

**Comparison of Physical Fitness Levels Futsal and Handball Extracurricular Activities SDN Ngagelrejo 1/396 Surabaya**

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Physical Education (PE) plays an important role in promoting students' physical fitness in elementary schools. The Indonesian Student Fitness Test (Tes Kebugaran Siswa Indonesia/TKSI) is a standardized instrument used to objectively assess students' physical fitness. This study aimed to compare the physical fitness levels of students participating in futsal and handball extracurricular activities at SDN Ngagelrejo 1/396 Surabaya. A quantitative comparative design was employed involving 60 students selected through purposive sampling. Data were collected using the TKSI Phase C instrument and analyzed using descriptive statistics and the Independent Samples *t*-test. The results showed that both groups had good physical fitness levels. Although the futsal group achieved an average fitness score approximately 2.6% higher than the handball group, the difference was not statistically significant ($p > 0.05$). These findings indicate that both extracurricular programs contribute similarly to students' physical fitness and support the use of TKSI as a standardized instrument for evaluating fitness and developing school-based training programs.

INTRODUCTION

Physical fitness is an important indicator that supports students' growth, development, and academic achievement at the elementary school level (Anam, S. et al., 2024). Physical fitness is a fundamental component that plays an important role in supporting health, optimizing the growth and development process, and enabling elementary school-aged children to perform daily activities effectively (Adhianto K, G., 2023). Students with good levels of physical fitness tend to have healthier physical conditions, be more active in various activities, and participate in the learning process more effectively (Prastyawan, R. R., Pulungan, K. A., 2022). The improvement of physical fitness and health can be optimized through the implementation of Physical Education, Sports, and Health (PJOK) programs that are systematically, structurally, and continuously designed (Zaenuddien et al., 2025). Physical Education, Sports, and Health (PJOK) is one of the essential subjects at the elementary school level that plays an important role in supporting the holistic development of students. PJOK not only develops students' motor skills and physical fitness but also instills positive values, such as creativity, discipline, teamwork, sportsmanship, responsibility, and the adoption of a healthy lifestyle. Furthermore, PJOK learning contributes to the development of cognitive, affective, spiritual, moral, and emotional aspects, thereby helping to shape students who are healthy, well-characterized, and prepared to face various demands of life (Hardi et al., 2024). The improvement of students' physical fitness can be influenced by their participation in sports extracurricular activities. Extracurricular activities are activities undertaken by students outside regular class hours and within the school

environment (Setiawan et al., 2026). Extracurricular activities are programs organized by schools to develop students' interests, talents, and abilities in non-academic fields, thereby supporting their achievement (Ridho et al., 2024). Among various sports, futsal and handball are extracurricular activities that are highly popular among students (dalam Woro et al., 2024). At SDN Ngagelrejo 1/396 Surabaya, futsal and handball are among the most popular extracurricular activities among students.

Futsal and handball have different physical activity characteristics. Futsal is a team ball sport played by two teams, each consisting of five players, and is generally played on an indoor court, although it can also be played outdoors (S. R. Nugroho et al, 2023). Physical fitness is a key component in futsal, as it enables players to move dynamically, rotate positions, and implement game strategies effectively to achieve the team's objectives (Ashari, 2024). A futsal match is played in two halves, with each half lasting 20 minutes of effective playing time. This format is designed to maintain a high level of game intensity, requiring players to possess good technical and tactical abilities, as well as a high level of physical fitness throughout the match (dalam Sma et al., 2023). Handball is a sport that requires well-developed physical, technical, and tactical skills. The basic movements involved in this game include running, jumping, throwing, catching, blocking, and pushing (Yosdiawan et al., n.d. 2024). Handball is an innovative team sport characterized by dynamic and high-intensity gameplay (Nicolosi et al., n.d 2023). Handball involves running to pursue or carry the ball, jumping during offensive or defensive actions, catching the ball from teammates or opponents, and throwing the ball to score

(Anggraini & Widodo, 2022). A handball team consists of seven players, including a goalkeeper. The handball court measures 40 m × 20 m. The ball used in handball is smaller than a futsal ball. A penalty throw is taken from a distance of 7 m from the goal (Yani et al., 2022). Players must be able to jump high, maintain balance, and shoot the ball accurately toward the opponent's goal (Csató, 2024). Success in handball largely depends on players' level of competence in mastering fundamental skills, both in defensive and offensive situations, with or without the ball (Alwan & Ismail, 2025).

To objectively, validly, and systematically assess students' physical fitness levels, the Ministry of Education, Culture, Research, and Technology developed the Indonesian Student Physical Fitness Test (Tes Kebugaran Siswa Indonesia/TKSI). Therefore, TKSI serves as an official reference for assessing students' physical fitness levels in Indonesia (Maulana et al., 2024). The Indonesian Student Physical Fitness Test (TKSI) is designed to evaluate various components of physical fitness, including muscular strength, coordination, reaction speed, agility, and cardiorespiratory endurance. The test is administered as an integrated and comprehensive series of assessments, allowing the results to serve as a basis for evaluating students' physical fitness levels, managing student fitness data, and supporting the identification and development of students' potential in sports in a more systematic and sustainable manner (Baun et al., 2025). Through this instrument, schools can obtain a comprehensive overview of students' physical fitness levels as a basis for planning physical education instruction (Bile et al., 2025).

At SDN Ngagelrejo 1/396 Surabaya, futsal and handball

extracurricular activities serve as a means for students to develop their sports skills while improving their physical fitness. Based on observations and discussions with the Physical Education teacher, students' physical fitness levels have not previously been assessed systematically using standardized measurement instruments. Consequently, the school and coaches do not yet have objective, valid, and comprehensive data regarding the students' physical fitness conditions. This lack of information presents a challenge in evaluating the outcomes of the training and development programs that have been implemented, as well as in designing training programs that are more targeted, effective, and aligned with the characteristics and physical development needs of students. Previous research by R.A Maulana et al., (2024) Research findings using the Indonesian Student Physical Fitness Test (TKSI) have shown that male students generally have higher levels of physical fitness than female students. However, these studies have primarily focused on describing the general characteristics of students' physical fitness and have not specifically evaluated students involved in particular sports extracurricular activities. To date, research comparing the physical fitness levels of elementary school students participating in futsal and handball extracurricular activities using the TKSI remains limited.

Although both sports involve different training characteristics and movement demands, they may contribute differently to the development of various components of students' physical fitness. Therefore, objective, valid, and standardized measurements are needed to obtain a comprehensive overview of students' physical fitness conditions. The findings are expected to provide a basis for developing more effective and targeted extracurricular training programs that are

aligned with students' physical development needs. Thus, this study is important for enriching empirical evidence regarding the physical fitness of students participating in sports extracurricular activities at the elementary school level through the application of the TKSI 2023. Based on the foregoing discussion, this study aims to analyze the differences in physical fitness levels between students participating in futsal and handball extracurricular activities at SDN Ngagelrejo 1/396 Surabaya. The Indonesian Student Physical Fitness Test (TKSI) was used as the research instrument to obtain an objective overview of the students' physical fitness levels. The findings are expected to provide empirical information regarding students' physical fitness conditions and serve as a basis for schools and coaches in designing, evaluating, and developing extracurricular training programs that are more effective, systematic, and aligned with the characteristics and needs of students. Its purpose is to serve as a guide for conducting tests and training, as well as a tool for data processing and storage, and even as a predictor for the development of students' talents in the field of sports (Risaldi et al., 2023).

The subjects of this study were sixth-grade students at SDN Ngagelrejo 1/396 Surabaya who participated in futsal and handball extracurricular activities. A total of 60 students participated in the study, consisting of 30 students from the futsal extracurricular group and 30 students from the handball extracurricular group. Each group consisted of 15 female and 15 male students. The selection of futsal and handball extracurricular activities was based on the consideration that both sports require various physical abilities, including endurance, speed, agility, strength, and coordination. These characteristics make both extracurricular activities relevant for

comparative research on students' physical fitness. This study focuses on comparing the physical fitness levels of students participating in futsal and handball extracurricular activities at SDN Ngagelrejo 1/396 Surabaya. The purpose of the study is to analyze differences in physical fitness levels between the two extracurricular groups based on measurements obtained using the Indonesian Student Physical Fitness Test (TKSI). The use of TKSI as the research instrument is expected to provide an objective, valid, and standardized overview of students' physical fitness conditions. Thus, the findings can serve as a basis for evaluating the effectiveness of extracurricular programs and supporting the development of more appropriate training strategies tailored to the characteristics and needs of students (Suryadi, 2022).

METHODS

This study employed a quantitative method with a comparative research design. According to Sugiyono (2013), quantitative research is a method used to examine a particular population or sample through data collection using research instruments, with the data subsequently analyzed using statistical techniques (In Purwandana et al., 2022). A comparative research design was used to compare two groups based on predetermined variables in order to determine whether there were differences between them. This study was classified as non-experimental research because no specific treatment was administered to the participants. Therefore, both groups were selected based on relatively similar characteristics so that any observed differences could reflect the influence of the sports activities in which they participated (Ardiansyah et al., 2023). In this study, the population consisted of students participating in the futsal and

handball extracurricular activities at SDN Ngagelrejo 1/396 Surabaya.

The researcher used purposive sampling to determine the study sample. Purposive sampling is a sampling technique in which participants are selected based on specific characteristics or predetermined criteria that are consistent with the nature of the research population (Setiawan, 2026). Based on these criteria, the researcher obtained a sample of 60 students, consisting of 30 students participating in the futsal extracurricular activity and 30 students participating in the handball extracurricular activity. Data were collected using the Indonesian Student Fitness Test (Tes Kebugaran Siswa Indonesia/TKSI) instrument, which consists of. The TKSI consists of five test items. The first is the Child Ball Test, which measures hand-eye coordination. The second is the Tok Tok Ball Test, which measures accuracy. The third is the Move the Ball Test, which assesses abdominal muscle strength. The fourth is the Shuttle Run 8×10 m Test, which measures agility. The fifth is the 600 m Run Test, which evaluates cardiorespiratory endurance. The TKSI instrument was used because it has good validity and reliability as a tool for measuring students' physical fitness levels. The equipment required to administer the test includes a stopwatch, tennis balls, cones/markers, a measuring tape, and a loudspeaker. The test procedures were conducted in accordance with the standard operating procedures specified in the Indonesian Student Fitness Test (TKSI) Phase C Guidelines (2023).

The study was conducted at the SDN Ngagelrejo 1/396 Surabaya field on Monday, May 11, 2026. The data collection was carried out during the scheduled extracurricular activities from 1:00 p.m. to 6:00 p.m. The research procedure began with the preparation of the equipment and

facilities required for the testing. Next, the researcher provided instructions to the participants by explaining the test procedures and asking them to perform a warm-up to reduce the risk of injury during data collection. The participants then completed the Phase C TKSI test battery in an orderly and disciplined manner. After the data were collected, they were analyzed using IBM SPSS Statistics 25.

Table 1. Norm TKSI

No	Range Value	of Criteria
1	22-25	Very good
2	18-21	Good
3	14-17	Moderate
4	10-13	Poor
5	≤ 9	Very Poor

Source : (Kemendikbudristek, 2023)

Based on Table 1, the physical fitness results were classified into five categories: Very Good, Good, Moderate, Poor, and Very Poor.

RESULTS AND DISCUSSION

This study aimed to analyze the comparison of the physical fitness levels of students participating in the futsal and handball extracurricular activities at SDN Ngagelrejo 1/396 Surabaya. The research data were obtained from the results of the Indonesian Student Fitness Test (Tes Kebugaran Siswa Indonesia/TKSI), which was administered to 60 students as the research sample.

Table 2. Descriptive Statistical Test Result

Variable	N	Mean	Median	Variance	Sd	Minimum	Maximum
Handball	30	18.03	18.00	4.240	2.059	14	22
Futsal	30	18.50	18.50	3.638	1.907	15	23

Based on Table 2, the physical fitness level of students participating in the handball extracurricular activity (n = 30) had a mean score of 18.03 and a median of 18.00, whereas the futsal group (n = 30) had a mean score of 18.50 and a median of 18.50. The close proximity between the mean and median values in both groups indicates that the data distribution was symmetrical, suggesting that the mean adequately represents the participants' physical fitness levels. The handball group had a score range of 14–22, whereas the futsal group had a score range of 15–23, indicating that both groups exhibited relatively comparable variations in physical fitness levels. In terms of data

the handball group had a variance of 4.240 dispersion, and a standard deviation of 2.059, while the futsal group had a variance of 3.638 and a standard deviation of 1.907. These values indicate that the variation in physical fitness scores was slightly lower in the futsal group, suggesting that the physical fitness characteristics of its participants homogeneous than those of the handball group. Although the futsal group had a slightly higher mean physical fitness score, the mean difference of 0.47 points small. Therefore, based on the descriptive statistics alone, it cannot be concluded that there was a significant difference in the physical fitness levels between the two groups.

Table. 3 Crosstabs Statistical Test Result

		Very Poor	Poor	Moderate	Good	Very good
child ball test	Handball	3 (10.0%)	5 (16.7%)	4 (13.3%)	12 (40.0%)	6 (20.0%)
	Futsal	1 (3.3%)	1 (3.3%)	9 (30.0%)	6 (20.0%)	13 (43.3%)
Tok-tok ball	Handball	3 (10.0%)	13 (43.3%)	13 (43.3%)	1 (3.3%)	-
	Futsal	5 (16.7%)	15 (50.0%)	8 (26.7%)	2 (6.7%)	-
Move the ball	Handball	0 (0.0%)	1 (3.3%)	6 (20.0%)	19 (63.3%)	4 (13.3%)
	Futsal	2 (6.7%)	4 (13.3%)	9 (30.0%)	12 (40.0%)	3 (10.0%)
Shuttle run 8x10m	Handball	-	-	2 (6.7%)	5 (16.7%)	23 (76.7%)
	Futsal	-	-	0 (0.0%)	4 (13.3%)	26 (86.7%)
600m run	Handball	-	4 (13.3%)	3 (10.0%)	18 (60.0%)	5 (16.7%)
	Futsal	-	1 (3.3%)	1 (3.3%)	21 (70.0%)	7 (23.3%)
Kebugaran	Handball	-	-	11 (36.7%)	18 (60.0%)	1 (3.3%)
	Futsal	-	-	11 (36.7%)	17 (56.7%)	2 (6.7%)

Based on Table 3, the crosstab analysis showed that the distribution of physical fitness categories among students participating in the handball and futsal extracurricular activities followed relatively similar patterns. In the Child Ball Test, the futsal group demonstrated a higher proportion of students in the very good category than the handball group, whereas in the Move the Ball Test, the handball group showed a higher percentage of students in the good category. In the Tok Tok Ball Test, both groups were predominantly classified in the poor and moderate categories, indicating that this component still requires improvement. Meanwhile, in the 8 × 10 m Shuttle Run Test and the 600 m Run Test,

both groups were dominated by the good and very good categories, with the futsal group showing a slightly better performance. Overall, the physical fitness levels of both groups were predominantly classified as good, accounting for 60.0% of the handball group and 56.7% of the futsal group, while 36.7% of students in both groups were classified in the moderate category. The futsal group also had a slightly higher proportion of students in the very good category (6.7%) compared with the handball group (3.3%). These findings indicate that the physical fitness profiles of students in both extracurricular activities were relatively comparable, although the futsal group showed a slight advantage in several physical fitness components

Table 4. Normality Test Result

Variable	N	KS-Statistics	Sig.	Information
TKSI Handball	30	0.147	0.095	Normal
Futsal	30	0.151	0.079	Normal

Based on Table 4, the results of the Kolmogorov–Smirnov normality test showed that the physical fitness data for the handball extracurricular group had a significance value of 0.095, while the futsal group had a significance value of 0.079,

while the futsal group had a significance value of 0.079. Since both significance values were greater than 0.05 ($p > 0.05$), the data for both groups were considered to be normally distributed.

Table 5. Independent Samples Test Result

Hasil Independent samples Variabel	Uji N	Mean	Sd	Homogeneity Test		Independen t test			
				F	Sig.	t	df	P-Value	
TKSI Handball	30	18.03	2.059	0.055	0.815	-0.911	58	0.366	
Futsal	30	18.50	1.907						

Based on Table 5, the results of the Independent Samples t-test showed that the handball extracurricular group had a mean physical fitness score of 18.03 ± 2.059 , whereas the futsal group had a mean score of 18.50 ± 1.907 . Prior to the comparison test, the homogeneity test (Levene's Test) produced an F value of 0.055 with a significance value of 0.815 ($p > 0.05$), indicating that the variances of the two groups were homogeneous. Therefore, the assumption of homogeneity was satisfied, and the use of the Independent Samples t-test was appropriate. The students. The Independent Samples t-test yielded a value of $t(58) = -0.911$ with a significance value of 0.366 ($p > 0.05$). This result indicates that there was no statistically significant difference in the physical fitness levels between students participating in the handball and futsal extracurricular activities. Although the futsal group had a slightly higher mean physical fitness score than the handball group, the difference in the mean scores was not large enough to be considered statistically significant. These findings suggest that both extracurricular activities provide relatively comparable physical fitness profiles among the students.

DISCUSSION

This study aimed to compare the physical fitness levels of students participating in handball and futsal extracurricular activities at SDN Ngagelrejo 1/396 Surabaya using the Indonesian Student Fitness Test (Tes Kebugaran Siswa Indonesia/TKSI). The results showed that the physical fitness levels of both groups were categorized as good. These findings

indicate that both handball and futsal extracurricular activities are equally capable of supporting the maintenance of students' physical fitness, as both activities involve various fitness components, including endurance, speed, agility, coordination, balance, and the ability to perform repeated movements during training sessions and matches.

The distribution of categories for each TKSI item showed variations in the abilities of each fitness component. The futsal group tended to demonstrate better results in components related to agility, movement coordination, and endurance, while the handball group showed a tendency toward better performance in components related to ball manipulation using the hands. These differences are a logical consequence of the technical characteristics of each sport. Futsal involves more frequent changes of direction, ball control using the feet, and fast-paced gameplay, whereas handball places greater demands on upper-limb coordination through activities such as catching, carrying, and throwing the ball. Although differences were observed in several fitness components, overall, both groups demonstrated relatively similar levels of physical fitness. Most students were classified in the good category, indicating that physical fitness is a multidimensional ability that is not determined by a single physical component but rather by the combination of various fitness components. Before hypothesis testing was conducted, the data met the assumptions of normality and homogeneity, making it suitable for analysis using the Independent Samples t-test. The results of the analysis showed that there was no significant difference in the physical fitness levels between students participating in handball and futsal extracurricular activities. This finding indicates that both extracurricular activities provide relatively equal contributions to students' physical

fitness. Although descriptively the futsal group tended to have slightly higher scores, the difference was not statistically significant.

Suryadi et al., (2023) The study compared the physical fitness levels of basketball and futsal extracurricular students. The study showed that comparisons of fitness levels between different sports branches must be analyzed using statistical tests because differences in mean values do not always indicate statistically significant differences. In addition, the study emphasized that physical fitness is influenced by the implementation of training programs provided to extracurricular participants. Previous research has also reported variations in physical fitness among extracurricular futsal participants and emphasized that the characteristics and implementation of training activities may be related to students' physical fitness (Mustofa et al., 2024). Likewise reported that extracurricular futsal participants demonstrated measurable cardiorespiratory endurance, highlighting the physical demands associated with futsal activities. In contrast, students participating in handball tended to show better performance in tasks involving hand-based ball manipulation and upper-limb coordination. This tendency is consistent with the technical characteristics of handball, which involve frequent catching, throwing, carrying, and controlling the ball with the hands. These activities require coordination between visual perception and upper-limb movement. However, the descriptive differences in particular fitness components should not be interpreted as evidence that one sport is generally superior to the other, because the present study focused on overall physical fitness and did not examine the specific effects of each training program on individual fitness components.

The finding of no statistically significant difference between the two groups is consistent with previous comparative research. Adikara and Wisnu (2024), for example, compared physical fitness levels among students participating in futsal and basketball extracurricular activities and found no statistically significant difference between the groups. Similarly, Wardana et al., (2024) demonstrated the importance of statistical testing when comparing physical fitness among students involved in different extracurricular sports, because differences in mean scores do not necessarily indicate statistically significant differences. According to Rubiyatno, Slamet et al., (2022) The physical fitness levels of extracurricular students are influenced by training activities that are carried out regularly and systematically. The study emphasized the importance of fitness evaluation as a basis for developing training programs so that students' physical condition development can be monitored periodically. In addition, Marcaida et al., (2023) showed that comparisons of physical fitness among extracurricular participants should consider the training characteristics of each sport. The authors explained that training intensity, training frequency, and participants' involvement during the training process are factors that contribute to influencing physical fitness levels. Therefore, the type of sport is not the only factor determining differences in physical fitness between groups. These findings support the results of the present study, which indicate that students participating in handball and futsal extracurricular activities have relatively similar levels of physical fitness.

CONCLUSION

Overall, the results of this study indicate that both handball and futsal extracurricular activities are equally

capable of supporting the development of elementary school students' physical fitness. Therefore, improvements in physical fitness do not solely depend on the choice of sport, but also on the quality of training programs, consistency in participating in training sessions, progressive training loads, and regular evaluation of physical conditions. Thus, schools are expected to continue developing well-planned extracurricular programs oriented toward improving students' physical fitness.

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