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Breakfast Habits, Physical Activity Levels, And Their Relationship To The Nutritional Status Of Sixth Grade Students At Sdn Banjarbendo Elementary School, Sidoarjo District

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Abstract

Breakfast habits and physical activity are important factors in determining the nutritional status and long-term health of school-aged children. Based on preliminary data from April 2025 at Banjarbendo Elementary School in Sidoarjo, 46 students (63%) had poor breakfast habits and 36 students (53%) had low levels of physical activity. Skipping breakfast can lead to an imbalance in daily energy intake, while low levels of physical activity can increase the risk of health problems and reduce children's fitness. This study aims to analyze the relationship between breakfast habits and physical activity levels and the nutritional status of sixth-grade students at Banjarbendo Elementary School. The study used a cross-sectional design with a sample size of 74 students, consisting of 47 boys and 27 girls. The independent variables in this study were breakfast habits and physical activity levels, while the dependent variable was nutritional status based on BMI/Age. Data were collected through questionnaires, interviews, and anthropometric measurements. Univariate and bivariate analyses were performed using the Chi-Square test. The results of the univariate analysis showed that the majority of respondents (41 students) had good breakfast habits, while 33 students (44.6%) had poor breakfast habits. Regarding physical activity, the majority of respondents were in the low and very low categories, at 63.5% and 21.6%, respectively. The results of the bivariate analysis showed no significant relationship between breakfast habits and students' nutritional status (p-value = 0.283). However, there was a significant relationship between physical activity levels and the nutritional status of sixth-grade students at Banjarbendo Elementary School (p-value = 0.020). This research is expected to serve as a basis for developing promotive and preventive efforts in the school environment, particularly through nutrition education and the promotion of regular physical activity to support optimal student growth and health.

Keywords: Breakfast, Physical Activity, Nutritional Status, Elementary School Students, BMI/Age.

INTRODUCTION

Nutritional status problems are universal issues that occur at all age levels, including school-age children. Among school-age children, the most commonly found nutritional problems are malnutrition, where many children are still found to be underweight or overweight (Amelia et al., 2024). In Indonesia, the prevalence of nutritional status among children aged 5–12 years shows that 2.2% (461 children) are classified as severely underweight, 5.8% (1,214 children) underweight, 68.8% (14,173 children) have normal nutritional status, 13.2% (2,763 children) are overweight, and 11.1% (2,324 children) are obese (Riskesdas, 2020). Data from the Indonesian Health Survey (Survei Kesehatan Indonesia / SKI) 2023 shows that the prevalence of nutritional status among children aged 5–12 years based on BMI-for-age in East Java Province is 3% (490 children) severely malnourished, 6.7% (1,096 children) undernourished, 66.8% (10,920 children) normal, 13.8% (2,256 children) overweight, and 9.7% (1,586 children) obese. At the district level, the prevalence of stunting in Sidoarjo Regency also shows positive development. Based on data from the Indonesian Health System (Sistem Kesehatan Indonesia / SKI) in 2023, the stunting rate among children in Sidoarjo Regency was recorded at 3.4% in August 2023, decreasing from 5.3% in early February 2023. Nevertheless, the number of children indicated as stunted slightly increased from 4,986 to 5,026 children. This indicates that nutritional problems, especially stunting, still require serious attention despite improvements in percentage, as the overall number of cases remains high (Muharram et al., 2025).

Nutritional status is the balance between nutrient intake and the amount required by the body to carry out activities (Ardiaria et al., 2021). Nutritional status in elementary school children remains a very serious issue because it will continue into adulthood and have adverse impacts on future health. Good nutritional status requires greater attention because poor nutritional status in children will affect mental growth, physical development, and cognitive ability (Wicaksana et al., 2019).

School-age children (aged 5–12 years) require adequate nutritional intake to support growth and development. One way to fulfill daily nutritional intake for school-age children is breakfast (Mutika and Doria, 2020). Breakfast contributes energy and nutrients that support daily activities and also influence children's nutritional status. Children who habitually skip breakfast have a three times higher risk of consuming snacks and difficulty controlling appetite, thereby increasing the potential for weight gain that may lead to obesity (Amalia and Adriani, 2019).

Breakfast habits should be instilled in children from an early age, as breakfast can improve children's nutritional status (Sari, 2019). Breakfast or morning meal refers to breaking the fast after a night without food intake. A good breakfast is generally consumed daily between 06.00 and 09.00. Ideally, the energy contribution from breakfast for elementary school children should not be less than 15–30% of the recommended daily nutritional intake (Amalia and Adriani, 2019).

School-age children who have breakfast habits tend to improve their academic performance and cognitive abilities. However, in Indonesia, many children are still not accustomed to having breakfast, resulting in suboptimal school activities. Breakfast containing carbohydrates, protein, and fat provides energy that serves as fuel for the body to be used immediately during physical activity (Rosario et al., 2019).

The interval between dinner and the next morning is quite long, approximately 10 hours, causing blood glucose levels, which serve as the body's energy source, to decrease in the morning. Morning time after waking up is the time to perform various activities, and the body requires sufficient energy, which can be obtained from breakfast. Breakfast provides energy for all school activities such as thinking and learning, as energy from dinner has already been used for bodily activities during the night and sleep. If breakfast is not regularly consumed, the body will attempt to increase blood glucose levels by utilizing fat reserves. In such conditions, the body is not in an optimal state to perform activities, which can disrupt children's learning concentration (Tamsuri et al., 2025).

Adequate food intake in the morning can influence biological aspects. Biological aspects relate to the physical aspects of life. Biologically, children who do not have breakfast will experience an empty stomach, leading to decreased blood glucose levels, whereas glucose is the main energy source for the brain. If children lack energy, they may become less enthusiastic, weak, easily fatigued, anemic, and prone to drowsiness. This condition makes children unable to concentrate when starting lessons, and they may also become more susceptible to illness, resulting in frequent school absences.

Adequate nutritional intake helps maintain the body in good condition, enabling individuals to sustain physical fitness through regular physical activity (Robby, 2022). One factor related to the level of physical activity is nutritional status, which reflects the body's condition influenced by nutrient intake. Children who skip meals are more likely to feel fatigued during physical activities due to insufficient nutrient intake (SKI, 2023). Nutritional status must be controlled to prevent overweight conditions. It can be managed through physical activity. Regular physical activity is necessary to maintain physical fitness. Well-maintained physical fitness allows students to participate in all school learning activities without significant fatigue, ensuring they remain in optimal condition to receive instructional material (Hidayat, 2021).

Engaging in regular physical activity can improve quality of life and reduce the risk of various serious diseases and leading causes of death (Geralda and Ahmad, 2023). Physical activity also plays a role in maintaining energy balance, making it effective in preventing obesity. To maintain ideal body weight or a healthy nutritional status, individuals who are overweight or obese are encouraged to

engage in moderate-intensity physical activities such as jogging, table tennis, swimming, cycling, playing musical instruments, and weightlifting. In addition, vigorous activities such as sprinting, playing football, aerobic exercise, martial arts, or fitness training can also be alternatives (Robby, 2022). Based on data from the Indonesian Health Survey (Survei Kesehatan Indonesia / SKI) 2023, 58% or 38,790 children aged 10–14 years were found to have low levels of physical activity. Of these, 54.6% reported lack of activity due to laziness, 34.5% due to lack of time, and 14.4% due to not having companions for activities (SKI, 2023).

Based on Riskesdas data in 2020, it is known that 65% of 25,000 school-age children in Indonesia skip breakfast, with 25% categorized as stunted and 10% categorized as undernourished. This is also supported by a preliminary study conducted in Sidoarjo Regency and observations at SDN Banjarbendo, which showed that many students buy snacks outside the school upon arrival.

A follow-up survey was conducted among 68 sixth-grade students of SDN Banjarbendo using questionnaires to determine their breakfast habits and levels of physical activity. The results showed that 26% (18 children) had very poor breakfast habits as they never had breakfast, 32% (22 children) had poor breakfast habits with a frequency of 1–3 times per week, 12% (8 children) had good breakfast habits with a frequency of 4–5 times per week, and 30% (20 children) had very good breakfast habits by always having breakfast daily. The preliminary study results related to physical activity levels conducted at SDN Banjarbendo showed that 53% (36 children) had low activity levels.

A preliminary study conducted by Rahmalia (2024) showed that the level of physical activity had a significant effect on overweight status among sixth-grade students at SDN Banjarbendo, Sidoarjo. As many as 48.45% of students who were overweight had low levels of physical activity. This indicates the importance of increasing children's physical activity, such as through morning exercise, to help prevent obesity and maintain a healthy nutritional status.

Breakfast is very important for school-age children. Physically, children are active in participating in sports lessons and extracurricular activities and need full concentration to receive daily lessons. Skipping breakfast can cause difficulty in concentrating, thinking, drowsiness, and weakness due to lack of energy from nutrients needed by the body (Ramadhaniasari, 2024). However, preliminary study results indicate that many children still do not have breakfast for various reasons, such as lack of time, difficulty waking up early, parents not having time to prepare food, not feeling hungry, or disliking breakfast. This indicates a gap between the theoretical importance of breakfast and the reality in the field.

Previous research conducted by Rahmalia (2024) only focused on the relationship between macronutrient intake related to physical activity and nutritional status, while this study focuses on breakfast habits of sixth-grade elementary school children. The selection of sixth-grade students as research subjects is based on the consideration that at that age (around 10–12 years), children generally have sufficient independence and cognitive ability to understand and explain their daily habits, including breakfast habits and physical activity.

Previous research conducted by Marvelia et al. (2020) focused on the relationship between breakfast habits and academic achievement in elementary school students, while this study focuses on the relationship between breakfast habits and nutritional status in elementary school children. Another study conducted by Miftah (2023) examined the relationship between breakfast habits, physical activity, and nutritional status in adolescents. However, this study focuses on elementary school children using BMI-for-age parameters to determine nutritional status. Therefore, the researcher intends to conduct a study different from previous research with the title "Breakfast Habits, Physical Activity Level, and Their Association with Nutritional Status among Sixth-Grade Students at SDN Banjarbendo, Sidoarjo District".

RESEARCH METHODS

Study Design

This study was a quantitative descriptive study using a *cross-sectional* design (Abduh et al., 2022), in which the independent and dependent variables were measured at the same time. The aim of this study was to determine the relationship between breakfast habits and physical activity levels with the nutritional status of sixth-grade students. This design was considered appropriate to identify the association between variables without follow-up observations.

Research Location and Time

The study was conducted at SDN Banjarbendo, Sidoarjo Regency, East Java, from October to December 2025. The location was selected because it provided direct access to the research subjects, namely sixth-grade students, and allowed data collection to be carried out in a natural school setting during learning activities.

Population and Sample

The population in this study consisted of all sixth-grade students at SDN Banjarbendo. The sampling technique used was *total sampling* (Salsabillah et al., 2022), meaning that all members of the population were used as research samples. The total sample in this study was 74 students.

Inclusion and Exclusion Criteria

The inclusion criteria in this study were students who were willing to participate in the research with parental consent through an *informed consent* form, registered as sixth-grade students in the odd semester of the 2025–2026 academic year, and in good health. The exclusion criteria were students who transferred to another school or were absent from learning activities during the research period.

Variables of the Study

The independent variables in this study were breakfast habits and physical activity level, while the dependent variable was the nutritional status of sixth-grade students (Agustian, 2019).

RESULTS AND DISCUSSION

General Description of the Research Location

SDN Banjarbendo is a public elementary school located at Jalan Balai Desa, Benda, Banjarbendo, Sidoarjo District, Sidoarjo Regency, East Java 61225. The school is led by Mrs. Nancy Diana Rosita, S.Pd., and has been accredited A and implements the *Merdeka Curriculum*. The total number of teaching staff at SDN Banjarbendo is 26 people, consisting of 9 male teachers and 17 female teachers, with a total of 398 students consisting of 213 male students and 185 female students. SDN Banjarbendo has a land area of 3,003 m² and is supported by various facilities to support *Teaching and Learning Activities* (*Kegiatan Belajar Mengajar* / KBM), including 11 classrooms, 1 *School Health Unit* (*Usaha Kesehatan Sekolah* / UKS) room, and 1 library.

Teaching and learning activities at this school take place from 07.00 to 13.00 WIB. In addition, there are two school canteen vendors who have been operating since 07.00 WIB until the end of the school day to meet the consumption needs of students while at school. Since September until now, SDN Banjarbendo has also implemented the *Free Nutritious Meal Program* (*Makan Bergizi Gratis* / MBG), which is provided to students every day at 09.30 WIB or during the school break. This program aims to support the fulfillment of students' nutritional needs and to support concentration and readiness in learning during the teaching and learning process.

Univariate Analysis Results

Table 1. Characteristics of Respondents and Socio-Economic Status

Variable	f	%
Age		
11	24	32,4%
12	48	64,9%
13	1	1,4%
14	1	1,4%
Gender		
Male	47	63,5%
Female	27	36,5%
Mother's Occupation		
Housewife	46	62,2%
Private Employee	13	17,6%
Factory Worker	2	2,7%
Trader	6	8,1%
Teacher/Lecturer	4	5,4%
Others	3	4,1%
Father's Occupation		
Private Employee	29	39,2%
Factory Worker	6	8,1%
Trader	8	10,8%
Entrepreneur	21	28,4%
Teacher/Lecturer	2	2,7%
Others	8	10,8%
Mother's Education		
Elemantary School/Equivalent	12	16,2%
Junior High School/Equivalent	9	12,2%
Senior High School/Equivalent	33	44,6%
Higher Education	20	27%
Father's Education		
Elemantary School/Equivalent	6	8,1%
Junior High School/Equivalent	10	13,5%
Senior High School/Equivalent	35	47,3%
Higher Education	23	31,1%
Living Arrangement		
With Parents	71	95,9%
With Grandparents	1	1,4%
With Realtives	2	2,7%

Table 1 shows that the characteristics of respondents indicate that the majority of students are 12 years old (64.9%) and male (63.5%). This age falls within upper elementary school age, which requires balanced nutritional intake and sufficient physical activity to support growth, development, and learning ability (Muchtar, 2024). In addition, based on gender, most respondents are male, totaling 47 students (63.5%), while females account for 27 students (36.5%). This difference in gender proportion has the potential to influence physical activity patterns and daily habits, considering that boys tend to have higher levels of physical activity compared to girls (Sabrina et al., 2021).

In terms of mothers' occupation, most respondents' mothers are housewives, totaling 46 individuals (62.2%). This condition indicates that the majority of mothers have relatively more time to accompany their children, including preparing breakfast, supervising eating patterns, and reminding children about healthy habits. Meanwhile, mothers who work as private employees (17.6%), traders (8.1%), teachers/lecturers (5.4%), and other occupations have time limitations that may affect their direct involvement in children's eating habits. Mothers play an important role in shaping children's

eating behavior through food provision, role modeling, and family interactions during mealtimes, which impact children's eating habits (Mahmood et al., 2021).

Fathers' occupations are dominated by private employees, totaling 29 individuals (39.2%), and entrepreneurs, totaling 21 individuals (28.4%). Fathers' occupations are related to family economic capacity, which indirectly affects food availability at home and the fulfillment of children's nutritional needs. Families with more stable economic conditions generally have better access to sufficient and nutritious food, allowing children to consume a more diverse diet (Christina et al., 2025).

Parental education levels show that most mothers have completed senior high school/equivalent, totaling 33 individuals (44.6%), and higher education, totaling 20 individuals (27%). Fathers' education is also dominated by senior high school/equivalent (47.3%) and higher education (31.1%). Parental education level plays an important role in shaping knowledge and parenting patterns related to children's health and nutrition. Parents with higher education generally have better ability to understand health information, select nutritious food, and implement healthy lifestyles within the family (Nadhira et al., 2024).

The living conditions of respondents show that most students live with their parents, totaling 71 students (95.9%). Living with parents allows direct supervision and guidance regarding children's habits, such as eating patterns, breakfast habits, and physical activity. A stable family environment, along with the role of parents as role models and regulators of daily habits, plays an important role in shaping children's health behavior. Direct parental involvement can support the formation of healthy lifestyle habits that influence children's growth and development (Butun, 2025).

Overall, the characteristics of respondents and their families indicate that parental education and occupation, particularly the mother's role, as well as family involvement in children's daily lives, are important factors that can strengthen the discussion regarding breakfast habits, physical activity, and students' nutritional status.

Univariate Analysis Results

Table 2. Univariate Analysis Results

Variable	f	%
Breakfast Habits		
Good (0-4)	41	55,4%
Poor (5-8)	33	44,6%
Physical Activity Level		
Very Low (1)	16	21,6%
Low (2)	47	63,5%
Moderate (3)	10	13,5%
High (4)	1	1,4%
Nutritional Status Level		
Underweight (-3 SD s/d <-2 SD)	1	1,4%
Normal (-2 SD s/d + 1 SD)	60	81,1%
Overweight (+1 SD s/d + 2 SD)	13	17,6%

Table 2 shows that 41 students (55.4%) had good breakfast habits, while 33 students (44.6%) had poor breakfast habits. Breakfast habits play an important role in the nutritional status of elementary school children because breakfast provides energy and nutrients before daily activities and may influence the risk of undernutrition or overnutrition (Aslam, 2020).

The level of physical activity among respondents was mostly in the low category (63.5%), followed by very low (21.6%), moderate (13.5%), and high (1.4%). Adequate physical activity is important for school-age children's health because it is related to body composition, weight maintenance, and metabolic processes in the body (Putri et al., 2021).

The nutritional status of respondents was dominated by normal nutrition, totaling 60 students (81.1%), followed by overweight (17.6%) and underweight (1.4%). This condition indicates a balance

between nutrient intake and the body's energy needs in most children, which is influenced by eating habits and daily physical activity levels (Tsaniya et al., 2022).

Descriptive Analysis Results of Breakfast Habits, Physical Activity Level, and Nutritional Status Variables

Table 3. Descriptive Analysis Results

Variable	Mean	Standard Deviation
Breakfast Habits		
Breakfast Habits Questionnaire	4,23	2,199
Physical Acitivy Level		
PAQC	2,401	0,5834
Nutritional Status		
Body Weight	40,25	10,895
Body Height	138,885	7,029
BMI-for-age (IMT/U)	20,774	5,088

Table 3 shows that the average score of respondents' breakfast habits is 4.23 with a standard deviation of 2.199, indicating variation in breakfast habits among students. The average physical activity level based on the PAQC score is 2.401 with a standard deviation of 0.5834, indicating that physical activity tends to be in the low to moderate category. Meanwhile, the average nutritional status indicators show a body weight of 40.25 kg, height of 138.885 cm, and BMI-for-age (IMT/U) value of 20.774 with a standard deviation of 5.088, indicating variation in nutritional status among students in this study.

Bivariate Analysis Results

Table 4. Relationship between Breakfast Habits and Nutritional Status

Breakfast Habits	Nutritional Status						Total	*P-value*
	Underweight		Normal		Overweight			
	n	%	n	%	n	%		
Good	1	1,35	35	47,3	5	6,8	50	0,283
Poor	0	0	25	33,8	8	10,8	33	

Based on Table 4, the relationship between breakfast habits and nutritional status among sixth-grade students shows a *p-value* of 0.283 (*p-value* > 0.05), therefore the null hypothesis (H_0) is accepted. Thus, in this study, there is no significant relationship between breakfast habits and the nutritional status of sixth-grade students at SDN Banjarbendo.

Table 5. Relationship between Physical Activity Level and Nutritional Status

Physical Activity Level	Nutritional Status						Total	*P-value*
	Underweight		Normal		Overweight			
	n	%	n	%	n	%		
Very Low	1	1,35	8	10,8	7	9,5	16	0,020
Low	0	0	41	55,4	6	8,1	47	
Moderate	0	0	10	13,5	0	0	10	
High	0	0	1	1,35	0	0	1	

Based on Table 5, the relationship between physical activity level and nutritional status among sixth-grade students shows a *p-value* of 0.020 (*p-value* < 0.05), therefore the null hypothesis (H_0) is rejected. Thus, in this study, there is a significant relationship between physical activity level and the nutritional status of sixth-grade students at SDN Banjarbendo.

Discussion

Relationship between Breakfast Habits and Nutritional Status

Based on the research results in Table 4, it is known that the p-value is 0.283 (p > 0.05). This shows that there is no significant relationship between breakfast habits and nutritional status in grade

VI students of SDN Banjarbendo. Thus, the research hypothesis stating that there is a relationship between breakfast habits and nutritional status is rejected.

Breakfast habits of school children can be seen from the type, time, amount of intake, and frequency, this is in accordance with the breakfast habits questionnaire that has been filled out through individual interview methods with respondents. A total of 55.4% (41 people) of respondents in this study showed good breakfast habits, but the nutritional status formed did not show a consistent pattern. Respondents who had good breakfast patterns did not all have normal nutritional status, and conversely respondents who rarely had breakfast did not all have undernourished status.

The components of a good breakfast are foods that contain balanced nutrition, namely containing carbohydrates, protein, fat, vitamins and minerals. In this study there were still very few who consumed vegetables and no one consumed fruits (Amalia & Adriani 2019). Actually this type of food is very necessary for children because it contains nutrients that are very needed including rich in minerals and vitamins, besides that fruit is also rich in energy and fiber. School children are still experiencing growth that requires balanced nutrition to support their growth. Nutrients are needed for growth, maintenance and regulation of organ function (Sopiyandi, 2020).

The results of interviews with respondents showed that some of their reasons for not having breakfast include not being used to having breakfast, this can be caused by several factors such as the stomach will feel nauseous and sick when they have breakfast, not having time for breakfast because they often wake up late. The next reason is that since the existence of the Free Nutritious Meal (MBG) program, some students stated that during MBG they no longer have breakfast because they already get free food distributed at 09.30 every day, where this time has shown past breakfast time. The availability of food is also one of the reasons students do not have breakfast, some students stated that they actually want to have breakfast but food is not provided at home, this is because their parents especially the students' mothers have left for work without providing breakfast first, on the other hand there are also some students who say that food is available at home but they are not used to eating. The better the living environment, the better the achievement of education level. Likewise good habits including breakfast and healthy lifestyles grow together with the family (Sulianto & Charrisa, 2024).

The role of parents in forming children's eating habits is very important, not only in terms of food provision but also through nutrition education at home. Research shows that parental education is related to children's healthy eating behavior, where parents who have higher education tend to be able to create a home food environment that is more supportive of healthy eating and regulate children's food intake. Parental education can also improve children's food literacy or food literacy through direct involvement in the daily eating process, which in turn affects breakfast habits and the selection of more nutritious foods (Xu et al., 2024).

The research results show no significant relationship between breakfast habits and nutritional status, but descriptively most students have good breakfast habits. Lack of nutrition in the morning will cause children to feel weak and unenthusiastic at school, and in the worst possibility children experience dizziness due to lack of blood sugar and experience fainting incidents during ceremonies or outdoor activities (Amalia & Adriani, 2019).

Students who are accustomed to having breakfast will more easily meet their daily nutritional needs so that their nutritional status tends to be normal (Hibban et al., 2024). However breakfast food only contains 15-30% of a person's total daily energy needs, therefore having breakfast regularly does not necessarily improve nutritional status. In addition, not only breakfast frequency but also the type of food consumed and portion influence the relationship between breakfast habits and nutritional status (Aulia, 2021). This can occur because someone who does not have breakfast in the morning may get higher energy intake at the next meal schedule or consume higher snacks between meals. This indicates that students remain in a healthy condition even though they skip breakfast. However, there

are several respondents whose nutritional status is thin and fat, this can be caused by economic factors that cause imbalance of food intake (Ikujenlola & Adekoya, 2020).

The role of parents and family on children's nutritional status is also supported by research which shows that active involvement of parents in preparing eating patterns and fulfilling nutritional needs is significantly related to children's nutritional status. Children who receive family support in nutritional fulfillment tend to have better nutritional status compared to children who lack supervision and support (Elva M. Sumirat et al., 2025).

This is in line with the research of Uli (2020) which states that good breakfast habits do not necessarily directly affect nutritional status if total energy and nutrient intake in a day is still unbalanced. In addition, children who do not have breakfast but consume high-calorie foods throughout the day can still experience overnutrition. Conversely, children who regularly have breakfast but with low-energy or essential nutrient meals can still be in the undernourished category.

The results of this study indicate that breakfast habits are not the only factor that determines nutritional status. Other factors that can affect the nutritional status of school children include disease history, feeding patterns, socio-demographics, environment and household food security (Lestari et al., 2023).

Relationship between Breakfast Habits and Nutritional Status

Based on the results in Table 5 it is known that the p-value is 0.020 ($p > 0.05$). This shows that there is a significant relationship between physical activity level and nutritional status in grade VI students of SDN Banjarbendo. Thus, the research hypothesis stating that there is a relationship between physical activity level and nutritional status is rejected.

Physical activity levels of school children can be known from the results of filling out the PAQ-C questionnaire through individual interviews with respondents, while the physical activity activities asked were one week before. Based on the results of the research conducted, it was found that students with very low physical activity levels were mostly in the normal nutritional status category, namely 8 students (10.8%), but there were also 7 students (9.5%) who were in the overnutrition category and 1 student (1.35%) with undernutrition. Meanwhile, students with low physical activity levels were dominated by normal nutritional status, namely 41 students (55.4%), while 6 students (8.1%) were in the overnutrition category. In the moderate physical activity category, all respondents (13.5%) were in normal nutritional status, and in the high physical activity category, only 1 student (1.35%) was in normal nutritional status.

In the current technological development era, many elementary school children spend more time at home with sedentary activities such as watching television, playing smartphones, or playing games compared to doing physical activities. This condition is also seen in the research results, where most students are in the low to very low physical activity level category (85.1%). This can be a factor that also influences the high percentage of respondents with overnutrition status (17.6%). Performing physical activity regularly can strengthen endurance and prevent obesity (Romadhoni et al., 2022).

Nutritional status of a person refers to their body condition, which is influenced by food intake and nutrient utilization (Rochmah & Nadhiroh, 2024). A person's nutritional health is influenced by their physical activity level. Physical activity in general can be defined as every body movement that requires skeletal muscle involvement, thereby causing energy expenditure and calorie burning (Yuni et al., 2022). Mismatch between physical activity level and the amount of calories consumed has the potential to cause nutritional complications. Based on the concept of physical activity, those who perform higher physical activity will experience increased energy expenditure (Rochmah & Nadhiroh, 2024).

A person who increases physical activity will experience increased energy expenditure accordingly. Without adequate physical exercise to balance excessive energy intake, individuals will

be prone to overweight and even obesity. Conversely, if a person's energy consumption does not match their physical activity needs, they are prone to undernutrition (Rafaely & Dheni, 2024).

Low activity will reduce the elasticity of the cardiovascular system. Conversely, high activity will increase the elasticity of the cardiovascular system. After physical activity, arterial blood pressure will increase. Physical activity is considered to affect nutritional status because it has beneficial effects on skeletal muscles, cardiovascular, respiratory and endocrine systems. Regular physical activity can improve quality of life and reduce the risk of many major causes of disease and death. Physical activity helps maintain energy balance thereby preventing obesity. Physical exercise should be done regularly, for 30-60 minutes per day (Robby, 2022).

This is in line with the research of Pratiwi (2024) which states that physical activity level has a significant relationship with nutritional status. The higher the physical activity performed by a person, the better the energy regulation in the body so that the risk of overnutrition can be reduced. Pratiwi (2024) also shows that children with low physical activity tend to have overnutrition status, due to imbalance between energy intake and energy expenditure. In addition, physical activity plays an important role in body metabolism and muscle and fat mass composition, thus affecting overall nutritional condition. Thus, the results of this study support the theory that physical activity is an important factor in maintaining the nutritional status of school-age children.

CONCLUSION

Based on the results of the research and discussion that have been conducted, it can be concluded that there is no significant relationship between breakfast habits and nutritional status (p-value = 0.283), therefore breakfast habits are not the main factor determining respondents' nutritional status; on the other hand, there is a significant relationship between physical activity level and students' nutritional status (p-value = 0.020), where students with low physical activity tend to have a higher risk of experiencing overnutrition compared to students with moderate to high physical activity levels.

REFERENCES

Abduh, M., Alawiyah, T., Apriansyah, G., Sirodj, R. A., & Afgani, M. W. (2022). Survey Design: Cross Sectional in Qualitative Research. *Journal of Science and Computer Education*, 3(01), 31–39. https://doi.org/10.47709/jpsk.v3i01.1955

Agustian, I., Eko, H., & Imanda, A. (2019). The Influence of Management Information Systems on Improving Service Quality at PT. Jasaraharja Putra Bengkulu Branch. *Professional Journal of FIS UNIVED*, 6(1), 42–49.

Amalia, S., & Adriani, M. (2019). The Relationship Between Breakfast Habits and Nutritional Status in Students of SMP Negeri 5 Banyuwangi. *Amerta Nutrition*, 3, 213. https://doi.org/10.2473/amnt.v3i4.2019.12-217

Amelia, N., & Putri, H. (2024). Students' Nutritional Status Based on BMI and Height at SD No. 1 Canggu, Badung, Bali. *Gender and Child Study Center UIN Alauddin Makassar*, 8(1), 55.

Ardiaria, M., Candra, A., Probosari, E., Adi, E. M., & Puruhita, N. (2021). Nutrition Education and Training Program for School-Age Children in Jomblang Village, Semarang. *Journal of Nutrition and Health*, 9(1), 2021.

Aulia, T. (2021). The Relationship Between Breakfast Habits and Nutrient Intake with Nutritional Status of Nutrition Students at UNESA Cohort 2017. *Journal of Nutrition University of Surabaya*, 1(1), 56–57.

Butun, A. (2025). The relationship between family nutrition and physical activity practices and

physical activity attitudes in children. *BMC Public Health*, 25(1), 2–10. https://doi.org/10.1186/s12889-025-24230-w

Chahyanto, B., & Hasfika, I. (2024). Monitoring Nutritional Status Through School Health Screening Program for Elementary School Children in Sibolga City. *Indonesian Scientific Nutrition Media*, 2(2), 65–76.

Christina, G., Bolang, A. S. L., & Kawengian, S. E. S. (2025). The Relationship Between Household Food Security and Nutritional Status in Children at SD Negeri 72 Manado City. *Medical Scope Journal*, 8(1), 31–36. https://doi.org/10.35790/msj.v8i1.61407

Elva M. Sumirat, Nur Risha Djumaat, Nurlatifa Olola, Salwa Nevara Yusuf, Tiara Baulu, Rahmayanti Datunsolang, & Nida Tazkia Saleh. (2025). The Influence of Parents' Role on Meeting Nutritional Needs of Children Aged 3–4 Years at TPA Asmaul Husna. *Journal of Early Childhood Education and Citizenship*, 2(4), 185–196. https://doi.org/10.61132/paud.v2i4.820

Geralda, A., & Ahmad, A. (2023). The Relationship Between Physical Activity and Physical Fitness of Junior High School Students. *Jambura Journal of Sports Coaching*, 5(2).

Hibban, A., Zuraida, R., & Febriani, W. (2024). The Relationship Between Breakfast Habits and Students' Nutritional Status. *Nutrition Science*, 14, 1953.

Hidayat, A. (2021). The Relationship Between Nutritional Status and Physical Activity with Physical Fitness Level of Students. *Journal of Physical Education and Sports Health*, 4(2), 516–521.

Ikujenlola, A. V., & Adekoya, T. S. (2020). Nutritional status and feeding habits of females in public and private universities in Osun State, Southwestern Nigeria. *Heliyon*, 6(9). https://doi.org/10.1016/j.heliyon.2020.e05023

Lestari, D. S., Jeki, A. G., & Fatmawati, T. Y. (2023). Nutritional Status, Breakfast Habits, and Physical Activity in Relation to Anemia in Adolescent Girls at SMKN 1 Jambi City. *Jurnal Kesehatan Panca Bhakti Lampung*, 11(2), 123. https://doi.org/10.47218/jkpbl.v11i2.266

Mahmood, L., Flores-Barrantes, P., Moreno, L. A., Manios, Y., & Gonzalez-Gil, E. M. (2021). The influence of parental dietary behaviors and practices on children's eating habits. *Nutrients*, 13(4). https://doi.org/10.3390/nu13041138

Marvelia, R., Kartika, R., & Dewi, H. (2021). The Relationship Between Breakfast and Academic Achievement of Students at SMA Negeri 4 Jambi City. *MEDIC*, 4(1), 198–205.

Miftah, N. (2023). The Relationship Between Breakfast Habits and Physical Activity with Nutritional Status of Adolescents at SMA Negeri 5 Tambun Selatan. Mitra Keluarga College of Health Sciences.

Murtiati. (2019). Fostering Children's Independence in School. *Jagaddhita*, 1(1), 53. https://id.theasianparent.com/read-aloud

Pratiwi. (2024). The Relationship Between Macronutrient Intake and Physical Activity with Overnutrition Status in Grade 5 Students at SDN Banjarbendo, Sidoarjo. *Indonesian Nutrition Journal*, 2(1), 21.

Rafaely, A., & Dheni, K. (2024). The Relationship Between Physical Activity and Nutritional Status Based on BMI/Age in Grade XI Students in Palembang. *Protein: Journal of Nursing and Midwifery Sciences*, 3(1), 92–102. https://doi.org/10.61132/protein.v3i1.940

Rahmalia, P., & Mujayanto. (2024). The Relationship Between Macronutrient Intake and Physical Activity on Overnutrition in Grade 5 Students at SDN Banjarbendo. *Amerta Nutrition*, 8(2SP), 31–40. https://doi.org/10.20473/amnt.v8i2SP.2024.31-40

Ramadhaniasari, D. (2024). The Relationship Between Knowledge and Attitudes with Breakfast Habits in Grade 4, 5, and 6 Students at SDN Ngagelrejo I Surabaya City. *Journal of Nutrition UNESA*, 04(01), 571–572.

Riskesdas. (2021). National Report of Riskesdas 2021. Ministry of Health of the Republic of Indonesia.

Robby, A. (2022). The Relationship Between Physical Activity and Nutritional Status of Nursing Students at Alma Ata University Yogyakarta. *Pontianak Nutrition Journal*, 5(1), 147–148.

Rochmah, A., & Nadhiroh, S. R. (2024). Physical Activity and Nutritional Status of Adolescents at SMP Negeri 25 Surabaya. *Media Gizi Kesmas*, 13(1), 234–240. https://doi.org/10.20473/mgk.v13i1.2024.234-240

Romadhoni, W. N., Nasuka, N., Candra, A. R. D., & Priambodo, E. N. (2022). Physical Activity of Sports Coaching Students During the COVID-19 Pandemic. *Gelanggang Olahraga: Journal of Physical Education and Sports*, 5(2), 200–207. https://doi.org/10.31539/jpjo.v5i2.3470

Rosario, A. M., Samodra, Y. L., & Suryanto, Y. I. (2019). Breakfast Habits Related to Physical Fitness in Elementary School Children at SD Budya Wacana Yogyakarta. *Indonesian Journal of Human Nutrition*, 6(2), 139–144. https://doi.org/10.21776/ub.ijhn.2019.006.02.7

Sabrina, F., Afriwardi, A., & Rusjdi, S. R. (2021). The Relationship Between Gender and Physical Fitness of Students at SD Negeri 13 Sungai Pisang Padang. *Indonesian Journal of Health Sciences*, 2(1), 76–81. https://doi.org/10.25077/jikesi.v2i1.305

Salsabillah, M., Sabandi, A., & Gistituati, N. (2022). Organizational Culture in Vocational High Schools. *JOHEM: Journal Higher Educational Management*, 1, 29–34. https://doi.org/10.24036/johem.v1i1

Sari, D. K., & M. (2019). Impact of Breakfast Counseling and 6 Days of Breakfast on Nutritional Status and Knowledge of Middle School Students in Berastagi, Indonesia. *Pakistan Journal of Nutrition*, 19(1), 12–18. https://doi.org/10.3923/pjn.2020.12.18

Sopiyandi. (2020). Analysis of Breakfast Type, Quantity, and Quality in Elementary School Students. *Journal of Health Vocational Studies*, 2, 62–68.

Sulianto, J., & Charrisa, O. (2024). The Relationship Between Breakfast Habits and Nutritional Status in Students of SMA Bunda Mulia Jakarta. *Journal of Medical and Health Sciences*, 11(6), 2549–4864.

Tunggal, M., & Doria, M. (2020). The Relationship Between Breakfast Habits and Nutritional Status in Students at SD Negeri Kedung Waringin 01. *Public Health Journal*, 11(1), 1–6.

Uli, M. (2020). The Relationship Between Breakfast Habits and Physical Activity with Overweight Incidence in Students at SDN Kenari 01 Central Jakarta. Undergraduate Thesis, Mitra Keluarga Health Sciences College.

Wicaksono, A., & Handoko, W. (2021). Physical Activity and Health. IAIN Pontianak Press. https://www.researchgate.net/publication/353605384

Xu, X., Cai, H., Zhang, J., & Xia, T. (2024). The effects of parental food education on children's food literacy: The mediating role of parent–child relationship and learning motivation. *Nutrients*, 16(15). https://doi.org/10.3390/nu16152564

Yuni, K., Negara, K., & Wulandari, S. (2022). The Relationship Between Body Image and Eating Patterns in Adolescent Girls Class XI at SMK PGRI 4 Denpasar. *National Health Research Journal*, 5(1), 88–89.