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Students' Physical Fitness Level

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ABSTRACT

Physical fitness is an important indicator in supporting learning readiness, health, and motor development in elementary school students. Low physical activity during school age has the potential to reduce children's physical capacity and impact the quality of learning. This study aims to determine the physical fitness level of fifth-grade students in the 2024/2025 academic year at SD Inpres 5 Lolu. The study used a quantitative descriptive approach with a survey design. The study population consisted of 26 students, all of whom were sampled using a total sampling technique. The instrument used was the Indonesian Physical Fitness Test (TKJI) for 10–12-year-olds, which covers components of speed, strength, muscular endurance, explosive power, and cardiorespiratory endurance. Data analysis was performed using percentages based on TKJI classification norms. The results showed that the overall physical fitness level of students was in the moderate category (47.5%), followed by poor (25%), good (17.5%), very poor (7.5%), and excellent (2.5%). Based on gender, male students demonstrated a relatively better fitness profile, with 22.73% in the good category and 54.55% in the moderate category. Female students were predominantly in the moderate (38.89%) and poor (27.78%) categories. It was concluded that the physical fitness level of fifth-grade students at SD Inpres 5 Lolu is in the moderate category and requires a structured and sustainable fitness improvement program through data-driven physical education (PJOK) learning.

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INTRODUCTION

Sports and physical activity are fundamental instruments in developing students' physical fitness as a foundation for lifelong health. Conceptually, physical fitness is understood as an individual's physical capacity to carry out daily activities efficiently without excessive fatigue and still have energy reserves for emergencies (Pohan et al., 2025; Gowa Sunga et al., 2022). In the educational context, Physical Education, Sports, and Health (PJOK) plays a strategic role in simultaneously developing cognitive, affective, and psychomotor aspects (Nur Ayu Oktaviani & S-1, 2020; Hartati et al., 2020). However, various national and international studies indicate a declining trend in the physical fitness levels of elementary school-aged children due to low daily physical activity, increased sedentary behavior, and the predominance of device use (Bile et al.,

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2021; Damsir, 2021; WHO, 2022). Empirical data from several Scopus studies over the past decade also shows that lack of physical activity in children aged 10–12 years is significantly correlated with decreased cardiorespiratory endurance, muscle strength, and less than ideal body composition (Erliana & Hartoto, 2023; Ortega et al., 2018; Janssen & LeBlanc, 2019). At the elementary school level, physical fitness has direct implications for learning readiness, concentration, and academic achievement (Hillman et al., 2019; Donnelly et al., 2016). Students with low fitness levels tend to tire more quickly, lack focus, and are at risk for long-term health problems. This issue is crucial because fifth grade (ages 10–11) is a period of fundamental motor development that determines the quality of physical capacity at subsequent levels. Based on initial observations at SD Inpres 5 Lolu, there is no structured empirical data on the physical fitness profiles of fifth-grade students. This lack of data has the potential to result in non-evidence-based physical education (PJOK) instruction that is not focused on students' real needs. Therefore, systematic survey research is needed to map physical fitness levels as a basis for more measurable coaching interventions.

Research on students' physical fitness has grown rapidly in the past decade. Globally, commonly measured components of physical fitness include cardiorespiratory endurance, muscular strength and endurance, agility, speed, and flexibility (Tomkinson et al., 2017; Ruiz et al., 2016). Instruments such as the Indonesian Physical Fitness Test (TKJI) and the Eurofit Test Battery are widely used in school-based research (Arifin et al., 2020; Cadenas-Sanchez et al., 2019). Scopus research shows that the physical fitness of elementary school-aged children is significantly associated with body mass index, moderate-vigorous physical activity (MVPA), and the quality of physical education (PJOK) instruction (Lubans et al., 2016; Fairclough et al., 2020). Longitudinal studies even show that cardiorespiratory fitness in childhood is a strong predictor of metabolic health in adulthood (Ortega et al., 2018). In Indonesia, several SINTA studies report that elementary school students' physical fitness levels tend to be moderate to poor (Bile et al., 2021; Damsir, 2021; Erliana & Hartoto, 2023). Contributing factors include the lack of intensity of physical education (PJOK) instruction, the lack of school sports facilities, and low student participation in physical activities outside of class. Quantitative descriptive survey approaches are widely used to map physical fitness conditions as baseline data for developing intervention programs (Pate et al., 2019; Tremblay et al., 2018). Recent studies also emphasize the importance of school-based fitness mapping, as school environment characteristics significantly influence students' physical activity (Sallis et al., 2021). Therefore, conceptually and empirically, physical fitness surveys are a relevant approach for providing objective data to support needs-based PJOK learning planning.

Although the literature on children's physical fitness is quite extensive, several significant research gaps remain. First, most previous studies have focused on large urban areas, while schools in specific areas have not been scientifically documented (Bile et al., 2021; Damsir, 2021). This limits generalizability and lacks a local database for school-based physical education policies. Second, many studies only highlight one or two fitness components, such as endurance or strength, without a comprehensive

analysis of all major components of physical fitness (Tomkinson et al., 2017; Ruiz et al., 2016). However, physical fitness is multidimensional and requires holistic measurement. Third, there are no scientific publications specifically mapping the physical fitness levels of fifth-grade students at SD Inpres 5 Lolu. This data gap hinders the development of evidence-based physical education (PE) learning strategies at the school. Fourth, recent research emphasizes the importance of integrating fitness data with the context of the school environment and student characteristics (Sallis et al., 2021), but studies at the local elementary school level are still limited in this contextual approach. Therefore, there is an urgent need to conduct a comprehensive survey that objectively and contextually maps students' physical fitness profiles at SD Inpres 5 Lolu.

This study aims to: (1) Analyze the physical fitness levels of fifth-grade students at SD Inpres 5 Lolu based on the main fitness components; (2) Classify fitness outcomes into normative categories as a basis for evaluating physical education (PJOK) learning; and (3) Provide empirical data as a baseline for developing school-based physical fitness improvement programs. The novelty of this study lies in: (1) A comprehensive, unit-based mapping approach that holistically integrates all components of physical fitness within a specific school context; (2) Provide evidence-based local baseline data, which can serve as a reference for developing the PJOK curriculum and physical education interventions at SD Inpres 5 Lolu; and (3) Contribute to the literature on physical fitness in elementary school-aged children in a region lacking scientific documentation, thereby enriching the body of reputable national research. Theoretically, this study reinforces the paradigm that physical fitness is a primary determinant of students' learning readiness and long-term health. Practically, the results of this study can inform the formulation of school policies for optimizing data-driven PJOK learning. Thus, this research is not only descriptive, but also strategic in supporting the development of physical education that is more measurable, contextual, and based on scientific evidence.

METHODS

Research methods are scientific procedures used to systematically obtain valid and reliable data to understand, solve, and predict educational problems (Sugiyono, 2015). In the context of physical fitness research, a quantitative approach is considered effective because it can produce objective data based on standardized physical measurements (Tomkinson et al., 2017; Cadenas-Sanchez et al., 2019). This study employed a quantitative descriptive design with a survey approach, aiming to comprehensively map the physical fitness levels of fifth-grade students at SD Inpres 5 Lolu.

The survey approach was chosen because it is relevant for obtaining a factual picture of a population's condition at a specific point in time without administering treatment (Sallis et al., 2021; Ladia et al., 2025). In physical education research, surveys based on physical tests are widely used to identify fitness profiles as a basis for planning learning interventions (Lubans et al., 2016; Fairclough et al., 2020). Empirically, quantitative descriptive methods are effective in mapping the distribution of fitness categories among elementary school students (Bile et al., 2021; Erliana & Hartoto, 2023).

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The study was conducted in the 2024/2025 academic year at SD Inpres 5 Lolu, Palu City. The study population was all 26 fifth-grade students. Given the relatively small population, the sampling technique used was total sampling, thus the entire population was included as research subjects. This approach is recommended in limited-population research to increase the accuracy of data description (Creswell, 2018; Pate et al., 2019).

The instrument used was the Indonesian Physical Fitness Test (TKJI) for 10–12-year-olds, published by the Ministry of National Education (2010). The TKJI was chosen because it has been nationally validated and aligns with the developmental characteristics of elementary school-aged children. Several recent studies have emphasized that measuring fitness in children must use reliable, age-appropriate instruments (Ruiz et al., 2016; Ortega et al., 2018; Tremblay et al., 2018). The TKJI measures several key components of fitness, namely cardiorespiratory endurance, muscular strength, muscular endurance, speed, and agility, which are important indicators of children's health (WHO, 2022; Janssen & LeBlanc, 2019).

Table 1.
TKJI Test Components and Items for Ages 10–12

No	Fitness Components	Test Items	Units of Measurement	Measurement Objectives
1	Speed	40-meter run	Seconds	Measure acceleration ability
2	Arm Strength	Hanging with bent elbows	Seconds	Measure static arm strength
3	Muscular Power and Explosiveness	Straight jump	Cm	Measure leg power
4	Abdominal Endurance	30-second lying-down run	Number of Repetitions	Measure core muscle endurance
5	Cardiorespiratory Endurance	600-meter run	Seconds	Measure aerobic capacity

Data collection procedures were conducted in accordance with the TKJI operational standards to ensure measurement consistency and reliability. Students warmed up beforehand to minimize the risk of injury (Hillman et al., 2019). Each test item was recorded based on the student's best performance. Data analysis was conducted using descriptive percentage analysis, referring to the TKJI classification norms (categories: very good, good, moderate, poor, and very poor). Descriptive analysis is recommended in fitness survey research to objectively map the distribution of student performance categories (Tomkinson et al., 2017; Sallis et al., 2021). The data were then presented in frequency distribution and percentage tables to provide a comprehensive overview of the physical fitness levels of fifth-grade students at SD Inpres 5 Lolu.

RESULTS AND DISCUSSION

Result

The physical fitness level of fifth-grade students at SD Inpres 5 Lolu was measured using the Indonesian Physical Fitness Test (TKJI) for students aged 10–12 years. This test covers five main components: speed, arm muscle strength, abdominal muscle endurance, leg explosiveness, and cardiorespiratory endurance. Conceptually, these five

components are the main indicators of fitness for elementary school-aged children (Tomkinson et al., 2017; Ortega et al., 2018; WHO, 2022).

40-Meter Run Test Results (Speed)

Speed is an important component in children's motor development and correlates with physical activity participation and game performance (Lubans et al., 2016; Ruiz et al., 2016).

Table 2.
40-Meter Run Test Results

Interval (seconds)	Category	Frequency	Percentage (%)
6,0–6,3	Very Poor	7	26,92
6,4–6,7	Poor	6	23,07
6,8–7,1	Sufficient	9	34,62
7,2–7,5	Good	3	11,54
7,6–7,9	Very Good	1	3,85
Total		**26**	**100**

Fifty percent of students were in the Good and Very Good categories, while the other 50% were in the Fair to Very Poor categories. This finding indicates a relatively balanced distribution of abilities. A study by Tomkinson et al. (2017) confirmed that the distribution of speed in children aged 10–12 years generally shows moderate variation due to differences in biological maturation.

Results of the Bended Elbow Hanging Test (Arm Muscle Strength)

Arm muscle strength plays a crucial role in body stability and weight-bearing activities (Janssen & LeBlanc, 2019).

Table 3.
Results of the Bended Elbow Hanging Test

Interval (seconds)	Category	Frequency	Percentage (%)
>47,53	Very Poor	0	0
35,28–47,53	Poor	12	46,15
23,03–35,27	Sufficient	1	3,85
10,78–23,02	Good	13	50
<10,78	Very Good	0	0
Total		**26**	**100**

The majority of students were in the "Poor" category (50%). This condition indicates the need for increased bodyweight-based strength training (Fairclough et al., 2020). The literature shows that low muscle strength in children is often associated with low levels of moderate-vigorous physical activity (MVPA) (Tremblay et al., 2018).

Sitting-Line Test Results (Abdominal Muscle Endurance)

Core muscle endurance is correlated with postural stability and motor performance (Cadenas-Sanchez et al., 2019).

Table 3.
Sitting-Line Test Results

Interval	Category	Frequency	Percentage (%)
7–10	Low	8	30,8
11–15	Medium	9	34,6
16–19	Good	6	23,1
20–22	Very Good	3	11,5
Total		**26**	**100**

The majority of students fell into the Moderate category (34.6%). This aligns with national research showing that elementary school children's core muscle endurance tends to be moderate due to unstructured physical activity (Bile et al., 2021).

Vertical Jump Test Results (Leg Power)

Leg power is an important indicator of explosive ability in sports activities (Ortega et al., 2018).

Table 4.
Vertical Jump Test Results

Interval (cm)	Category	Frequency	Percentage (%)
21–24	Very Poor	1	3,8
25–28	Poor	1	3,8
29–32	Sufficient	9	34,6
33–36	Good	3	11,5
37–40	Very Good	12	46,2
Total		**26**	**100**

A total of 46.2% of students were in the Very Good category. This finding indicates relatively good potential for explosive leg strength. A study by Ruiz et al. (2016) confirmed that leg strength in children often develops faster than cardiorespiratory endurance.

600-Meter Run Test Results (Cardiorespiratory Endurance)

Cardiorespiratory endurance is a key predictor of long-term metabolic health (Ortega et al., 2018; WHO, 2022).

Table 5.
600-Meter Run Test Results

Interval (minutes)	Category	Frequency	Percentage (%)
>2,70	Very Poor	2	7,68
2,48–2,69	Poor	5	19,23
2,26–2,47	Sufficient	7	26,92
2,03–2,25	Good	12	46,15
<2,03	Very Good	0	0
Total		**26**	**100**

The majority of students were in the Good category (46.15%). However, none achieved the Very Good category. This indicates that aerobic capacity was adequate but not optimal. The literature indicates that increasing VO_2max in school-aged children requires at least 60 minutes of structured physical activity per day (WHO, 2022; Sallis et al., 2021).

Overall, the physical fitness profile of fifth-grade students at SD Inpres 5 Lolu was in the Fair to Good category, with dominant strength in leg explosive power and cardiorespiratory endurance, but relatively weak arm muscle strength. This pattern is consistent with global findings that school-aged children tend to develop better power than static strength (Tomkinson et al., 2017; Janssen & LeBlanc, 2019). These results provide a baseline of empirical data that can be used as a basis for school-based physical fitness improvement interventions.

Discussion

The results of a survey of the physical fitness levels of fifth-grade students at SD Inpres 5 Lolu provide a comprehensive overview of the physical capacity profile of

children aged 10–11 years in an elementary school setting. Conceptually, children's physical fitness encompasses the components of speed, strength, muscular endurance, explosive power, and cardiorespiratory endurance, which are interrelated in supporting physical activity performance and learning readiness (Ortega et al., 2018; Tomkinson et al., 2017; WHO, 2022). The findings of this study indicate significant variation in ability within each component, empirically reflecting the heterogeneity of students' biological development and physical activity levels.

Speed (40-meter dash)

The majority of students fell into the "Sufficient" category (34.62%), with 50% falling into the "Good" and "Very Good" categories. Empirically, running speed in elementary school-aged children is influenced by neuromuscular factors, coordination, and biological maturation (Ruiz et al., 2016; Cadenas-Sanchez et al., 2019). The relatively balanced distribution between high and low categories indicates that some students have good acceleration capacity, while others still need development. Global research shows that sprint speed in children aged 10–12 tends to increase significantly when physical education (PJOK) learning integrates coordination training and speed-based games (Lubans et al., 2016; Fairclough et al., 2020). Therefore, these results indicate that small-sided games-based interventions can be an effective strategy for improving sprint performance in students in the "Poor" category.

Arm Muscle Strength and Endurance (Hanging with Elbow Bend)

The results indicate a polarization of ability: 50% fell in the "Poor" category and 46.15% in the "Good" category. This phenomenon is interesting because almost no students fell in the "Fair" category. Physiologically, the arm muscle strength of school-aged children is significantly influenced by the frequency of body-weight-based activities such as climbing, hanging, or traditional games (Janssen & LeBlanc, 2019; Tremblay et al., 2018). Recent studies have shown that low arm muscle strength in children is often associated with increased sedentary behavior and minimal outdoor physical activity (Sallis et al., 2021; WHO, 2022). The polarization in these findings may reflect differences in students' daily activity habits. The "Good" group likely has higher exposure to physical activity outside of school hours. The implication is that physical education teachers need to implement a differentiated approach to training. Light calisthenics-based exercises, simple circuit training, and hanging games can progressively increase arm muscle strength (Fairclough et al., 2020; Ortega et al., 2018).

Abdominal Muscle Endurance (Lying-to-Sit)

The distribution of abilities shows that the majority of students fall into the "Moderate" (34.6%) and "Low" (30.8%) categories. Only 11.5% achieved the "Very Good" category. Core muscle endurance plays a crucial role in postural stability and movement efficiency (Cadenas-Sanchez et al., 2019). Longitudinal research shows that core muscle strength in children is positively correlated with motor performance and balance (Ortega et al., 2018). The low achievement of some students may be attributed to a lack of specific exercises that stimulate the abdominal muscles in a structured manner. In the elementary school context, physical education (PEK) instruction is often game-oriented

without a systematic core strengthening program (Lubans et al., 2016). Therefore, the integration of simple core stability exercises such as planks, modified sit-ups, and balance games is necessary to gradually increase core muscle endurance. Progressive programs based on the principle of mild overload have been shown to be effective in improving the performance of school-aged children (Fairclough et al., 2020).

Leg Muscle Explosive Power (High Jump)

The most striking finding in this study was that 46.2% of students were in the "Very Good" category. This result indicates relatively high potential for explosive leg power. Biologically, leg power development in children aged 10–11 years experiences a significant increase due to neuromuscular system development (Tomkinson et al., 2017). Research by Ruiz et al. (2016) and Ortega et al. (2018) shows that leg power often develops faster than cardiorespiratory endurance in children. These results are consistent with research findings, where the high jump showed a more dominant distribution in the height category compared to other components. The advantages in this aspect can be utilized in explosive game-based learning such as hurdle jumping, small ball games, and light plyometric activities. However, it is important to maintain safety and progressive principles to avoid the risk of injury (WHO, 2022).

Cardiorespiratory Endurance (600-Meter Run)

The majority of students (46.15%) were in the "Good" category, but none achieved the "Very Good" category. Conceptually, cardiorespiratory endurance is a key indicator of long-term health and a predictor of metabolic risk (Ortega et al., 2018; WHO, 2022). Children's aerobic capacity is strongly influenced by the frequency of moderate to vigorous physical activity, at least 60 minutes per day (WHO, 2022). A study by Sallis et al. (2021) emphasized that schools play a central role in ensuring children achieve these physical activity recommendations. The absence of a "Very Good" category indicates that although most students have adequate capacity, their cardiorespiratory fitness levels are not yet optimal. Interventions based on aerobic games, light interval running, and team activities involving continuous movement can be solutions to increase VO_2max capacity (Fairclough et al., 2020).

Integrative Analysis of Fitness Profiles

Overall, the physical fitness profile of fifth-grade students at SD Inpres 5 Lolu falls within the fair to good category, with dominant strengths in leg explosive power and cardiorespiratory endurance, but relatively weak strengths in arm muscle strength and core endurance. This pattern is consistent with global findings indicating an imbalance in the development of fitness components in school-aged children (Tomkinson et al., 2017; Janssen & LeBlanc, 2019). This diversity of outcomes underscores the importance of an evidence-based physical education (PE) learning approach. Teachers serve not only as facilitators of physical activity but also as regular evaluators of students' physical capacity (Lubans et al., 2016).

Theoretical and Practical Implications

Theoretically, the results of this study reinforce the paradigm that children's physical fitness is multidimensional and influenced by environmental factors, activity

habits, and the quality of PE instruction (Sallis et al., 2021; WHO, 2022). Practically, the results of this survey can serve as a baseline for: (1) Developing differentiated training programs based on ability categories; (2) Periodically evaluating the effectiveness of physical education (PJOK) instruction; and (3) Developing school policies to encourage students' daily physical activity. With structured and progressive interventions, sustainable improvements in physical fitness can be achieved. This research confirms that fitness surveys are not simply measurements, but strategic instruments for developing the quality of physical education based on scientific evidence.

CONCLUSION

Based on the results of a survey of 26 fifth-grade students at SD Inpres 5 Lolu, it was found that the students' physical fitness levels were in the sufficient to good category with variations between components. In the 40-meter sprint test, 9 students (34.62%) were in the sufficient category, while 13 students (50%) had reached the good and very good categories, indicating relatively moderate speed capabilities. In the elbow flexion hang test, 13 students (50%) were in the poor category and 12 students (46.15%) were in the good category, reflecting the polarization of arm muscle strength that requires targeted intervention. The sitting position test showed 9 students (34.6%) in the moderate category and 8 students (30.8%) in the low category, indicating the need for core muscle strengthening. In the vertical jump test, 12 students (46.2%) reached the very good category, indicating optimal leg explosive power potential. Meanwhile, in the 600-meter run test, 12 students (46.15%) were in the good category, and 7 students (26.92%) were in the fair category, indicating adequate but not optimal cardiorespiratory capacity. Overall, these results underscore the importance of a structured training program and regular fitness assessments to improve the quality of data-driven physical education (PJOK) learning.

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Education (PJOK) learning and the improvement of student physical fitness in elementary schools.

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