IJEDR: Indonesian Journal of Education and Development Research
E-ISSN: 3025-2393 P-ISSN: 3025-2385
Vol. 5 No. 1 January 2027

Analysis of Physical Fitness Level, Nutritional Status, and Physical Activity Among Male Students

Santia Bersalina
Faculty of Sports Sciences, Universitas Negeri Manado, Manado City, Province of North Sulawesi, Indonesia
Email: santibersalinasayub@gmail.com

Abstract

This study examined the relationship of nutritional status and physical activity with physical fitness among male students at SD Negeri 079 Tanete. A quantitative correlational design was used with 30 male students aged 10-12 years from grades IV to VI, selected through purposive sampling. Physical activity was measured with the International Physical Activity Questionnaire (IPAQ), nutritional status with Body Mass Index (BMI), and fitness with the Beep Test, push-up, sit and reach, and shuttle run. Because the Shapiro-Wilk test showed non-normal data, Spearman Rank correlation was applied in SPSS. Results showed a strong relationship between BMI and fitness ($r = 0.791$; $p = 0.000$), and very strong relationships for exercise duration ($r = 0.934$; $p = 0.000$) and frequency ($r = 0.935$; $p = 0.000$). Physical activity was therefore the more dominant factor. Schools and parents should encourage daily physical activity and provide balanced nutrition.

Keywords: Physical Fitness, Nutritional Status, Physical Activity, Elementary School Students, Spearman Correlation

This work is licensed under a Creative Commons Attribution-NonCommercial 4.0 International License.

INTRODUCTION

Based on the above review, the level of physical fitness during the school-age years can be regarded as a crucial foundation that helps children carry out daily activities and instills long-term healthy living habits. Physical fitness refers to the body's capacity to complete daily tasks efficiently without acute fatigue, leaving enough energy to enjoy leisure time, relax, or face sudden emergencies, so that a fit person always has extra energy reserves after activity (Giri Wiarjo, 2013:170). Such good fitness is strongly influenced by two main factors: nutritional status, where adequate nutrient supply acts as the provider of daily energy, and a routine of active movement that strengthens flexibility, endurance, and muscle strength (WHO, 2020). This matters given its vital role in forming a healthy lifestyle from an early age (Nurhayati et al., 2021), during the very rapid physical, mental, and social growth of elementary school children. Based on the above review, it can be concluded that the physical fitness of elementary school children is largely determined by the synergy between good nutrition and the habit of active movement. Balanced nutrition has a vital function in supporting the energy for movement, whereas poor nutritional conditions risk causing health problems that in turn limit a child's physical mobility (World Health Organization, 2020). Consistency in exercising is also a main pillar of building bodily fitness, although current trends show that very few children meet the recommended daily amount of movement (Tremblay et al., 2016). This decline in activity is driven by the massive penetration of digital technology that brings children closer to gadgets, so that time for active movement is eroded by an excessively sedentary lifestyle.

Given this urgency, research that examines the correlation between physical fitness, nutritional profile, and daily movement habits among male students at SDN 079 Tanete is very important for gathering empirical field data that can also serve as a strategic reference for improving children's health and fitness. Educational institutions have proven to be in a very

strategic position to instill a culture of healthy living through learning programs and sports agendas that give students room to keep moving and maintain their fitness. Attention to physical fitness is increasingly urgent amid the declining trend in physical activity caused by lifestyle shifts and the growing penetration of modern technology (Ministry of Health of the Republic of Indonesia, 2018). This is aggravated by the 2018 Riskesdas data, which confirm that nutritional problems, both malnutrition and obesity, still affect school-age children, where suboptimal nutrition risks reducing physical capacity and disrupting their learning in class. This national vulnerability is directly reflected in the individual variation in fitness levels found at SDN 079 Tanete, so an in-depth study is needed to map the correlation between nutritional status, active movement habits, and physical fitness level specifically among male students at the school.

Review of Literature

Table 1. Previous Studies

No	Researcher (Year)	Location and Subjects	Method/Instrument	Main Findings	Relevance to This Study
1	Safriadi, Aspa, and Rahmatullah (2025)	SDN 111 Pekanbaru, elementary school students	Not detailed in the article	Daily physical activity was low due to limited PE class time and few sports extracurriculars. Normal nutritional status was 75.0%. Good fitness was only 8%, and most students were in the moderate category (62%).	Consistent with the low physical activity duration (mean 45.70 minutes) and the dominance of below-good fitness (76.7%) in this study.
2	Johanis, Budi, and Wibowo (2025)	SDN Pacarkembang IV Surabaya, elementary school students	Not detailed in the article	Nutritional status varied widely. Normal was 42.9% and undernutrition was 38.1%.	Comparison for the distribution of nutritional status (this study: normal 53.3%, under 30.0%, over 16.7%).
3	Putra, Masrun, and Setiawan (2022)	SMK Negeri 2 Kerinci, vocational high school students	Not detailed in the article	Physical fitness was in the moderate category even though most students had normal nutritional status.	Supports the finding of moderate fitness (46.7%) and shows that normal nutrition does not automatically mean good fitness.
4	Fadilah and Ekayanti (2023)	SDN 1 Cijeungjing, elementary school students	Harvard Step Test	Fitness was in the excellent category despite relatively low physical activity.	Results differ from this study. The difference is attributed to the instrument (Harvard Step Test vs Beep Test).
5	Satin, Mandosir, Irmanto, Susanto, and Kristanto (2021)	High school students in Jayapura City	Spearman Rank correlation	Used Spearman because the data were not normally distributed.	Basis for choosing the Spearman Rank test after the Shapiro-Wilk normality test.
6	Wahid and Kurniawan (2023)	Elementary school students in other regions of Indonesia	Not detailed in the article	Physical fitness was dominated by the poor category.	Shows that low fitness among elementary children is a common phenomenon, not unique to SDN 079 Tanete.

7	Putri (2019)	Elementary school students in other regions of Indonesia	Not detailed in the article	Physical fitness was dominated by the poor category.	Same as no. 6, reinforcing the pattern of low fitness in elementary children.

RESEARCH METHODS

Using purposive sampling, the number of research subjects was set at 30 male students from grades four, five, and six at SD Negeri 079 Tanete, with the requirements that participants be aged 10-12 years, have no history of illness that could hinder physical activity, and be willing to take part in the entire research process. The research population comprised all male students in grades IV, V, and VI at SD Negeri 079 Tanete, because this group matches the research target concerning physical fitness, nutritional status, and physical activity of school-age children. The research was conducted at SD Negeri 079 Tanete on the grounds that students differ in physical fitness levels, which were assumed to be related to their nutritional condition and physical activity patterns, while the timing began after the survey permit from the relevant agency was issued and lasted until all data collection was completed. The data obtained were numerical information describing students' physical activity, nutritional status, and physical fitness as found in the field. The research gave no treatment to respondents; instead it observed and measured the variables as they were. Descriptive analysis was used to describe the characteristics of each variable, while relationships between variables were analyzed through a correlational approach to determine the degree of association formed, based on empirical data. On this basis, the study used a quantitative approach with a descriptive correlational design.

Based on that theoretical foundation, the choice of these three aspects as the focus of study refers to Sugiyono's (2019:68) definition of a variable as anything the researcher determines to be studied in order to obtain in-depth information that is then analyzed as the basis for drawing conclusions. To collect information on the independent variable, physical activity, the study used the International Physical Activity Questionnaire (IPAQ) developed by Craig et al. (2003) to record the duration, intensity, and frequency of children's daily movement over one week. The companion independent variable, nutritional status, was assessed through anthropometric assessment, which involved recording the children's height and weight. These two physical measures were then processed into a Body Mass Index (BMI) value using the formula of body weight in kilograms divided by the square of height in meters, and then grouped into underweight, normal, and overweight categories following WHO (2020) standards. The dependent variable in this research is physical fitness, assessed with a series of standardized test batteries (Nurhayati et al., 2021) covering students' agility, flexibility, muscle strength, and cardiovascular endurance.

Based on these details, the data collection methodology comprised three main approaches: direct assessment of physical performance to measure physical fitness, a questionnaire to capture the physical activity profile, and anthropometric data collection to determine students' nutritional status, each technique supported by measuring instruments suited to the type of information sought. Physical fitness was evaluated using a standard test battery (Léger et al., 1988) consisting of the 20-meter shuttle run, or Beep Test, for cardiovascular stamina, push-ups for muscle strength, sit and reach for flexibility, and the shuttle run for children's agility. Meanwhile, physical activity parameters were gathered through a questionnaire based on the International Physical Activity Questionnaire (IPAQ), whose validity and reliability have been tested internationally (Craig et al., 2003). Body Mass Index (BMI) was calculated by dividing body weight (in kilograms) by the square of height (in

meters), with figures obtained from anthropometric procedures using a stadiometer accurate to 0.1 cm for height and a digital scale with 0.1 kg precision to record weight accurately (WHO, 2020).

Based on all these stages, data processing and analysis were completed using SPSS, including both descriptive and inferential statistics. Before the association test was run, the data had to pass a descriptive summary stage, including calculation of the mean, mode, median, and standard deviation for the physical fitness, physical activity, and nutritional status variables, which were then visualized as tables and graphs (Sugiyono, 2019:207). The choice of correlation test was preceded by a normality check using the Shapiro-Wilk method, given the relatively small sample size (n = 30), with a significance level above 0.05 indicating normally distributed data and a value below 0.05 indicating non-normal distribution (Ghozali, 2018:161). Based on this prerequisite test, data passing normality were analyzed with the Pearson Product Moment, while non-normal data were tested with Spearman Rank, following the guidance of Sugiyono (2019:228-245). The strength of the relationship between variables was then interpreted using the correlation coefficient guideline of Sugiyono (2019:231): the strength of a relationship can be interpreted from the magnitude of the correlation coefficient. An r value in the range 0.00-0.199 indicates a very weak relationship, and 0.20-0.399 is in the weak category. A moderate relationship is indicated by 0.40-0.599, while the range 0.60-0.799 indicates a strong relationship. A correlation of 0.80-1.000 is categorized as a very strong relationship. Hypothesis testing, decision criteria (Sugiyono, 2019:229): if $p < 0.05$, Ha is accepted (there is a significant relationship); if $p \geq 0.05$, H0 is accepted (there is no significant relationship).

Overview of Research Data

Table 2. Student Data

No.	Student Name	Age	Nutritional Status (BMI)	Physical Fitness Level	Physical Activity Frequency (Times/Week)	Physical Activity Duration (Minutes/Day)
1	AD	10	Normal	Good	5	60
2	BD	11	Normal	Moderate	4	45
3	CA	10	Underweight	Poor	2	30
4	DA	12	Overweight	Good	6	75
5	EA	11	Normal	Moderate	3	40
6	FR	10	Underweight	Poor	2	30
7	GH	11	Normal	Moderate	4	50
8	HI	10	Overweight	Good	6	70
9	IA	12	Normal	Good	5	60
10	JO	10	Normal	Moderate	3	45
11	KN	11	Underweight	Poor	1	25
12	LA	12	Normal	Moderate	4	50
13	MA	10	Overweight	Good	5	60
14	NA	11	Normal	Moderate	3	40
15	OI	10	Normal	Moderate	4	45
16	PI	12	Underweight	Poor	2	30
17	QR	11	Normal	Moderate	4	50
18	RS	10	Normal	Moderate	3	40
19	ST	12	Underweight	Poor	2	28
20	TU	11	Normal	Moderate	4	50
21	UV	10	Overweight	Good	5	65
22	VW	12	Normal	Good	5	60
23	WX	11	Underweight	Poor	2	30

24	XY	10	Normal	Moderate	3	45
25	YZ	12	Normal	Moderate	4	50
26	AB	11	Overweight	Good	6	72
27	BC	10	Underweight	Poor	1	25
28	CD	12	Normal	Moderate	4	48
29	DE	11	Normal	Moderate	3	40
30	EF	12	Underweight	Poor	2	30

Notes:

- Nutritional Status (BMI): Determined from students' BMI values. Categories: Underweight, Normal, Overweight.
- Physical Fitness Level.
- Physical Activity Duration: Average time per day spent on physical activity.

RESEARCH RESULTS AND DISCUSSION

Research Result

Data for this research were collected through three main methods specified according to the needs of each variable: the International Physical Activity Questionnaire (IPAQ) by Craig et al. (2003) to record the physical activity profile, anthropometric assessment to determine nutritional status, and direct testing of physical fitness levels. All these measurement procedures were applied to a total of 30 male students aged 10 to 12 years in grades four, five, and six of Sekolah Dasar Negeri 079 Tanete as research subjects. All data were then processed using SPSS. The results are presented step by step as follows.

Descriptive Statistics of Numerical Variables

To describe the characteristics of the research data, the descriptive statistics are presented as a numerical summary. This information covers all the numerical variables analyzed so that the activity and physical characteristics of the students can be seen more comprehensively.

Table 3. Descriptive Statistics of Numerical Variables

Variable	N	Min	Max	Mean	Std. Dev
Age (years)	30	10	12	10.83	0.791
Body Weight (kg)	30	24	50	35.2	7.972
Height (cm)	30	130	148	138.4	5.392
BMI (kg/m^2)	30	13	24.3	18.23	3.24
Beep Test (Level)	30	2	6	4	1.114
Push-up (Reps)	30	8	25	14.93	5.112
Sit & Reach (cm)	30	17	30	23.2	3.925
Shuttle Run (sec)	30	12	16	13.93	1.338
PA Frequency (times/week)	30	1	6	3.5	1.456
PA Duration (min/day)	30	25	75	45.7	14.629

Source: SPSS Data Processing Results, 2026

Based on Table 3, the students' mean age is 10.83 years, with an age range of 10 to 12 years, a period that according to Nurhayati, Wahyuni, and Arifin (2021) is a critical period of children's physical, mental, and social growth, so physical fitness at this age becomes an important foundation for healthy living patterns later on. The participants' mean Body Mass Index (BMI), calculated from the anthropometric assessment, reached 18.23 kg/m^2, derived from a mean body weight of 35.20 kg and a mean height of 138.40 cm, indicating that students are generally within the normal nutritional status range according to WHO (2020) standards. However, the minimum value of 13.00 kg/m^2 and maximum of 24.30 kg/m^2 indicate a fairly

wide variation in nutritional condition, in line with the findings of Johanis, Budi, and Wibowo (2025), who also found fairly wide variation in nutritional status among students of SDN Pacarkembang IV Surabaya even though most students were of normal nutrition. For the physical fitness components, the mean Beep Test was Level 4.00, push-up 14.93 repetitions, sit and reach 23.20 cm, and shuttle run 13.93 seconds. These components represent the four main health-related aspects of physical fitness: cardiovascular endurance, muscle strength, flexibility, and agility (Telew, 2024; Léger et al., 1988). Meanwhile, the students' mean daily physical activity duration was 45.70 minutes, still below the WHO (2020) minimum recommendation of 60 minutes per day. This finding is consistent with the results of Safriadi, Aspa, and Rahmatullah (2025) at SDN 111 Pekanbaru, who also found low daily physical activity among students due to limited PJOK (physical education) lesson time and a lack of sports extracurricular activities.

Frequency Distribution of Nutritional Status

Having established the general picture of the numerical data, the frequency distribution of students' nutritional status is presented below, based on Body Mass Index (BMI) categories set according to WHO (2020) standards.

Table 4. Frequency Distribution of Students' Nutritional Status

Category	Frequency	Percentage	Cumulative
Underweight	9	30.00%	30.00%
Normal	16	53.30%	83.30%
Overweight	5	16.70%	100.00%
Total	30	100%	

Source: SPSS Data Processing Results, 2026
Notes: Underweight = BMI < 17.0 | Normal = BMI 17.0-23.0 | Overweight = BMI > 23.0 (WHO, 2020)

Of the 30 students in the sample, most, namely 16 students (53.3%), had normal nutritional status, 9 students (30.0%) were in the underweight category, and 5 students (16.7%) were in the overweight category. The proportion of normal nutritional status in this study (53.3%) is slightly lower than the findings of Safriadi, Aspa, and Rahmatullah (2025) at SDN 111 Pekanbaru, who recorded 75.0% of students with normal nutritional status, but higher than the results of Johanis, Budi, and Wibowo (2025) at SDN Pacarkembang IV Surabaya, who recorded only 42.9% of students with normal nutrition, with the proportion of underweight reaching 38.1%. This difference confirms the view of Nugraha and Wibowo (2021) that the nutritional status of school-age children is strongly influenced by local context, including food access, family economic level, and parents' nutritional knowledge in each region (WHO, 2020; Ministry of Health of the Republic of Indonesia, 2018).

Frequency Distribution of Physical Fitness Level

Next, to determine the distribution of students' physical fitness, the frequency distribution of physical fitness levels based on the results of the four tests administered is presented below.

Table 5. Frequency Distribution of Physical Fitness Level

Category	Frequency	Percentage	Cumulative
Poor	9	30.00%	30.00%
Moderate	14	46.70%	76.70%
Good	7	23.30%	100.00%
Total	30	100%	

Source: SPSS Data Processing Results, 2026

Notes: Good = Beep Test ≥ Level 5, Push-up ≥ 20 reps, Sit & Reach ≥ 27 cm, Shuttle Run ≤ 12.5 sec (Nurhayati et al., 2021)

Of all 30 students who were research subjects, 14 students (46.7%) were in the moderate physical fitness category. Next, 9 students (30.0%) were in the poor category, while the other 7 students (23.3%) had reached the good category. Thus, 23 students, or 76.7% of all respondents, had not yet reached the good physical fitness category, so students' fitness in general still needs attention. This condition is in line with the findings of Safriadi, Aspa, and Rahmatullah (2025), who reported that only 8% of students at SDN 111 Pekanbaru reached the good fitness category, with the majority in the adequate category (62%). Likewise, the results of Putra, Masrun, and Setiawan (2022) among students of SMK Negeri 2 Kerinci showed that physical fitness was in the moderate category even though most students' nutritional status was normal. A similar pattern was also found by Wahid and Kurniawan (2023) and Putri (2019), both of whom reported a predominance of the poor category in elementary school students' physical fitness in other regions of Indonesia. The similarity of these patterns indicates that low physical fitness among elementary school-age children is not a problem unique to SDN 079 Tanete, but a fairly common phenomenon found in various similar studies in Indonesia (Sulistiono, 2014a, in Putro & Winarno, 2022).

Frequency Distribution of Physical Activity Intensity

The frequency distribution of students' physical activity intensity obtained through the IPAQ questionnaire is presented below. These data describe how active students are in their daily physical activities.

Table 6. Frequency Distribution of Physical Activity Intensity

Category	Frequency	Percentage	Cumulative
Light	9	30.00%	30.00%
Moderate	17	56.70%	86.70%
High	4	13.30%	100.00%
Total	30	100%	

Source: SPSS Data Processing Results, 2026
Notes: Light = < 3 times/week & < 30 min/day | Moderate = 3-4 times/week & 30-60 min/day | High = ≥ 5 times/week & > 60 min/day (IPAQ; Craig et al., 2003)

Most students, namely 17 (56.7%), performed physical activity at moderate intensity, while light intensity accounted for 30.0% and high intensity for only 13.3%. Only 4 students (13.3%) truly met the high-intensity physical activity recommendation according to WHO (2020) guidance. The low proportion of students with high-intensity physical activity is in line with the findings of Tremblay et al. (2016) in their global review of 38 countries, which reported that only a small proportion of children worldwide truly meet the daily physical activity recommendation. The findings of Fadilah and Ekayanti (2023) among students of SDN 1 Cijeungjing show a different pattern from the results of this study. This methodological critique also underlies the choice of instrument, in which this research relied on the Beep Test to measure physical fitness, whose characteristics clearly differ from the Harvard Step Test used by Fadilah and Ekayanti (2023), who at that time found their subjects in the very good category despite low physical activity levels; such variation in instruments is one of the essential reasons why the correlation between physical activity and bodily fitness often shows non-uniform patterns across different groups of students (Fadilah & Ekayanti, 2023; Gandasari, 2024).

Data Normality Test Results

The statistical technique for analyzing relationships between variables was first determined based on the characteristics of the data distribution. Therefore, before the correlation was run, the data needed to be examined through a normality test to determine whether their spread meets the assumption of normal distribution. Since this study involved 30 respondents, the choice of an appropriate correlation test method depends heavily on the evaluation of data spread verified through the Shapiro-Wilk normality test, following the reference of Ghozali (2018). The normality results for all analyzed variables are as follows.

Table 7. Data Normality Test Results (Tests of Normality)

Variable	Shapiro-Wilk Statistic	df	Sig.	Conclusion
BMI (kg/m^2)	0.928	30	0.04	Not Normal (p < 0.05)
PA Frequency (times/week)	0.935	30	0.07	Normal (p > 0.05)
PA Duration (min/day)	0.941	30	0.09	Normal (p > 0.05)
Physical Fitness	0.811	30	0	Not Normal (p < 0.05)

Source: SPSS Data Processing Results, 2026

The initial examination of data spread was carried out with the Shapiro-Wilk test involving a total of 30 respondents, a prerequisite step that is essential for determining the appropriate statistical method before the relationship tests are run (Ghozali, 2018). Based on this testing, the variables physical activity duration (p = 0.094) and physical activity frequency (p = 0.066) proved to be normally distributed because they exceeded the threshold, but BMI (p = 0.044) and physical fitness (p = 0.000) fell below the significance line and therefore failed to meet the normality assumption. Because the normality assumption failed for some variables, the parametric Pearson test option was automatically dropped and switched entirely to the non-parametric Spearman Rank test, in order to comply with the methodological guidance of Sugiyono (2019). The Spearman Rank technique was thus established as the main basis for analyzing relationships between variables in this research. This approach is in line with the procedure also used by Satin, Mandosir, Irmanto, Susanto, and Kristanto (2021) in their study of high school students in Jayapura City; the Spearman correlation test was chosen specifically because the distribution of the collected data proved not to meet the assumption of normal distribution.

Spearman Correlation Test Results

After the normality test results showed that the BMI and physical fitness data were not normally distributed, the analysis of relationships between variables was carried out using Spearman correlation. This test was used to determine whether there is a significant relationship between physical activity and nutritional status and students' physical fitness level. The overall correlation results are presented in detail in the following table.

Table 8. Spearman Rank Correlation Test Results

Variable		BMI (kg/m^2)	PA Frequency	PA Duration	Physical Fitness
BMI (kg/m^2)	r	1	0.853**	0.843**	0.791**
	Sig.	.	0	0	0
	N	30	30	30	30
PA Frequency	r	0.853**	1	0.982**	0.935**
	Sig.	0	.	0	0
	N	30	30	30	30
PA Duration	r	0.843**	0.982**	1	0.934**
	Sig.	0	0	.	0
	N	30	30	30	30

Physical Fitness	r	0.791**	0.935**	0.934**	1
	Sig.	0	0	0	.
	N	30	30	30	30

Source: SPSS Data Processing Results, 2026

To make the correlation results easier to read and understand, a summary of the hypothesis decisions for the three relationships analyzed is presented below.

Table 9. Summary of Correlation Test Results and Hypothesis Decisions

Relationship	Calculated r	Sig.	Correlation Strength	Decision
Nutritional Status (BMI) → Physical Fitness	0.791	0	Very Strong	Ha Accepted
PA Frequency → Physical Fitness	0.935	0	Very Strong	Ha Accepted
PA Duration → Physical Fitness	0.934	0	Very Strong	Ha Accepted

Source: SPSS Data Processing Results, 2026

All of these association findings are summarized in a structured way in the table above. Its calculations serve to detect the degree of association between physical activity and nutritional status and the subjects' level of physical fitness, based on the analytical decision to use Spearman correlation after the BMI and physical fitness data proved not to meet the normal distribution assumption, namely r = 0.935 for frequency and r = 0.934 for physical activity duration. All of these values fall in the very strong relationship category according to the interpretation criteria used in this study. The analysis shows that both variables studied are related to students' physical fitness, although the strength of the relationship differs. Physical activity shows a very strong relationship with the level of physical fitness, while nutritional status also has a strong relationship with students' fitness condition.

Discussion

General Overview of Students' Physical Fitness, Nutritional Status, and Physical Activity

A similar tendency was reported by Safriadi, Aspa, and Rahmatullah (2025), who found that the mean physical fitness level of students at SDN 111 Pekanbaru was at an adequate level, with a score of 2.2 out of a maximum of 5. This picture of rather low fitness is also in line with the research of Putri (2019), who recorded that 45.0% of elementary school children in Kalidoni District, Palembang, fell into the poor category, and the findings of Wahid and Kurniawan (2023), who confirmed that the majority of students aged 10 to 12 years at SD Negeri Kauman 1 Malang were in the poor category for physical fitness. This series of findings from previous studies shows a pattern consistent with conditions in the field, where the evaluation of physical fitness among male students at SDN 079 Tanete showed the largest proportion in the moderate category at 46.7%, followed by the poor category at 30.0%, with the remaining 23.3% having reached the good category. The author takes the view that low physical fitness among elementary school-age children is not surprising, given that more and more children spend their time on gadgets and activities that involve little physical movement (Cahyono, Wahjuni, & Wibowo, 2022; Tremblay et al., 2016).

In terms of nutritional status, most students (53.3%) were normal, yet 30.0% of students were still underweight. This condition is not much different from the results of Johanis, Budi, and Wibowo (2025) at SDN Pacarkembang IV Surabaya, who found that the proportion of underweight students was still quite significant at 38.1%. Cusanni and Rosmawati (2019), in their study at SD Negeri 01 Pangkalan, also found a similar pattern, namely that most students had normal nutritional status but their physical fitness was still classified as poor. Fadilah and Ekayanti (2023) also reported that 79.3% of students at SDN 1 Cijeungjing had normal nutritional status, consistent with the general trend that most elementary school-age children

in Indonesia have normal nutritional status, although the proportions of underweight and overweight still need to be watched (Ministry of Health of the Republic of Indonesia, 2018). These findings indicate that normal nutritional status alone is not enough to guarantee good fitness without a habit of active movement every day (Fernanda, Nurrochmah, Yunus, & Mu'arifin, 2023).

In terms of physical activity, students' mean daily duration was only 45.70 minutes per day, still below the WHO (2020) recommendation of 60 minutes per day, and only 13.3% of students had high-intensity physical activity. According to Cahyono, Wahjuni, and Wibowo (2022), students' physical fitness condition can be related to limited opportunities for physical activity in daily life. Safriadi, Aspa, and Rahmatullah (2025) reported that the low level of physical fitness among students at SDN 111 Pekanbaru was related to several conditions, both inside and outside the school environment. On the internal side, limited daily movement and limited Physical Education, Sports, and Health (PJOK) learning time are among the things that need attention, while within the school environment, limited choices of extracurricular activities can also reduce students' opportunities to be physically active. Outside school, increased use of electronic devices, marked by ever longer time spent looking at screens (screen time), is also a relevant problem for school-age children. These conditions show that limited daily physical activity needs attention in efforts to support the maintenance and improvement of students' physical fitness. Putro and Winarno (2022) said something similar in their literature review, concluding that external roles such as support from educators and parents strongly support the achievement of optimal physical fitness in school-age children. The author considers this condition to deserve serious attention from schools and parents, because ages 10 to 12 are a critical period of children's physical development that strongly determines the quality of their long-term health (Nurhayati et al., 2021).

Relationship Between Nutritional Status and Physical Fitness

Physiologically, this close relationship rests on the role of adequate nutrition as the body's main energy supplier, where nutritional deficiency risks causing early fatigue and a decline in physical endurance (WHO, 2020). This is in line with the results of this research, which recorded a very strong Spearman correlation of $r = 0.791$ with $p = 0.000$ between nutritional status and students' physical fitness. A similar significant relationship was also reported by Sartika, Husain, and Asrul (2025) at SD Inpres 5/81 Balieng Toa, Bone Regency, using the Pearson test ($p = 0.00$), who found that balanced nutrition moves linearly with high physical fitness, while poor nutrition is directly proportional to low physical performance. Consistent findings were confirmed by Johanis, Budi, and Wibowo (2025) through the Kruskal-Wallis test ($p = 0.000$) on sixth-grade students of SDN Pacarkembang IV Surabaya, and by Yunitasari, Sinaga, and Nurdiani (2019), who recorded a positive correlation between body fat percentage and the pulse rate of physical education instructors in South Jakarta. Further support for this phenomenon is shown by the literature review of Nugraha and Wibowo (2021), which demonstrates the superiority of the fitness of well-nourished children over undernourished children, and by the pioneering research of Sepriadi (2017), which stated that nutritional status contributes 14.08% to elementary school students' fitness, a figure that can soar to 69.38% when combined with motor skills. Idham, Neldi, Komaini, Sin, and Damrah (2022) also found that nutritional status has a direct influence of 9.7% on students' PJOK learning outcomes, which indirectly shows a link between nutritional condition and students' physical ability at school. However, not all studies found a consistent relationship between these two variables.

Although most of the literature records a close association, not all scientific investigations agree on a link between nutritional profile and physical fitness level. This empirical fact was

reported by Gandasari (2024), who found no meaningful relationship between nutritional status and physical fitness among students of SMP Maniamas Ngabang. A similar conclusion was also reinforced by the research of Satin, Mandosir, Irmanto, Susanto, and Kristanto (2021) on high school students in Jayapura City, whose data analysis proved that nutritional status showed no significant correlation at all with students' level of physical fitness. According to Shahudin, Yulianto, and Faridah (2024), this difference in results can be influenced by various contextual factors such as sample characteristics, age level, and the measurement instruments used. The author considers that although the contribution of nutritional status is not as large as that of physical activity in this study, its role cannot be ignored because nutrition is the body's main fuel for physical performance (Telew, 2024). Children who lack calorie and protein intake will not have enough energy to carry out physical activity well, so fulfilling balanced nutrition every day is a basic foundation that must be met first before any physical training program can run effectively (Romadhan, Simanjuntak, Bafadal, Triansyah, & Hidasari, 2023).

Relationship Between Physical Activity and Physical Fitness

The statistics show a record correlation coefficient for physical activity duration of r = 0.934 with significance p = 0.000, and for physical activity frequency r = 0.935 at p = 0.000. This series of quantitative results essentially concludes that physical activity has a very strong degree of association with the physical fitness of students at SDN 079 Tanete, which according to Sugiyono's (2019) guideline falls in the very strong category. This finding is consistent with the research of Samudera, Wahjuni, and Hidayat (2024) at SD Pasar Ikan Sidoarjo, who obtained a significance value of 0.001 for physical activity, while nutritional status had a value of 0.916 and lifestyle 0.188. Firdaus and Fadhli (2025) reported a significant association between physical activity and physical fitness in children aged 7-8 years at SDN 1 Paciran. This was shown by an analysis yielding a correlation coefficient of 0.354 with a significance value of 0.002, indicating that activity duration is related to children's stamina. In addition, Cahyono, Wahjuni, and Wibowo (2022) reported that physical activity has a beta of 0.4 with alpha = 0.000 in relation to physical fitness. The similarity of results across these studies reinforces the finding that the higher the physical activity students perform, in terms of both frequency and duration, the stronger its association with the level of physical fitness.

Putro and Winarno (2022), in their literature review of 13 research articles, found that across all studies analyzed, physical activity consistently appeared as a variable related to physical fitness in 10 of the 13 studies, compared with nutritional status, which appeared in only 5 studies, affirming the dominance of physical activity as a determinant of fitness in children and adolescents. Pratama, Hanief, and Bekti (2020), in their study at SDN 03 Talang Tulungagung, empirically indicated that students who consistently engage in daily movement activity at school tend to have more optimal fitness levels, in line with the dominance of the adequate fitness category, which reached the largest proportion at 76.79%; accordingly, an important recommendation was also voiced by Taufiqurrahman, Amiruddin, and Masyitah (2025), who underline the urgency of establishing school physical activity programs that are managed systematically and sustainably to boost students' physical fitness. Pratama, Kusumawardhana, and Zhannisa (2025) at SD Negeri 1 Tamanrejo Kendal found that students who took part in a structured physical training program experienced a significant improvement in fitness, with an average increase of 10.70% among male students and 16.75% among female students. Romadhan, Simanjuntak, Bafadal, Triansyah, and Hidasari (2023), among Physical Education students at Universitas Tanjungpura, also found a significant relationship between physical activity and physical fitness, and when combined with nutritional status, the two gave an effective contribution of 58.141% to physical fitness.

However, not all studies reported consistent results. Fadilah and Ekayanti (2023), for example, found that although most students at SDN 1 Cijeungjing had low physical activity, their physical fitness remained in the very good category. This condition is one possible explanation for why no significant relationship was found between physical activity, or fruit and vegetable consumption habits, and the level of physical fitness. Thus, the results show a different pattern between physical activity level and physical fitness achievement in the subjects studied. According to Putro and Winarno (2022), this difference can be influenced by differences in fitness measurement instruments (for example, Harvard Step Test versus Beep Test), the geographic characteristics of the sample (coastal versus urban children), and genetic factors and lifestyle patterns that are not entirely measured in cross-sectional research. The author takes the view that the findings of this study have a very logical basis. The human body is indeed designed to move, and the more often and the longer a child is active, the more trained their cardiovascular system, muscle strength, flexibility, and agility become (Telew, 2024). Conversely, children who rarely move will experience a gradual decline in physical capacity even though their nutritional intake is sufficient (Fernanda et al., 2023). Therefore, encouraging children to move more every day is the most effective and direct step to improve their physical fitness, in line with the WHO (2020) recommendation that emphasizes at least 60 minutes of physical activity per day for school-age children.

At the institutional level, these findings can serve as a basis for the Health Office and the Education Office to design routine monitoring programs for students' nutrition and physical fitness, especially in schools vulnerable to malnutrition problems. This is in line with the urgent role of parents at home in serving balanced, nutritious meals while limiting gadget use, and with concrete steps by schools to expand children's opportunities for active movement by adding physical education lesson hours, regular morning exercise, and extracurricular activities at least twice a week. To address gaps in earlier research, future studies are advised to recruit larger and more representative samples with comprehensive designs, and to use more objective movement measurement tools such as accelerometers. Nevertheless, these recommendations and practical implications must be treated wisely given that this study has several fundamental limitations, including a sample limited to 30 male students from a single institution so that the results cannot yet be widely generalized, susceptibility to reporting bias due to the use of the IPAQ questionnaire, and the absence of other factors that also influence fitness such as stress level, health history, and children's sleep quality.

CONCLUSION

This study found that students' physical fitness was generally in the moderate category (46.7%), with mostly normal nutritional status (53.3%) and predominantly moderate physical activity intensity (56.7%). Even so, 30.0% of students were still underweight and 30.0% had poor physical fitness, which is an important note for follow-up. Students' mean daily physical activity duration of 45.70 minutes is also still below the WHO (2020) minimum recommendation of 60 minutes per day. The Spearman test showed that all three variables analyzed have a significant relationship with students' physical fitness. The strongest relationship was found for physical activity frequency, with $r = 0.935$ and $p = 0.000$, followed by physical activity duration with $r = 0.934$ and $p = 0.000$. Meanwhile, nutritional status also showed a significant relationship, with $r = 0.791$ and $p = 0.000$. Based on these coefficients, the relationship of all three variables with physical fitness falls in the very strong category. From all these results, physical activity proved to be the most dominant factor influencing students' physical fitness, while nutritional status acts as an equally important supporting factor. The two work together in shaping children's optimal physical condition.

The novelty of this study lies in its integrated analysis of nutritional status and specific dimensions of physical activity, particularly exercise duration and frequency, in relation to physical fitness among male elementary school students aged 10–12 years. Unlike studies that examine physical activity or nutritional status as separate correlates of fitness, this research simultaneously investigates these factors using multiple fitness indicators, including cardiorespiratory endurance, muscular endurance, flexibility, and agility. The findings reveal that exercise duration (r = 0.934) and frequency (r = 0.935) exhibit stronger associations with physical fitness than nutritional status (r = 0.791), highlighting the potential importance of behavioral dimensions of physical activity in understanding fitness variation during late childhood. By providing context-specific evidence from an Indonesian elementary school population, this study contributes to the limited empirical understanding of how nutritional and activity-related factors are associated with multidimensional physical fitness in school-aged boys. These findings may inform the development of school-based physical education and health promotion strategies that prioritize regular, sustained physical activity alongside balanced nutrition.

BIBLIOGRAPHY

Cahyono, E. A., Wahjuni, E. S., & Wibowo, S. (2022). Analisis faktor yang berhubungan dengan kebugaran jasmani ditinjau dari screen time, aktivitas fisik dan status gizi. JSES: Journal of Sport and Exercise Science, 5(2), 59–65. https://doi.org/10.26740/jses.v5n2.p59-65

Craig, C. L., Marshall, A. L., Sjöström, M., Bauman, A. E., Booth, M. L., Ainsworth, B. E., Pratt, M., Ekelund, U., Yngve, A., Sallis, J. F., & Oja, P. (2003). International Physical Activity Questionnaire: 12-country reliability and validity. Medicine & Science in Sports & Exercise, 35(8), 1381–1395.

Cusanni, W., & Rosmawati. (2019). Tingkat kesegaran jasmani dan status gizi siswa Sekolah Dasar Negeri 01 Pangkalan Kecamatan Pangkalan Koto Baru. Jurnal Pendidikan dan Olahraga, 2(3), 21–25.

Fadilah, M. N., & Ekayanti, I. (2023). Hubungan kebiasaan konsumsi sayur dan buah, serta aktivitas fisik dengan status gizi dan kebugaran jasmani siswa SDN 1 Cijeungjing. [nama jurnal, volume(nomor), halaman belum ada]

Fernanda, D. D. H., Nurrochmah, S., Yunus, M., & Mu'arifin. (2023). Analisis status gizi, tingkat kebugaran jasmani siswa kelas 8 di SMPN 1 Poncokusumo Kabupaten Malang. Jurnal Segar, 12(1). https://doi.org/10.21009/segar/1201.04

Firdaus, A. M., & Fadhli, N. R. (2025). Kebugaran jasmani anak pesisir: Studi tingkat aktivitas fisik pada anak usia 7–8 tahun. Jurnal Edukasi Citra Olahraga, 5(2), 282–292. https://doi.org/10.38048/jor.v5i2.5446

Gandasari, M. F. (2024). Hubungan aktivitas jasmani dan status gizi terhadap tingkat kebugaran jasmani. Innovative: Journal of Social Science Research, 4(3), 9548–9555. https://doi.org/10.31004/innovative.v4i3.11579

Ghozali, I. (2018). Aplikasi analisis multivariate dengan program IBM SPSS 25. Badan Penerbit Universitas Diponegoro.

Giri Wiarjo. (2013). Fisiologi dan olahraga. Graha Ilmu.

Idham, Z., Neldi, H., Komaini, A., Sin, T. H., & Damrah. (2022). Pengaruh kebugaran jasmani, status gizi, dan motivasi belajar terhadap hasil belajar PJOK. Jurnal Basicedu, 6(3), 4078–4089. https://doi.org/10.31004/basicedu.v6i3.2196

Johanis, F., Budi, J., & Wibowo, S. (2025). Status gizi dan kebugaran jasmani anak sekolah dasar: Tinjauan korelasional berdasarkan PACER test. Jurnal Pendidikan, 10(2). https://doi.org/10.23969/jp.v10i02.27717

Kementerian Kesehatan Republik Indonesia. (2018). Laporan nasional Riset Kesehatan Dasar (Riskesdas) 2018.

Léger, L. A., Mercier, D., Gadoury, C., & Lambert, J. (1988). The multistage 20 metre shuttle run test for aerobic fitness. Journal of Sports Sciences, 6(2), 93–101.

Nugraha, M. H., & Wibowo, S. (2021). Hubungan antara status gizi dengan kebugaran jasmani. Jurnal Universitas Negeri Surabaya, 9(2). https://doi.org/10.26740/jses

Nurhayati, T., Wahyuni, R., & Arifin, Z. (2021). Pengaruh aktivitas fisik terhadap kebugaran jasmani siswa sekolah dasar. Jurnal Pendidikan Olahraga, 10(2), 45–54.

Pratama, Y. N., Kusumawardhana, B., & Zhannisa, U. H. (2025). Analisis tingkat kebugaran jasmani siswa Sekolah Dasar Negeri 1 Tamanrejo Kecamatan Sukorejo Kabupaten Kendal. Jurnal Ilmiah Penjas, 11(1), 239–250. https://doi.org/10.36728/jip.v11i1.4079

Putra, R. (2022). A Tinjauan status gizi dan kesegaran jasmani siswa Sekolah Menengah Pertama Negeri 3 Kapur IX. Jurnal Edu Research, 11(1), 18–23. https://doi.org/10.30606/jer.v11i1.1507

Putra, R. A., S, A., Masrun, M., & Setiawan, Y. (2022). Status gizi dan tingkat kebugaran jasmani siswa kelas X SMK Negeri 2 Kerinci. Jurnal Gladiator, 2(4), 161–172. https://doi.org/10.24036/gltdor108011

Putra, T. N., Alnedral, Bafirman, Welis, W., Damrah, Arba'i, B. M., & Sandy, B. (2022). Pengaruh kebugaran jasmani, status gizi, dan motivasi terhadap hasil belajar PJOK siswa SMK Abdurrab Kota Pekanbaru. Jurnal Kejaora: Jurnal Kesehatan Jasmani dan Olah Raga, 7(2). https://doi.org/10.36526/kejaora.v7i2.2109

Putri, S. A. R. (2019). Status gizi dan tingkat kebugaran jasmani siswa Sekolah Dasar di Kecamatan Kalidoni Kota Palembang. Prosiding Seminar Nasional Olahraga, 1(1).

Putro, B. C., & Winarno, M. E. (2022). Analisis aktivitas fisik dan status gizi terhadap kebugaran jasmani junior high school: Literature review. Sport Science and Health, 4(1), 1–11. https://doi.org/10.17977/um062v4i12022p1-11

Romadhan, A. R., Simanjuntak, V. G., Bafadal, M. F., Triansyah, A., & Hidasari, F. P. (2023). Hubungan status gizi dan aktivitas fisik terhadap kebugaran jasmani mahasiswa Pendidikan Jasmani Universitas Tanjungpura. Journal Physical Health Recreation (JPHR), 4(1), 113–120. https://doi.org/10.55081/jphr.v4i1.1590

Safriadi, A., Aspa, A. P., & Rahmatullah, M. I. (2025). Tingkat kebugaran jasmani pada peserta didik kelas V SDN 111 Pekanbaru menggunakan tes kebugaran pelajar nusantara. Pendekar: Jurnal Pendidikan Berkarakter, 3(4). https://doi.org/10.51903/1144

Samudera, F. D. B., Wahjuni, E. S., & Hidayat, T. (2024). Dampak status gizi, pola hidup sehat dan aktivitas fisik terhadap kebugaran jasmani pada siswa Sekolah Dasar Pasar Ikan Sidoarjo. EduInovasi: Journal of Basic Educational Studies, 4(1), 774–790. https://doi.org/10.47467/eduinovasi.v4i1.6145

Sartika, N., Husain, A., & Asrul, A. (2025). Hubungan antara status gizi dengan tingkat kebugaran jasmani pada siswa SD Inpres 5/81 Balieng Toa Kecamatan Sibulue Kabupaten Bone. Syntax Idea, 7(10). https://doi.org/10.46799/syntaxidea.v7i10.13645

Satin, P. M., Mandosir, Y. M., Irmanto, M., Susanto, I. H., & Kristanto, B. (2021). Hubungan antara status gizi dan aktivitas fisik dengan tingkat kebugaran jasmani pelajar SMA di Kota Jayapura. Indonesian Journal of Kinanthropology (IJOK), 1(1), 1–7. https://doi.org/10.26740/ijok.v1n1.p1-7

Sepriadi, S. (2017). Kontribusi status gizi dan kemampuan motorik terhadap kesegaran jasmani siswa sekolah dasar. Jurnal Keolahragaan, 5(2), 194–206. https://doi.org/10.21831/jk.v5i2.15147

Shahudin, N. N., Yulianto, A. G., & Faridah, A. (2024). Pengaruh status gizi terhadap tingkat kebugaran jasmani pada siswa sekolah. Journal Olympic (Physical Education, Health and Sport), 4(2), 61–69.

Sugiyono. (2019). Metode penelitian kuantitatif, kualitatif, dan R&D (Edisi ke-2). Alfabeta.

Taufiqurrahman, H., Amiruddin, & Masyitah. (2025). Tingkat kebugaran jasmani siswa UPTD SD Negeri 16 Juli di Kabupaten Bireuen menggunakan tes kebugaran pelajar nusantara (TKPN). Jurnal Pendidikan Nusantara, 10(2).

Telew, A. A. J. (2024). Tes dan pengukuran olahraga (A. Y. Mamahit, Ed.). Yayasan Syalom Cipta Sumikolah.

Tremblay, M. S., Barnes, J. D., González, S. A., Katzmarzyk, P. T., Onywera, V. O., Reilly, J. J., & Tomkinson, G. R. (2016). Global matrix 2.0: Report card grades on the physical activity of children and youth comparing 38 countries. Journal of Physical Activity and Health, 13(11), 343–366.

Wahid, W. N., & Kurniawan, A. W. (2023). Survei kebugaran jasmani pada siswa sekolah dasar. Jurnal Master Penjas & Olahraga, 4(1), 270–281. https://doi.org/10.37742/jmpo.v4i1.77

World Health Organization. (2020a). Guidelines on physical activity and sedentary behaviour.

World Health Organization. (2020b). Nutrition in childhood. https://www.who.int/nutrition

Yunitasari, A. R., Sinaga, T., & Nurdiani, R. (2019). Asupan gizi, aktivitas fisik, pengetahuan gizi, status gizi dan kebugaran jasmani guru olahraga sekolah dasar. Media Gizi Indonesia, 14(2), 197–206. https://doi.org/10.204736/mgi.v14i2.197–206