interviewing parents of elementary school students.

3. Results and discussion

3.1. Characteristics of elementary school children in Tanete Riattang Barat Sub District, Bone Regency in 2018.
The age of elementary school children ranges from 6 to 12 years, based on the distribution of the average age is 8.5 years. Respondents included the category of school age children, namely 6 to 12 years. The number of children sampled was 37 person with a percentage of female sex of 48.7% (18 person) and male sex of 51.3% (19 person) [4].

3.2. Characteristics of family of primary school children in Tanete Riattang Barat Sub District, Bone Regency in 2018.
In this study, the highest proportion of education for fathers and mothers is high school with a percentage of 62.1%. Husaini [5] added that the higher the level of education of parents, the higher the knowledge that influences the selection of daily food. Employment status of the respondents parents in this study there were more than half of the respondents (64.8%) as housewives. Employment of mothers as entrepreneurs is second place with a percentage of 16.2%. The smallest proportion of mothers of respondents working in honorary fields is 2.7%. The results show that some mothers have more time to care for and care for their children because mothers do not work outside the home to make a living. According to Suhendri [6], mothers who does not work in the family can affect children's nutritional consumption. Because mothers act as caregivers and regulators of food consumption of family members.

The level of income of parents varies from less than IDR 1,000,000 to more than IDR 3,000,000. There are three parents of respondents (8.1%) who have an income of IDR 1,000,000. Furthermore, the highest income (35.1%) of the parents of the respondents had income between IDR 1,000,001 - IDR 2,000,000. Furthermore, there are (27%) parents who have an income of IDR 2,000,001 - IDR 3,000,000. Then there are (29.7%) parents who have an income of more than IDR 3,000,001. Whereas in expenditure, there were eight parents of respondents (21.6%) who had an expenditure of IDR 1,000,000. Furthermore, the highest expenditure (40.5%) of the respondents parents had income between IDR 1,000,001 – IDR 2,000,000. Furthermore, there are (21.6%) parents who have an income of IDR 2,000,001 – IDR 3,000,000. Then there are (18.9%) parents who have an income of more than IDR 3,000,001. Expenditures in this study include education, health, household costs such as electricity and water costs, consumption and other costs.

Knowledge of maternal food and nutrition consumption in this study includes knowledge about food quality, food hygiene, food management, nutritious food, immunization and breakfast for children. The results showed that there were 70.2% of mothers who had good knowledge about food consumption and nutrition, but 29.7% of mothers of respondents who had less knowledge.

Socio-economic level of student parents in Tanete Riattang Barat Sub District, Bone Regency is mostly in the moderate category as many as 25 children (67.5%), followed by a high category of eight children (21.6%) and there are as many low categories four children (10.8%).

3.3. Univariate analysis

3.3.1. Overview of the nutritional status of elementary school children in Tanete Riattang Barat Sub-District, Bone Regency in 2018. The nutritional status of children in this study was measured using anthropometric measurements with a sample aged 6-12 years. The results of the study on the nutritional status of elementary school students in Tanete Riattang Barat Sub District, Bone Regency were obtained by measuring student height and weight as follows:

| Nutritional status | Frequency (F) | Percentage (%) | Frequency (F) | Percentage (%) | Frequency (F) | Percentage (%) |
|--------------------|---------------|----------------|---------------|----------------|---------------|----------------|
| Very thin          | 2             | 5.4            | 0             | 0              | 2             | 5.4            |
| Thin               | 2             | 5.4            | 1             | 2.7            | 3             | 8.1            |
| Normal             | 9             | 24.3           | 12            | 32.4           | 21            | 56.7           |
| Fat                | 2             | 5.4            | 2             | 5.4            | 4             | 10.8           |
| Obesity            | 4             | 10.8           | 3             | 8.1            | 7             | 18.9           |
| Total              | 19            | 51.3           | 18            | 48.6           | 37            | 100            |

Table 1 showed that the nutritional status of elementary school students is in the normal category with a percentage of 56.7%, thin 8.1%, fat 10.8%, very thin 5.4%, and obesity 18.9%. Male and female
students the dominant nutritional status category was normal with the percentage of male students 24.3% and female 32.4%. Based on the facts in the field, the various nutritional status of children is caused by different eating habits of children. Children who have good nutritional status eat an average of three times a day while those who are on average twice a day are obese on average more than three times a day.

Although there were 56.7% of elementary school children whose nutritional status was in the normal category, there were still many children whose handgrip strength was weak. The following is the distribution of respondents based on group groups the level of handgrip strength.

**Table 2. Distribution of hand grips of elementary school children**

| Hand Grip Strength | Boy         |          | Girl         |          |
|--------------------|-------------|----------|--------------|----------|
|                    | Right hand  | Left hand| Right hand   | Left hand|
|                    | F   | %     | F   | %     | F   | %     | F   | %     |
| Good               | 3   | 15.7  | 4   | 21.7  | 4   | 22.2  | 4   | 22.2  |
| Middle             | 2   | 10.5  | 3   | 15.7  | -   | -     | 1   | 5.5   |
| Poor               | 14  | 73.6  | 12  | 63.1  | 14  | 77.7  | 13  | 72.2  |
| Total              | 19  | 100   | 19  | 100   | 18  | 100   | 18  | 100   |

F Frequency of Children

Table 2 shows that there are 73.6% of boys in the poor category for the right hand and 63.1% for the left hand. Then for boys left hand only 25.7% have good right hand strength and 21% have good left hand strength. Whereas there are 77.7% of girls whose right hand strength is still in the less category and 72.2% for the left hand, then only 5% of girls have good left hand grip strength, and there is no right hand strength in the good category for women.

3.3.2. Description of food consumption patterns of elementary school children in Tanete Riattang Barat Sub District, Bone Regency, 2018. The description of the consumption pattern in this study uses the 7x24 hour food frequency and recall method. This method has been carried out by previous research Nur‘aini and Mira [7] by calculating the consumption frequency of nine types of food for street children aged 5-18 years. The following is the frequency of food consumption of elementary school children in Tanete Riattang Barat District, Bone Regency, 2018:

**Table 3. Frequency food consumption of elementary school children**

| Food Variety       | Often (%) | Sometimes (%) | Rarely (%) |
|--------------------|-----------|---------------|------------|
| Grains             | 91.8      | 8.1           | 0          |
| Tubers             | 5.4       | 27            | 67.5       |
| Animal             | 91.8      | 8.1           | 0          |
| Oil and Fat        | 18.9      | 64.8          | 16.2       |
| Oily Seed          | 0         | 40.5          | 59.4       |
| Food Peanuts       | 8.1       | 64.8          | 27         |
| Food Sugar         | 27        | 62.1          | 10.8       |
| Fruit and Vegetable| 51.3      | 45.9          | 2.7        |
| Other              | 13.5      | 59.4          | 27         |

Table 3 shows the highest level of consumption of subjects in the food group of grains (91.8%) and the lowest participation rate in the group of oily fruit/ seed (0%). The same results are also by Ariani [8] that the consumption of oil and fat and oily fruits/seeds is the food group with the smallest amount
of consumption. The low consumption in the oil and fat food group will underestimate. This is because some of the oil/fat consumed by individuals in the form of finished food in this study was not calculated in the oil/fat group.

3.3.3. **Overview of food diversity of elementary school children in Tanete Riattang District West Regency of Bone in 2018.** Measuring diversity of food consumption in this study it was used with the Expected Food Patterns (EFP). The results showed that the average EFP score only reached 81.5 from the ideal EFP score of 100 (Table 4). Similarly, when viewed per food group, there is still an EFP score for each food group in the study area still below the ideal score. The following is a table of the average EFP scores of elementary school children in Tanete Riattang Barat Sub District, Bone Regency.

| Food Variety          | Energy Actual | % Actual | AKE  | Weight Actual | AKE Score | Score Maks | Score PPH |
|-----------------------|----------------|----------|------|---------------|-----------|-----------|-----------|
| Grains                | 640.7          | 43       | 43.1 | 0.5           | 21.5      | 25       | 21.5      |
| Tubers                | 12.9           | 0.8      | 0.8  | 0.5           | 0.4       | 0.4      | 0.4       |
| Animal Food           | 276            | 18.5     | 18.5 | 2             | 37        | 24       | 24        |
| Oil and fat           | 209.9          | 14.1     | 14.1 | 0.5           | 7         | 5        | 5         |
| Oily Fruit/Seeds      | 22.4           | 1.5      | 1.5  | 0.5           | 0.7       | 1        | 0.7       |
| Nuts                  | 73.5           | 4.9      | 4.9  | 2             | 2.4       | 10       | 2.4       |
| Sugar                 | 122.4          | 8.2      | 8.2  | 0.5           | 4.1       | 2.5      | 2.5       |
| Vegetable and Fruit   | 74.5           | 5        | 5    | 5             | 25        | 30       | 25        |
| Other                 | 55.6           | 0        | 0    | 0             | 0         | 0        | 0         |
| Total                 | 1488.3         | 100      | 100.1| 11.5          | 98.1      | 98.1     | 100       | 81.5      |

3.4. **Bivariate analysis results**

3.4.1. **Relationship of children food consumption pattern with family social economy at West Tanete Riattang District, Bone Regency, 2018.** The relationship between the pattern of food consumption of children with socio economic family in Tanete Riattang Barat District can be seen in table 5.

| Social economy      | Food variety | R     | P-value | Information               |
|---------------------|--------------|-------|---------|---------------------------|
| Level of education  | Grains       | 0.457 | 0.004  | There is a relationship  |
|                     | Tubers       | 0.241 | 0.150  | There is no relationship |
|                     | Animal food  | 0.329 | 0.047  | There is a relationship  |
|                     | Oil and fat  | 0.457 | 0.004  | There is a relationship  |
|                     | Oily fruit/seeds | 0.268 | 0.109  | There is no relationship |
|                     | Nuts         | 0.01  | 0.955  | There is no relationship |
|                     | Sugar        | 0.373 | 0.023  | There is a relationship  |
|                     | Vegetable and fruit | 0.374 | 0.022  | There is a relationship |
|                     | Other        | 0.393 | 0.016  | There is a relationship  |
| Revenue             | Grains       | 0.491 | 0.002  | There is a relationship  |
|                     | Tubers       | 0.187 | 0.268  | There is no relationship |
|                     | Animal food  | 0.575 | 0.000  | There is a relationship  |
|                     | Oil and fat  | 0.471 | 0.003  | There is a relationship  |
|                     | Oily fruit/seeds | 0.008 | 0.961  | There is no relationship |
|                     | Nuts         | 0.278 | 0.096  | There is no relationship |
Based on table 5, the significance value of socio economic relations with consumption patterns of grain, animal, oil and fat, sugar, vegetables and fruits, and other foods is 0.000. Because the significance value is less than 5%, it can be concluded that there is a relationship between socioeconomic and consumption patterns of grain, animal, oil and fat, sugar, vegetables and fruits, and other foods. The direction relationship shows a positive relationship it means the higher the socioeconomic value, the higher the value of eating patterns that can be achieved and vice versa.

Then the socio economic relations with food consumption patterns of tubers, oily seeds and beans have a significance value of more than 5%, it can be concluded that there is no relationship. Based on the facts in the field, children who have high socio economic status have good nutritional status. If a child who has sufficient nutrition will have an impact on his nutritional status. On average, children who fall into the middle and lower socio-economic categories of their parents only provide food so that their children are full, regardless of whether or not enough nutrients are consumed. This is following Sebataraja's [12] study, that socioeconomic affects children's nutritional adequacy because the level of education can influence someone to understand and receive information about nutrition.

4. Conclusions
Based on the results of research on the pattern of food intake and nutritional status of children in terms of socio-economic aspects, it can be concluded that are: The biggest consumption pattern of
elementary school children is in the food group the smallest grains and participation rates are in the food group oily fruit/ seeds. The level of food diversification in Tanete Riattang Barat Subdistrict falls into the adequate category. Of the 37 elementary school children in Tanete Riattang Barat District, most of them were normal nutritional status. There is a significant correlation between socio-economic and consumption patterns child food in types of grain, animal, oil and fat, sugar, food vegetables and fruit, and other types of food and no correlation significant for the types of food for tubers, beans and seeds greasy. There is a significant relationship between socio-economic and nutritional adequacy child.

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