

## **Protein Intake, Nutritional Status, and Family Socioeconomic Relationships with Learning Achievement of Children Aged 13-15 Years at Nabil Husein Junior High School Samarinda Year 2022**

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### **Abstract**

Nutritional problems in adolescents will affect the quality of human resources which can result in reduced generations and have an impact on the nation's economic situation in the future. Vulnerable aged 13-15 years experiencing nutritional needs much faster. Protein intake, nutritional status and socioeconomic status in several studies showed different results. The purpose of this study was to determine the relationship between protein intake, nutritional status, and socioeconomic status with the learning achievement of children aged 13-15 years at SMP Nabil Husein Samarinda. Quantitative research design, correlational descriptive type, cross sectional approach. The sample used was 49 students of class VIII using a purposive sampling technique. Protein intake was obtained through a 24-hour food recall interview, nutritional status measurements based on BMI/Age, and socioeconomic status were obtained by filling out a questionnaire form. The results obtained from this study were the relationship between protein intake and learning achievement with a p-value of 0.670, nutritional status with learning achievement with a p-value of 0.358, parents' education with learning achievement with a p-value of 0.429, parental income with learning achievement with a p-value -value 0.441, parents' work with learning achievement with a p-value of 0.437. The conclusion of this study is that there is no relationship between protein intake, nutritional status and socioeconomic status of parents with learning achievement of class VIII students of Junior High School Nabil Husein Samarinda.

**Keywords:** Protein Intake, Nutritional Status, Socioeconomic, Learning Achievement

**Submitted:** 04 January 2023

**Revised:** 15 February 2023

**Accepted:** 25 February 2023

**DOI:** <https://doi.org/10.25026/jsk.v5i1.1669>

## 1 Introduction

Nutritional problems in adolescents will affect the quality of human resources, which can result in loss of generations and impact on the state of the nation's economy in the future. Adolescents are residents aged 10–19 years, a period of rapid growth and development, both physiologically, psychologically and cognitively, the need for nutrient intake will increase [1].

Based on Rikesdas data for 2018, there were 25.7% of adolescents aged 13–15 years with short nutritional status and 26.9% of adolescents aged 16–18 years who were very short. In addition, there were 8.7% of teenagers who were thin and 8.1% who were very thin. Meanwhile, the prevalence of overweight was 16.0% and obesity was 13.5%. East Kalimantan ranks 4th highest in cases of overweight adolescents 13–15 years and Samarinda City ranks 8th highest in cases of overweight [2].

Vulnerable aged 13–15 years experience much more rapid nutritional needs. Because of this phase, there is a growth spurt, a surge in body size that causes an increase in metabolic rate, so that the body requires more energy for activity, synthesis of new tissues and brain development [3]. The increase in rapid growth must be balanced with a balanced and appropriate intake, in order to meet the needs of growth. The macronutrient that teenagers need in large quantities is protein in muscle and brain formation [4].

Protein intake can affect the learning achievement of adolescents. This effect is influenced by increased levels of amino acids and choline, which are neurotransmitter precursors. This secretion can improve the psychological condition system so that it can improve good reasoning and cognitive processes for adolescents [5]. Fulfillment of protein intake is indirectly influenced by the socio-economic status of the family which is closely related to employment, income and educational level of parents [6].

Nutrition is an important part of adolescents in school learning, nutrition can improve intellectual abilities, brain abilities, and

encourage physical growth and adolescent brain development. Good and balanced nutrition affects the concentration ability and intelligence of adolescents in absorbing what they have learned at school. Therefore, adolescents must always maintain and improve their nutritional status [7].

The nutritional status of adolescents has an impact on improving the quality of human resources, chronic malnutrition and nutrition are more closely related to decreased learning achievement, have lower scores on cognitive intelligence tests compared to normal children. Student achievement is the first indicator to determine the level of success of a student [7]. Based on the presentation of these facts, the researchers were interested in examining the relationship between nutritional status, protein intake and family socio-economic status with the learning achievement of children aged 13–15 years at Nabil Husein Junior High School Samarinda.

## 2 Method

The research design used quantitative, descriptive correlational research type, with a cross sectional approach. The dependent variable is academic achievement, the independent variable is nutritional status, protein intake and family socio-economic status. The sample used was class VIII students of SMP Nabil Husein Samarinda with a population of 95 students, using a purposive sampling technique to get 49 people. Anthropometric measurements of nutritional status data based on BMI/Age, protein intake obtained from the results using a 24-hour recall, family socio-economic measures were measured using a socio-economic questionnaire. Data processing in this study consisted of four stages, namely editing, coding, processing and cleaning. Data analysis performed included for univariate and bivariate analysis. The bivariate analysis technique in this study used the Pearson correlation test using the IBM SPSS Statistics 22 software.

### 3 Results and Discussion

Table 1 Characteristics of Respondents

Characteristics of Respondents	Total (n=49)	
	n	%
Age Group (yrs)		
13 years old	22	44.9
14 years	24	49.0
15 years	3	6.1
Gender		
Woman	37	75.5
Man	12	24.5
Report Value		
Low score	25	51.0
High Score	24	49.0
Nutritional Status (BMI for Age)		
Severe Malnutrition	0	0
Mild Malnutrition	1	2.0
Normal	43	87.8
Overweight	1	2.0
Obesity	4	8.2
Protein Intake		
Weight Deficit	10	20.4
Moderate Deficit	0	0
Mild Deficit	7	14.3
Optimal	28	57.1
Over	4	8.2

The characteristics of the respondents in this study based on table 1 can be seen that out of 49 respondents there were 24 respondents (49.0%) mostly 14 years old, most of the 37 respondents (75.5%) were female, and some had low report card scores (71-80) 25 respondents (51.0%). The results of measuring nutritional status based on (BMI for Age) were dominant with normal nutritional status -2 SD to +1 SD as many as 43 respondents (87.8%) and the results of interviews using a 24-hour recall of protein intake, mostly 28 respondents were optimal (57.1%) cut off 80-120 AKP (protein adequacy rate).

Table 2 Socioeconomic Family

Socioeconomic	Total (n=49)	
	n	%
Father's Education		
Low education	12	24.5
Higher education	37	75.5
Family Income		
Low Income	11	22.4
High Income	38	77.6
Job Status		
Working	47	95.9
Unemployment	2	4.1

Socio-economic parents of respondents from the results of the questionnaire in table 2 that of the 49 respondents, most of the father's education was higher education, namely high school to university, as many as 37 people (75.5%), low education in fathers, what is meant is no education, elementary school and elementary school. Most of the respondents' parents had a high income of Rp.1.500.000-Rp.3.000.000 and >Rp. 4.500.000 as many as 38 people (77.6%) and almost all the respondents' parents worked (95.9%), The low category used by researchers is income <Rp. 500,000 then between Rp. 500,000 – Rp. 1,500,000.

Table 3 Relationship between Protein Intake and Learning Achievement

Protein Intake	Learning achievement				Total n	p-value
	Low score		High Score			
	n	%	n	%		
Deficit	20	50	20	50	40	0.670
Good intake	2	22,2	7	77,8	9	

The relationship between protein intake and learning achievement based on the results of the chi-square test showed that there was no significant relationship between protein intake and learning achievement of class VIII students at Nabil Husein Samarinda Junior High School with a p-value of  $0.670 > \alpha = 0.05$ . The results of this study are in line with previous studies in Depok which stated that there was no relationship between protein intake (p-value 0.704) and academic achievement [8]. However, the results of this study are different from those in Palu, showing that there is a positive relationship between protein intake and learning achievement (p-value 0.00) [9].

Consuming protein can provide the amino acids needed by the brain to produce neurotransmitters and protect the brain so that it continues to function normally. Amino acids such as glycine, glutamate, tyrosine and tryptophan in the form of protein are needed for the formation of neurotransmitters that will connect the brain's work processes [10]. In the process of absorption of glucose that occurs in the body, protein has a very important role, namely as a means of transport for these processes, so that a lack of protein intake will

disrupt the supply of nutrients to the brain and interfere with concentration [11].

Although there is no relationship between the protein factor and learning achievement, there are several other possible factors that can affect the level of success in learning that can be considered, such as intelligence, attention, interest, talent and the way parents educate, but these were not examined in this study [12]. In addition, some students have good academic achievement, but have less protein intake because these students have good psychological conditions during exams, and have genetic intelligence as well as interest, talent, motivation and have better cognitive abilities [12]. Some students who have low achievement, but have good protein intake, this can be due to the absorption of a person's body of protein nutrients found in food is not perfect [13].

Table 4 Relationship of Nutritional Status (BMI for Age) with Learning Achievement

Nutritional Status	Learning achievement				Total		p-value
	Low score		High Score		n	%	
	n	%	n	%			
Normal	23	92	2	8	25	100	0.358
Malnutrition	2	8.3	22	91.7	24	100	

The relationship between nutritional status (BMI/A) and academic achievement in table 4 shows that there is no significant relationship between nutritional status and learning achievement of class VIII students at SMP Nabil Husein Samarinda, with a p-value of  $0.358 > \alpha = 0.05$ . The results of this study are in line with previous research that there is no relationship between nutritional status and student achievement in Tomohon City [14]. However, several recent studies have found a relationship between nutritional status and student achievement at SMP Negeri 2 Kumelembuai [15].

Nutritional status is a picture of what a person consumes for a long time, can be in the form of undernutrition or excess nutrition, nutritional status can also affect a person's health status, the main determinant of brain growth, which means that nutritional status has an important role in forming intelligence. Deficiency or excess of essential nutrients can

affect the occurrence of learning disabilities, which directly affects the success of learning achievement [7].

However, if seen from table 4 that nutritional status does not affect student achievement. Analysis of researchers in the field, there are several other factors which according to researchers are more powerful as a determinant of the success of learning achievement in class VIII students at Nabil Husein Junior High School. Factors that affect the process and learning outcomes of students in schools that need to be examined again are related to internal student factors such as interest and motivation to learn, external factors in the form of supportive facilities and the influence of friends, and finally the strategies and methods used in participating in learning activities [16]

In addition, the gap between students with normal nutritional status but poor academic achievement is thought to be caused by a lack of food consumed by students, especially foods that can improve learning achievement such as foods high in protein, vitamins, minerals and other nutrients needed by children's brains. Although the quantity of food consumed by students can meet the nutritional needs of students, which is characterized by good nutritional status, the quality of the food is lacking.

Table 5. Family Socio-Economic Relationship with Learning Achievement

Family Socio-Economic	Learning achievement				Total		p-value
	Low score		High Score		n	%	
	n	%	n	%			
Father's Education							0.441
Low education	5	41.7	7	58.3	12	100	
Higher education	0	0	37	100	37	100	
Family Income							0.437
Low Income	0	0	11	100	11	100	
High Income	8	21	30	79	38	100	
Job Status							0.429
Working	0	0	47	100	47	100	
Unemployment	2	100	0	0	2	100	

The results of the analysis show the relationship between parents' education and learning achievement with a p-value of  $0.429 > \alpha = 0.05$  which means there is no significant relationship, the relationship between parents'

income and learning achievement with a p-value of  $0.441 > \alpha=0.05$  means that there is no significant relationship, and the relationship between parents' work and academic achievement with a p-value of  $0.437 > \alpha=0.05$  which indicates that there is no significant relationship. This is in line with research in Kediri showing that there is no significant relationship between education, income, and employment of people with academic achievement [17]. However, this is not in line with research in Padang showing that there is a significant socio-economic relationship with student achievement [18].

Family socioeconomic status is one of the variables that have a role in relation to student achievement. The family's socioeconomic status is determined by the level of education, employment, and family income [19]. The condition of parents' economic status is one of the external factors that influence the way of learning and student achievement. Parents with higher socioeconomic status tend to have more resources to support their child's academic success, such as better access to high-quality education, study materials, and technology needed for learning. Parents can also provide emotional support and motivation for their children to learn and achieve high achievements [18].

The other hand, parents from lower socioeconomic backgrounds may not have the same resources to support their child's academic success, which can affect student achievement. In addition, children who live in an unstable or unsafe environment can also affect their learning, because their ability to focus and concentrate can be disrupted. Socio-economic parents are not always the most important factor in student achievement. There are many other factors that can affect student achievement, such as individual abilities, motivation, and educational support received at school. Socio-economic parents may not always be the most important factor in determining student achievement. In addition, some students who live in low socioeconomic backgrounds are able to perform well regardless of the socioeconomic circumstances of their parents [17].

According to the researchers, this socio-economic role plays an important role according

to the child's ability, because if from a socio-economic perspective it is still categorized as lacking, it means that the fulfillment of nutritional status in terms of food intake is still lacking, this can also affect the growth and development of important body components. If the food consumed is not in accordance with the needs of the respondent's body, this can affect the learning achievement of the respondent.

#### 4 Conclusion

Based on the results of the analysis, it showed that the relationship between protein intake and learning achievement was p-value 0.670, nutritional status and learning achievement had a p-value of 0.358, parents' education had a p-value of 0.429, parents' income had a p-value of 0.441, parents' work with learning achievement with a p-value of 0.437. Based on the results of the research that has been described, it can be concluded that there is no relationship between protein intake, nutritional status and socio-economic status of parents with the learning achievement of class VIII students of SMP Nabil Husein Samarinda.

#### 5 Conflict of interest

There is no conflict of interest in this research.

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### How to Cite:

Anshory, J., Anggraini, A.D.N., Satriani, S., 2023. Protein Intake, Nutritional Status, and Family Socioeconomic Relationships with Learning Achievement of Children Aged 13-15 Years at Nabil Husein Junior High School Samarinda Year 2022. *J. Sains Kes.*, 5(1). 50-55. DOI: <https://doi.org/10.25026/jsk.v5i1.1669>



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