

THE RELATIONSHIP BETWEEN BREAKFAST HABITS AND NUTRITIONAL STATUS WITH LEARNING ACHIEVEMENT IN STRADA NAWAR BEKASI JUNIOR HIGH SCHOOL STUDENTS

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ABSTRACT

Learning achievement is a form of evaluation based on the results obtained in the process of gaining knowledge. Learning achievement can be influenced by various factors, both environmental and health factors, such as breakfast habits and nutritional status. The aim of this research was to analyze the relationship between breakfast habits and nutritional status with learning achievement in junior high school students. This study was an analytical observational research using a cross-sectional study design. The research was conducted at Strada Nawar Bekasi Junior High School from September to December 2022 with the sample being students from grades VII and VIII. The sample was chosen randomly using proportionate random sampling with a total of 81 students based on inclusion and exclusion criteria. The data collected include height and weight through anthropometric measurements, interviews on breakfast habits using the SQ-FFQ form, and student report cards for the last semester. The data obtained were then tested with SPSS software using chi-square test analysis. The results showed that there were students with good breakfast habits (77.8%), overnutritional status (40.8%), and good learning achievement (48.1%). From this research, it was found that there was a relationship between breakfast habits (p -value = 0.041) and there was no relationship between nutritional status (p -value = 0.190) with learning achievement. It was concluded that good breakfast habits are directly proportional to the student's learning achievement and there is no relationship between nutritional status and student's learning achievement.

Keywords: breakfast habits, learning achievement, nutritional status, teenagers

INTRODUCTION

The adolescent phase is one of the stages in the human growth and development cycle as well as a transition phase from child life to adult life, one which is marked by biological and psychological growth and development. Teenagers are the nation's greatest asset and are the hope in achieving the nation's ideals. Teenagers are part of the wheel of the nation's destiny and are considered agents of change so that teenagers are expected to be able to have good performance or achievements and be able to face existing challenges, both now and in the future. Therefore, education is really needed because it is an important key in improving the quality of the nation in the future.

In recent changes to curriculum policy, there has been a focus on promoting children's well-being. However, a common belief in discussions about promoting children's well-being is that it

conflicts with or is seen as less important than their academic achievement (Clarke, 2020). Academic abilities during education can be seen from student learning achievements, which can also be a standard for children's success at school. This proves that the development of quality human resources in schools requires development support from health factors, namely nutrition. Nutrition is a factor that can determine the level of health and balance between physical and mental development. Therefore, food and nutrition are essential requirements for humans. Nutrition is crucial for maintaining good health and overall well-being, and is a key aspect of healthcare. The nutritional status of individuals can impact their health outcomes (Kesari & Noel, 2023).

Nutrition has an influence on brain development and behavior, ability to work and productivity, as well as the body's immunity to infectious diseases.

Usually, someone with good nutritional status tends to lead them to carry out a higher level of activity so that it can support learning achievement. Learning achievement has a close relationship with the level of intelligence, and physical activity is related to overall body health. Physical activity, intelligence and academic achievement are being studied from a multidisciplinary perspective (Gil-Espinosa et al., 2020).

Nutrient intake that is not in accordance with the body's needs will cause health problems, both overnutrition and undernutrition. Insufficient nutritional intake during adolescence can affect students' activities at school, such as getting tired easily, appearing weak, disrupted growth, malnutrition in adulthood, and decreasing achievement at school (Hakim et al., 2014). Malnutrition in children will see them experience changes in metabolism which have an impact on cognitive abilities and brain abilities. Research conducted by Sari (2019) in one of the junior high schools in Padang City stated that the better the students' nutritional status, the better the students' learning achievements. In adulthood, the hippocampus is one of the areas of the brain that experiences a high level of neurogenesis, or the formation of new neurons. This process plays a role in regulating both emotional and cognitive functions in the hippocampus. However, this process can be influenced by various factors, both internal (intrinsic) and external (extrinsic), including nutrition (Melgar-Locatelli, 2023).

Based on data contained in Riskesdas (2018), the prevalence of adolescents in Indonesia who are thin and very thin in the age range 13-15 years is 8,7%, while the prevalence of adolescents in Indonesia with overweight and obese nutritional status in the age range 13-15 years is 16,0%. In West Java Province, the prevalence of adolescents in the 13-15 year age range who have very thin nutritional status is 1,75%, underweight is 6,13%, overweight of 11,96%, and obesity of 4,89%. Furthermore, the prevalence of adolescents in Bekasi City in the age range of 13-15 years who have a very thin nutritional status is 1,56%, thin is 10,12%, overweight by 19,55%, and obesity by 5,73%.

Daily eating behavior can influence a child's nutritional status, including breakfast behavior.

Teenagers need breakfast before going to school in order to meet their nutritional needs and as an energy reserve so they can carry out their activities well and concentrate on studying. Breakfast contains carbohydrates that are ready to be used to increase blood glucose. After eating dinner, the body enters a fasting state for 10-12 hours with blood glucose reserves sufficient to be used for activities for two to three hours in the morning, so students need breakfast to provide energy so they don't feel lethargic or weak (Rizkyta & Mulyati, 2014). If blood glucose levels are normal, students will concentrate well, as evidenced by their achievement in learning. However, if the glucose level is not normal, the student's concentration will decrease so that the student can experience fatigue and drowsiness. This can result in not achieving good learning achievement (Hanif, 2016).

Based on data from the 2015 Global School Health Survey in the Indonesian Ministry of Health article (2018), the results showed that the prevalence of teenagers who did not eat breakfast was 62,2% (Hafiza et al., 2020). Many adolescents in developing countries skip breakfast. Breakfast consumption positively affects children and adolescents' academic performance and behaviors, particularly in mathematics and arithmetic (Indriasari et al., 2021). A study among high-school girls in Surabaya observed 58.0% breakfast skippers (Irdiani & Nindya, 2017), and in Makassar it was 41.2% (Amrin, 2014). A 2016 study in Makassar reported that 37.0% of high-school students did not have a daily breakfast (Thasim, 2016). In Indonesia, the reason why many children are accustomed to not having breakfast before going to school is the lack of food availability, the food does not look attractive, the types of food provided are less varied, and time constraints because they have to leave early (Irdiani & Nindya, 2017).

Strada Nawar Junior High School is one of the schools located in a densely populated location in Bekasi City, West Java Province. The road to school is very busy in the morning, causing traffic jams along the road. With the school starting time at 06.55 am, students are required to leave even earlier in order to arrive at school on time and thus avoid traffic jams by skipping breakfast. A preliminary study conducted by researchers on 25

students from Strada Nawar Junior High School revealed that nine students skipped breakfast due to a lack of appetite or time constraints. Among these nine individuals, three students achieved enough learning achievements, four students good learning achievements, and two students very good in their learning achievements. Additionally, data indicated that four students with good learning achievements included one student with poor nutritional status, one with good nutrition, and two classified as obese. Furthermore, 14 students exhibited good learning achievements, comprising seven students with good nutrition, four students classified as obese, one child with undernutrition, and two students with overnutrition. Another seven students demonstrated very good learning achievements, with two classified as good nutrition, three as overnutrition, and two as undernutrition. Based on this background, researchers are interested in finding out the relationship between breakfast habits and nutritional status with the learning achievement of Strada Nawar Bekasi Junior High School students.

METHODS

This research was an analytical observational research that refers to a cross-sectional design with a sample size of 81 junior high school students obtained through proportional random sampling based on the Lemeshow (1997) formula for cross-sectional research design. This research was conducted at Strada Nawar Bekasi Junior High School from September to December 2022. The subjects of this research consisted of students in grades 7 and 8 and were selected using inclusion and exclusion criteria. Inclusion criteria were being healthy, not dieting or fasting, and willing to be a research subject. Meanwhile, the exclusion criterion was students who were not present when the research was conducted.

The independent variables in this study were the breakfast habits and nutritional status of Strada Nawar Bekasi Junior High School students, while learning achievement was the dependent variable. The data collection instruments used in this research include a general personal data questionnaire, form, a semi-quantitative food frequency questionnaire (SQ-FFQ), breakfast

habits form, and microtoise as well as digital scales for anthropometric measurements. The results of anthropometric measurements were used to assess students' nutritional status based on body mass index (BMI) by measuring height and weight, which were then recalculated using Z-score. Data related to student learning achievement at Strada Nawar Bekasi Junior High School were collected by recording the average grades obtained from all subjects on student report cards during the last semester of the 2022/2023 academic year.

The collected data were analyzed through SPSS software version 26, employing bivariate analysis, specifically the chi-square test. This analysis aims to evaluate the correlation between breakfast habits and academic performance, as well as the correlation between nutritional status (BMI for Age) and academic achievement. The significance of the relationship between variables was determined when the p-value was $< 0,05$. This research has been granted permission by the Ethics Commission of the Faculty of Dentistry, Airlangga University with a certificate ethical clearance number 530/HRECC. FODM/VIII/2022.

RESULTS AND DISCUSSIONS

Sample Characteristics Based on Child Characteristics

The sample characteristics observed included gender, age, class and nutritional status. Based on the data collected, the gender frequency is 59.3% male and 40.7% female with the majority aged 13 years (44.4%) as explained in Table 1.

Table 1. Sample Distribution According to Gender, Age, and Class of Strada Nawar Bekasi Junior High School Students

Characteristics	n	(%)
Gender		
Male	48	59.3
Female	33	40.7
Age		
11 years old	11	13.6
12 years old	26	32.1
13 years old	36	44.4
14 years old	7	8.6
16 years old	1	1.2
Class		
VII	41	50.6
VIII	40	49.4

Physiologically, men have a larger brain size than women. In addition, in general, men have better spatial abilities than women and are more active so that men achieve better in areas related to physical strength and agility such as sports or outdoor activities, while women have better verbal abilities than men so that women achieve better in academic matters (Herdiansyah, 2016; Suendang, 2017). In this study, most of the respondents (50.6%) were class VII students. If the class level is higher, respondents will have broader knowledge and understanding (Damara & Muniroh, 2021).

Sample Characteristics Based on Family Characteristics

The family characteristics observed include education level, employment and parental income. The distribution of parents' education and employment levels can be seen in Table 2 which is then reclassified based on father and mother groups.

Table 2. Sample Frequency Distribution Based on Education and Occupation of Parents of Strada Nawar Bekasi Junior High School Students

Characteristics	Father		Mother	
	n	(%)	n	(%)
Education				
Not completed in primary school	0	0	1	1.2
Elementary School	1	1.2	0	0.0
Junior High School	1	1.2	1	1.2
Senior High School	10	12.3	21	25.9
University	69	85.2	58	71.6
Work				
Doesn't work	4	4.9	30	37.0
Traders and Entrepreneurs	27	33.3	22	27.2
Civil servants	17	21.0	6	7.4
Private sector employee	20	24.7	10	12.3
Health Services	1	1.2	7	8.6
Educator	2	2.5	2	2.5
Driver	1	1.2	0	0.0
Others	9	11.1	4	4.9

It can be seen in Table 2, the majority of parents' education at Strada Nawar Bekasi Junior High School, was 85.2% fathers and 71.6% mothers took university level until graduation. The level of parental education can indirectly influence environmental factors in children's growth and development that support student

learning achievement. The family environment is the place where children receive the main and first education in life. The way parents educate their children when studying at home can influence the child's learning achievement so that it will differ according to the education the child receives (Wulandari, 2015).

As for employment, most respondents had fathers who worked as traders and entrepreneurs (33.3%) and mothers who did not work or were housewives (37.0%). Parents' work has an influence on the intensity of time and communication spent with children. Working parents have little time to pay attention, especially to their children's learning activities, so children find it difficult to achieve the expected learning achievements due to lack of support and attention (Bishnoi et al., 2020).

Table 3. Sample Frequency Distribution Based on Parents' Income of Strada Nawar Bekasi Junior High School Students

Family Income	n	(%)
<City minimum wage	3	3.7
1-2x City minimum wage	13	16.0
>2x City minimum wage	65	80.2

Family income was classified according to the amount of the Bekasi City Minimum Wage, West Java Province for 2022 which is contained in the Decree of the Governor of West Java Number: 561/Kep.732-Kesra/2021 concerning Regency/City Minimum Wages in the West Java Province Region for 2022. Based on this group, it was found that 80.2% of households had an income higher than the minimum wage set for the Bekasi City area in 2022, namely IDR 4.816.921,17. Sufficient family income can increase allocations to fulfill daily needs, both primary needs such as purchasing food and secondary needs such as facilities related to children's education which are indirectly related to children's learning achievements (Hardiyanti, 2019).

Relationship between Breakfast Habits and Nutritional Status and Learning Achievement

Based on Table 4, a total of 63 students (77.8%) had good breakfast habits, while five other students (6.2%) had poor breakfast habits.

Table 4. Breakfast Habits, Nutritional Status and Learning Achievement of Strada Nawar Bekasi Junior High School Students

Variables	n	(%)
Breakfast Habits		
Less	5	6.2
Enough	13	16.0
Good	63	77.8
Nutritional status		
Undernutrition	4	4.9
Good nutrition	44	54.3
Overnutrition	33	40.8
Learning Achievement		
Enough	32	39.5
Good	39	48.1
Very Good	10	12.4

The student learning achievement results obtained showed that 48.1% of respondents had good learning achievements, and 12.4% had very good learning achievements. A total of 54.3% had good nutritional status, but 40.8% of respondents had overnutritional status consisting of overweight and obesity.

Based on Table 5, the majority of students with good breakfast habits have good learning achievements (52.4%), while the majority of students who have less good breakfast habits have enough learning achievements (60.0%). From the hi-square test, it was found that there was a relationship between breakfast habits and student learning achievement with a p-value=0.041 and a correlation coefficient (r) of 0.227, which means

the relationship between the two variables was very weak.

The majority of students with good learning achievements consist of students with good nutritional status (45.5%), and students with overnutritional status (54.5%). Based on results of the chi-square test, it obtained p-value=0.190, which means there was no relationship between nutritional status and the learning achievement of junior high school students.

Based on the results of this research, it was found that there was a relationship between breakfast habits and learning achievement. Most students who have good breakfast habits can achieve good learning achievements. Eating breakfast is a habit that is carried out regularly in the morning and plays an important role for school-aged children in growth and development as well as in meeting nutritional needs so that they can carry out various activities at school optimally. Even though the breakfast habits of most respondents are good, there are still some respondents who have poor breakfast habits. Several respondents stated the reasons for skipping breakfast, namely being lazy about breakfast, rushing because they were afraid of being late, not being used to breakfast, and feeling nauseous. If a child does not have breakfast, the child will become weak due to lack of food, making it difficult for the child to concentrate on studying. This can have an influence on achieving optimal learning achievement (Verdiana & Muniroh, 2017).

The food consumed every day must be fulfilled both in quantity and quality. Food that is balanced

Table 5. Distribution of the Relationship Between Breakfast Habits and Nutritional Status with Learning Achievement in Strada Nawar Bekasi Junior High School Students

Variable	Learning Achievement						p value
	Enough		Good		Very good		
	n	(%)	n	(%)	n	(%)	
Breakfast Habits							
Less	3	60.0	1	20.0	1	20.0	0.041 r=0.227
Enough	8	61.5	5	38.5	0	0.0	
Good	21	33.3	33	52.4	9	14.3	
Nutritional status							
Undernutrition	0	0.0	1	25.0	3	75.0	0.190
Good nutrition	19	43.2	20	45.5	5	11.4	
Overnutrition	13	39.4	18	54.5	2	6.1	

Information :

- Malnutrition = $Z \leq -2$ SD

- Good nutrition = -2 SD $< Z < +1$ SD

- Overnutrition = $Z \geq +1$ SD

between quantity and quality will support a person in their activities. A good breakfast consists of foods that are sources of energy, sources of building substances, and sources of regulatory substances. Breakfast is the most important meal of the day. The completeness of the nutritional content in preparing the breakfast menu needs to be considered, namely breakfast must contain nutrients, such as carbohydrates, protein, fat, vitamins and minerals (Delley & Brunner, 2019). Most respondents' breakfast menu consisted of staple foods, side dishes, vegetables and fruit. Most respondents said that their breakfast menu always changes every day. Gibney et al. (2018) stated that many people believe that breakfast is a crucial meal and should be given extra focus, especially for children. Eating breakfast regularly is linked to consuming more essential nutrients, following a healthier diet that includes fruits and vegetables, and consuming fewer sugary drinks. Regulation of the Minister of Health of the Republic of Indonesia Number 41 of 2014 states that the menu provided for students must also be varied, consisting of food sources of carbohydrates in the form of rice, noodles, bread or tubers, side dishes, such as eggs, tempeh, processed meat or fish, vegetables, fruit and drinks.

The results of this research were in line with research conducted by Mahbub and Fatih (2018) which stated that there was a relationship between breakfast habits and learning achievement. There were two benefits of breakfast for students. First, breakfast contains carbohydrates which are used to increase glucose in the blood because normal glucose levels cause better enthusiasm and concentration in learning, which can affect learning achievement. Second, breakfast contributes to the nutrients needed by the body, such as protein, fat, vitamins and minerals (Adolphus et al., 2016). In the morning, glucose stores are used up after the body's metabolic processes throughout the night. Glucose is a source of energy for the brain. Maintaining stable glucose levels is necessary for good cognitive function. Depletion of glucose levels in the morning causes students to start feeling hungry and experience fatigue and decreased cognitive function. If students skip breakfast, students become less concentrated, which can affect learning achievement (Tang et al., 2017).

The amount of food eaten at breakfast is mostly rich in nutrients, but lunch, dinner, snacks or fast food in excessive amounts or which does not comply with the Balanced Nutrition Guidelines will cause nutritional imbalances (Laswati, 2017). Even though students consume a breakfast that is structured with a menu, such as staple foods, animal side dishes, vegetable side dishes, vegetables, and/or fruit, other food consumed by students in a day in greater quantities consists of fast food or snacks, such as fried foods, colored drinks, and soft drinks which results in students having an unbalanced nutritional intake. Not a few teenagers think that by consuming a large amount of food and achieving a full stomach, their nutritional needs are met (Mardalena, 2017). The daily eating habits play a crucial role in influencing the level of nutritional adequacy, considering it is influenced as a whole and not just by a single meal, such as breakfast. Paying attention to a balanced nutritional intake in daily eating habits significantly contributes to determining the level of nutritional adequacy (Renita, 2017).

Nutritional status is a determinant of brain intelligence development, so the role of nutritional status is very important (Verdiana & Muniroh, 2017). Learning disorders or learning disabilities can occur if students experience deficiencies or excesses of nutritional substances, which can have an impact on successful learning achievement. Learning disabilities refer to several disorders that may affect the acquisition, organization, retention, comprehension, or the application of verbal and/or nonverbal information (Al-Mahrezi, 2016). However, the results of this study state that there was no relationship between nutritional status and learning achievement. Nutritional status only contributes 3.57% to concentration levels, which will also affect learning achievement.

Most of the students in this study had good nutritional status, but there were also some students who had overnutritional status. Based on the research results, it was found that students consumed quite a variety of foods. Family income factors as well as the mother's education and employment can determine the food that her family will buy and consume. Most students have mothers who don't work. Differences in available time occur between mothers who work and mothers

who do not work. Mothers who don't work tend to have more time to communicate with their children than mothers who work. This can also affect children's eating patterns. Mothers who do not work can regulate their children's eating patterns by providing a variety of foods, while mothers who work are less able to regulate their eating patterns, so they tend to give children more freedom in managing their eating patterns (Scaglioni et al., 2018). Apart from that, most of the respondents had mothers with the highest level of education, namely tertiary education. Mothers who have formal education will have an impact on the mother's level of knowledge. The higher the level of formal education, the greater the mother's level of knowledge in obtaining and absorbing practical information in formal and non-formal situations. With knowledge, a person will find it easy to absorb information and apply it in daily behavior and lifestyle. Thus, highly educated mothers will have good knowledge in providing children's food needs (Sukandar, 2020). Sufficient family income can contribute to children's growth and development because parents can fulfill children's various needs, both primary needs such as food and secondary needs. The average family income was IDR.15.006.172,84±8.521.111,22, which means that family income was higher than the minimum wage set for Bekasi City in 2022, namely IDR 4.816.921,17. With high income, the family's purchasing power becomes high so that the family's ability to meet food needs is also high so that the types of food purchased tend to be diverse (Arida et al., 2015). Nowadays, parents have the desire to have a healthy lifestyle so that eating preferences and habits are adjusted to the income of a family, so that income also influences kitchen needs, for example, oil. The higher the income, the higher the quality of the oil because the benefit sought is a healthy lifestyle (Pinem & Safrida, 2018).

Based on the research results, it was found that there was no relationship between nutritional status and the learning achievement of Strada Nawar Junior High School students. Fat is more easily stored as a reserve energy supply in adipose tissue. Fat only requires 3.0% of the energy compared to carbohydrates which require 23.0% of the energy to be converted into fat reserves in adipose tissue.

Therefore, the habit of consuming fat tends to lead to obesity more quickly than carbohydrates and protein. Schwander et al. (2014) stated that someone who regularly consumes foods high in fat will be at risk of becoming obese, while Schmitt and Gaspar (2023) stated that obesity can disrupt blood flow to the brain because there is an increase in fat deposits resulting in a lack of oxygen in the brain. The impact of lack of oxygen is that it will disrupt learning in the long term and will also hinder learning achievement. If someone is obese or has an increased BMI, that person tends to experience increased feelings of laziness and a decrease in activity and creativity.

The absence of a relationship between nutritional status and learning achievement is due to the existence of other factors that influence learning achievement. Slameto (2015) stated that the factors that influence learning achievement are divided into two, namely internal factors and external factors. Internal factors are factors that originate from within oneself, while external factors are factors that originate from outside oneself, such as factors originating from the school and the surrounding environment. One of the factors that influences learning achievement is time management. Students in this study stated that the schedule set by the school tends to be busy and there are many assignments given by the school so that most of the students' time is spent at school. Time management is the key for students to manage and utilize time according to their needs. If students can manage their study time well and spend some of their time doing other activities, this will have a good impact on their learning achievement. Apart from that, another factor that influences learning achievement is learning motivation. Motivation to learn is a factor that plays an important role because students can develop activity and initiative and can maintain persistence in learning. Motivation to learn can create circumstances that encourage someone to want to do something. In the context of learning, motivation functions as an encouragement that gives rise to learning activities and is directional in the learning process so that a person can achieve the desired goals. Students who have strong motivation will have sufficient energy to carry out learning activities so that learning achievement can be optimal (Sardiman, 2014).

A study stated that there was a relationship between breakfast habits and academic achievement. Students who were accustomed to eating breakfast will have high concentration abilities so that they can improve learning achievement (Ernadi & Ilmi, 2020). Adequate nutrition in children plays a very important role in leading to good body growth. Good body growth includes brain growth and development, which is a determinant of children's intelligence (Maku et al., 2018).

CONCLUSION

Based on the research results, it was found that more than half of the respondents had good breakfast habits and nutritional status. Furthermore, it was found that there was a positive correlation between breakfast habits and study achievement, but there was no relationship between nutritional status and study achievement. Therefore, it is best for schools to provide education regarding breakfast habits and balanced nutrition through assistance from health promoters as well as optimizing the School Health Unit program in schools.

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