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Analysis of physical fitness and basic technical skills of extracurricular futsal players

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ABSTRACT

Physical fitness and basic futsal technical skills are fundamental factors in achieving optimal player performance, particularly in school extracurricular activities. Poor physical condition and inadequate technical mastery can negatively affect game quality and training outcomes. This study aimed to analyze the levels of physical fitness and basic futsal technical skills among students participating in the futsal extracurricular program at SMK Nusantara Kotabumi. The research employed a quantitative descriptive method involving 20 students selected through purposive sampling. Data were collected using physical fitness tests, including a 20-meter sprint, push-ups, sit-ups, and shuttle run, as well as basic futsal skill tests covering passing, dribbling, and shooting based on FIFA standards and motor skill theory. Data were analyzed using descriptive statistics, including percentages, mean scores, and performance categories. The results revealed that students' physical fitness levels were categorized as good (30%), moderate (60%), and poor (10%). In terms of technical skills, passing ability was predominantly in the good category (65%), while dribbling (55%) and shooting (50%) were classified as moderate. These findings indicate that although students demonstrate satisfactory passing skills, improvements are needed in agility, dribbling speed, and shooting accuracy. Therefore, coaches should implement player-centered training programs and conduct regular evaluations to enhance overall performance. Future studies are recommended to involve larger samples, additional variables, experimental designs, and technology-based assessment instruments.

Keywords: analysis; physical fitness, basic techniques, futsal, extracurricular activities.

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INTRODUCTION

Physical fitness and basic technical skills are the two main components that determine the performance of a futsal player, especially at the school development level (Notoargo, 2017; FJ Rahman, 2018). Extracurricular futsal activities aim not only to develop students' interests and talents but also to develop physical and technical abilities that support optimal play. However, many young players still have inadequate physical fitness and varying basic technical skills, which impacts the quality of their play and the effectiveness of their training. This situation highlights the importance

of conducting a thorough analysis to determine the extent of players' physical and technical readiness so that training programs can be designed more effectively.

A number of previous studies have shown that physical fitness is closely related to athletic performance (Hakim et al., 2020; D. Rahman, 2023; Saputra et al., 2023). Studies by several researchers have shown that fitness components such as speed, muscular strength, endurance, and agility contribute significantly to the effectiveness of the game (Aliriad et al., 2023; Barranco-Ruiz & Villa-González, 2020; Wahl-Alexander, 2023). Furthermore, other research confirms that basic techniques such as passing, dribbling, and shooting are important indicators in determining the quality of school-age players' play. However, most previous studies have focused on only one aspect, namely physical fitness or basic technical skills, separately, thus failing to provide a comprehensive picture of the relationship between these two aspects in the context of futsal coaching in schools.

These empirical findings collectively point to the need for a theoretical framework that can explain how physical capacity translates into technical execution. The theory of motor skills states that basic technical abilities can only develop optimally if supported by good physical condition (Armstrong, 2013; Yonglitthipagon et al., 2017). This concept emphasizes that physical fitness is not merely a supporting factor, but a foundation for improving a player's movement technique. FIFA's basic futsal technique test standards provide objective guidelines for assessing young players' passing, dribbling, and shooting abilities. Based on this theory, analyzing fitness and basic technical skills is essential for understanding a player's profile and serving as a guide for developing more effective training programs.

This study addresses a specific gap in the existing literature: while previous studies (Hakim et al., 2020; Supriady, 2021; Samin, 2024) have examined either physical fitness or basic technical skills in isolation, none have simultaneously analyzed both dimensions in extracurricular futsal players at the vocational high school level using FIFA-standardized instruments. This study offers a novel contribution by presenting a comprehensive, dual-aspect analysis that combines both physical fitness and basic technical skill assessment, providing schools with empirical data to identify player strengths and weaknesses and design more targeted training programs (Hadi et al., 2022; Jamaludin et al., 2023).

Based on this description, there is a research gap: there are not many studies that specifically analyze the fitness profile and basic technique simultaneously in extracurricular futsal players at the vocational high school level, especially using standardized instruments. The novelty of this study is the presentation of a comprehensive analysis that combines both aspects to provide a complete picture of player performance as a basis for evaluation and training program development.

The purpose of this study is to analyze the level of physical fitness and basic technical skills of extracurricular futsal players at SMK Nusantara Kotabumi, so that accurate information can be obtained regarding the physical condition and technical abilities of students as a consideration in designing a more effective and targeted training program.

METHOD

This study uses a quantitative descriptive method to describe the level of physical fitness and basic technical skills of extracurricular futsal players in a systematic and measurable manner (Darwin et al., 2021; Sugiyono, 2019). This method was chosen because it aligns with the research objectives, namely presenting factual data through numerical analysis.

The study population consisted of 28 students who were members of the futsal extracurricular activity at SMK Nusantara Kotabumi. The sample was determined using a purposive sampling

technique based on the criteria of active training, resulting in 20 students who met the requirements for participating in regular training for at least the past three months.

The research instruments included a physical fitness test and a basic futsal technical skills test. The physical fitness test used a 20-meter sprint, 1-minute push-up, 1-minute sit-up, and a 4×10-meter shuttle run based on the Cooper Test standards (Podstawski, 2025). Futsal technical skills instruments include the Passing Accuracy Test, Dribbling Speed Test, and Shooting Accuracy Test, which refer to FIFA standards (Mappaompo et al., 2022). It should be noted that for the Dribbling Speed Test, a lower completion time indicates a higher level of skill, as faster performance reflects superior dribbling ability.

The research was conducted through the following stages: (1) preparation of instruments and research permits; (2) implementation of tests which began with warm-ups and were followed by physical fitness testing and basic technical skills according to procedures; (3) recording and verification of test results; and (4) processing and interpretation of data to be compiled into a research report.

Data analysis was performed using descriptive statistics to calculate the average value, percentage, and category of physical fitness and basic futsal technical skills test results. To explore associations between variables, a Kolmogorov-Smirnov normality test and Pearson correlation test were also conducted using SPSS Version 29.

RESULTS

Physical fitness test data analysis was performed by calculating the average value, percentage, and dominant category for each physical fitness component. The components measured included speed, arm strength, abdominal strength, and agility. The analysis results are presented in the following table:

Table 1. Physical Fitness Test Results

Fitness Components	Average	Dominant Category	Percentage
20-meter sprint (seconds)	3.7 seconds	Enough	55%
Push-ups (repeats)	32	Good	60%
Sit-ups (repeats)	28	Enough	50%
Shuttle run (seconds)	12.6 seconds	Not enough	40%

Based on the table, it can be seen that the fitness component with the best category results is arm muscle strength through a push-up test with an average score of 32 times in one minute and a dominant percentage of 60%. Conversely, the lowest score is in the agility component (shuttle run) with a category of less and a percentage of 40%, indicating that students' agility abilities are still low.

Table 2. Results of Basic Futsal Technical Skills

Basic Techniques	Average Score	Dominant Category	Percentage
Passing	8/10	Good	65%
Dribbling	15.2 seconds	Enough	55%
Shooting	6/10	Enough	50%

The analysis showed that passing was the most mastered technique by the players, with an average score of 8 out of 10 attempts, categorized as good. Meanwhile, dribbling and shooting abilities were in the fair category, indicating that individual techniques still need improvement.

Table 3. Normality Test Results

Variables	Kolmogorov-Smirnov	Sig. (p-value)	Interpretation
Physical Fitness	0.176	0.072	Normally Distributed Data
Basic Techniques	0.149	0.087	Normally Distributed Data

Table 4. Pearson Correlation Test Results

Correlated Variables	Pearson r	Sig. (p-value)	Strength of Relationship	Interpretation
Physical Fitness × Passing	0.462	0.021	Moderate	Significant
Physical Fitness × Dribbling	-0.531	0.010	Moderate–Strong	Significant
Physical Fitness × Shooting	0.398	0.041	Moderate	Significant
Physical Fitness × Total Basic Techniques	0.512	0.012	Moderate–Strong	Significant

The Kolmogorov–Smirnov normality test revealed that the physical fitness and basic futsal techniques variables had significance values of 0.072 and 0.087, respectively. Both values were greater than 0.05, thus concluding that all data in this study were normally distributed. With the assumption of normality met, the analysis continued using the Pearson correlation test.

The results of the Pearson correlation test indicate a significant relationship between physical fitness and basic futsal technical abilities. The correlation between physical fitness and passing has a correlation coefficient of 0.462 with a significance value of 0.021, indicating a moderate relationship. In dribbling techniques, a correlation value of -0.531 with a significance value of 0.010 indicates a significant relationship with moderate to strong strength. The negative correlation value in the dribbling test reflects the nature of the instrument: a lower completion time (smaller numerical value) corresponds to faster and more skilled dribbling performance. The relationship between physical fitness and shooting obtained a correlation value of 0.398 with a significance value of 0.041, which is included in the moderate relationship category. Overall, the relationship between physical fitness and total basic techniques shows a correlation value of 0.512 and a significance value of 0.012, indicating a significant relationship with moderate to strong strength.

Based on the research results, which showed a p-value <0.05, it can be concluded that there is a significant relationship between physical fitness and basic futsal technical skills. This finding indicates that players with better physical fitness levels have more optimal basic technical skills in futsal. This condition aligns with the characteristics of futsal, which requires physical components such as speed, agility, endurance, and motor coordination to support effective playing techniques.

DISCUSSION

The results of the study showed that physical fitness components such as sprints, sit-ups, and shuttle runs were in the adequate category, while push-ups were in the good category. This is likely because futsal involves physical activity such as body thrusts and the use of the arms for balance, resulting in adequate development of upper body muscle strength (Alfarizi et al., 2024; Husyaeri &

Saleh, 2022). Specific exercises such as the parachute run and boomerang run have been shown to be effective in improving sprint speed and change of direction ability (Aksal et al., 2023; Yanto & Rasyono, 2022).

In terms of basic futsal techniques, passing received the highest score and was in the good category. This indicates that the training pattern employed was predominantly focused on passing. This finding is supported by research (Husyaeri & Saleh, 2022; Kurniawati, 2024; Subarja et al., 2022), which indicates that drill training methods and the development of teamwork-based passing models can improve the accuracy and effectiveness of players' passing. Meanwhile, dribbling and shooting skills, which are in the "fair" category, indicate that the training provided has not fully focused on mastering individual techniques. Exercises such as the shuttle run and zigzag run have been shown to improve dribbling skills through adaptation to rapid changes in direction (Alami et al., 2025), while target-based training can improve shooting accuracy (Saran et al., 2022).

The results of the Pearson correlation test showed that physical fitness was significantly related to all components of basic futsal technical ability. The strongest correlation was found in dribbling skills, followed by passing and shooting. These findings indicate that physical components such as speed, agility, and explosive power contribute to improving the quality of futsal playing technique. This is in line with Bernhardin et al. (2023) and Bernhardin & Fauzi (2022), who found that zig-zag training had a significant impact on increasing the agility of futsal players.

Overall, the results of this study reinforce previous findings that developing physical and technical abilities in futsal must be integrated to optimally improve player performance. Previous research has shown that structured training programs, both technical and physical, play a crucial role in developing better futsal playing skills (Candra et al., 2020; Hanif et al., 2023). Based on the findings of this study, the most urgent area for improvement is agility, as indicated by the lowest performance in the shuttle run test (Table 1). Coaches are therefore encouraged to incorporate agility-focused exercises such as shuttle run drills and zig-zag agility circuits into regular training schedules. Additionally, given that dribbling and shooting remain at the "fair" level, individual technique training through targeted repetition exercises should be prioritized alongside physical conditioning to support comprehensive player development.

CONCLUSION

This study demonstrates that physical fitness plays a crucial role in supporting basic futsal technical skills, with a statistically significant relationship confirmed between overall fitness and all three technical dimensions: passing, dribbling, and shooting.

From a coaching perspective, these findings highlight the importance of integrating physical conditioning and technical training within futsal programs. The data indicate that agility (shuttle run) is the weakest physical component, and dribbling and shooting are the least developed technical skills. Coaches are therefore advised to adopt structured agility-specific training (e.g., shuttle run drills, zig-zag circuits) and individualized technique sessions to address these weaknesses in a targeted manner.

For future research, it is recommended to employ experimental designs to test the effectiveness of specific training interventions, increase the sample size for greater generalizability, incorporate a broader range of physical and technical variables, and utilize technology-based assessment instruments to obtain more precise and comprehensive results.

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CONFLICT OF INTEREST

The authors state that there is no conflict of interest in this study.

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