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The Relationship of Food Consumption Level and Physical Activities towards the Nutritional Status of *Paskibraka* Extracurricular Members

Hubungan Tingkat Konsumsi Makan dan Aktivitas Fisik dengan Status Gizi Anggota Ekstrakurikuler Paskibraka

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ABSTRACT

Background: The Republic of Indonesia has a flag-hoisting team at the independence ceremony known as *Paskibraka*. Good nutritional status is one of the conditions for becoming a *Paskibraka*. Food consumption level and physical activity are factors that affect nutritional status.

Objectives: This research aimed to determine the relationship between food consumption level and physical activity towards the nutritional status of students taking *Paskibraka* Extracurricular at SMAN 1 Bangkalan.

Methods: This research used quantitative correlational research using a cross-sectional approach. The total sampling method was used to select 56 samples from students joining *Paskibraka* extracurriculars aged 15-16. While the independent variables included food consumption levels and physical activity, the dependent variable was nutritional status. The instruments were the respondent identity questionnaire, SQ-FFQ (Semiquantitative Food Frequency Questionnaire), and GPAQ (Global Physical Activity Questionnaire). The data were analyzed using Spearman's rank correlation.

Results: This research found that students' food consumption levels were normal (energy=76.8%, protein=58.9%, fat=73.21%, carbohydrates=69.64%). It also revealed that 75% had moderate physical activity and 89.29% had good nutritional status. Food consumption levels (energy p=0.011, fat p=0.024, and carbohydrates p=0.003) correlated with nutritional status, but protein consumption levels (p=0.141) and physical activity (p=0.626) did not correlate with it.

Conclusions: Food consumption levels (energy, fats, and carbohydrates) correlated with nutritional status, but protein consumption and physical activity did not. A *Paskibraka* extracurricular student must pay attention to their daily food consumption and physical activity to have a good nutritional status.

INTRODUCTION

The ceremony to celebrate Indonesia Independence Day is an important serial event held in the State Palace and other places in Indonesia's regions. A ceremony is an annual event that is conducted on August 17. The flag-hoisting brought by a *Paskibraka* team is the peak of the ceremony. The Ministerial Regulation No. 14 of 2017 contains the requirements for becoming the *Paskibraka* team. The requirements include having Indonesian nationality, good physical and mental health, ideal body height, and not experiencing color blindness. In addition, during the selection at the Regency/Municipal levels, the applicants must be at Grade X, so they will be at Grade XII when selected and assigned to raise the flag on August 17. They must pass the selection process, possess a recommendation letter from the school and parents or guardians, have

substantial academic achievement, and be willing to attend the program training center[1].

State Senior High School (SMAN) 1 in Bangkalan is one of the schools with *Paskibraka* as an extracurricular. The extracurricular prepare students to become the *Paskibraka* team at the Regency level. It trains students' physical fitness, other than attending school like ordinary students. Once a week, these students must attend physical training for three hours. Some regular activities include 150 m jogging for 3-5 laps, back up, sit up, and push up 20 times, as well as lining-up training.

Paskibraka Extracurricular is one of the early ways to prepare *Paskibraka* candidates to reach the national level. Thus, dietary habits and physical activities should be carefully considered to support good Nutrition. The *Paskibraka* team's diet is seriously considered because they must have a strong body and physical

endurance. Besides consuming high protein food, the *Paskibraka* members must take vitamins to suffice their stamina needs[2]. They are also prohibited from eating spicy, sour, and oily food. Another essential factor for the *Paskibraka* team is physical activity. They are trained with activities, such as foot drills, hoisting, flag lowering, and other physical training conducted from morning to afternoon. These activities are intense, triggering much sweat from the body. In addition, the activities increase breathing frequency and heart rate[3]. For this reason, this paper aims to investigate the level of food consumption and physical activities towards the nutritional status of students taking *Paskibraka* extracurriculars at SMAN 1 in Bangkalan.

METHODS

This research employed a quantitative correlational design with a cross-sectional approach. It was conducted in December 2022. All members of *Paskibraka* Extracurricular at the State Senior High School 1 in Bangkalan in Grade X became the research population. Then, total sampling was used as the technique to select the sample. All students (56 students) joining this Extracurricular were then taken as the sample. The level of food consumption and physical activities carried out by students in this extracurricular was considered the independent variable.

Meanwhile, the nutritional status of the students served as the dependent variable, which was calculated using the body mass index by age. Airlangga University's Health Research Ethics Commission has given ethical approval for this research with No. 876/HRECC. FODM/XII/2022. Data in this research referred to food consumption data that were measured using the

Semiquantitative Food Frequency Questionnaire (SQ-FFQ) in the last six months. The data were analyzed using the Nutrisurvey software. Meanwhile, physical activity data were collected using GPAQ or the Global Physical Activity Questionnaire.

Further, the data of nutritional status were measured via anthropometry. The anthropometry involving body weight was carried out using digital scales, while the body height was measured using a microtoise. The data were then administered using the WHO Anthro Plus software. The data analysis stage in this research covered bivariate and univariate analysis. The univariate analysis illustrates the conditions of the independent variables (level of food consumption and physical activities). Meanwhile, the dependent variable was manifested in the participants' nutritional status. In this research, Spearman's Rank correlation was used as the analysis technique at the bivariate stage using the SPSS software.

RESULTS AND DISCUSSION

This research found sample characteristics based on age, body weight, and height. The data were obtained from identity questionnaires filled out by the participants. The sample characteristics are presented in Table 1. Sample characteristics in this research describe the results of the sample frequency distribution based on age, weight, and height. The research reported that most participants were 16 years old, 35 samples (63%). Further, approximately half of the participants weighed 51-50 kg by 24 samples (42.86%). Meanwhile, the highest height was in the 166-170 cm range by 23 samples (41.07%).

Table 1. The characteristics of *Paskibraka* Extracurricular members at the State Senior High School 1 in Bangkalan in Grade X

Sample Characteristics	n	%
Age (years)		
15	21	37.5
16	35	62.5
Weight (kg)		
40-50	14	25
51-60	24	42.86
61-70	14	25
71-80	4	7.14
Height (cm)		
160-165	14	25
166-170	23	41.07
171-175	14	25
176-180	5	8.93

n (Sample size); % (Percentage of the sample size); kg (kilogram); cm (centimeter)

Table 2. Frequency distribution of energy, protein, fat, carbohydrate consumption levels, physical activity, and nutritional status of *Paskibraka* Extracurricular members at the State Senior High School 1 in Bangkalan in Grade X

Variables	n (%)	Min	Max	x̄ ± SD
Energy Consumption				
High-Level Deficit	0 (0%)			
Medium Level Deficit	0 (0%)			
Low-Level Deficit	7 (12.5%)	1,497.3	3,679.5	2,370.8 ± 527.6 kcal
Normal	43 (76.8%)			
Excessive	6 (10.7%)			
Protein Consumption		44.6	108.1	66.95 ± 15.57 g

Variables	n (%)	Min	Max	x̄ ± SD
High-Level Deficit	0 (0%)			
Medium Level Deficit	1 (1.79%)			
Low-Level Deficit	20 (35.71%)			
Normal	33 (58.93%)			
Excessive	2 (3.57%)			
Fat Consumption				
High-Level Deficit	0 (0%)			
Medium Level Deficit	0 (0%)	50.5	124.1	79.6 ± 18.42 g
Low-Level Deficit	10 (17.86%)			
Normal	41 (73.21%)			
Excessive	5 (8.93%)			
Carbohydrate Consumption				
High-Level Deficit	0 (0%)			
Medium Level Deficit	0 (0%)	214.9	563.7	346.7 ± 80.6 g
Low-Level Deficit	10 (17.86%)			
Normal	39 (69.64%)			
Excessive	7 (12.50%)			
Physical Activities				
Light	0 (0%)			
Moderate	42 (75%)	1038	3876	2341.91 ± 673.79 met
Hard	14 (25%)			
Nutritional Status				
Severely thin	0 (0%)			
Underweight	4 (7.14%)			
Normal	50 (89.29%)	-2.06	1.1	-0.504 ± 0.98 SD
Overweight	2 (3.57%)			
Obesity	0 (0%)			

n (Sample size); % (Percentage of sample size); Min (Lowest result); Max (Highest result); x̄ (Average); SD (Standard deviation); kcal (kilocalories); g (gram); met (Metabolic equivalent)

Food consumption is eating various types of food and drink by every individual to meet their daily nutritional needs. Food consumption data can inform the levels of energy, protein, fat, and carbohydrate intake consumed by an individual every day. The level of food consumption is classified into five categories: high-level deficit, medium-level deficit, low-level deficit, normal, and excessive. Food consumption is analyzed using the *Semiquantitative Food Frequency Questionnaire* (SQ-FFQ) that was consumed for six months with the Nutrisurvey software. This research obtained energy consumption from staple food and snack consumption among male and female students. The result revealed that most energy consumption fell into a normal category by 43 samples (76.8%). The minimum energy consumption was 1,498 kcal/day, while the maximum was 3,680 kcal/day. The average energy consumption was reported as 1,498 kcal/day. Most male students admitted they preferred the staple food by consuming more carbohydrates. They believed that it made them complete their tasks quickly so that they could save their money. On the other hand, the female students stated that they barely had breakfast because they were too lazy and rushed to come to school. Thus, they preferred to eat snacks at school.

Protein is one of the macronutrients needed to develop, repair, and regulate the function of tissues and organs, including muscles. The protein consumption data showed that most participants' protein consumption was categorized into normal by 33 samples (58.93%). Meanwhile, the results of minimum protein consumption indicated 44.6 g/day and 108.1 g/day for maximum protein consumption. The average value of protein consumption was 66.95 ± 15,57 g/day. If we referred to the Recommended Dietary Allowances (RDA) for males aged 16-18 years old, the average value of protein consumption in this research remained insufficient. One of the reasons is that male students tend to eat staple foods with higher carbohydrates to make them complete and save pocket money.

Meanwhile, for female students, the average value of their protein consumption was beyond the RDA by 65 g. It is important to note that a lack of protein can cause impaired brain function, stunted growth, and development, and the body is susceptible to disease or infection due to decreased body immunity[4]. Protein contains the amino acid required to form multiple neurotransmitters, i.e., chemical compounds that deliver messages or stimuli to brain nerve cells or muscles. In addition, protein can slow down the digestive system and prevent the rise in blood sugar after eating, which is crucial in controlling blood sugar[5]. Therefore, a lack of protein can cause weakness. For students who take part in *Paskibraka* extracurricular activities, lack of protein makes them weak and faint because *Paskibraka* activities are pretty intense compared to other students.

The sample frequency distribution results based on fat consumption found that most fat consumption was in the normal category, namely 41 samples (73.21%). While the minimum fat consumption value was 50.5 g/day, the maximum was 124.1 g/day. The average value of fat consumption was 79.6 g/day. Like protein consumption, the average fat consumption was still insufficient compared to the male RDA of 85 g. This is because male students do not like to consume oily food.

Meanwhile, the average fat consumption exceeded the fat value in the RDA for female students, which was 70g.

Most participants reported consuming carbohydrates in a normal category, i.e., 39 samples (69.64%). The minimum carbohydrate consumption was 214.9 g/day, and the maximum was 563.7 g/day. Meanwhile, the average value of carbohydrate consumption was 346.7 g/day. The average carbohydrate consumption for both men and women has exceeded the carbohydrate consumption in the RDA by 379.6 g/day and 326.9 g/day, respectively. The fulfillment of the average consumption of carbohydrates in this research was in line with the habits of male students who consumed rice in large quantities and the female students who consumed various snacks such as *Cireng, Batagor, Pentol,* and *Terang bulan* at school. This research also found that the standard deviation for energy consumption, protein, fat, and carbohydrates was below the average. This means that the distribution of the variable data on carbohydrate consumption is homogeneous/relatively the same and less varied.

Another independent variable in this research is physical activities. This variable was analyzed using the GPAQ questionnaires. Based on the questionnaires, it was obtained that the physical activities of most participants fell into the medium category by 42 samples (75%). While the minimum activity was 1,038 MET (Metabolic Equivalent) in the medium category, the maximum activity was 3876 MET in the high category. Physical activity obtained an average score of 2,341.91 MET in the medium category. Men's physical activity had a more excellent average than women, by 2,748.7 MET rather than 2,097.8. The possible reason is that most male students do more sports to improve their posture. Further, the standard deviation in physical activity was 673.79 MET, less than the average. It indicates that the spread of small physical activity variables or data is relatively the same/uniform.

BMI/Age measured the nutritional status of the samples because the age of all the samples was under 18 years, whereas when there was a change in age, there was a change in body composition. Nutritional status data on BMI/Age in this study were analyzed using the WHO Anthro Plus software. As presented in Table 2, most of the samples had good nutritional status, as many as 50 samples (89.29%). Meanwhile, the calculation results of BMI/Age with a minimum Z-score value of -2.06 SD, a maximum Z-score of 1.1 SD, and an average value of BMI/Age of -0.504. These results were classified in the category of good Nutrition. Another key finding was the nutritional status standard deviation, which showed 0.98 SD. This value is above the average, indicating that the data distribution from the variable nutritional status varies.

Table 3. Analysis of the relationship between variables on the level of consumption of energy, protein, fat, carbohydrates, physical activity, and nutritional status of *Paskibraka* Extracurricular members at the State Senior High School 1 in Bangkalan in Grade X

Variables	Nutritional Status			Total	p-value	r
	Under Nutrition	Normal	Over Nutrition			
Energy Consumption						
Low-Level Deficit	2 (3.6%)	5 (8.9%)	0 (0%)	100.0	0.011	0.338*
Normal	2 (3.6%)	40 (71.4%)	1 (1.8%)	100.0		
Excessive	0 (0%)	5 (8.9%)	1 (1.8%)	100.0		
Protein Consumption						
Medium Level Deficit	0 (0%)	1 (1.8%)	0 (0%)	100.0	0.141	0.199
Low-Level Deficit	2 (3.6%)	18 (32.1%)	0 (0%)	100.0		
Normal	2 (3.6%)	30 (53.6%)	1 (1.8%)	100.0		
Excessive	0 (0%)	1 (1.8%)	1 (1.8%)	100.0		
Fat Consumption						
Low-Level Deficit	2 (3.6%)	8 (14.3%)	0 (0%)	100.0	0.024	0.301*
Normal	2 (3.6%)	38 (67.9%)	1 (1.8%)	100.0		
Excessive	0 (0%)	4 (7.1%)	1 (1.8%)	100.0		
Carbohydrate Consumption						
Low-Level Deficit	3 (5.4%)	7 (12.5%)	0 (0%)	100.0	0.003	0.393**
Normal	1 (1.8%)	37 (66.1%)	1 (1.8%)	100.0		
Excessive	0 (0%)	6 (10.7%)	1 (1.8%)	100.0		
Physical Activities						
Moderate	4 (7.1%)	36 (64.3%)	2 (3.6%)	100.0	0.626	0.067
Hard	0 (0%)	14 (25%)	0 (0%)	100.0		

Spearman's rank correlation test; *) Correlation is significant at the 0.05 level (2-tailed); **) Correlation is significant at the 0.01 level (2-tailed); p-value (Probability value); r (Correlation coefficient)

Table 3 shows that participants' energy consumption levels fall into a normal category with a good or normal nutritional status (40 samples). The correlational coefficient between the energy consumption level and nutritional status was 0.338. This value fell in the range of 0.26 – 0.50 with p=0.011<0.05, indicating a correlation between the energy consumption level and nutritional status among students joining *Paskibraka* Extracurricular. The value is classified as adequate. An individual's energy need is the amount of energy consumption in food needed as energy expenditure according to the Basal Metabolic Rate

(BMR), Specific Dynamic Activity (SDA), and physical activity. When doing physical activity, the muscles need the primary energy to move. In addition, they need additional energy so that the lungs and heart can distribute oxygen and intake nutrients to all body cells, including muscles. In this case, food consumption affects a person's nutritional status[6]. If the energy from food that enters the body matches the energy expended, a person can achieve energy balance. However, suppose the energy from food that enters the body is less than the energy used. In that case, an energy deficiency will occur, which results in a negative energy balance in the body. This makes the body weight not ideal or underweight, causing slow growth, weight loss, and tissue damage.

Further, it should be noted that excessive energy consumption can lead to weight gain, and if done for a long time, there is a risk of obesity and degenerative diseases. These findings reflect those of Rokhmah et al. (2016)[7], who claimed that the adequacy level of energy significantly correlates with the nutritional status of female high school respondents at the Al-Izzah Islamic Boarding School, Batu City. Meanwhile, previous research conducted by Reppi et al. (2015)[8] stated a significant relationship between energy intake and nutritional status with a value of p<0.001 nutritional status of female students at SMAN 4 in Manado. Similar results were presented in Sutrio's research (2017)[9], which revealed a relationship between energy intake and the nutritional status of Global Madani Senior High School Students in Bandar Lampung City.

Further, protein consumption level tended to be in the normal category with a good nutritional status (30 samples). The correlation between protein consumption and nutritional status shows a Correlation Coefficient of 0.199 with p=0.141> 0.05. This shows no correlation between protein consumption and the nutritional status of *Paskibraka*'s extracurricular students. Macro-nutrients that function in developing, transporting, and storing nutrients and enzymes, forming structural components, forming antibodies, as well as energy sources are proteins. Generally, protein intake is taken from foodstuffs with high-quality protein sources. This type of protein consists of animal and vegetable protein. Each of these proteins has a different amino acid content. Because the body requires various amino acids, one must consume food from animal and vegetable protein sources in one meal[6]. Based on the results of the respondents' SQ-FFQ, foods with protein content eaten by the majority of respondents in this research were duck eggs on average two times a week, purebred chicken eggs 3-4 times a week, shrimp on average two times a week, and meat chicken 3-4 times a week. Meanwhile, tofu and tempeh were consumed 4-5 times a week. This study found that the portion of the respondent's protein meal was sufficient. For one meal, each respondent ate 1 type of side dish. In addition, some respondents consumed 300 g of rice and three pieces of fried food for one meal. Most school snacks contain lots of carbohydrates and fat. Based on the data above, a low protein consumption deficit and moderate/fulfilled level deficit but normal nutritional status can occur because their energy needs are met through carbohydrate and fat consumption with a deficit protein consumption. Participants in this research tended to consume 1 protein source in one meal. For example, they only consumed food sources of animal protein (chicken, chicken eggs, shrimp, tilapia fish) or only ate tofu and tempeh as a source of protein. The lack of protein sources can affect the process of growth and development in adolescents. This finding aligned with Fitriani's research (2020)[10,] which suggested that the adequacy level of protein had no relationship to the nutritional status (BMI/Age) of SMAN 86 Jakarta students. Similarly, in the study of Irdiana and Nindya (2017)[11], the results of data analysis showed no significant correlation between protein adequacy and nutritional status (BMI/Age) of SMAN 3 Surabaya students. Another identical finding was reported by Setia et al. (2019)12 research, claiming no significant correlation between protein intake and nutritional status (BMI/Age) of Flobamorata Sports Gifted High School students in Kupang.

Based on Table 3, it was found that the highest fat consumption was at a normal level with good nutritional status in 38 samples. The correlation between fat consumption and nutritional status was analyzed using the Spearman's Rank test. As a result, a Correlation Coefficient value of 0.301 was obtained, including in the value range 0.25-0.5 with a p-value of 0.024 <0.05. This shows a correlation between the level of fat consumption and the nutritional status of *Paskibraka*'s extracurricular students, who are adequate. The densest energy source was fat. Calories in fat were relatively high per gram: 9 kcal, where the energy produced was 2.25 times greater than carbohydrates and protein in the same amount. The largest energy reserve in the body is fat, which is obtained by consuming one or a combination of several energy substances, including protein, fat, and carbohydrates[6]. Fitriani's research (2020)[10] was in line with these findings. She found a correlation between the adequacy level of fat intake and the nutritional status of SMAN 86 Jakarta students. In addition, Khoerunisa and Istianah's research (2021)[13] argued that fat intake significantly correlated with nutritional status in adolescents, with a p-value of 0.003 and an OR value of 3.455. This explains the possibility that subjects with good fat intake can have a poor nutritional status 3.4 times more than those with inadequate fat intake because most subjects eat foodstuffs that store much fat for one meal per day.

Participants' tendency in carbohydrate consumption was at a normal level with good nutritional status (37 samples). The correlation between carbohydrate consumption and nutritional status was analyzed using Spearman's Rank test. The test obtained a correlation coefficient of 0.393, categorized into 0.25-0.5, with p=0.003<0.05. This shows a correlation between carbohydrate consumption and nutritional status among students taking *Paskibraka* extracurriculars. The correlation is classified as adequate. Carbohydrate is one of the fastest meal substances that can supply energy to the body. Food with carbohydrates tends to be consumed frequently because it is considered more practical, cheaper, and easier to obtain and store. Carbohydrate is not only used as a source of energy but also stored as fat if consumed excessively[6]. The correlation between carbohydrate consumption and nutritional status indicates that such consumption can affect individuals'

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nutritional status. This finding is positive because if the students eat more carbohydrates, their nutritional status will increase. This finding also conformed to Safita's research (2019)[4] as she found a correlation between carbohydrate consumption and students' nutritional status at the Islamic Junior High School in Pondok Pesantren (Islamic boarding school) Al Muttaqien Pancasila Sakti in Klaten. Parinduri (2018)[5] also supports it as he found similar findings in Syafana Islamic School Primary.

It was found that, on average, the participants had moderate physical activity. Thirty-six samples (64.3%) had good nutritional status, four samples (7.1%) lacked nutritional status, and two samples (3.6%) had more nutritional status. Meanwhile, 14 samples (25%) tended to have good nutritional status at high physical activity levels. The correlation between physical activity level and nutritional status was analyzed through the Spearman's Rank test. The research found a correlation coefficient of 0.067, with p=0.626> 0.05. This shows that the level of physical activity of *Paskibraka*'s extracurricular students does not correlate with nutritional status. Even though the statistical results state that physical activity has no relationship to nutritional status, it does not mean that physical activity cannot affect nutritional status. In addition to physical activity, various factors can affect nutritional status, including food consumption. Most of the samples in this study had good nutritional status, with as many as 36 samples (64.3%) with moderate physical activity levels. Therefore, stress factors are more likely to influence their nutritional status. The energy needs of adolescents are essential to fulfill because, during adolescence, the need for nutrients in physical and psychological development and growth tends to increase. In addition, the nutritional needs of adolescents who follow trends in food consumption, dietary patterns, and physical activity need to be considered[6]. This research is in line with Saint and Ernawati (2019)[16]. Using Pearson Chi-Square analysis, they did not obtain a significant correlation between physical activity and nutritional status with a p-value of 0.892 in class XII IPA students at SMAN 7 Surakarta. Moreover, the research conducted by Noviayanti & Marfuah (2017) showed that physical activity did not significantly correlate with the nutritional status (BMI/Age) of adolescents[17].

CONCLUSIONS

In conclusion, there is a relationship between the level of food consumption (energy, fat, and carbohydrates) and nutritional status. However, there is no correlation between protein consumption level and physical activity with the nutritional status of *Paskibraka* extracurricular students at SMAN 1 Bangkalan, Madura.

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