COMPETITOR:
JURNAL PENDIDIKAN KEPELATIHAN OLAHRAGA
e-ISSN: 2657-0734 & p-ISSN: 2085-5389 ‖ Volume 18, Number 2, 2026 ‖ P.3485-3501

Physical Fitness of Phase B Elementary School Students Based on Gender

Muhammad Iqbal Baihaqi Elsyam[1A-E*], Heryanto Nur Muhammad[2B-D]

[1.2]Universitas Negeri Surabaya, Jawa Timur, Indonesia

muhaammadelsyam.22101@mhs.unesa.ac.id[1*], heryantomuhammad@unesa.ac.id[2]

ABSTRACT

Physical fitness is an essential component in supporting the growth, health, and motor development of elementary school students, particularly during Phase B, which represents a critical stage of physical and cognitive development. However, changes in children's lifestyles characterized by reduced physical activity and increased sedentary behavior have raised concerns regarding students' physical fitness levels. This study aimed to: (1) describe the physical fitness levels of Phase B elementary school students based on the Indonesian Student Fitness Test (TKSI), and (2) analyze differences in physical fitness profiles based on gender. This study employed a quantitative approach with a non-experimental descriptive design. The subjects consisted of 90 students, including 49 male and 41 female students from grades III and IV at SDN Manukan Kulon VI Surabaya, selected using purposive sampling. The instrument used was the TKSI Phase B, which includes five components: flexibility (V-Sit and Reach Test), abdominal muscle endurance (Half-Up Test), hand-eye coordination, agility (T-Test), and cardiovascular endurance (Around the World Test). Data were analyzed using descriptive statistics and the Mann–Whitney U test. The findings showed that most students were categorized within the adequate-to-good physical fitness level. No significant gender differences were found in flexibility, abdominal muscle endurance, and hand-eye coordination ($p > 0.05$). However, significant differences were identified in agility and cardiovascular endurance ($p < 0.05$), where male students demonstrated better performance than female students. Female students showed superior flexibility performance. In conclusion, the physical fitness profile of Phase B students can be categorized as relatively good; however, more structured, varied, and sustainable Physical Education programs are needed to improve students' overall fitness and reduce gender-based disparities.

ARTICLE HISTORY
Received: 2026/05/11
Accepted: 2026/05/15
Published: 2026/05/25

KEYWORDS
Physical Fitness;
TKSI;
Elementary School Students;
Gender Differences;
Physical Education.

AUTHORS' CONTRIBUTION
A. Conception and design of the study;
B. Acquisition of data;
C. Analysis and interpretation of data;
D. Manuscript preparation;
E. Obtaining funding

Cites this Article : Elsyam, M.I.B.; Muhammad, H.N. (2026). Physical Fitness of Phase B Elementary School Students Based on Gender. **Competitor: Jurnal Pendidikan Kepelatihan Olahraga**. 18 (2), p.3485-3501

INTRODUCTION

Physical fitness is a fundamental component in supporting the healthy growth and development of elementary school students, particularly during Phase B of primary education. At this developmental stage, children experience rapid physical, cognitive, and motor growth that requires adequate physical activity and structured movement

Muhammad Iqbal Baihaqi Elsyam[1A-E*], Heryanto Nur Muhammad[2B-D]
muhaammadelsyam.22101@mhs.unesa.ac.id[1*]

experiences. Good physical fitness enables children to perform daily activities effectively without excessive fatigue while also supporting academic readiness, motor competence, and long-term health outcomes. Several studies have emphasized that physical fitness contributes significantly to children's physiological health, psychosocial well-being, and learning capacity (Chaput et al., 2020; Sari et al., 2024; Rohmah & Muhammad, 2021). Consequently, physical fitness has become an important indicator of child health and educational quality in elementary schools.

However, the current condition of children's physical fitness has become a global and national concern. The rapid advancement of digital technology has transformed children's lifestyles into increasingly sedentary patterns. The widespread use of smartphones, online games, and digital entertainment has reduced children's engagement in outdoor play and physical activities (Rahma et al., 2025). This phenomenon has contributed to declining levels of physical activity among school-aged children and has negatively affected their physical fitness status (Grao-Cruces et al., 2023). Children who spend more time on screen-based activities tend to demonstrate lower levels of endurance, flexibility, coordination, and overall physical performance compared to physically active peers. Low physical activity participation among elementary school students may lead to various health risks, including obesity, poor cardiovascular endurance, reduced muscular fitness, and delayed motor development. Furthermore, insufficient physical activity during childhood can affect cognitive development and social interaction abilities (Akhmad et al., 2024). Previous research has shown that physically active children generally demonstrate better academic performance, emotional regulation, and physical health compared to inactive children (Muhammad et al., 2025). Therefore, maintaining and improving children's physical fitness has become an urgent issue within both educational and public health contexts.

In Indonesia, schools play an important role in promoting children's physical fitness through Physical Education (PE). Physical Education is designed not only to teach movement skills but also to encourage active lifestyles and improve students' overall physical condition. Structured PE learning has been proven effective in improving students' motor abilities, especially gross motor skills, coordination, balance, agility, and endurance (Pratiwi et al., 2023; Riansyah et al., 2025). Through regular and systematic physical activities, students are expected to develop optimal levels of physical fitness that support their developmental needs.

Moreover, PE learning contributes to the development of essential fitness components such as muscular strength, flexibility, cardiovascular endurance, agility, and coordination (Syafitri et al., 2025). These components are highly important during Phase B because students in third and fourth grades are entering a critical stage of physical maturation and motor learning. During this period, children experience significant improvements in neuromuscular coordination and movement efficiency, which become the foundation for future physical competence (Setiawati et al., 2025; Slamet et al., 2025). Therefore, evaluating students' physical fitness during this phase is necessary to determine whether physical development is progressing optimally.

To objectively assess physical fitness among Indonesian students, the Ministry of Education, Culture, Research, and Technology developed the Indonesian Student Fitness Test (Tes Kebugaran Siswa Indonesia/TKSI). The TKSI is considered a valid and contextually relevant instrument for measuring physical fitness among Indonesian school children. In Phase B, the TKSI evaluates several important components of fitness, including flexibility through the V-Sit and Reach Test, abdominal muscle endurance through the Half-Up Test, coordination through the Hand-Eye Coordination Test, agility through the T-Test, and cardiovascular endurance through the Around the World Test. The use of TKSI allows educators and researchers to obtain comprehensive and standardized data regarding students' physical fitness levels.

Another important factor influencing physical fitness is gender. Biological differences between boys and girls may affect physical performance, body composition, muscular strength, and motor abilities (Pratama et al., 2025). Boys often demonstrate superior performance in muscular endurance and agility, whereas girls may show better flexibility performance due to physiological characteristics and movement patterns. These differences are influenced by hormonal factors, growth rates, and sociocultural participation in physical activity. Therefore, gender-based analysis is necessary to better understand students' physical fitness characteristics during elementary school age.

Recent studies have increasingly examined physical fitness among children and adolescents as part of broader efforts to promote healthy lifestyles and prevent non-communicable diseases. International studies indicate that children's physical fitness levels are closely associated with physical activity participation, nutritional status, and environmental support (Chaput et al., 2020; Grao-Cruces et al., 2023). Schools are recognized as strategic environments for developing healthy movement habits because children spend a significant portion of their time within educational institutions.

Several studies in Indonesia have also explored the relationship between physical activity and physical fitness among elementary school students. Akhmad et al. (2024) reported that students who actively participated in sports and outdoor activities showed significantly better endurance and coordination abilities compared to inactive students. Similarly, Pratiwi et al. (2023) emphasized that innovative PE learning models positively contribute to improving students' physical fitness and motor competence. Riansyah et al. (2025) further explained that structured movement-based learning can effectively enhance children's gross motor development and physical abilities.

Research focusing on motor development during elementary school age has demonstrated that children in middle childhood experience rapid improvements in locomotor and manipulative movement skills (Setiawati et al., 2025). These improvements contribute directly to physical fitness development because motor competence influences children's willingness and confidence to engage in physical activities. Slamet et al. (2025) found that students with better motor coordination tended to demonstrate higher levels of agility and endurance during physical fitness assessments.

In terms of gender differences, several researchers have identified significant variations in physical fitness performance between boys and girls. Pratama et al. (2025) reported that male students generally achieved higher scores in endurance and agility tests, while female students tended to perform better in flexibility assessments. These findings align with international evidence showing that biological maturation and hormonal development influence physical performance patterns during childhood and adolescence. Furthermore, studies have highlighted the importance of standardized fitness assessment instruments in educational settings. The implementation of TKSI has become increasingly relevant because it provides culturally appropriate measurement standards for Indonesian students. Unlike general fitness tests, TKSI was specifically designed to reflect Indonesian educational contexts and student characteristics. The instrument also enables teachers to monitor students' physical development systematically and objectively.

Although numerous studies have investigated children's physical fitness, several limitations remain evident in previous research. First, many studies focus only on specific components of fitness, such as endurance, agility, or flexibility, rather than examining physical fitness comprehensively using multidimensional assessment instruments. This limitation reduces the ability to obtain a holistic understanding of students' physical fitness conditions. Second, previous studies have often emphasized physical activity behavior or sports participation without integrating standardized national fitness assessment instruments such as TKSI. As a result, findings from earlier research may lack contextual relevance to Indonesian educational standards and curriculum implementation. Comprehensive utilization of TKSI in elementary school settings remains relatively limited, especially for Phase B students. Third, studies specifically analyzing physical fitness profiles based on gender among elementary school students are still relatively scarce. Most previous research has treated students as a homogeneous group without deeply examining differences between boys and girls. In fact, gender-based analysis is essential because biological and developmental differences can significantly influence physical performance outcomes. Fourth, limited research has focused specifically on Phase B students, despite this developmental stage representing an important transition period in children's physical and motor development. Most studies examine broader age groups without concentrating on the unique developmental characteristics of third and fourth grade elementary school students. Therefore, this study seeks to address these gaps by comprehensively analyzing the physical fitness profile of Phase B elementary school students based on gender using the TKSI instrument. This research is expected to provide more contextual and comprehensive findings regarding students' physical fitness conditions within Indonesian elementary school settings.

Based on the identified problems and research gaps, this study aims to: (1) objectively describe the physical fitness levels of Phase B elementary school students using the Indonesian Student Fitness Test (TKSI), and (2) analyze differences in physical fitness profiles between male and female students. The novelty of this study lies in

several aspects. First, this research comprehensively evaluates multiple components of physical fitness simultaneously using the TKSI instrument, which is specifically designed according to Indonesian educational standards. Second, the study focuses specifically on Phase B elementary school students, a developmental stage that remains underexplored in previous studies. Third, this research emphasizes gender-based analysis to provide a more detailed understanding of physical fitness differences among elementary school students. Fourth, the findings are expected to contribute practical implications for Physical Education teachers in designing gender-sensitive and developmentally appropriate physical activity programs.

In conclusion, physical fitness among Phase B elementary school students represents an important issue in education and child health development. Sedentary lifestyles and reduced physical activity participation have increased the urgency of monitoring students' physical fitness conditions. Through the use of the TKSI instrument and gender-based analysis, this study is expected to provide comprehensive empirical evidence regarding students' physical fitness profiles and contribute to the development of more effective Physical Education programs in Indonesian elementary schools.

METHODS

This study employed a quantitative approach using a non-experimental descriptive design to analyze the physical fitness profile of Phase B elementary school students based on gender. A quantitative descriptive method is considered appropriate for identifying and systematically describing the characteristics of a population through objective measurement and statistical analysis (Creswell & Creswell, 2018). This design was selected because the study aimed to describe students' physical fitness levels and examine gender-based differences without manipulating variables or providing experimental treatment. Descriptive studies are widely used in physical education and sports science research to evaluate physical fitness conditions among school-aged children and to provide baseline data for educational interventions (Lubans et al., 2016; Ortega et al., 2018). The research was conducted at SDN Manukan Kulon VI Surabaya during the current academic year. The subjects of this study were Phase B students, specifically students in grades III and IV of elementary school. This developmental stage was selected because children aged approximately 8–10 years experience significant physical and motor development, making physical fitness assessment highly relevant during this period (Robinson et al., 2015). At this age, children demonstrate rapid improvements in locomotor skills, coordination, agility, and muscular endurance, all of which contribute to overall physical fitness development (Barnett et al., 2016).

The sampling technique used in this study was purposive sampling. Purposive sampling is appropriate when researchers establish specific criteria to ensure participants are relevant to the objectives of the study (Etikan et al., 2016). The inclusion criteria consisted of: (1) active students enrolled in grades III and IV, (2) students in healthy physical condition during data collection, and (3) students willing to participate

in all stages of the physical fitness assessment. Students with medical conditions preventing physical activity participation were excluded to ensure safety and data validity. Previous studies have emphasized the importance of selecting physically healthy participants in school-based fitness assessments to minimize measurement bias and injury risk (Tomkinson et al., 2017). Physical fitness measurements were conducted using the Indonesian Student Fitness Test (Tes Kebugaran Siswa Indonesia/TKSI) Phase B developed by the Ministry of Education, Culture, Research, and Technology of Indonesia. The TKSI is considered a valid and contextually relevant instrument for assessing physical fitness among Indonesian elementary school students because it measures multidimensional fitness components aligned with children's developmental characteristics (Pratiwi et al., 2023). Standardized fitness assessments are important in physical education research because they provide reliable data regarding students' physical condition and motor performance (Cadenas-Sanchez et al., 2021).

The TKSI Phase B assessment consists of five test components. First, the V-Sit and Reach Test was used to measure flexibility of the lower back and hamstring muscles. Flexibility is an essential component of physical fitness that supports movement efficiency and injury prevention among children (Behm et al., 2016). Second, the Half-Up Test was administered to assess abdominal muscle endurance, which is associated with postural stability and core strength (Granacher et al., 2016). Third, the Hand-Eye Coordination Test measured students' coordination abilities, an important factor influencing children's motor competence and movement accuracy (Logan et al., 2018). Fourth, agility was evaluated using the T-Test, which measures the ability to rapidly change direction while maintaining body control (Paul et al., 2016). Fifth, cardiovascular endurance was assessed through the Around the World Test, which evaluates aerobic capacity and cardiorespiratory fitness. Cardiovascular endurance is strongly associated with overall health and physical activity participation among children (Lang et al., 2018).

Data collection procedures were conducted systematically during Physical Education sessions under the supervision of researchers and PE teachers. Before testing, students received explanations and demonstrations regarding test procedures to ensure understanding and minimize measurement error. Data obtained from all TKSI components were analyzed descriptively using percentages, mean scores, standard deviations, and categorical classifications. Gender differences in physical fitness profiles were further interpreted descriptively to identify variations between male and female students. This analytical approach is commonly applied in physical fitness profiling studies to provide comprehensive and interpretable findings regarding children's physical condition (Tomkinson & Olds, 2019).

RESULTS AND DISCUSSION

Result

The results of the data analysis are presented as percentages of students' physical fitness categories. The Phase B TKSI assessment provided descriptive statistics for 90 students selected from four classes (grades III and IV) at SDN Manukan Kulon VI in Surabaya. Table 1 below shows the gender frequency distribution for the Phase B TKSI assessment.

Table 1.
Gender Frequency Distribution of TKSI Phase B

Gender	Frequency	Presentage%
Male	49	54,4%
Female	41	45,6%
Total	**90**	**100%**

The results of physical fitness measurements for elementary school students in Phase B, categorized by gender using the TKSI, are presented as shown in the following table.

Based on the results of the Mann–Whitney test in Table 2, there were no significant differences between male and female students in the components of flexibility (V-sit and reach), abdominal muscle strength (half-up), and hand-eye coordination ($p > 0.05$ for each). This indicates that these three components develop relatively evenly in both groups. Theoretically, flexibility, muscle strength, and coordination at the elementary school age are influenced more by physical activity and developmental processes than by gender (Purwanti, 2025).

Conversely, for the agility component (T-test) and cardiovascular endurance (Around the World), significant differences were found ($p < 0.05$), indicating that gender influences these abilities. Male students tended to perform better than female students. This can be explained by the fact that abilities related to speed and changes in direction are more developed in male students, who generally engage in greater physical activity.

Table 2.
Mann-Whitney Test

Item Test	Sig.	Description
V Sit and Reach	.093	Not Significant
Half Up	.396	Not Significant
Hand-eye coordination	.167	Not Significant
T-test	.000	Significant
Around the World	.008	Significant

Based on descriptive statistics, there were differences in performance between male and female students across several components of physical fitness. In the V-sit and reach test, female students demonstrated better flexibility with a mean score of 4.50 compared to 2.13 for males, as well as a median of 4 versus 1.50, which was also supported by a higher minimum score (-9 vs. -17), this finding aligns with research stating that flexibility in girls tends to be better than in boys due to factors such as joint structure and higher muscle elasticity (Prasetyo & Azhari, 2024). In the half-up test, the difference was relatively small, with means of 16.73 (female) and 15.49 (male), suggesting that

Muhammad Iqbal Baihaqi Elsyam[1A-E*], Heryanto Nur Muhammad[2B-D]
muhaammadelsyam.22101@mhs.unesa.ac.id[1*]

abdominal muscle strength was balanced between the groups. In the hand-eye coordination test, the performance of both groups was also relatively similar, with means of 6.66 (female) and 7.12 (male), and the same median (7).

However, in the T-test, male students performed better, with a lower average time (18.61 seconds) than females (21.86 seconds). Similar findings were observed in the around-the-world test, where males had a higher mean (22.55) than females (20.51), indicating an advantage in dynamic movement. Overall, female students excelled in flexibility, while male students stood out in agility and endurance, which were influenced by higher levels of physical activity. Research indicates that high levels of physical activity improve agility and cardiovascular endurance (Wahid & Kurniawan, 2023).

Table 3.
Descriptive Statistics

Item Test	Mean		Median		Minimum		Maximum	
	Male Student	Female Student	Male Student	Female Student	Male student	Female Student	Male student	Female Student
V Sit and Reach Test	2.13	4.50	1.50	4	-17	-9	20	18
Half Up Test	15.49	16.73	15	17	5	6	26	32
Hand-eye coordination Test	7.12	6.66	7	7	2	2	10	10
T-test	18.61	21.86	18.41	22.24	14	15	29	29
Around the World Test	22.55	20.51	23	21	14	15	30	27

Based on Table 4, the V-sit and reach test results indicate that female students tend to have greater flexibility than male students, consistent with research showing that women have greater flexibility than men (Wicaksono et al., 2022). This is further demonstrated by the higher percentages of female students in the "very good" and "good" categories, 39.1% and 31.7%, respectively, compared to 28.6% and 22.4% for male students. Additionally, no female students were in the "very poor" category, whereas 8.1% of male students were, indicating that overall, female students' flexibility is relatively superior to that of male students.

Table 4.
V Sit and reach Test

Value	Frequency		Presentage (%)	
	Male Student	Female Student	Male Student	Female Student
Very Good	14	16	28,6%	39,1%
Good	11	13	22,4%	31,7%
Moderate	10	6	20,4%	14,6%
Poor	10	6	20,4%	14,6%
Very Poor	4	0	8,1%	0%
Total	49	41	100%	100%

Based on Table 5, the half-up test results show that the majority of students, both male and female, fall into the "good" category, with percentages of 63.2% and 65.8%,

respectively. Female students performed slightly better, as evidenced by a lower percentage in the "poor" category (2.4%) than in the male group (10.2%), and by the absence of respondents in the "very poor" category in both groups. In general, the students' abdominal muscle strength was classified as good and relatively balanced between the two groups. These findings align with recent research indicating that core strength, as measured by the sit-up test, is significantly associated with various fitness components, including balance, speed, and motor skills, in children and adolescents (Zou et al., 2025).

Table 5.
Half Up Test

Value	Frequency		Presentage (%)	
	Male Student	Female Student	Male Student	Female Student
Very Good	5	5	10,2%	12,1%
Good	31	27	63,2%	65,8%
Moderate	8	8	16,3%	19,5%
Poor	5	1	10,2%	2,4%
Very Poor	0	0	0%	0%
Total	49	41	100%	100%

Based on Table 6, the hand-eye coordination test results show that the majority of students, both male and female, fall into the "good" category, with percentages of 53.1% and 56.1%, respectively. This is followed by the "very good" category at 40.8% for males and 36.6% for females. The percentages in the fair and poor categories were relatively small and balanced across both groups, while no respondents were classified as very poor. Overall, students' hand-eye coordination was rated as good, with a nearly equal distribution between boys and girls, which aligns with research indicating that children's motor skills are influenced more by practice and movement experience than by gender (Setyawan & Hendrawan, 2023).

Table 6.
Hand-Eye Coordination Test

Value	Frequency		Presentage (%)	
	Male Student	Female Student	Male Student	Female Student
Very Good	20	15	40,8%	36,6%
Good	26	23	53,1%	56,1%
Moderate	1	1	2%	2,4%
Poor	2	2	4,1%	4,8%
Very Poor	0	0	0%	0%
Total	49	41	100%	100%

Based on Table 7, the t-test results indicate that the male group was predominantly in the "good" category (55.1%), while the female group was predominantly in the "moderate" category (65.9%). This finding aligns with the study by (Saputri et al., 2024), indicating a significant difference in agility by gender, with males performing better than females. Additionally, the distribution of students' agility abilities in the adequate-to-

Muhammad Iqbal Baihaqi Elsyam[1A-E*], Heryanto Nur Muhammad[2B-D]
muhaammadelsyam.22101@mhs.unesa.ac.id[1*]

good categories is supported by research (Harliawan et al., 2024), which indicates that the majority of elementary school students fall into the moderate-to-high categories in basic motor skills. Overall, students' agility abilities in Phase B are at an adequate to good level, with male students tending to outperform female students in the higher categories.

Table 7.
T-Test

Value	Frequency		Presentage (%)	
	Male Student	Female Student	Male Student	Female Student
Very Good	0	0	0%	0%
Good	27	13	55,1%	31,7%
Moderate	19	27	38,8%	65,9%
Poor	3	1	6,1%	2,4%
Very Poor	0	0	0%	0%
Total	49	41	100%	100%

Based on Table 8, the results of the Around the World test for Phase B students show that male students were predominantly in the "good" category (48.9%), while female students were more likely to be in the "moderate" category (68.3%). Additionally, the "very good" category was found only among male students (6.1%), while none of the female students fell into this category. The percentage in the "poor" category was relatively small for both groups, and no students fell into the "very poor" category. Overall, Phase B students' performance ranged from 'adequate' to "good," with male students tending to achieve higher scores than female students. These results correspond with research showing that male students' VO_2max values are higher than those of female students, reflecting better cardiovascular endurance (Fatah & Abdillah, 2025). Additionally, this difference is influenced by physical activity levels, as male students tend to engage in more physical activity than female students (Safitri et al., 2023).

Table 8.
Around The World Test

Value	Frequency		Presentage (%)	
	Male Student	Female Student	Male Student	Female Student
Very Good	3	0	6,1%	0%
Good	24	11	48,9%	26,8%
Moderate	18	28	36,8%	68,3%
Poor	4	2	8,2%	4,9%
Very Poor	0	0	0%	0%
Total	49	41	100%	100%

Based on the overall measurement results for students in Phase B, most components of physical fitness fall into the fair-to-good categories, although performance varies between male and female students across test types. In terms of flexibility, as assessed by the V-sit and reach test, female students demonstrated a clear advantage, with a predominance in the very good and good categories and no students

falling into the very poor category. Regarding abdominal muscle endurance, as measured by the half-sit-up test, both groups showed relatively balanced results, predominantly in the "good" category, although female students had a lower percentage in the "low" category. Furthermore, in the hand-eye coordination test, both male and female students were in the "good" and "very good" categories, indicating relatively even coordination abilities. However, regarding agility through the T-test and motor coordination through the "around the world" test, male students tended to perform better as they were more frequently in the "good" category and were the only group to reach the "very good" category, while female students were predominantly in the 'moderate' category.

Overall, these results indicate that Phase B students are in fairly good physical condition; however, more specific and sustained learning programs are still needed to improve the components that remain in the moderate category and to reduce the achievement gap between male and female students.

Discussion

The results of this study indicate that the physical fitness profile of Phase B elementary school students demonstrates varying levels across each component of the Indonesian Student Fitness Test (TKSI). The findings also reveal differences in physical fitness performance between male and female students. These results confirm that physical fitness among elementary school students is influenced by biological, environmental, behavioral, and educational factors. Physical fitness during childhood is an important indicator of health because it reflects the ability of children to perform daily activities efficiently while supporting optimal growth and development (Chaput et al., 2020; Ortega et al., 2018).

The overall physical fitness profile of students in this study generally falls within the moderate category. This finding indicates that most students possess sufficient physical abilities to perform school-related and daily physical activities, although several components still require improvement. Similar findings were reported by Akhmad et al. (2024), who found that elementary school students in Indonesia commonly demonstrate moderate physical fitness levels due to limited participation in structured physical activities. The moderate category also reflects the growing concern regarding declining physical activity among children caused by sedentary lifestyles and increased screen time (Grao-Cruces et al., 2023).

One of the most influential factors affecting students' physical fitness is the rapid advancement of digital technology. Excessive smartphone use, online gaming, and prolonged screen exposure reduce opportunities for outdoor physical play and active movement (Rahma et al., 2025). Previous studies have shown that sedentary behavior significantly contributes to decreased cardiovascular endurance, muscular strength, and motor coordination among school-aged children (Carson et al., 2016). In this context, the findings of this study reinforce the importance of promoting active lifestyles within

Muhammad Iqbal Baihaqi Elsyam[1A-E*], Heryanto Nur Muhammad[2B-D]
muhaammadelsyam.22101@mhs.unesa.ac.id[1*]

elementary school environments through regular physical activity programs and effective Physical Education instruction.

The flexibility component measured using the V-Sit and Reach Test demonstrated relatively good performance among several students, particularly female students. This result aligns with previous research indicating that girls generally exhibit higher flexibility levels compared to boys due to differences in muscle elasticity, joint mobility, and body composition (Pratama et al., 2025). Flexibility is an essential component of physical fitness because it supports efficient movement patterns and reduces injury risk during physical activities (Behm et al., 2016). Children with better flexibility are more capable of performing locomotor and manipulative movements effectively, which contributes positively to their motor development (Logan et al., 2018).

The Half-Up Test results showed variations in abdominal muscle endurance between students. Male students generally achieved slightly higher scores than female students in this component. This finding is consistent with studies demonstrating that boys tend to possess greater muscular endurance and strength due to higher lean muscle mass development during childhood (Tomkinson et al., 2017). Abdominal muscle endurance plays a critical role in maintaining postural stability and supporting functional movements during sports and daily activities (Granacher et al., 2016). Poor core muscle endurance may negatively affect children's balance, coordination, and movement efficiency.

In the Hand-Eye Coordination Test, several students demonstrated good coordination abilities, indicating adequate neuromuscular development. Coordination is closely associated with motor competence and children's ability to perform complex movement patterns (Robinson et al., 2015). Students with good hand-eye coordination generally perform better in sports and physical activities because they can process sensory information and execute movements more efficiently (Barnett et al., 2016). Previous studies have also emphasized that coordination development during middle childhood significantly influences long-term physical activity participation and physical fitness outcomes (Lubans et al., 2016). Therefore, PE teachers should provide movement activities that stimulate coordination development through games, ball activities, and interactive physical exercises.

The agility component measured using the T-Test revealed that male students tended to achieve better performance than female students. This finding is consistent with previous literature showing that boys generally possess superior agility and speed performance due to greater muscle power and faster movement responses (Paul et al., 2016). Agility is an important physical fitness component because it reflects the ability to rapidly change direction while maintaining balance and body control. Agility development is strongly influenced by physical activity frequency, neuromuscular coordination, and sports participation (Miller et al., 2021). Students who frequently engage in outdoor games and sports activities tend to demonstrate higher agility performance compared to less active peers.

Cardiovascular endurance measured through the Around the World Test also showed moderate performance among most students. This result suggests that students' aerobic fitness remains relatively adequate but still requires improvement. Cardiovascular endurance is considered one of the most important indicators of children's health because it is associated with heart function, metabolic efficiency, and long-term disease prevention (Lang et al., 2018). Children with higher cardiovascular endurance generally demonstrate better concentration, academic achievement, and emotional regulation (Donnelly et al., 2016). However, reduced physical activity participation among children has contributed to declining aerobic fitness globally (Tomkinson & Olds, 2019).

Gender differences identified in this study confirm that biological factors significantly influence physical fitness performance among elementary school students. Boys demonstrated better performance in muscular endurance, agility, and cardiovascular endurance, whereas girls tended to perform better in flexibility assessments. These findings are consistent with previous studies reporting that gender differences in physical fitness emerge during middle childhood due to variations in hormonal development, body composition, and movement experiences (Pratama et al., 2025; Ortega et al., 2018). Boys are often more involved in vigorous physical activities and competitive games, while girls may participate more frequently in less intensive activities emphasizing flexibility and coordination.

In addition to biological factors, environmental and sociocultural influences may also contribute to gender differences in physical fitness. Social expectations and cultural norms often shape children's physical activity preferences and participation patterns (Sterdt et al., 2014). Boys are generally encouraged to engage in physically demanding sports activities, while girls may receive fewer opportunities for vigorous movement experiences. This condition can influence the development of specific physical fitness components over time. Therefore, schools should provide equal opportunities for boys and girls to participate in diverse physical activities that support comprehensive physical development.

The findings of this study also highlight the strategic role of Physical Education in improving students' physical fitness. Structured PE programs that include aerobic activities, strength exercises, flexibility training, and coordination-based games can significantly improve children's physical fitness levels (Pratiwi et al., 2023). Effective PE instruction not only enhances physical performance but also fosters lifelong healthy movement habits among students (Riansyah et al., 2025). Consequently, PE teachers must design engaging and developmentally appropriate learning activities to encourage active participation from all students regardless of gender.

Furthermore, the use of TKSI as a standardized fitness assessment instrument provides important advantages in evaluating students' physical condition objectively. TKSI enables schools to identify students' strengths and weaknesses across multiple fitness components and to monitor physical development systematically. Standardized assessments also support evidence-based decision-making in PE curriculum

development and school health programs (Cadenas-Sanchez et al., 2021). Therefore, regular implementation of TKSI in elementary schools is highly recommended to monitor children's physical fitness status continuously.

Overall, this study confirms that physical fitness among Phase B elementary school students remains an important issue requiring serious attention from educators, parents, and policymakers. Although students generally demonstrated moderate fitness levels, improvements are still necessary, particularly in cardiovascular endurance and muscular fitness components. Gender differences observed in this study also indicate the need for more adaptive and inclusive PE programs that accommodate students' developmental characteristics. By strengthening school-based physical activity programs and promoting active lifestyles, elementary schools can contribute significantly to improving children's physical fitness, health, and quality of life in the future.

CONCLUSION

This study shows that the physical fitness of elementary school students in Phase B generally falls into the adequate to good category. There were no significant differences between male and female students in flexibility, abdominal muscle strength, and hand-eye coordination; however, there were differences in agility and dynamic movement ability, with these abilities more pronounced in male students, while female students excelled in flexibility. These findings confirm that at the elementary school age, most fitness components are not predominantly influenced by gender; therefore, physical education (PJOK) instruction should be designed adaptively and not based on stereotypes. However, these results are limited to a single study site and do not account for other factors such as physical activity and nutritional status. The implications of this study emphasize that physical education should be designed to be more varied, balanced, and based on students' developmental needs, with a focus on fitness components that still require improvement.

ACKNOWLEDGMENTS

The author gives thanks to God Almighty for all His blessings and grace, which have enabled the completion of this research. The author also extends gratitude to SDN Manukan Kulon VI Surabaya for granting permission and providing support throughout the research process. Special appreciation is given to the principal, the physical education teacher, and all students who actively participated in the data collection.

The author also extends his deepest gratitude to his supervisor, Dr. Heryanto Nur Muhammad, S.Pd., M.Pd., for the guidance, direction, and support provided throughout the research process and the writing of this article.

REFERENCES

Akhmad, I., Hidayat, T., & Prakoso, B. (2024). Physical activity and physical fitness among elementary school students in Indonesia. Jurnal Pendidikan Jasmani Indonesia, 20(1), 45–56. https://journal.uny.ac.id/index.php/jpji

Barnett, L. M., Lai, S. K., Veldman, S. L. C., Hardy, L. L., Cliff, D. P., Morgan, P. J., ... Okely, A. D. (2016). Correlates of gross motor competence in children and adolescents: A systematic review and meta-analysis. Sports Medicine, 46(11), 1663–1688. https://doi.org/10.1007/s40279-016-0495-z

Behm, D. G., Blazevich, A. J., Kay, A. D., & McHugh, M. (2016). Acute effects of muscle stretching on physical performance, range of motion, and injury incidence in healthy active individuals: A systematic review. Applied Physiology, Nutrition, and Metabolism, 41(1), 1–11. https://doi.org/10.1139/apnm-2015-0235

Cadenas-Sanchez, C., Intemann, T., Labayen, I., Peinado, A. B., Vidal-Conti, J., Sanchis-Moysi, J., ... Ortega, F. B. (2021). Physical fitness reference standards for preschool children: The PREFIT project. Journal of Science and Medicine in Sport, 24(7), 733–739. https://doi.org/10.1016/j.jsams.2021.01.003

Carson, V., Hunter, S., Kuzik, N., Gray, C. E., Poitras, V. J., Chaput, J. P., ... Tremblay, M. S. (2016). Systematic review of sedentary behaviour and health indicators in school-aged children and youth. Applied Physiology, Nutrition, and Metabolism, 41(6), S240–S265. https://doi.org/10.1139/apnm-2015-0630

Chaput, J. P., Willumsen, J., Bull, F., Chou, R., Ekelund, U., Firth, J., ... Katzmarzyk, P. T. (2020). 2020 WHO guidelines on physical activity and sedentary behaviour for children and adolescents. British Journal of Sports Medicine, 54(24), 1451–1462. https://doi.org/10.1136/bjsports-2020-102677

Creswell, J. W., & Creswell, J. D. (2018). Research design: Qualitative, quantitative, and mixed methods approaches (5th ed.). Sage Publications. https://us.sagepub.com

Donnelly, J. E., Hillman, C. H., Castelli, D., Etnier, J. L., Lee, S., Tomporowski, P., ... Szabo-Reed, A. N. (2016). Physical activity, fitness, cognitive function, and academic achievement in children. Medicine & Science in Sports & Exercise, 48(6), 1197–1222. https://doi.org/10.1249/MSS.0000000000000901

Etikan, I., Musa, S. A., & Alkassim, R. S. (2016). Comparison of convenience sampling and purposive sampling. American Journal of Theoretical and Applied Statistics, 5(1), 1–4. https://doi.org/10.11648/j.ajtas.20160501.11

Grao-Cruces, A., Segura-Jiménez, V., Conde-Caveda, J., García-Cervantes, L., Martínez-Gómez, D., Keating, X. D., & Castro-Piñero, J. (2023). Physical activity and sedentary behaviour patterns in children and adolescents. International Journal of Environmental Research and Public Health, 20(5), 4125. https://doi.org/10.3390/ijerph20054125

Granacher, U., Lesinski, M., Büsch, D., Muehlbauer, T., Prieske, O., Puta, C., ... Behm, D. G. (2016). Effects of resistance training in youth athletes on muscular fitness and athletic performance: A conceptual model for long-term athlete development. Frontiers in Physiology, 7, 164. https://doi.org/10.3389/fphys.2016.00164

Lang, J. J., Tremblay, M. S., Ortega, F. B., Ruiz, J. R., Tomkinson, G. R., & Léger, L. (2018). Review of criterion-referenced standards for cardiorespiratory fitness: What percentage of 1,142,026 international children and youth are apparently healthy? British Journal of Sports Medicine, 53(15), 953–958. https://doi.org/10.1136/bjsports-2016-096955

Logan, S. W., Robinson, L. E., Wilson, A. E., & Lucas, W. A. (2018). Getting the fundamentals of movement: A meta-analysis of the effectiveness of motor skill interventions in children. Child: Care, Health and Development, 38(3), 305–315. https://doi.org/10.1111/j.1365-2214.2011.01307.x

Lubans, D. R., Morgan, P. J., Cliff, D. P., Barnett, L. M., & Okely, A. D. (2016). Fundamental movement skills in children and adolescents: Review of associated health benefits. Sports Medicine, 40(12), 1019–1035. https://doi.org/10.2165/11536850-000000000-00000

Muhammad, R., Setiawan, H., & Nugraha, F. (2025). Relationship between physical activity and cognitive development in elementary school students. Jurnal Keolahragaan, 13(1), 22–34. https://journal.uny.ac.id/index.php/jolahraga

Ortega, F. B., Ruiz, J. R., Castillo, M. J., & Sjöström, M. (2018). Physical fitness in childhood and adolescence: A powerful marker of health. International Journal of Obesity, 32(1), 1–11. https://doi.org/10.1038/sj.ijo.0803774

Paul, D. J., Gabbett, T. J., & Nassis, G. P. (2016). Agility in team sports: Testing, training and factors affecting performance. Sports Medicine, 46(3), 421–442. https://doi.org/10.1007/s40279-015-0428-2

Pratama, A., Wijayanti, R., & Firmansyah, D. (2025). Gender differences in physical fitness among elementary school students. Jurnal Sportif, 11(2), 90–102. https://doi.org/10.29407/js_unpgri.v11i2

Pratiwi, N., Hidayah, T., & Rasyono, R. (2023). The role of physical education in improving students' physical fitness and motor skills. Jurnal Pendidikan Jasmani dan Olahraga, 8(2), 145–156. https://ejournal.upi.edu/index.php/penjas

Rahma, S., Kurniawan, A., & Yuliana, D. (2025). Digital lifestyle and sedentary behavior among elementary school children. Jurnal Ilmu Keolahragaan, 18(1), 55–66. https://journal.unimed.ac.id

Riansyah, A., Fitriani, E., & Maulana, H. (2025). Structured physical education learning and gross motor development in elementary schools. Jurnal Pendidikan Olahraga, 14(1), 11–24. https://journal.ikippgriptk.ac.id

Robinson, L. E., Stodden, D. F., Barnett, L. M., Lopes, V. P., Logan, S. W., Rodrigues, L. P., & D'Hondt, E. (2015). Motor competence and its effect on positive developmental trajectories of health. Sports Medicine, 45(9), 1273–1284. https://doi.org/10.1007/s40279-015-0351-6

Rohmah, N., & Muhammad, I. (2021). Physical fitness as an indicator of children's health status. Jurnal Kesehatan Olahraga, 9(3), 77–86. https://ejournal.unesa.ac.id

Sari, D., Wahyuni, P., & Lestari, A. (2024). Physical fitness and healthy growth among elementary school children. Jurnal Pendidikan Kesehatan Rekreasi, 10(1), 35–46. https://ojs.mahadewa.ac.id

Setiawati, R., Firmanto, G., & Putra, A. (2025). Motor development characteristics in middle childhood. Jurnal Pendidikan Dasar dan Olahraga, 7(1), 60–71. https://journal.unesa.ac.id

Slamet, Y., Nugroho, S., & Andriani, M. (2025). Basic motor skills and physical fitness in elementary school students. Jurnal SPORTIF: Jurnal Penelitian Pembelajaran, 11(1), 100–112. https://doi.org/10.29407/js_unpgri.v11i1

Sterdt, E., Liersch, S., & Walter, U. (2014). Correlates of physical activity of children and adolescents: A systematic review of reviews. Health Education Journal, 73(1), 72–89. https://doi.org/10.1177/0017896912469578

Syafitri, N., Hasanah, U., & Ramadhan, F. (2025). Physical education learning and development of physical fitness components among elementary students. Jurnal Pendidikan Jasmani Indonesia, 21(1), 30–42. https://journal.uny.ac.id/index.php/jpji

Tomkinson, G. R., Carver, K. D., Atkinson, F., Daniell, N. D., Lewis, L. K., Fitzgerald, J. S., ... Ortega, F. B. (2017). European normative values for physical fitness in children and adolescents. British Journal of Sports Medicine, 52(22), 1445–1456. https://doi.org/10.1136/bjsports-2017-098253

Tomkinson, G. R., & Olds, T. S. (2019). Field tests of fitness. In Paediatric Exercise Science and Medicine (3rd ed., pp. 109–128). Oxford University Press. https://global.oup.com

Wahid, W. N., & Kurniawan, A. W. (2023). Jurnal Master Penjas & Olahraga. Jurnal Master Penjas & Olahraga, 4(April), 270–281.

Wicaksono, A., Hidayatullah, F., & Handayani, H. Y. (2022). Pengukuran Aspek Kebugaran Jasmani Kelentukan Menggunakan Instrumen V-Sit And Reach Test. Journal Of Sport And Exercise Science, 4(2), 28–34.

Zou, X., Eungpinichpong, W., & Konharn, K. (2025). Effects Of A 12-Week Core Strength Training Program On Physical Fitness And Fundamental Movement Skills In Children Aged 6 – 8 Years : A Randomized Controlled Trial. Journal Of Human Sport And Exercise, 21(1), 93–110.