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DESCRIPTION OF DIETARY DIVERSITY AND ITS RELATIONSHIP TO NUTRITIONAL STATUS IN ADOLESCENTS AT SMP N 1 PENDOPO BARAT EMPAT LAWANG DISTRIC

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ABSTRACT

Adolescents are vulnerable to nutritional problems including undernutrition and overnutrition. Food diversity plays a role in meeting nutritional needs, both macro and micro. Abnormal nutritional status will have an impact, one of which is on adolescent brain development. Objective: to determine the description of food diversity and its relationship to nutritional status in adolescents at Junior High School 1 Pendopo Barat, Empat Lawang Regency. This research method is analytic observational using cross sectional design. A total of 92 students were selected using simple random sampling technique. the results of the analysis showed 85.9% of adolescents had good food diversity and most adolescents had good or normal nutritional status (82.6%). Bivariate analysis using the chi square test showed a significant relationship between dietary diversity and adolescent nutritional status (p-value = 0.009). There is a relationship between dietary diversity and parental income with adolescent nutritional status and no relationship between age, gender and maternal occupation with adolescent nutritional status. It is recommended for adolescents to increase the consumption of milk, fruits and vegetables sources of vitamin A, and green vegetables and limit the consumption of offal.

Keywords: dietary diversity, nutritional status, adolescents

Introduction

Adolescents are people between the ages of 10 and 19. Adolescence is a period of rapid growth and development that requires increased nutrition.[1] In adolescence there will be a growth spurt, namely peak growth in height (peak high velocity) and weight (peak weight velocity).[2] However, until now adolescents, especially in Indonesia, are still experiencing nutritional problems. The burden of nutritional problems experienced by adolescents is undernutrition, overnutrition and micronutrient deficiencies.[1] Based on the results of Riskesdas in 2018, the prevalence of nutritional status of Body Mass Index according to age (IMT / U) in adolescents aged 13-15 years in Indonesia was 1.9% of adolescents with very thin nutritional status, 6.8% of adolescents with thin nutritional status, 11.2% of adolescents with fat nutritional status and 4.8% of adolescents with obese nutritional status. The prevalence of nutritional status (IMT/U) in adolescents aged 13-15 years in South Sumatra was 1.6% of adolescents with very thin nutritional status, 7.2% of adolescents with thin nutritional status, 10.9% of adolescents with fat nutritional status and 3.4% of adolescents with obese nutritional status.[3] The prevalence of nutritional status (IMT/U) in adolescents aged 13-15 years in Empat Lawang Regency was 13.92% of adolescents

with underweight nutritional status, 4.32% of adolescents with obese nutritional status and 5.33% of adolescents with obese nutritional status.[3]

Abnormal nutrition in a person causes impaired body growth, a smaller body followed by a smaller brain size. The number of cells in the brain is reduced and there is immaturity and imperfection in the child's thinking speed.[4] A person will have a good nutritional status, if the intake of nutrients in accordance with the needs of the body. Inadequate intake of nutrients in the diet can cause malnutrition, on the other hand, people whose nutritional intake is excessive will cause excess nutrition.[5] United Nations Children's Fund (UNICEF) states that nutrition problems among adolescents are caused by 3 things, namely direct causes, indirect causes, and basic causes. Direct causes include low food intake, poor food quality and lack of physical activity. Indirect causes include poor food choices, eating habits, harmful social norms including body image, low access to food sources, and low participation in school nutrition by parents and communities. [6] Some studies state that nutritional status can be influenced by several factors, one of which is the diversity of food consumption. Food diversity is important for the body to fulfill nutritional needs, especially micronutrients.[7] Harahap's research in October 2020 showed that food diversity is related to students' nutritional status.[8] This is in line with Mirmiran's research in 2004 which states that there is a significant and positive correlation between food diversity and most nutritional adequacy ratios where people with a food diversity score of 6 or more have a higher BMI ($P < 0.01$) than others.[9]

Dietary diversity needs to be measured because there is no single type of food that contains all the nutrients needed by the body to ensure growth and maintain health, except breast milk for newborns until 6 months of age.[10] People's food consumption is still not in accordance with the message of balanced nutrition. The 2010 Riskesdas revealed the following picture. First, there are still many people who do not consume enough vegetables and fruits. [11] Based on Riskesdas 2013, 93.5% of the population aged over 10 years consumed vegetables and fruits below the recommended level. Second, the quality of protein consumed on average per person per day is still low because most of it comes from vegetable protein such as legumes. Third, the consumption of foods and beverages with high sugar, high salt and high fat content, both in urban and rural communities, is still quite high.[12]

Methods

The research design used was observational with a Cross Sectional Study approach. This research was conducted in February 2023 at Junior High School 1 Pendopo Barat, Empat Lawang Regency. A total of 92 students in grades VII, VIII and IX of States Junior High School 1 Pendopo Barat, Empat Lawang Regency were selected as samples using simple random sampling technique. Sample identity data including name, age, gender, mother's occupation and parents' income were

obtained from direct interviews using a questionnaire. Height data (TB) using a microtoise. Weighing body weight (BB) using digital scales then continued to calculate body mass index (BMI) values and z-score values. Food diversity was collected by direct interview with a semi-quantitative food frequency form. The SQ-FFQ method is a method to determine the nutritional intake habits of individuals at a certain period of time. The purpose of this method is to obtain precise information about food intake during the last 1 month. Primary data collection was carried out by researchers directly. The variables measured in this study were food diversity and nutritional status of adolescents. Chi Square test analysis with the level of significance (significant) used $p < 0.05$.

Results

Univariate analysis in this study was conducted to determine the frequency distribution of age, gender, mother's occupation, parents' income, adolescent nutritional status, food diversity, and consumption based on food groups. While bivariate analysis was used to determine the relationship between dietary diversity and nutritional status in adolescents at Junior High School 1 Pendopo Barat, Empat Lawang Regency.

Table 1. Distribution of Respondent Characteristics

Respondent Characteristics	Frequency	Percentage (%)
Age		
13 Years	54	58,7
14 Years	32	34,8
15 Years	6	6,5
Gender		
Male	38	41,3
Female	54	58,7
Mother's Occupation		
Work	67	72,8
Not Working	25	27,2
Parents' Income		
<Rp 3,144,446	44	47,8
≥ IDR 3,144,446	48	52,2

The results of the distribution of characteristics of 92 respondents, the most age at the age of 13-14 years, namely 86 people (93.5%). Most of the respondents were female, namely 54 people (58.7%). The occupation of the respondent's mother was dominated by working mothers, namely a total of 67 people (72.8%) and more parents' income above regional minimum wage, namely 48 people (52.2%).

Table 2. Frequency distribution of variables

Variable	Frequency	Percentage (%)
Dietary diversity (SQ-FFQ)		
Good diversity (≥4)	79	85,9
Less diversity (<4)	13	14,1
Nutrition Status		
Thinnes	12	13
Normal	76	82,6
Overweight	4	4,3

The results of the frequency distribution of food diversity from 92 respondents, the most food diversity was in the good category, namely 79 people (85.9%) and most respondents had good or normal nutritional status, namely 76 people (82.6%).

Table 3. Frequency distribution of food groups

Food Group	Consumption Frequency			
	Consumption		No Consumption	
	n	%	n	%
Starchy Staple Foods	92	100	0	0
Green Vegetables	17	18,5	75	81,5
Fruit and Vegetable Sources of Vitamin A	37	40,2	55	59,8
Other Fruits and Vegetables	73	79,3	19	20,7
Offal	4	4,3	88	95,7
Meat and Fish	79	85,9	13	14,1
Eggs	68	73,9	24	26,1
Pods, Beans and Grains	81	88	11	12
Milk and Milk Products	40	43,5	52	56,5

The results of the frequency distribution of food groups from 92 respondents, the food groups that were frequently consumed were starchy staple food groups (100%), pods, nuts and seeds (88%), meat and fish (85.9%), fruits and other vegetables (79.3%) and eggs (73.9%). Meanwhile, food groups that were rarely consumed were milk and dairy products (43.5%), fruits and vegetables with vitamin A (40.2%), green vegetables (18.5%) and offal (4.3%).

Table 4. Shows the number of respondents who have normal nutritional status and have good food diversity is 69 people (87.3%), while respondents who have normal nutritional status who have less food diversity are 7 people (53.8%). While as many as 16 people (17.4%) of respondents have abnormal nutritional status. The p-value obtained is 0.009, meaning that there is a significant relationship between food diversity and nutritional status in adolescents. The PR value shows that adolescents who have less food diversity are more likely to have abnormal nutritional status 3.6 times than adolescents who have good food diversity (95% CI; 1.651-21.192). Parents' income is associated with the nutritional status of adolescents at Junior High School 1 Pendopo Barat. Meanwhile, age, gender and mother's occupation did not show a significant relationship with the nutritional status of adolescents.

Table 4. Relationship between dietary diversity, respondent characteristics and adolescent nutritional status (IMT/U)

Food Diversity	Nutritional Status (IMT/U)				Total		P-*value*	PR (CI 95%)
	Abnormal		Normal					
	n	%	n	%	N	%		
Less	6	46,2	7	53,8	13	100	0,009	3,646 1,598-8,318
Good	10	12,7	69	87,3	79	100		
Total	16	17,4	76	82,6	92	100		

Respondent Characteristics	Nutritional Status (IMT/U)				Total	p-value
	Abnormal		Normal			
	n	%	n	%		
Age						
13 Years	10	18,5	44	81,5	54	0,459
14 Years	4	12,5	28	87,5	32	
15 Years	2	33,3	4	66,7	6	
Gender						
Male	6	15,8	32	84,2	38	0,734
Female	10	18,5	44	81,5	54	
Mothers Occupation						
Work	15	22,4	52	77,6	67	0,060
Not Working	1	4,0	24	96	25	
Parents Income						
<Rp3.144.446	12	27,3	32	72,7	44	0,034
≥Rp3.144.446	4	8,3	44	91,7	48	

Discussion

The dietary diversity of adolescents at Junior High School 1 Pendopo Barat, Empat Lawang Regency, found that 14.1% of adolescent dietary diversity was said to be lacking and 85.9% of adolescents with good dietary diversity. This study is in line with research conducted in 2020 that food diversity is related to the nutritional status of students. The nutritional status (IMT/U) of adolescents at Junior High School 1 Pendopo Barat mostly had normal nutritional status, namely 76 people (82.6%). The remaining respondents with abnormal nutritional status were 16 people (17.4%). This is in line with research in 2019 which showed that the nutritional status of most samples was in the normal category at 68.8%.[13] The nutritional status of adolescents who are not normal is more in the thinnes category, namely 12 adolescents and the rest are in the overweight category, namely 4 adolescents. Of the 16 adolescents who had abnormal nutritional status, 10 of them were female. In general, food intake is closely related to nutritional status. If the food consumed has good nutritional content, the nutritional status is also good, otherwise if the food consumed has low nutritional content, it will cause malnutrition.[14] In women, body image is so important that women delay eating or reduce the amount of food consumed, causing intake to not match their needs.[15] Adolescents start to show attraction to the opposite sex therefore they focus more on their appearance. [16] As for male respondents, 3 adolescents were in the overweight

category and 3 adolescents were in the thinnes category. Previous research states that male adolescents tend to be overweight or overweight, this is because the needs of adolescent girls are greater than those of young women. [17]

In this study, some of the foods that were necessarily consumed were staple food groups (100%). Staple food sources of carbohydrates are commonly consumed and are part of the eating culture in Indonesia. [18] The food group that was also widely consumed by respondents was legumes and grains (88%) with the most consumed food ingredients being tempeh and tofu. This is in line with research which states that the average subject consumes tofu and tempeh 2-6 times a week. [19] The meat and fish group (85.9%) with the most consumed food ingredients are chicken, fish and other processed meat. Other fruits and vegetables (79.3%) with the most consumed food ingredients are eggplant and guava and eggs (73.9%). Chicken eggs became the most animal source food consumed by the subjects, where all groups consumed eggs 3-7 times a week. This can be caused because the price of eggs tends to be cheaper than the price of chicken and beef. Eggs also tend to be easy to process and practical, especially for breakfast. For the types of food groups that are rarely consumed are milk and dairy products (43.5%), fruits and vegetables sources of vitamin A (40.2%), green vegetables (18.5%) and offal (4.3%). This is in line with research in 2022 which stated that the food groups that were rarely consumed were organ meats, green vegetables and vitamin A source vegetables. [20]

The abundance of school meals, including ready-to-eat food products that do not guarantee better nutrition for students, also affects vegetable and fruit consumption among students. The least consumed food groups were green vegetables (18.5%) and offal (4.3%). Green vegetables and offal are not not consumed at all but only consumed in small portions so that it does not meet the needs of green vegetable intake. Research in 2020 shows that the average fiber consumption when viewed based on vegetable and fruit consumption in the SQ-FFQ results is 2.6 grams per day, it can be said that the average fiber consumption of respondents is still very low from the recommended amount. The recommended fiber consumption for adolescents aged 10-18 years from AKG 2019 is 29- 34 grams per day. [21] Meanwhile, recommendations for adequate consumption of fruits and vegetables in Indonesia are contained in a balanced nutrition plate which contains recommendations to consume 2-3 servings of fruit a day and 3-4 servings of vegetables a day. About two-thirds of the recommended consumption of fruits and vegetables is vegetable servings. [10]

Adolescents who do not like vegetables because they are not accustomed to them since childhood and think that all vegetables have a bitter taste. The solution that can be applied is to make food variations such as mixed with meat or other ingredients. For some vegetables such as bitter melon, you can soak them with salt to reduce the bitterness. It can also be done by cutting vegetables into small pieces, so they don't taste too much like vegetables or can be mixed with

other ingredients, such as potatoes, so that the taste is not too dominant. [22] As for the consumption of offal, it does not need to be increased because offal contains a certain amount of cholesterol, which when consumed in excess over a long period of time will cause various health problems such as obesity and narrowing or blockage of heart blood vessels. [23]

Respondent Characteristics

The *p-value* of age is 0.399 and 0.218 (p-value> 0.005) which means that there is no relationship between age and adolescent nutritional status. This is not in line with research which states that there is a significant relationship between age and the nutritional status of adolescents, the results of which say that students aged > 15 years who are overweight (84.4%) have a potential to be almost 8 times more likely to experience overweight than students aged ≤ 15 years.[2] The difference in the results of this study is due to the age in this study only in the distribution of the early adolescent phase (12- 15 years) so that there is no comparison for the middle and late adolescent phases. The results of statistical analysis of gender show a *p-value* of 0.734 which means that there is no meaningful relationship between gender and nutritional status. This is in line with research that states there is no relationship between gender and overweight and obesity in adolescents with a *p-value of* 0.006.[24] This is also supported by the results of respondent interviews where the amount and type of food consumed by adolescent boys and adolescent girls tend to be the same. The results of statistical analysis of mother's occuption showed a *p-value* of 0.060, meaning that there was no significant relationship between maternal employment and adolescent nutritional status. Based on the results of the interview, the researcher assumes that adolescents tend to be able to choose the food they want to consume even though food has been prepared at home and adolescents also often spend time outside the home. However, it is different from Handari's 2017 research which shows a significant relationship between maternal employment and adolescent nutritional status.[2] Mothers who do not work are considered to take better care of their children's health, because the meeting time between mothers and children is usually longer than mothers who work.[25] The results of statistical analysis parent's income showed a *p-value* of 0.034, meaning that there is a significant relationship between parental income and adolescent nutritional status. This is in line with research that states the relationship between family economy and adolescent nutritional status, where parents' income has an impact on the purchase of food and the amount of pocket money given by parents. The size of parents' income affects consumption patterns. High parental income can buy better food in terms of quality and quantity.[26] Based on the results of interviews, respondents whose parents' income is below the minimum wage more often consume the same type of food than respondents whose parents' income is above the minimum wage.

Conclusions

In this study, the average respondent was 13 years old, the majority was female, the mother workedand the parents' income was above the minimum wage. Most adolescents' dietary diversity was in the good category (85.9%). The most consumed food groups were staple foods (rice, bread, noodlesand others), legumes and grains, meat and fish, fruit and other vegetables and eggs. The least consumed foods were milk and milk products, vitamin A-source vegetables, green vegetables and offal. Most of the respondents' nutritional status was normal (82.6%) and there was a significant relationship between dietary diversity and parents' income with the nutritional status of adolescents and there was no relationship between age, gender and mother's occupation with the nutritional statusof adolescents. It is recommended that adolescents increase their consumption of green vegetables and vitamin A- source fruits and vegetables by 3-4 servings a day, and increase their consumption of milk by 2-4 servings a day. Teenagers are expected to limit the consumption of offal because it is high in fat and cholesterol.

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Conflict of Interest

The authors declare that they have no conflict of interest

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