

Physical Fitness Analysis of Junior High School Students Phase D Using Indonesian Student Fitness Test Instruments

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Abstrack

This study aims to describe the level of physical fitness of grade VIII students and compare the achievement of fitness components based on gender using the Indonesian Student Fitness Test (TKSI) Phase D. The use of TKSI Phase D is a practical contribution to this study because it provides a standardized fitness mapping, contextual, and can be directly used by PJOK teachers as a basis for student coaching. The research uses a descriptive-comparative quantitative approach with a survey method. The sample consisted of 37 students in grade VIII-1, including 17 male students and 20 female students, who were selected through purposive sampling techniques based on active participation, consistency of attendance, and willingness to participate in the entire series of tests. TKSI Phase D instruments include hand and eye coordination test, sit-up test, standing broad jump test, T-test, and beep test. Data were analyzed using frequency distribution, percentages, descriptive statistics, and independent t-test samples. The results showed that the overall physical fitness level of students was in the medium category, with 10 students in the good category, 15 students in the medium category, 11 students in the low category, and 1 student in the low category. Based on gender, dominant male students are in the medium category, while dominant female students are in the less category. The results of the differential test showed that male students had significantly better performance in all components of TKSI, namely muscle endurance, leg explosiveness, agility, cardiorespiratory endurance, and eye-hand coordination. These findings confirm that TKSI Phase D can serve as an initial diagnostic basis for designing more adaptive fitness interventions in local schools on an ongoing basis. This study concludes that students' physical fitness still requires targeted coaching through data-driven PJOK learning, especially for students with low fitness categories.

Keywords: Physical Fitness; TKSI Phase D; Junior High School Students; Physical Education; Student Fitness

INTRODUCTION

Physical fitness is an important indicator in student development because it is related to the body's ability to follow learning, participate in physical activities, and maintain optimal health. In physical education, physical fitness is not only seen as an output of sports activities, but also as the basis for motor development, cardiovascular health, muscle strength, coordination, agility, and readiness to learn movement. International studies show that the physical fitness of children and adolescents is an important marker of health and needs to be monitored periodically to design appropriate educational, health, and physical activity interventions (Muller et al., 2024; Santos et al., 2023; Sardeli et al., 2022). In addition, students' cardiorespiratory fitness and physical abilities are also related to cognitive function, psychological well-being, and active living behaviors at school age (Aldhahi et al., 2026; Berki et al., 2024; W. Chen et al., 2022, 2022).

Attention to student fitness is increasing because the physical activity of children and adolescents tends to be influenced by lifestyle changes, sedentary behavior, screen use, and reduced opportunities to move at school and outside school (Azzouzi et al., 2022; Chin-Cheng et al., 2022; Fillon et al., 2023; Gilbert et al., 2022). These challenges can be more pronounced in rural areas because access to sports facilities, structured physical activity programs, and student fitness monitoring have not always been equally available. Research in rural adolescents shows that

physical activity is influenced by demographic, environmental, physical education, and cardiovascular fitness factors (Aldhahi et al., 2026; Kazemzadeh et al., 2022). Therefore, data-based physical fitness mapping is an important need for schools to design PJOK learning according to the actual conditions of students.

The main problem in this study is the lack of objective data on the level of physical fitness of grade VIII students of SMPN 4 Jerowaru. Based on the initial context of the study, grade VIII students at the school have never measured their physical fitness level using standardized instruments. This condition makes it difficult for PJOK teachers to know the fitness profile of students, identify groups that need coaching, and determine learning strategies according to the physical needs of students. Without structured measurement, PJOK learning risks only being oriented to general activities and not fully addressing the real fitness needs of students. Another issue is the possible difference in fitness based on gender and test components. Previous studies have shown that differences in age, gender, socioeconomic status, weight status, and body composition can affect the fitness achievement of children and adolescents (Chin-Cheng et al., 2022; Muller et al., 2024; Reyes et al., 2023; Tsolakis et al., 2022). Several studies have also found differences in the performance of boys and girls in aspects of strength, agility, flexibility, coordination, and aerobic capacity (Barber et al., 2024; Donoso Usen & Planas Anzano, 2024; Pereira et al., 2022; Sugimoto et al., 2023). Thus, student fitness research needs to distinguish between descriptive goals, namely mapping fitness categories, and comparative goals, namely testing differences in achievement between male and female students in the TKSI component.

The literature shows that the measurement of students' physical fitness needs to be done through tests that are valid, systematic, and relevant to school age. Various studies have used physical test batteries to assess fitness components such as muscle strength, endurance, agility, balance, coordination, flexibility, and cardiorespiratory capacity (Agne et al., 2022; Cabarkapa et al., 2022; Santos et al., 2023; Sugimoto et al., 2023). The use of tests such as standing long jumps, shuttle runs, obstacle courses, sit-ups, or aerobic endurance tests have been widely used to map the fitness and motor development profiles of school-age children (Dos Santos et al., 2022; Pereira et al., 2022; Reyes et al., 2023). The evidence shows that fitness evaluations are more meaningful when done with structured instruments and can be translated into learning information.

In the context of physical education, the results of fitness measurements can be used as a basis for the preparation of learning programs, physical activity interventions, and evaluation of coaching success. Nontraditional physical education programs, school-based physical activities, and interventions in rural schools have been proven to increase physical activity involvement and several components of student fitness if designed according to the context of students (Heinrich et al., 2023; Kwaiser et al., 2024; Watkins et al., 2024). Innovative learning approaches, such as flipped learning or multicomponent educational interventions, have also been reported to increase students' opportunities to be more active in PJOK learning (Fillon et al., 2023; Killian et al., 2022). The findings confirm that schools need an early diagnosis of fitness before devising a more targeted physical activity improvement program.

In this study, the solution used is to measure the level of physical fitness of students using the Indonesian Student Fitness Test (TKSI) Phase D. This instrument is relevant because it is prepared for phase D students and includes five tests, namely hand and eye coordination test, sit-up test, standing broad jump test, T-test, and beep test. The five tests represent eye-hand coordination, muscle endurance, leg explosiveness, agility, and cardiorespiratory endurance. With this coverage,

TKSI Phase D can provide a more comprehensive picture of student fitness compared to general observations in PJOK learning and help teachers link test results with practice needs.

The research gap can be formulated more specifically, first, the study of student physical fitness based on standardized instruments is still limited to the local context of SMPN 4 Jerowaru. Second, fitness studies in rural areas still require more specific empirical data because environmental characteristics, facilities, physical activity habits, and learning patterns can be different from urban areas (Kazemzadeh et al., 2022; Tsolakis et al., 2022). Third, most previous studies have emphasized physical activity or fitness interventions and the relationship of health variables, while descriptive-comparative research based on school needs is still needed as a basis for early diagnosis before interventions are developed (Liu & Xiang, 2023; Watkins et al., 2024, 2024). Therefore, this research is important to provide contextual, measurable, and relevant basic data for PJOK teachers.

This study aims to describe the level of physical fitness of grade VIII students of SMPN 4 Jerowaru using the Indonesian Student Fitness Test (TKSI) Phase D instrument and compare the achievement of the fitness component between male and female students. Descriptively, this study identifies the distribution of student fitness categories. Comparatively, this study tested the differences in performance in the components of coordination, muscle endurance, leg explosiveness, agility, and cardiorespiratory endurance. The novelty of the research lies in the provision of empirical data on the physical fitness of SMPN 4 Jerowaru students through the national instrument TKSI Phase D according to the characteristics of the junior high school level. The practical contribution is the availability of a basis for PJOK teachers to develop learning strategies, fitness coaching programs, and follow-up for students with low fitness categories. The scope of this study is limited to grade VIII students of SMPN 4 Jerowaru with a descriptive-comparative quantitative approach. The research focus was directed at physical fitness mapping and comparison of achievement by gender, rather than testing the effectiveness of exercise interventions. The results of the research are expected to be the initial basis for schools to develop a more adaptive, data-based, and oriented PJOK program to improve the physical fitness of students.

METHOD

Research Design

This study uses a quantitative approach with a descriptive-comparative design because the research data is in the form of numerical scores from the results of student physical fitness measurements. The descriptive approach was used to describe the distribution of students' physical fitness levels based on the category of the Indonesian Student Fitness Test (TKSI) Phase D, while the comparative approach was used to compare the achievement of the physical fitness component between male and female students. Thus, the descriptive objective is directed at mapping the fitness category, while the comparative objective is directed at testing the differences between the sexes. School-age fitness measurements need to be carried out objectively, standardized, and systematic to monitor students' health, motor performance, and physical activity readiness (Muller et al., 2024; Santos et al., 2023).

Location and Research Subject

The research was carried out at SMPN 4 Jerowaru, East Lombok Regency. The research population is all grade VIII students of SMPN 4 Jerowaru which totals 148 students. The research sample was determined using the purposive sampling technique, which is the selection of samples

based on certain considerations that are in accordance with the research objectives. The sample used was 37 students in class VIII-1, consisting of 17 male students and 20 female students. Class VIII-1 was chosen because the PJOK schedule allows for the implementation of all tests, attendance is relatively consistent and is recommended by PJOK teachers. Sample criteria included active participation in PJOK learning, consistency of attendance, willingness to take the entire series of tests, and conditions that allow the test to be conducted safely, completely, and objectively.

The characteristics of the research subjects are important to consider because the physical fitness achievements of children and adolescents can be influenced by age, gender, physical activity, weight status, and living environment (Kazemzadeh et al., 2022; Tsolakis et al., 2022). Therefore, gender information is used as the basis for comparative analysis to see possible differences in physical fitness achievement between male and female students.

Research Instruments

The instrument used in this study is the Indonesian Student Fitness Test (TKSI) Phase D. This instrument was chosen because it suits junior high school learners and measures several components of physical fitness. The use and categorization of scores refers to the official guidelines and norms of TKSI Phase D for junior high schools/MTs grades 7, 8, and 9 (BGP Banten, 2023). TKSI Phase D consists of five tests, namely hand and eye coordination test, sit-up test, standing broad jump test, T-test, and beep test. Each test item represents a different component of fitness. The hand and eye coordination test is used to measure eye and hand coordination, the sit-up test is used to measure abdominal muscle endurance, the standing broad jump test is used to measure the explosiveness of leg muscles, the T-test is used to measure agility, while the beep test is used to measure cardiorespiratory endurance.

The selection of these five components is in line with the physical fitness literature of children and adolescents which places muscle strength, muscle endurance, explosiveness, agility, coordination, and cardiorespiratory capacity as important indicators in the evaluation of school-age physical fitness (Cabarkapa et al., 2022; Pereira et al., 2022; Sugimoto et al., 2023). In addition, measurements of cardiorespiratory fitness and motor ability have relevance to health, physical activity participation, and the development of students' movement performance (W. Chen et al., 2022; Dos Santos et al., 2022).

Data Collection Procedure

Data collection was carried out through the implementation of a series of Phase D TKSI tests in the school environment. Before the implementation of the test, the researcher obtained permission from the school, coordinated with the PJOK teacher, and asked for approval of student participation according to school procedures. Coordination is carried out to determine schedules, venues, readiness of facilities, field assistants, and safety procedures. Students are explained the purpose of the research, the procedure for each test item, the rules of implementation, the right not to continue the test if they feel uncomfortable, and safety aspects. Participants were also instructed to warm up, wear appropriate sportswear, and follow the teacher's instructions to reduce the risk of injury.

The test was carried out sequentially according to the TKSI Phase D component. Each student took part in the entire series of tests, namely eye-hand coordination, sit-up, standing broad jump, T-test, and beep test. The results of each test item are recorded on the assessment sheet according to the actual score obtained by the student. Furthermore, the score of each item is converted based on the TKSI Phase D norm to obtain a physical fitness level category. The

categories used include very good, good, medium, less, and less than once. This procedure is performed to obtain a comprehensive picture of the student's fitness condition and allows for a comparison of results by gender.

Data Analysis Techniques

Data were analyzed using descriptive statistics and inferential statistics. Descriptive analysis was used to calculate the frequency and percentage of students' overall physical fitness categories, as well as by male and female groups. The percentage is calculated by dividing the number of students in each category by the number of all samples, then multiplied by 100%. In addition, mean scores and standard deviations are calculated for each component of the test to illustrate the tendency of student performance in each aspect of physical fitness.

Inferential analysis was carried out to find out the difference in the results of TKSI components between male and female students. The test used is an independent samples t-test because the data consists of two independent groups. Prior to the interpretation of the t-test, the homogeneity of the variance was checked using Levene's Test. If the significance value of the Levene's Test is greater than 0.05, then the interpretation of the t-test results using the equal variances line is assumed. The significance level used was 0.05 with a 95% confidence interval. In addition to the p-value, the effect size was calculated using Hedges' g and reported in the results to show the magnitude of the difference between groups. Effect size reporting is important in fitness research because statistical significance alone does not necessarily indicate the practical significance of differences in students' physical performance (Muller et al., 2024; Sugimoto et al., 2023).

The results of the analysis are presented in the form of category distribution tables, descriptive statistics, differential test results, significance values, confidence intervals, and effect sizes. The interpretation of the results was carried out by linking the statistical findings with the context of PJOK learning, student characteristics, and the need for the development of physical fitness programs in schools. This approach was chosen so that the results of the study not only explain the difference in numbers but also provide practical meaning for PJOK teachers.

RESULT

This study involved 37 grade VIII students of SMPN 4 Jerowaru consisting of 17 male students and 20 female students. Physical fitness measurement was carried out using the Indonesian Student Fitness Test (TKSI) Phase D instrument, which included five tests, namely *hand and eye coordination test*, *sit-up test*, *standing broad jump test*, *T-test*, and *beep test*. The student's final score is converted into a physical fitness category based on the TKSI Phase D norms.

Table 1. Distribution of student physical fitness level categories

Category	Overall (n = 37)	Boys (n = 17)	Girls (n = 20)
Very good	0 student (0,00%)	0 student (0,00%)	0 student (0,00%)
Good	10 students (27,03%)	6 students (35,29%)	4 students (20,00%)
Medium	15 students (40,54%)	8 students (47,06%)	7 students (35,00%)
Less	11 students (29,73%)	3 students (17,65%)	8 students (40,00%)
Less than once	1 student (2,70%)	0 student (0,00%)	1 student (5,00%)
Quantity	37 students (100%)	17 students (100%)	20 students (100%)

Based on Table 1, the physical fitness level of grade VIII students of SMPN 4 Jerowaru is the most in the medium category, namely 15 students or 40.54%. Furthermore, 10 students or 27.03% were in the good category, 11 students or 29.73% were in the poor category, and 1 student or 2.70% was in the less category. No student achieved the good category. Thus, the descriptive results show that the physical fitness of students has not reached optimal conditions because 32.43% of students are still in the category of less once.

When viewed by gender, male students are most in the medium category, namely 8 students or 47.06%, followed by the good category as many as 6 students or 35.29%, and the less category as many as 3 students or 17.65%. There are no male students in the category of either once or less. In the women's group, the most dominant category was lacking, namely 8 students or 40.00%, followed by the medium category as many as 7 students or 35.00%, the good category as many as 4 students or 20.00%, and the less category as much as 1 student or 5.00%. This pattern shows that descriptively the proportion of female students in the low fitness category is greater than that of male students.

Descriptive analysis was conducted to describe the mean and standard deviation of the five TKSI components in the male and female groups. The results of descriptive statistics are presented in Table 2.

Table 2. Descriptive statistics of tksi components based on gender

Test Components	Boys, M $\pm$ SD	Girls, M $\pm$ SD	Average Difference
Sit-up	16,53 $\pm$ 4,09	11,80 $\pm$ 5,31	4,73
Standing broad jump	195,47 $\pm$ 21,79	140,50 $\pm$ 28,99	54,97
T-test	11,17 $\pm$ 1,54	13,37 $\pm$ 2,04	-2,20
Beep test	16,71 $\pm$ 1,65	14,85 $\pm$ 2,32	1,86
Eye-hand coordination	7,82 $\pm$ 3,99	5,25 $\pm$ 3,70	2,57

The results in Table 2 show that male students have a higher average than female students in the components of sit-up, standing broad jump, beep test, and eye-hand coordination. In the T-test component, male students have a lower average time than female students. Since the T-test is a time-based test, a lower score indicates better agility performance. Thus, descriptively male students showed better performance in all components of TKSI measured.

The largest difference in average was seen in the standing broad jump, which was 54.97. This shows that there is a difference in the explosive power of the leg muscles between male and female students. Differences were also seen in sit-ups as an indicator of abdominal muscle endurance, beep test as an indicator of cardiorespiratory endurance, and eye-hand coordination as an indicator of coordination ability. These findings are in line with the literature that explains that differences in gender, physical development, body composition, and physical activity characteristics can affect the physical fitness achievements of children and adolescents (Muller et al., 2024; Sugimoto et al., 2023; Tsolakis et al., 2022).

Different tests were carried out using *independent samples t-test* to find out if there was a difference in physical fitness test results between male and female students. Prior to the interpretation of the t-test, the results of Levene's Test showed that all components had a significance value above 0.05, so that the assumption of variance homogeneity was met. Therefore, the interpretation of the t-test uses *the assumed equal variances* line.

Table 3. Independent samples t-test results of TKSI components based on gender

		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
sit_up	Equal variances assumed	4.014	.053	2.992	35	.005	4.72941	1.58053	1.52076	7.93806
	Equal variances not assumed			3.056	34.713	.004	4.72941	1.54744	1.58701	7.87182
broad_jump	Equal variances assumed	1.407	.244	6.422	35	.000	54.97059	8.55979	37.59328	72.34789
	Equal variances not assumed			6.572	34.535	.000	54.97059	8.36380	37.98300	71.95818
t_test	Equal variances assumed	.580	.451	-3.650	35	.001	-2.20050	.60280	-3.42425	-.97675
	Equal variances not assumed			-3.733	34.603	.001	-2.20050	.58942	-3.39758	-1.00342
beep_tests	Equal variances assumed	4.011	.053	2.754	35	.009	1.85588	.67394	.48771	3.22406
	Equal variances not assumed			2.831	34.012	.008	1.85588	.65567	.52342	3.18835
coordination	Equal variances assumed	.216	.645	2.035	35	.049	2.57353	1.26445	.00656	5.14050
	Equal variances not assumed			2.023	33.060	.051	2.57353	1.27244	-.01509	5.16215

The results of the t-test showed that there were significant differences between male and female students in all components of TKSI. In the *sit-up* component, male students obtained significantly higher scores than female students, $t(35) = 2.992$; $p = 0.005$; Hedges' $g = 0.97$. These findings show that the abdominal muscle endurance of male students is better than that of female students. In the *standing broad jump*, the difference was also significant, $t(35) = 6.422$; $p < 0.001$; Hedges' $g = 2.07$, with an average difference of 54.97. This effect size value shows that the difference in limb explosive power is the most prominent difference in this study.

In the *T-test component*, there was a significant difference between male and female students, $t(35) = -3.650$; $p = 0.001$; Hedges' $g = -1.18$. The average time of male students is lower than that of female students, so male students have better agility. On *the beep test*, male students also showed significantly higher results, $t(35) = 2.754$; $p = 0.009$; Hedges' $g = 0.89$. This indicates that the cardiorespiratory endurance of male students is better than that of female students. Meanwhile, in eye-hand coordination, the difference between male and female students was also significant, $t(35) = 2.035$; $p = 0.049$; Hedges' $g = 0.66$. However, because the p-value is very close to the significance limit of 0.05 and the confidence interval is close to zero, the results of eye-hand coordination need to be interpreted carefully.

In general, the results of the study show that the level of physical fitness of grade VIII students of SMPN 4 Jerowaru is in the medium category. This condition indicates that most students have the basic physical capacity to participate in PJOK learning but have not yet reached an optimal level of fitness. The proportion of students in the category of less which reached 32.43% is an important finding because it shows the need for a more targeted fitness coaching program. In the context of physical education, monitoring students' physical fitness is important because fitness is one of the indicators of health, readiness to move, and the basis for long-term physical activity development (Muller et al., 2024; Santoso et al., 2023).

DISCUSSION

The findings of this study show that the physical fitness of grade VIII students of SMPN 4 Jerowaru is generally at the intermediate level. These conditions show the basic capacity of students, but also the need to strengthen certain fitness components. In the context of physical education, these results are important because physical fitness is an indicator of health, readiness to learn movement, and the basis for long-term physical activity participation (W. Chen et al., 2022; Muller et al., 2024; Santoso et al., 2023). Therefore, these results should be read as the basis for improving PJOK learning, not just a report on the fitness category.

Empirically, male students showed better achievements than female students in the components of muscle endurance, leg explosiveness, agility, cardiorespiratory endurance, and eye-hand coordination. This difference needs to be interpreted proportionally because the study did not directly measure physical activity habits, motivation, exercise experience, and school environment support. Possible explanations include physical activity experiences, exercise involvement, movement confidence, and adolescent biological development. At high school age, fitness is not only influenced by growth factors, but also the quality of daily physical activity, sedentary patterns, habits of participating in PJOK, and motivation to actively move (W. Chen et al., 2022; Kazemzadeh et al., 2022; Liu & Xiang, 2023). Thus, the results of this study reflect the need for learning that is more adaptive to the characteristics of students.

These findings are in line with previous studies that reported that gender is associated with differences in physical fitness performance in children and adolescents. Muller et al., (2024) found that age, gender, and socioeconomic status play a role in the risk of muscle and cardiorespiratory fitness in schoolchildren. Reyes et al., (2023) It shows that boys tend to excel on musculoskeletal fitness indicators, while physical activity and motor coordination are predictors of fitness development. Similar findings were reported Sugimoto et al., (2023), which shows the difference in physical performance between boys and girls on several physical tests, especially aspects of balance and ability to solve movement obstacles. This conformity reinforces the interpretation that the difference in TKSI results is related to the characteristics of adolescent fitness development.

The results of this study also support a study that confirms the importance of cardiorespiratory capacity as an indicator of student fitness and health. S. Chen et al., (2022) Shows that cardiorespiratory fitness is related to the psychological well-being and cognitive function of school children and adds that changes in physical activity behavior, screen-based sedentary activities, and health-related fitness can occur dynamically according to changes in school environment and mobility opportunities. This condition is relevant to PJOK because the opportunity to move affects endurance, strength, and learning engagement.

However, the results of this study need to be read critically because not all studies show the same pattern of excellence in male students. Bigford et al., (2023); Kudlacek et al., (2025); Liao et al., (2023); Sugimoto et al., (2023), for example, finding that girls can perform better on the flexibility component. Santoso et al., (2023) It also shows that child fitness trends do not always move uniformly between genders and between test types. Thus, the differences between male and female students should not be generalized as universal advantages but understood according to the components of the test used. Because TKSI Phase D assesses more strength, explosiveness, agility, coordination, and endurance, the results may differ when the instrument includes flexibility, body composition, or indicators of daily physical activity.

Theoretically, physical fitness in children and adolescents develops through the interaction of biological growth, movement experience, basic motor skills, motivation, and physical activity environments. Cazorla-González et al., (2022); Dos Santos et al., (2022); Kilpela et al., (2023) emphasized that children with better basic movement skills will have an easier time developing transitional skills and more complex physical activities. Pereira et al., (2022) It also shows that the development of gross motor coordination is influenced by jumping ability, speed, and agility, so that the components of fitness and coordination cannot be separated in PJOK learning. This means that TKSI results need to be translated into basic movement skill development activities, not just an increase in test scores.

From the perspective of adolescent development, differences in performance between the sexes can be influenced by maturation, body composition, and social experiences in physical activity. Buchwald et al., (2024); Gagliardi et al., (2020); Tsolakis et al., (2022) showed that weight and gender status were associated with children's fitness performance in rural areas. Cabarkapa et al., (2022) It also emphasizes that aerobic capacity and body composition have a relationship with the quality of movement function. This means that student fitness needs to be seen as the result of multidimensional interactions, not just the results of exercises in PJOK learning. This condition demands a learning environment that increases opportunities to move and reduces sedentary behavior.

This interpretation shows that female students need a more inclusive learning approach and provide a sense of psychological security. Abrahamsen et al., (2024); Anderson et al., (2023); Barber et al., (2024); Liu & Xiang, (2023) emphasizing that motivation based on values, expectations, interests, and beliefs of abilities is related to the results of physical activity and children's fitness. Must et al., (2022) Shows that fun, interest-based physical activity programs, such as dance, can encourage young women engagement. Thus, the low achievement of some female students should not be interpreted as a permanent limitation, but as a signal of the need for an attractive, gradual, and relevant learning design to students' movement preferences.

The results of this study provide important implications for PJOK schools and teachers. First, the measurement of TKSI Phase D needs to be used as a basis for the initial mapping of student fitness, not just a momentary evaluation activity. Fitness data can be used to group exercise needs, determine learning priorities, and monitor student progress. This is in line with recommendations for child fitness research that emphasize the importance of standardized monitoring to support school interventions and physical activity policies (Muller et al., 2024; Santos et al., 2023). Practically, the results of the TKSI category can help teachers distinguish the intensity of training, the form of activity, and the learning target according to the needs of students.

Second, PJOK teachers need to design a fitness improvement program that targets the components of muscle endurance, leg explosiveness, agility, cardiorespiratory endurance, and coordination in a balanced manner. School-based interventions have been shown to have the potential to increase physical activity, especially if they are structured in the context of students and the school environment (Kwaiser et al., 2024; Watkins et al., 2024). The non-traditional PJOK learning model can also improve movement and fitness competence if done in a structured and sustainable manner (Heinrich et al., 2023). In addition, innovative learning strategies such as flipped learning can expand opportunities for active physical activity during PJOK learning (Aliriad et al., 2024; Çağın et al., 2025; Killian et al., 2022). Thus, fitness exercises need to be combined with active play and individual feedback so that students understand the purpose of the exercise.

Third, schools need to pay special attention to students in the low fitness category through gradual, fun, and non-punitive activities. Fillon et al., (2023); Abdurrahman et al., (2024; Crosbie et al., (2025); De Pero et al., (2022); Fillon et al., (2023) suggests that multicomponent educational interventions can reduce the tendency to sedentary behavior in schoolchildren. Mesfar et al., (2022); Mologne et al., (2023); Tortella et al., (2023) It also emphasizes that structured activities combined with free play can improve children's fitness indicators. Therefore, the PJOK program at SMPN 4 Jerowaru should be directed to active, inclusive, game-based learning, paying attention to gender differences, and encouraging physical activity habits at school and outside school. This study was limited to one class in one school, so generalizations need to be careful. Follow-up research is recommended to involve a larger sample, multiple schools, and supporting variables, such as daily physical activity, motivation, body mass index, and school environment during the upcoming study period.

CONCLUSION

This study concludes that the level of physical fitness of grade VIII students of SMPN 4 Jerowaru is generally in the medium category. These findings show that most students already have the basic physical capacity to participate in PJOK learning, but their fitness has not yet reached optimal conditions. The presence of students in the less categories emphasizes the need for more directed, systematic, and sustainable physical fitness coaching. The measurement results using the Indonesian Student Fitness Test (TKSI) Phase D showed that there was a difference in fitness achievement between male and female students. Male students tend to perform better in the components of muscle endurance, leg explosiveness, agility, cardiorespiratory endurance, and eye-hand coordination. Meanwhile, female students are more in the low fitness category, so they require special attention in PJOK learning planning. Practically, the results of this research can be used as an initial basis for PJOK teachers in compiling data-based learning. Fitness programs need to be directed at strengthening physical components that are still weak through gradual, safe, fun, and student-friendly activities. Thus, TKSI Phase D is relevant to be used as an instrument for mapping the physical fitness of junior high school students.

RECOMMENDATION

Based on the results of the research, PJOK schools and teachers are advised to use the results of the Indonesian Student Fitness Test (TKSI) Phase D as the basis for the preparation of learning programs and physical fitness coaching for students. The PJOK program needs to be directed at improving the fitness components that are still weak, especially muscle endurance, leg explosiveness, agility, coordination, and cardiorespiratory endurance. PJOK teachers need to pay special attention to students who are in the category of less through gradual, safe, measurable, and fun physical activities. Forms of activity can be in the form of active games, simple circuit exercises, self-body strength training, coordination exercises, and light to moderate aerobic activities. Female students also need to receive more inclusive learning support so that physical activity participation can increase. Schools are advised to conduct regular fitness monitoring, for example at the beginning and end of the semester, to evaluate student development and the effectiveness of the PJOK program. Researchers are then advised to involve a larger sample, compare several schools, and add variables of daily physical activity, body mass index, exercise motivation, sleep patterns, and device use.

REFERENSI

- Abdurrahman, E., Nasuka, Sulaiman, S., Raharjo, H. P., & Setyawati, H. (2024). Analysing the Mental Imagery Training to Improve the Ability of Petanque Sport Shooting Game: Literature Review. *Physical Education Theory and Methodology*, 24(3), 474–479. <https://doi.org/10.17309/tmfv.2024.3.17>
- Abrahamsen, F. E., Kvam, A., & Sæther, S. A. (2024). Psychological Determinants in Biathlon Performance: A U23 National Team Case Study. *Sports*, 12(2), 38. <https://doi.org/10.3390/sports12020038>
- Agne, A., Olmedillas, H., Pérez Ruiz, M., Del Valle Soto, M., & Fernandez-Del-valle, M. (2022). Physical Fitness—Not Physical Activity Levels—Influence Quality of Life in Anorexia Nervosa. *International Journal of Environmental Research and Public Health*, 19(5). Scopus. <https://doi.org/10.3390/ijerph19052678>
- Aldhahi, M. I., Bakhsh, H. R., Bin sheeha, B. H., Aljabiri, M. S., & Alhasani, R. (2026). Physiological and Psychological Predictors of Functional Performance Related to Injury Risk in Female Athletes: A Cross-Sectional Study. *Healthcare (Switzerland)*, 14(2). Scopus. <https://doi.org/10.3390/healthcare14020174>
- Anderson, N., Marcum, J., Bonauto, D., Siegel, M., & LaSee, C. (2023). The Relative Burden of Occupational Injuries and Illnesses in Firefighters: An Analysis of Washington Workers' Compensation Claims, 2006–2020. *International Journal of Environmental Research and Public Health*, 20(22). Scopus. <https://doi.org/10.3390/ijerph20227077>
- Azzouzi, S., Stratton, C., Muñoz-Velasco, L. P., Wang, K., Fourtassi, M., Hong, B.-Y., Cooper, R., Balikuddembe, J. K., Palomba, A., Peterson, M., Pandiyan, U., Krassioukov, A., Tripathi, D. R., Tuakli-Wosornu, Y. A., & Hajjioui, A. (2022). The Impact of the COVID-19 Pandemic on Healthy Lifestyle Behaviors and Perceived Mental and Physical Health of People Living with Non-Communicable Diseases: An International Cross-Sectional Survey. *International Journal of Environmental Research and Public Health*, 19(13). Scopus. <https://doi.org/10.3390/ijerph19138023>
- Barber, B. V., Kephart, G., Vallis, M., Matthews, S. A., Martin-Misener, R., & Rainham, D. G. (2024). Time-Use Sequences: A Mixed-Methods Study Exploring How, When, and Where Spatiotemporal Patterns of Everyday Routines Can Strengthen Public Health Interventions. *International Journal of Environmental Research and Public Health*, 21(9). Scopus. <https://doi.org/10.3390/ijerph21091128>
- Berki, T., Csányi, T., & Tóth, L. (2024). Associations of physical activity and physical education enjoyment with self-concept domains among Hungarian adolescents. *BMC Psychology*, 12(1). Scopus. <https://doi.org/10.1186/s40359-024-01953-w>
- Bigford, G. E., Betancourt, L. F., Charlifue, S., & Nash, M. S. (2023). Therapeutic Lifestyle Intervention Targeting Enhanced Cardiometabolic Health and Function for Persons with Chronic Spinal Cord Injury in Caregiver/Care-Receiver Co-Treatment: A Study Protocol of a Multisite Randomized Controlled Trial. *International Journal of Environmental Research and Public Health*, 20(19). Scopus. <https://doi.org/10.3390/ijerph20196819>
- Buchwald, S. C. L., Gitelman, D., Smits, D., Rodriguez de la Vega, P. E., & Barengo, N. C. (2024). The Impact of Physical Activity on Memory Loss and Concentration in Adults Aged 18 or Older in the U.S. in 2020. *International Journal of Environmental Research and Public Health*, 21(9). Scopus. <https://doi.org/10.3390/ijerph21091193>
- Cabarkapa, D., Whetstone, J. M., Patterson, A. M., Mosier, E. M., Cabarkapa, D. V., & Fry, A. C. (2022). Relationship between Health-Related Physical Fitness Parameters and Functional Movement Screening Scores Acquired from a Three-Dimensional Markerless Motion Capture System. *International Journal of Environmental Research and Public Health*, 19(8). Scopus. <https://doi.org/10.3390/ijerph19084551>

- Chen, S., Wang, B., Imagbe, S., Gu, X., Androzzi, J., Liu, Y., Yli-Piipari, S. R., Hu, G., & Staiano, A. E. (2022). Adolescents' Behaviors, Fitness, and Knowledge Related to Active Living before and during the COVID-19 Pandemic: A Repeated Cross-Sectional Analysis. *International Journal of Environmental Research and Public Health*, 19(5). Scopus. <https://doi.org/10.3390/ijerph19052560>
- Chen, W., Zhang, Z., Giordani, B., & Larson, J. (2022). Technology-Enhanced 4Active Intervention Impacting Psychological Well-Being and Physical Activity among Older Adults: A Pilot Study. *International Journal of Environmental Research and Public Health*, 19(1). Scopus. <https://doi.org/10.3390/ijerph19010556>
- Chin-Cheng, Y., Ching-Te, L., & Ting-I, L. (2022). The Effect of Multimedia Teaching Intervention on Physical Education Curriculum on University Students' Sports Attitudes and Sports Behaviors. *Annals of Applied Sport Science*, 10(2). Scopus. <https://doi.org/10.52547/aassjournal.1046>
- Crosbie, F., Pasquier, F., & Nedelec, M. (2025). Does the Method Matter? Examining How Specific Educational Approaches Shape Sleep Education Outcomes in High-Level Adolescent Athletes. *Journal of Strength and Conditioning Research*, 39(10), e1243–e1248. Scopus. <https://doi.org/10.1519/JSC.00000000000005195>
- De Pero, R., Mallia, L., Capitani, M., & Scibinetti, P. (2022). Motor Creativity and Self-Efficacy in Young Gymnasts: Expertise Differences. *Journal of Educational, Cultural and Psychological Studies*, 2022(26), 249–265. Scopus. <https://doi.org/10.7358/ecps-2022-026-depe>
- Donoso Usen, L., & Planas Anzano, A. (2024). Relationship Between Shoulder Flexibility And Handstand Alignment In Different Female Artistic Gymnastics Apparatus. *Science of Gymnastics Journal*, 16(3), 435–445. Scopus. <https://doi.org/10.52165/sgj.16.3.435-445>
- Dos Santos, F. G., Pacheco, M. M., Stodden, D., Tani, G., & Maia, J. A. R. (2022). Testing Seefeldt's Proficiency Barrier: A Longitudinal Study. *International Journal of Environmental Research and Public Health*, 19(12). Scopus. <https://doi.org/10.3390/ijerph19127184>
- Fillon, A., Fearnbach, N., Vieira, S., G  linier, J., Bagot, S., Bailly, M., Boscaro, A., P  lissier, L., Siroux, J., Grasteau, V., Bertsch, J., Pereira, B., Duclos, M., Lambert, C., & Thivel, D. (2023). Changes in Sedentary Time and Implicit Preference for Sedentary Behaviors in Response to a One-Month Educational Intervention in Primary School Children: Results from the Globe Trotter Pilot Cluster-Randomized Study. *International Journal of Environmental Research and Public Health*, 20(2). Scopus. <https://doi.org/10.3390/ijerph20021089>
- Gagliardi, C., Pillemer, K., Gambella, E., Piccinini, F., & Fabbietti, P. (2020). Benefits for older people engaged in environmental volunteering and socializing activities in city parks: Preliminary results of a program in Italy. *International Journal of Environmental Research and Public Health*, 17(11). Scopus. <https://doi.org/10.3390/ijerph17113772>
- Gilbert, A. S., Jabbari, J., & Hern  ndez, R. (2022). How Do Perceived Changes in Child and Adolescent Activities Relate to Perceptions of Health during COVID-19? Exploring Heterogeneity during the Pandemic. *International Journal of Environmental Research and Public Health*, 19(18). Scopus. <https://doi.org/10.3390/ijerph191811206>
- Heinrich, K. M., Beattie, C. M., Crawford, D. A., Stoeper, P., & George, J. (2023). Non-Traditional Physical Education Classes Improve High School Students' Movement Competency and Fitness: A Mixed-Methods Program Evaluation Study. *International Journal of Environmental Research and Public Health*, 20(10). Scopus. <https://doi.org/10.3390/ijerph20105914>
- Kazemzadeh, S., Opper, C. E., Fang, X., & Lazorick, S. (2022). Determining Trends and Factors Associated with Self-Reported Physical Activity among Adolescents in Rural North

- Carolina. *International Journal of Environmental Research and Public Health*, 19(18). Scopus. <https://doi.org/10.3390/ijerph191811417>
- Killian, C. M., Espinoza, S. M., Webster, C. A., Long, B., Urtel, M., Mays Woods, A., & D'Agostino, E. M. (2022). Flipping the Script: An Initial Exploration of Flipped Learning as an Enhanced Alternative to Traditional Physical Education Lessons. *International Journal of Environmental Research and Public Health*, 19(22). Scopus. <https://doi.org/10.3390/ijerph192215188>
- Kudlacek, M., Fromel, K., Groffik, D., & Mitas, J. (2025). Individual physical activity preferences of adolescents in the Czech Republic and Poland: A 14-year comparative study reflecting the gender trends and prospective responses to global lifestyle challenges. *BMC Pediatrics*, 25(1). Scopus. <https://doi.org/10.1186/s12887-024-05342-5>
- Kwaiser, M. M., Medellin, A. M., Watkins, J. M., Goss, J. M., Hobson, J. M., Martinez Kercher, V. M., & Kercher, K. A. (2024). Evaluation of a Pilot College Student-Based Physical Activity Implementation Strategy in a Rural Middle School. *International Journal of Environmental Research and Public Health*, 21(12). Scopus. <https://doi.org/10.3390/ijerph21121645>
- Liao, C.-C., Hsu, C.-H., Kuo, K.-P., Luo, Y.-J., & Kao, C.-C. (2023). Ability of the Sport Education Model to Promote Healthy Lifestyles in University Students: A Randomized Controlled Trial. *International Journal of Environmental Research and Public Health*, 20(3). Scopus. <https://doi.org/10.3390/ijerph20032174>
- Liu, J., & Xiang, P. (2023). Expectancy-Value Motivation and Physical Activity- and Health-Related Outcomes among At-Risk Children and Adolescents. *International Journal of Environmental Research and Public Health*, 20(13). Scopus. <https://doi.org/10.3390/ijerph20136273>
- Mesfar, A., Hammami, R., Selmi, W., Gaied-Chortane, S., Duncan, M., Bowman, T. G., Nobari, H., & van den Tillaar, R. (2022). Effects of 8-Week In-Season Contrast Strength Training Program on Measures of Athletic Performance and Lower-Limb Asymmetry in Male Youth Volleyball Players. *International Journal of Environmental Research and Public Health*, 19(11). Scopus. <https://doi.org/10.3390/ijerph19116547>
- Mologne, M. S., Hu, J., Carrillo, E., Gomez, D., Yamamoto, T., Lu, S., Browne, J. D., & Dolezal, B. A. (2023). The Efficacy of an Immersive Virtual Reality Exergame Incorporating an Adaptive Cable Resistance System on Fitness and Cardiometabolic Measures: A 12-Week Randomized Controlled Trial. *International Journal of Environmental Research and Public Health*, 20(1). Scopus. <https://doi.org/10.3390/ijerph20010210>
- Muller, X., Pienaar, A. E., Gerber, B., Moran, C. N., & Brooks, N. E. (2024). Global Comparisons of Age, Gender and Socioeconomic Status Differences of Physical Fitness Health Risk in South African Primary School Children: Longitudinal Data from the NW-CHILD Study. *International Journal of Environmental Research and Public Health*, 21(12). Scopus. <https://doi.org/10.3390/ijerph21121554>
- Must, A., Bandini, L. G., Curtin, C., Rancaño, K. M., Eliasziw, M., Tybor, D. J., & Stanish, H. (2022). A Pilot Dance Intervention to Encourage Physical Activity Engagement for Adolescent Girls with Intellectual Disabilities. *International Journal of Environmental Research and Public Health*, 19(8). Scopus. <https://doi.org/10.3390/ijerph19084661>
- Pereira, S., Bastos, F., Santos, C., Maia, J., Tani, G., Robinson, L. E., & Katzmarzyk, P. T. (2022). Variation and Predictors of Gross Motor Coordination Development in Azorean Children: A Quantile Regression Approach. *International Journal of Environmental Research and Public Health*, 19(9). Scopus. <https://doi.org/10.3390/ijerph19095417>
- Reyes, A., Chaves, R., Vasconcelos, O., Pereira, S., Tani, G., Stodden, D., Hedeker, D., Maia, J., & Baxter-Jones, A. (2023). Modeling the Dynamics of Children's Musculoskeletal Fitness. *International Journal of Environmental Research and Public Health*, 20(4). Scopus. <https://doi.org/10.3390/ijerph20042938>

- Santos, C., Pereira, S., Vasconcelos, O., Tani, G., Hedeker, D., Katzmarzyk, P. T., Maia, J., & Bustamante, A. (2023). Secular Trends in Physical Fitness of Peruvian Children Living at High-Altitude. *International Journal of Environmental Research and Public Health*, 20(4). Scopus. <https://doi.org/10.3390/ijerph20043236>
- Santoso, R., Rahayu, T., & Setyawati, H. (2023). Software Development Tools with Android Base for Skills Data Collection in Physical Education. *Journal of Internet Services and Information Security*, 13(1), 22–33. Scopus. <https://doi.org/10.58346/JISIS.2023.I1.003>
- Sardeli, A. V., Gáspari, A. F., dos Santos, W. M., de Araujo, A. A., de Angelis, K., Mariano, L. O., Cavaglieri, C. R., Fernhall, B., & Chacon-Mikahil, M. P. T. (2022). Comprehensive Time-Course Effects of Combined Training on Hypertensive Older Adults: A Randomized Control Trial. *International Journal of Environmental Research and Public Health*, 19(17). Scopus. <https://doi.org/10.3390/ijerph191711042>
- Sugimoto, D., Stracciolini, A., Berbert, L., Nohelty, E., Kobelski, G. P., Parmeter, B., Weller, E., Faigenbaum, A. D., & Myer, G. D. (2023). Assessment of Physical Tests in 6–11 Years Old Children: Findings from the Play Lifestyle and Activity in Youth (PLAY) Study. *International Journal of Environmental Research and Public Health*, 20(3). Scopus. <https://doi.org/10.3390/ijerph20032552>
- Tortella, P., Quinto, A., Fumagalli, G. F., Lipoma, M., Stodden, D., & Sgrò, F. (2023). Effects of Different Teaching Approaches on Proxy Measures of Physical Fitness of Italian Kindergarten Children. *International Journal of Environmental Research and Public Health*, 20(10). Scopus. <https://doi.org/10.3390/ijerph20105792>
- Tsolakis, C., Cherouveim, E. D., Skouras, A. Z., Antonakis-Karamintzas, D., Czvekus, C., Halvatsiotis, P., Savvidou, O., & Koulouvaris, P. (2022). The Impact of Obesity on the Fitness Performance of School-Aged Children Living in Rural Areas—The West Attica Project. *International Journal of Environmental Research and Public Health*, 19(18). Scopus. <https://doi.org/10.3390/ijerph191811476>
- Watkins, J. M., Goss, J. M., Major, M. G., Kwaiser, M. M., Medellin, A. M., Hobson, J. M., Martinez Kercher, V. M., & Kercher, K. A. (2024). Refined Feasibility Testing of an 8-Week Sport and Physical Activity Intervention in a Rural Middle School. *International Journal of Environmental Research and Public Health*, 21(7). Scopus. <https://doi.org/10.3390/ijerph21070913>