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The Relationship of Nutritional Intake to Nutritional Status and Teenagers Learning Concentration in the Ahludz Dzikri Al-Qur'an Assembly

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ABSTRACT

Adolescence, which lasts from ten to twelve years, is a period of growth and development of the body that requires adequate nutritional intake to prevent problems such as malnutrition and decreased concentration in studies. According to basic data collected in October 2020, 30% of teenagers had normal nutritional status and 70% had poor nutritional status or were underweight. The purpose of this study is to ascertain how nutritional status and intake are related the focus of adolescent learning at the Ahludz Dzikri Al-Qur'an Assembly. This research uses an analytical observational method with a cross-sectional approach. Thirty students from the Ahludz Dzikri Al-Qur'an Council participated in this study. The Spearman test was employed to examine the non-probability sampling methods used in this investigation. The research results showed that there is a relationship between nutritional status and nutrient intake, and that nutrient intake and nutritional status are related, and then learning should be focused, so it is better for students to consume a variety of foods to improve the students' nutritional status and concentration.

INTRODUCTION

The teenage years, from 10 to 18 years old, are crucial because adolescents are among the most important human resources, and as successors, they will play a significant role in the country's future development.[1] A productive, intelligent, and independent adolescent is characterized by good qualities.[2] During the adolescent phase, a period of increase or transition from childhood to adult growth occurs, characterized by rapid growth, often referred to as the "growth spurt." Adolescents experience swift developments physically, mentally, and emotionally.[3] Throughout this phase, adolescents undergo significant growth, both in terms of physical strength and in their expanding and deepening scientific understanding. As a result, they evolve into critical and dynamic individuals. During adolescence, the most crucial need is for proper and ideal nutritional intake to support growth and development. With the increasing number of adolescents in Indonesia, adolescent nutritional issues must be a primary concern due to their impact on the growth and development of their bodies.[4]

Nutritional status is a measure that can indicate how well an individual's health is affected by the amount of nutrients consumed and utilized by the body. A person with adequate nutrition will have a balance between the intake and expenditure of energy.[5] The intake of macronutrients and micronutrients is one of many factors that can influence nutritional status. Macronutrient intake

includes energy, protein, fats, and carbohydrates, which are essential for building, supporting, and repairing tissues within the body, as well as serving as the primary energy source for the body. Micronutrients include vitamin A, vitamin C, and zinc, which are important for strengthening the body's immunity.[6]

One of the many nutritional problems still present in Indonesia is Protein-Energy Malnutrition (PEM), which negatively impacts concentration and learning ability.[7] According to Yorgancı 2018, learning concentration is the ability to think and act with focus on the studied material and set aside everything else unrelated to that material.[8] One of the factors affecting concentration and the ability to absorb knowledge is nutritional intake. Nutrient intake can be seen as an indicator of the health of students. Nutritional issues, both undernutrition and overnutrition, can arise due to an imbalance in the amount of nutrients the body needs.[1]

The Basic Health Research in 2019 data shows that 1.4 percent of Indonesians are very underweight, 6.7 percent are underweight, and 78.3% are normal, 9.5 percent are overweight, and 4 percent are obese.[9] In the Sumatra Province, 1.9% of the population is classified as very underweight, while 6.3% are underweight. The normal nutritional status is 82.5%, overweight status is 7.2%, and obesity status is 2.0%.[10] According to previous research based on 2016 Ministry of Health data in Indonesia, 11.1% of adolescents in the Ogan Komering Ilir District are underweight.

At the Al-Qur'an Ahludz Dzikri assembly, there are 40 students, 30 of whom are aged 16-18 years and will be the sample in this study. This is because, according to baseline data collected in October 2022, there are 30% of adolescents with normal nutritional status and 70% of adolescents with less or underweight nutritional status. Consequently, the author wants to undertake research on the relationship between nutritional status and nutrient intake among the youth at the Al-Qur'an Ahludz Dzikri assembly.

MATERIALS AND METHODS

The study is analytical observational research with a cross-sectional approach. This research commenced from the proposal preparation to the report compilation between October 2022 and June 2023. Conducted in December 2022 with a population of 30 students at the Majelis Al-Qur'an Ahludz Dzikri in Ogan Komering Ilir District, South Sumatra, this study utilized a non-probability sampling technique.

The data collection techniques for this study included primary data consisting of participant characteristics (name, gender, place and date of birth, and age), interviews on nutrient intake, anthropometric measurements (weight and height), and assessment of the students study consumption levels. Secondary data consisted of the list of students' names from the Majelis Al-Qur'an Ahludz Dzikri.

The data collection method began with issuing a letter to the Majelis Al-Qur'an Ahludz Dzikri. This was followed by an explanation of the research's purpose and process, respondents completing a consent form to participate, and a personal data form. Subsequently, a food intake recall was conducted, followed by calculating the percentage of macronutrient intake. Anthropometric measurements were then taken, including weighing and measuring height to calculate nutritional status.

The following day, at 10:00 AM, the Kraepelin test forms were distributed, selected because this time falls during a break period. The procedure involved handing out the test sheets to the respondents and then asking the students to add two numbers in each column from the bottom up. If the sum consisted of two digits, only the last digit needed to be written down, right in between the numbers being added on the right side. If respondents made a mistake in their calculations, they were not required to erase it but were simply to cross out the incorrect number and write the correct one beside it. After that, every 15 seconds, a tapping sound would be heard, indicating that respondents should move to the next column on the right and start calculating again from the bottom up. Subsequently, the respondent's food intake was recalled again, and the percentage of nutrient intake was calculated, along with measuring weight and height.

RESULTS

Characteristics of age, intake of macronutrients, nutritional status, and the level of concentration in studying are among the following research results:

Table 1. Frequency Distribution of Respondents at Majelis Al-Quran Ahludz Dzikri, Ogan Komering Ilir District, 2022

No.	Age group	n	%
1.	16 years	11	27.5%
2.	17 years	13	32.5%
3.	18 years	6	15%
Total			**100**

Source: Primary Data, 2022

The table above shows that the majority of students at Majelis Al-Quran Ahludz Dzikri are 17 years old, with 13 students (32.5%).

Table 2. Frequency Distribution of Macronutrient Intake Levels of Students at Majelis Al-Qur'an Ahludz Dzikri, Ogan Komering Ilir District, 2022

Category	Macronutrients							
	Energy		Protein		Fat		Carbohydrates	
	n	%	n	%	n	%	n	%
Severe Deficit	11	36.5%	7	23.3%	7	23.3%	10	33.3%
Moderate Deficit	5	17%	7	23.3%	7	23.3%	7	23.3%
Mild Deficit	11	36.5%	1	3.3%	0	0%	10	33.3%
Normal	3	10%	8	26.7%	10	33.3%	3	10%
Above Needs	0	0%	7	23.3%	6	20%	0	0%
Total	**30**	**100%**	**30**	**100%**	**30**	**100%**	**30**	**100%**

Source: Primary Data, 2022

The table above indicates that the majority of students at Majelis Al-Quran Ahludz Dzikri fall into the categories of severe and mild deficit for energy intake, each with a total of 11 students (36.5%), are in the normal category for protein intake with a total of 8 students (26.7%), are in the normal category for fat consumption with a total of 10 students (33.3%), and fall into the categories of severe and mild deficit for carbohydrate consumption, each with a total of 10 students (33.3%).

Table 3. Frequency Distribution of Nutritional Status of Students at the Majelis Al-Qur'an Ahludz Dzikri, Ogan Komering Ilir District 2022

Nutritional Status	N	Percentage (%)
Very Underweight	0	0%
Underweight	18	60%
Normal	6	20%
Overweight	4	13.3%
Obesity	2	6.7%
Total	**30**	**100%**

Source: Primary Data, 2022

The table above explains that among the students at the Majelis Al-Qur'an Ahludz Dzikri, 18 students (60%) are underweight.

Table 4. Frequency Distribution of Study Concentration Level of Students at the Majelis Al-Qur'an Ahludz Dzikri, Ogan Komering Ilir District, 2022

Level of Study Concentration	N	Percentage (%)
Low	4	13.3%
Medium	23	76.7%
High	3	10%
Total	**30**	**100%**

Source: Primary Data, 2022

The table above shows that among the students at the Majelis Al-Qur'an Ahludz Dzikri, 23 students (76.7%) have a medium level of study concentration.

Table 5. Relationship Between Energy Intake and Nutritional Status of Students at the Majelis Al-Qur'an Ahludz Dzikri

Energy Intake Level	Nutritional Status										Total		*p*
	Very underweight		Underweight		Normal		Fat		Obesity				
	n	%	n	%	n	%	n	%	n	%	n	%	
Severe deficit	0	0	8	72.7	3	27.3	0	0	0	0	11	100	0.047
Moderate deficit	0	0	3	60	1	20	1	20	0	0	5	100	
Mild deficit	0	0	7	63.6	1	9.09	1	9.09	2	18	11	100	
Normal	0	0	0	0	1	33.3	2	66.7	0	0	3	100	
Above needs	0	0	0	0	0	0	0	0	0	0	0	100	

Source: Primary Data, 2022

The table above reveals that, of the 30 respondents with a severe energy intake deficit, 8 (or 72.7%) were underweight. There is a significant relationship, with a p-value of 0.047, between energy intake and the nutritional status of the students.

Table 6. Relationship Between Protein Intake and Nutritional Status of Students at the Al-Qur'an Ahludz Dzikri

Protein Intake Level	Nutritional Status										Total		p
	Very underweight		Underweight		Normal		Fat		Obesity				
	n	%	n	%	n	%	n	%	n	%	n	%	
Severe deficit	0	0	6	85.7	1	14.3	0	0	0	0	7	100	0.013
Moderate deficit	0	0	5	71.4	2	28.6	0	0	0	0	7	100	
Mild deficit	0	0	1	100	1	0	0	0	0	0	1	100	
Normal	0	0	3	37.5	3	37.5	1	12.5	1	12.5	8	100	
Above needs	0	0	3	42.9	0	0	3	42.9	1	14.3	7	100	

Source: Primary Data, 2022

From 30 participants, 6 individuals (85.7%) were undernourished, and their protein intake fell into the severe deficit category, according to the table above. A significant correlation, p=0.013, exists between nutritional status and protein intake of the students as shown by the Spearman test.

Table 7. Relationship Between Fat Intake and Nutritional Status of Students at the Majelis Al-Qur'an Ahludz Dzikri

Fat Intake Level	Nutritional Status					Total	p
	Very	Underwei	Normal	Fat	Obesity		

	underweight			ght								
	n	**%**	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**
Severe deficit	0	0	6	85.7	1	14.3	0	0	0	0	7	100
Moderate deficit	0	0	6	85.7	0	0	1	14/3	0	0	7	100
Mild deficit	0	0	0	0	0	0	0	0	0	0	0	100
Normal	0	0	4	40	4	40	2	20	0	0	10	100
Above needs	0	0	2	33	1	17	1	17	2	33	6	100

0.006

Source: Primary Data, 2022

From 30 respondents with severe or moderate fat intake deficits, 6 (85.7%) were undernourished, as shown in the table above. A significant correlation exists between fat consumption and the nutritional status of the students, with a Spearman significance value of 0.006.

Table 8. Relationship Between Carbohydrate Intake and Nutritional Status of Students at the Majelis Al-Qur'an Ahludz Dzikri

Carbohydrate Intake Level	Nutritional Status										Total		p
	Very underweight		Underweight		Normal		Fat		Obesity				
	n	**%**	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**	
Severe deficit	0	0	7	70	3	30	0	0	0	0	7	100	
Moderate deficit	0	0	5	72.42	1	14.26	1	14.3	0	0	7	100	0.044
Mild deficit	0	0	6	60	1	10	1	10	20	10	0	0	
Normal	0	0	0	0	1	33.33	2	66.7	0	0	10	100	
Above needs	0	0	0	0	0	0	0	0	0	0	6	0	

Source: Primary Data, 2022

A significant relationship exists between carbohydrate intake and the nutritional status of students, as shown in the table above. Of the 30 individuals surveyed, their carbohydrate intake was classified under severe deficit, with 7 surveyed individuals, or 70% of the total, being undernourished.

Table 9. Relationship Between Energy Intake and Learning Concentration of Students at Majelis Al-Qur'an Ahludz Dzikri

Energy Intake Level	Learning Concentration						Total		p
	Low		Medium		High				
	n	%	n	%	n	%	n	%	
Severe deficit	4	36.4	7	63.63	0	0	11	100	0.006
Moderate deficit	0	0	5	100	0	0	5	100	
Mild deficit	0	0	8	72.7	3	27.3	11	100	
Normal	0	0	3	100	0	0	3	100	
Above needs	0	0	0	0	0	0	0	0	

Source: Primary Data, 2022

The table above shows that out of 30 respondents, 8 have a medium learning concentration (72.7%) with their energy intake in the mild deficit category. There is a relationship between energy intake and the learning concentration of students, according to Spearman's test with a significance level of 0.006.

Table 10. Relationship Between Protein Intake and Learning Concentration of Students at Majelis Al-Qur'an Ahludz Dzikri

Protein Intake Level	Learning Concentration						Total		p
	Low		Medium		High				
	n	%	n	%	n	%	n	%	
Severe deficit	2	28.6	5	71.4	0	0	7	100	0.007
Moderate deficit	2	28.6	5	71.4	0	0	7	100	
Mild deficit	0	0	1	100	0	0	1	100	
Normal	0	0	7	30.4	1	33.3	8	100	
Above needs	0	0	5	71.4	2	28.6	7	0	

Source: Primary Data, 2022

The table indicates that 5 respondents (71.4%) fall into the medium learning concentration category, while 30 respondents have a protein intake level in the severe to moderate deficit category. There is a relationship between protein intake and the learning concentration of students, according to Spearman's test with a significance level of 0.007.

Table 11. Relationship Between Fat Intake and Learning Concentration of Students at Majelis Al-Qur'an Ahludz Dzikri

Fat Intake Level	Learning Concentration						Total		p
	Low		Medium		High				
	n	%	n	%	n	%	n	%	
Severe deficit	2	28.6	5	71.4	0	0	7	100	0,002
Moderate deficit	1	14.3	6	85.7	0	0	7	100	
Mild deficit	0	0	0	0	0	0	0	0	
Normal	1	10	9	90	0	0	10	100	
Above needs	0	0	3	50	3	50	6	100	

Source: Primary Data, 2022

According to the table above, out of 30 respondents with a moderate fat intake level, six (85.7%) have a medium learning concentration. There is a relationship between fat consumption

and the learning concentration of students, according to Spearman's test with a significance level of 0.002.

Table 12. Relationship between Carbohydrate Intake and Learning Concentration of Students at Majelis Al-Qur'an Ahludz Dzikri

Carbohydrate Intake Level	Learning Concentration						Total		p
	Low		Medium		High				
	n	%	n	%	n	%	n	%	
Severe deficit	3	30	7	70	0	0	10	100	0.015
Moderate deficit	1	14.28	6	71.42	0	0	7	100	
Mild deficit	0	0	7	70	3	30	10	100	
Normal	0	0	3	100	0	0	0	100	
Above needs	0	0	0	0	0	0	6	0	

Source: Primary Data, 2022

The table above shows that out of 30 respondents with a severe deficit in carbohydrate intake, 7 of them, or 70% of the total, had a medium level of learning concentration. The relationship between carbohydrate intake and the learning concentration of students is indicated by a Spearman's significance of 0.015.

Table 13. Relationship between Nutritional Status and Learning Concentration of Students at Majelis Al-Qur'an Ahludz Dzikri

Nutritional Status	Learning Concentration						Total		p
	Low		Medium		High				
	n	%	n	%	n	%	n	%	
Very Underweight	0	0	0	0	0	0	0	0	0.064
Underweight	2	11.1	16	88.9	0	0	18	100	
Normal	2	33.3	4	66.7	0	0	6	100	
Overweight	0	0	3	75	1	25	4	100	
Obesity	0	0	0	0	2	100	2	100	

Source: Primary Data, 2022

The table above proves that out of 30 respondents, 16 respondents (88.9%) with an underweight nutritional status and a medium level of learning concentration. For respondents with normal nutritional status experiencing a medium level of learning concentration, there were 4 respondents (66.7%). Spearman’s rho test shows a significance of 0.064, indicating no significant relationship between nutritional status and the learning concentration of students.

DISCUSSION

Student Characteristics

The respondents of this study were students, with 32.5% being 17 years old. Regarding gender, all 30 students were male, accounting for 100%. Nutritional intake is crucial during adolescence to support healthy growth.[11] At this stage, proper nutrition is essential because, if met,

it can offer numerous benefits. These include aiding in learning concentration, enabling active participation in physical activities, socializing, achieving physical maturity, reaching sexual maturity, and developing into adulthood.[12]

Macro Nutrient Intake Level

From the conducted research, the results indicate that the majority of the students' energy intake falls into the severe deficit category, with 11 students (36.5%), moderate deficit intake with 5 students (17%), mild deficit intake with 11 students (36.5%), and normal intake level with 3 students (10%). Many students have a severe deficit in energy intake, which is attributed to the observation during the dietary recall that some students did not consume much food. Excessive consumption of energy can lead to obesity.[13]

Regarding the students protein intake, 7 students (23.3%) were categorized under severe deficit, another 7 students (23.3%) under moderate deficit, 1 student (3.3%) under mild deficit, 8 students (26.7%) were at a normal intake level, and 7 students (23.3%) were above the required intake level. A protein deficiency can lead to decreased growth, weakened immune system, increased susceptibility to diseases, and decreased physical activity and work capacity.[13]

For the students' fat intake, 7 students (23.3%) were in the severe deficit category, 7 students (23.3%) in the moderate deficit, 10 students (33.3%) were at a normal intake level, and 6 students (20%) exceeded the necessary intake. The majority of students had a normal fat intake, with many still under the deficit category. This is partly because, during dietary recalls, it was found that some students prefer not to consume foods high in fat, and the meals provided were not very high in fat.[14] A lack of fat consumption can lead to deficiencies in fat-soluble vitamins.[15]

Regarding carbohydrate intake, 10 students (33.3%) were in the mild deficit category. Many students had a severe deficit in carbohydrate intake because, during the dietary recall, it was noted that the students did not consume many carbohydrate-rich foods, with white rice being the primary source of high carbohydrates consumed. Excess carbohydrates are stored in the body as fat.[16]

Nutritional Status Level

Factors affecting the nutritional status of adolescents include nutritional intake, gender, physical activity, education, and parental genetic factors.[17] Proper nutrition occurs when there is harmony between the consumed nutrients and the required needs.[18] Overnutrition is a situation where the intake exceeds the necessary requirements, coupled with a lack of physical activity. Obesity occurs due to the accumulation of stored energy in fat bonds, leading to various health issues such as cardiovascular diseases, gastrointestinal and liver disorders, bone complications, and even death.[19]

According to the study conducted, the results showed that 18 students (60%) had inadequate nutritional status, while 6 individuals (20%) had normal/good nutritional status. The findings indicate that adolescents experience low nutrition, good nutrition, overnutrition, or obesity. This is caused by an imbalance between consumed intake and required needs due to insufficient physical activity, resulting in unbalanced energy utilization.[20]

Learning Concentration Levels

Concentration means focusing the mind and actions on the topic being studied by eliminating all irrelevant factors.[21] The aspects that contribute to focus in learning fall into two categories, including internal and external components.[22] Internal factors are those originating from within the individual, such as disturbances that may be caused by brain development and hormones regulated by neurotransmitters.[23] If neurotransmitters produce more hormones, children tend to be more hyperactive. Insufficient hormone production by neurotransmitters can slow down children, leading to decreased concentration levels.[24] According to the study findings, the concentration level of the students is low, with 21 out of 30 students (70%) having low concentration levels and 9 students (30%) having medium concentration levels. There were no students with high concentration levels.

Relationship Between Nutritional Status and Learning Concentration

Based on the research findings, 16 students, or 88.9 percent, fall into the underweight category in terms of their nutritional status. There is an insignificant relationship between the nutritional status of the students and their learning concentration at the Ahludz Dzikri Quran Assembly, according to a p-value of 0.064 ($p>0.05$).

According to a study conducted by Kharis Fajar (2020), there is no significant correlation between an individual's nutrition level and learning concentration. The results show that $Sig=0.412 > \alpha = 0.05$, indicating that H0 is accepted. It is not possible to determine the level of student learning concentration at SMP Negeri 1 Ngumut Tulung Agung based on factors that can influence learning concentration, such as age, physical condition, gender, and nutritional status.[20]

Nutritional status can be one of the factors that impact learning concentration; however, the research conducted found no significant relationship between nutritional status and learning concentration.[25] This is because there are many factors that can affect learning concentration, such as internal health factors, adequate sleep, and a calm environment.

CONCLUSION

Based on the research conducted on students at the Ahludz Dzikri Quran Assembly in Ogan Komering Ilir Regency, South Sumatra, the conclusions drawn are that the respondent characteristics include 27.5% of the students aged 16 years, 32.5% aged 17 years, and 15% aged

18 years, with all students being in healthy condition. The majority of students energy nutrient intake falls into the categories of severe and moderate deficit, amounting to 36.5%. The majority of students protein nutrient intake falls into the normal category, amounting to 26.7%. The majority of students fat nutrient intake falls into the normal category, amounting to 33.3%. The majority of students carbohydrate nutrient intake falls into the categories of severe and mild deficit, amounting to 33.3%. Most students have a nutritional status classified as undernourished, amounting to 60%, and the student's learning concentration falls into the moderate category, amounting to 76.7%. In the conducted research, there is a correlation between nutritional status and students learning concentration, but there is no correlation between nutrient intake and students learning concentration.

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