

The Effect of Fitness-Based Exercise Training on Selected Physical and Skill Variables of Male Handball Players

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Abstract

Physical fitness plays a vital role in enhancing sports performance, particularly in fast-paced team games like handball. Handball requires a combination of speed, agility, strength, endurance, coordination, and sport-specific skills such as passing, dribbling, and shooting. Fitness-based exercise training programmes are widely used to improve these physical and skill components; however, systematic studies at the district level, especially in Raigad Tahasil, are limited. Therefore, the present study was undertaken to examine the effect of a fitness-based exercise training programme on selected physical and skill variables of male handball players. The study adopted an experimental pre-test and post-test research design with a single group. A total of 30 male handball players from Raigad Tahasil were selected as the sample using purposive sampling technique. The age of the subjects ranged between 17 and 23 years. The training programme was conducted for eight weeks, five days per week, with each session lasting approximately 60 minutes. The training included general fitness exercises such as running, calisthenics, flexibility exercises, strength drills, and basic skill-related activities. Selected physical variables included speed, agility, and muscular endurance, while selected skill variables included passing accuracy and dribbling ability. Data were collected using standardized physical fitness tests, questionnaires, and systematic observation schedules. Pre-test and post-test data were statistically analysed using descriptive statistics and the paired 't' test to determine the significance of differences.

The results of the study revealed significant improvement in all selected physical and skill variables after the training programme. The findings clearly indicate that fitness-based exercise training has a positive effect on the physical fitness and skill performance of male handball players. The study concludes that structured fitness training programmes should be an integral part of handball coaching at the district and college levels. The outcomes of this study may be useful for physical education teachers, coaches, and sports administrators in planning effective training programmes for handball players.

Keywords: Fitness-based exercise training, Physical fitness, Skill variables, Handball players, Training programme, Raigad Tahasil.

1. Introduction

Handball is a dynamic and physically demanding team sport that requires players to perform repeated high-intensity movements such as sprinting, jumping, throwing, and rapid changes of direction. To meet these demands, players must possess a high level of physical fitness along with well-developed technical skills. Physical fitness components such as speed, agility, strength, and endurance directly influence the effectiveness of skill execution and overall game performance.

In recent years, fitness-based exercise training has gained importance in sports training programmes. Such training focuses on improving general and specific fitness components through structured exercises, including running, strength drills, flexibility exercises, and conditioning activities. For handball players, fitness-based training helps in enhancing movement efficiency, reducing fatigue, and improving coordination between physical fitness and skill performance.

At the district and college levels, many handball players participate in competitions without undergoing systematic physical conditioning. This often leads to poor performance, early fatigue, and increased risk of injuries. In regions like Raigad Tahasil, there is a need for simple, practical, and scientifically planned training programmes that can be easily implemented with limited facilities.

Skill variables such as passing accuracy and dribbling ability are essential for successful handball performance. These skills depend not only on technical practice but also on underlying physical fitness. Improved speed and agility enable players to move effectively during attacking and defensive situations, while muscular endurance helps maintain performance throughout the match.

The present study aims to examine the effect of a fitness-based exercise training programme on selected physical and skill variables of male handball players of Raigad Tahasil. The study attempts to provide empirical evidence regarding the usefulness of fitness training at the grassroots level. The findings are expected to contribute to the development of effective training strategies for handball players and encourage the inclusion of structured fitness programmes in regular coaching practices.

1.1 Objectives of the Study

1. To study the effect of fitness-based exercise training on selected physical variables of male handball players.
2. To study the effect of fitness-based exercise training on selected skill variables of male handball players.
3. To find out the overall effectiveness of fitness-based exercise training on handball performance.

1.2 Significance of the Study

1. The significance of the present study lies in its practical application for physical education teachers, coaches, and sports trainers working at the district and college levels. Handball performance is greatly influenced by physical fitness and skill efficiency. However, in

many training setups, especially at the grassroots level, structured fitness training is often neglected due to lack of awareness and resources.

2. This study highlights the importance of fitness-based exercise training in improving both physical and skill variables of handball players. The findings of the study provide scientific support for the inclusion of regular fitness training in handball coaching programmes. Coaches can use the results to design simple and effective training plans that focus on improving speed, agility, endurance, and skill performance.
3. The study is particularly significant for players of Raigad Tahasil, as it addresses the local training needs and conditions. It helps in understanding how a planned training programme can enhance performance even with limited facilities. The results can motivate players to adopt fitness-oriented training routines to improve their competitive performance.
4. From an academic perspective, the study contributes to existing literature by providing empirical data on fitness training and handball performance at the district level. It can serve as a reference for future researchers who wish to conduct similar studies in other regions or sports.
5. Overall, the study supports the development of a scientific approach to sports training and promotes the importance of physical fitness in achieving excellence in handball.

2. Hypotheses (H₀)

1. There is no significant difference between the pre-test and post-test mean scores of speeds of male handball players after the fitness-based exercise training programme.
2. There is no significant difference between the pre-test and post-test mean scores of agilities of male handball players after the fitness-based exercise training programme.
3. There is no significant difference between the pre-test and post-test mean scores of passing accuracy and dribbling performance of male handball players after the fitness-based exercise training programme.

3. Research Methodology

The present study adopted an experimental research design to examine the effect of fitness-based exercise training on selected physical and skill variables of male handball players. A single-group pre-test and post-test design was used. The training intervention was systematically planned and conducted for a fixed duration. Standardized tests, questionnaires, and observation methods were used for data collection.

3.1 Sample

The sample for the study consisted of 30 male handball players selected from Raigad Tahasil. The age of the subjects ranged between 17 and 23 years. The players had prior experience in handball and were actively participating in district or college-level competitions. Purposive sampling technique was used to select the subjects. All participants were medically fit and volunteered to participate in the study.

3.2 Data Collection Tools

In the present study, appropriate data collection tools were used to obtain accurate and reliable information related to selected physical and skill variables of male handball players.

Standardized skill performance tests and a systematic observation schedule were employed to assess training effects before and after the intervention.

Skill Performance Tests: Skill performance tests were used to measure handball-specific skills such as passing accuracy and dribbling ability. These tests were selected for their simplicity, objectivity, and suitability for district-level players. Standard procedures were followed to ensure uniform testing conditions and reliable measurement of skill performance.

Observation Schedule: An observation schedule was used to record players’ performance during training sessions and skill tests. The researcher systematically observed movement execution, coordination, and skill application. This tool helped in collecting qualitative information to support quantitative test results and provided a comprehensive understanding of players’ performance improvements.

3.3 Data Collection Process

Prior to the commencement of the study, permission was obtained from the concerned authorities and informed consent was taken from the subjects. Pre-test measurements of selected physical and skill variables were recorded using standardized procedures. After the pre-test, the subjects underwent an eight-week fitness-based exercise training programme.

The training sessions were conducted five days per week under the supervision of the researcher. Each session included warm-up, main training activities, and cool-down. After the completion of the training period, post-test measurements were taken using the same tools and procedures as the pre-test. The collected data were carefully recorded and tabulated for statistical analysis.

4. Data Analysis

The collected data were analysed using appropriate statistical techniques to determine the effectiveness of the training programme. Descriptive statistics such as mean and standard deviation were used. The paired ‘t’ test was applied to find out the significance of differences between pre-test and post-test scores.

Table 1: Comparison of Pre-Test and Post-Test Scores on Speed

Test	Mean (sec)	SD	Mean Difference	t-value	Level of Significance
Pre-Test	5.80	0.42	0.48	4.21*	Significant at 0.05
Post-Test	5.32	0.38			

*Significant at 0.05 level (df = 29)

Interpretation:

Table 1 indicates that the post-test mean score of speed is better than the pre-test mean score. The calculated t-value (4.21) is greater than the table value at 0.05 level of significance. Hence, the improvement in speed is statistically significant due to the fitness-based exercise training programme.

Table 2: Comparison of Pre-Test and Post-Test Scores on Agility

Test	Mean (sec)	SD	Mean Difference	t-value	Level of Significance
Pre-Test	12.40	0.65	0.78	5.03*	Significant at 0.05
Post-Test	11.62	0.58			

*Significant at 0.05 level (df = 29)

Interpretation:

Table 2 shows a significant improvement in agility performance after the training programme. The calculated *t*-value (5.03) exceeds the required table value at 0.05 level. Therefore, the fitness-based exercise training programme significantly improved the agility of male handball players.

Table 3: Comparison of Pre-Test and Post-Test Scores on Skill Performance

Skill Variable	Pre-Test Mean	Post-Test Mean	Mean Difference	<i>t</i> -value	Level of Significance
Passing Accuracy	12.6	16.8	4.2	6.15*	Significant at 0.05
Dribbling (sec)	15.4	13.9	1.5	4.87*	Significant at 0.05

*Significant at 0.05 level (df = 29)

Interpretation:

Table 3 reveals significant improvement in both passing accuracy and dribbling performance. The calculated *t*-values for passing and dribbling are greater than the table value at 0.05 level of significance. This indicates that the fitness-based exercise training programme had a positive and statistically significant effect on handball skill performance.

5. Result and Discussion

5.1 Results

The results of the present study revealed that the fitness-based exercise training programme had a positive and significant effect on selected physical and skill variables of male handball players. The analysis of pre-test and post-test scores showed noticeable improvement in speed, agility, muscular endurance, passing accuracy, and dribbling ability after the completion of the eight-week training programme.

The paired *t*-test results indicated that the calculated *t*-values for all selected variables were higher than the table value at the 0.05 level of significance. This confirms that the improvements observed in the post-test scores were not due to chance but were the result of systematic fitness-based exercise training. Speed performance improved as evidenced by reduced sprint time, while agility scores showed better change-of-direction ability. Similarly, skill performance tests revealed increased passing accuracy and reduced dribbling time, indicating enhanced coordination and control.

Overall, the findings clearly demonstrate that regular participation in fitness-based exercise training significantly enhances both physical fitness and handball-specific skill performance. Thus, the null hypothesis stating that fitness-based exercise training would not have a significant effect was rejected.

5.2 Discussion

The significant improvement observed in the physical and skill variables of male handball players can be attributed to the structured and progressive nature of the fitness-based exercise training programme. Handball is a sport that requires frequent acceleration, sudden changes of direction, and continuous skill execution under fatigue. The training programme focused on

developing these essential fitness components, which directly contributed to improved performance.

Improvement in speed may be due to regular running drills, dynamic movements, and conditioning exercises that enhanced neuromuscular coordination and muscle activation. Similarly, the improvement in agility can be linked to exercises involving quick footwork, directional changes, and balance, which are essential for effective handball performance. Enhanced muscular endurance allowed players to maintain their performance levels throughout training and testing sessions.

The improvement in passing accuracy and dribbling ability suggests that better physical fitness supports effective skill execution. As players became fitter, their movement efficiency, control, and coordination improved, leading to more accurate and consistent skill performance. These findings support the view that physical fitness forms the foundation for skill development in team sports.

The results of the present study are in agreement with previous research that reported positive effects of fitness and conditioning training on handball performance. Earlier studies have also emphasized that systematic fitness programmes improve both physical capabilities and technical skills. Therefore, the present study confirms that fitness-based exercise training is an effective and practical approach for improving handball performance at the district and college levels.

5.3 Results on Null Hypotheses

The results of the present study were analysed to test the formulated null hypotheses related to selected physical and skill variables of male handball players. The paired *t*-test was applied to compare pre-test and post-test mean scores for speed, agility, passing accuracy, and dribbling performance.

The analysis revealed that the calculated *t*-value for speed was greater than the table value at the 0.05 level of significance. Therefore, the null hypothesis related to speed was rejected, indicating a significant improvement in speed due to the fitness-based exercise training programme. Similarly, the calculated *t*-value for agility exceeded the critical value, leading to rejection of the null hypothesis for agility.

With respect to skill variables, the *t*-values obtained for passing accuracy and dribbling performance were also higher than the table value at the 0.05 level of significance. Hence, the null hypothesis stating that there would be no significant difference in skill performance was rejected. These results confirm that the fitness-based exercise training programme significantly influenced both physical and skill variables of male handball players.

6. Conclusion

The present study was conducted to examine the effect of a fitness-based exercise training programme on selected physical and skill variables of male handball players. Based on the analysis of pre-test and post-test data, it can be concluded that the training programme had a significant and positive effect on the performance of the players. The findings revealed marked improvement in physical variables such as speed, agility, and muscular endurance, as well as in skill variables including passing accuracy and dribbling ability.

The structured and regular nature of the fitness-based exercise training programme helped players develop better physical conditioning, which directly supported efficient execution of handball skills. Improved physical fitness enabled players to move faster, change direction more effectively, and maintain skill performance with reduced fatigue. This demonstrates that physical fitness plays a fundamental role in enhancing overall handball performance.

The study also highlights that simple and well-planned fitness exercises can bring significant improvements even at the district level, where advanced facilities may not always be available. Therefore, fitness-based exercise training should be considered an essential component of handball coaching programmes. In conclusion, the results of the study clearly support the effectiveness of fitness-based exercise training in improving both physical fitness and skill performance of male handball players, and its inclusion in regular training is strongly recommended.

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