



A Study Of Effect Of Plyometric Training On Agility Of Kho-Kho Players

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Abstract:

This study explores the impact of plyometric exercises on improving agility among state-level male Kho-Kho players from the Mumbai division. Agility is a vital skill in Kho-Kho, a game that requires quick reflexes, swift directional changes, and exceptional body control to surpass opponents. The ability to accelerate, decelerate, and change direction rapidly is crucial for success in the fast-paced dynamics of the sport. The research aimed to assess the effects of plyometric training on motor fitness components for state-level male Kho-Kho players from Mumbai Suburban and Thane. The study involved 60 players aged 18-20, who were randomly assigned into two groups of 30 participants each (N=30). Group I, the experimental group, underwent a structured plyometric training program for 12 weeks, with sessions held three times per week. Group II, the control group, continued with their regular curriculum without any additional training intervention. After completing the program, the participants were reevaluated using specific criterion variables. The difference between their pre- and post-training mean scores was used to measure the impact of the training. The hypothesis was tested at a 0.05 significance level, and a t-test was employed to analyze the data. The results showed that plyometric training strongly increased agility, a key motor fitness component for Kho-Kho players. This study highlights the effectiveness of plyometric exercises as a specialized training method for boosting the performance of state-level Kho-Kho players.

Key words: Plyometric training, agility, Kho-Kho.

Introduction

Kho-Kho is a traditional Indian sport played between two teams of twelve players each, with only nine players from each team allowed on the field at a time. While it is sometimes confused with Kabaddi, Kho-Kho features its own distinct rules and style of play. In this game, one team sits or kneels in a straight line in the center of the court, with each player facing alternate directions. Meanwhile, the opposing team sends three players onto the field, and the seated team's objective is to tag these players while running only in one specified direction. Known for its emphasis on speed, strategy, and teamwork, Kho-Kho has been a cherished sport in rural India for generations. As one of the country's most prominent indigenous games, it is primarily played on land and has seen organized competitions ranging from state to national levels. In recent years, significant efforts have been made to popularize Kho-Kho on a global scale, aiming to improve its standards and gain international recognition for this historic Indian sport.¹

Agility is the ability to move quickly and smoothly, combining strength, coordination, and balance to change direction efficiently while maintaining control. This skill is crucial in many sports and physical activities, as it allows athletes to react swiftly to changing situations and adapt to fast-paced environments. Agility goes beyond speed; it also requires quick decision-making, sharp reflexes, and the ability to accelerate, decelerate, and shift direction effortlessly without losing stability. Agility is a crucial component of performance in sports such as basketball, soccer, tennis, and Kho-Kho. It enables athletes to evade opponents, adapt to dynamic game situations, and execute complex movements with precision. For instance, basketball players rely on agility to manoeuvre through defenders and perform sharp pivots, while soccer players use it to outpace opponents and control the ball. Similarly, agility is vital in Kho-Kho, where players must make quick adjustments and move seamlessly to tag or evade others. Beyond its impact on athletic performance, agility also helps reduce the risk of injuries. Agility training focuses on enhancing reaction time, coordination, footwork, and body control. Drills like ladder exercises, cone drills, plyometrics, and reaction-based activities not only improve physical performance but also enhance balance and spatial awareness, contributing to injury prevention. Beyond sports, agility is equally beneficial for everyday life and general fitness, aiding in maintaining balance, flexibility, and control particularly important for preventing falls in older adults. Developing agility is valuable for individuals of all ages, whether they seek to excel in sports or improve their overall physical well-being and functional fitness. In summary, agility is a dynamic skill that integrates physical and mental components, playing a pivotal role in both sports performance and daily life. With consistent practice and targeted exercises, individuals can enhance their agility, improving their adaptability, performance, and success in various activities.²

Plyometric training is a focused exercise method designed to develop rapid and powerful movements, such as jumps and bounds, to boost an athlete's explosive strength. This type of training is highly effective in enhancing physical qualities like power, speed, agility, balance, cardiovascular endurance, and reaction time. By performing exercises that involve swift muscle stretching followed by contraction, athletes condition their muscles to generate maximum force in minimal time, resulting in notable performance gains. Studies have consistently shown the effectiveness of plyometric training across various sports disciplines. For instance, a study published in the *Journal of Sports Science and Fitness* found that a 3-week plyometric training regimen significantly enhanced speed, agility, and jump performance among badminton players.³

Specific plyometric exercises that can be advantageous for Kho-Kho players include squat jumps, box jumps, and lateral cone hops. These exercises are particularly effective in developing the lower body's explosive power and agility, which is essential for the rapid and dynamic movement's characteristic of Kho-Kho. Including upper-body plyometric exercises, such as medicine ball throws, can greatly improve overall coordination and reaction time, both crucial for athletic performance. However, despite its many advantages, plyometric training must be approached carefully. Correct technique is crucial to avoid injuries, and athletes should start with low-intensity plyometric exercises. Gradually increasing the intensity helps build strength and coordination while reducing the risk of harm. Consulting a qualified professional is recommended to ensure exercises are performed correctly and effectively incorporated into the athlete's training regimen. In conclusion, plyometric training is a highly effective tool for athletes, including Kho-Kho players, to enhance their explosive movements, agility, and overall performance. By systematically incorporating plyometric exercises into their training routines, athletes can achieve substantial improvements in the physical attributes essential for excelling in their respective sports.⁴

Hypothesis of the Study

H₀₁: There is no significant difference in the mean scores of agility of male kho-kho players belonging to Experimental and Control Groups.

H₁₁: There is significant difference in the mean scores of agility of male kho-kho players belonging to Experimental and Control Groups.

Methodology

The present study aimed to examine the effect of plyometric training on the motor fitness component of agility among state-level male Kho-Kho players from Mumbai Suburban and Thane. A total of 60 players,

aged 18-20, were randomly divided into two groups of 30 participants each (N=30). Group I, referred to as the Experimental Group (EG), participated in a structured plyometric training program for 12 weeks, with sessions conducted three times per week. Group II, designated as the Control Group (CG), followed their regular training regimen without any additional intervention. The impact of the plyometric training was assessed by comparing the pre- and post-training mean scores of agilities. The hypothesis was tested at a 5% level of significance, and the collected data were analyzed using a t-test to determine the differences in initial and final mean scores.

Analysis and Discussion

The data have been analyzed using an independent t-test with the online Vassar Stats computational package to test this hypothesis, as shown in the following table. This method is commonly used in sports science research to determine whether there are significant differences between two independent groups, such as the experimental and control groups in this study. The t-test provides insights into the effectiveness of the intervention, in this case, the plyometric training, by comparing the pre- and post-test scores of agilities.

Table 1: Mean Pre and Post Test Score on Agility of Control Group.

	n	ΣX	ΣX^2	SS	Mean	Mean a — Mean b	df	t	LoS
Pre-Control	30	390.50	5089.099	6.0817	13.0167	0.1267	29	+3.67	0.000972
Post Control	30	386.69	4989.009	4.447	12.89				

The mean gain in agility scores for the control group of kho-kho players between pre- and post-tests are **0.1267**. The calculated t-value is **+3.67** (0.000972), with degrees of freedom $df=29$ at a 5% level of significance. This indicates a slight improvement in the agility of kho-kho players with the regular training program. However, the change is marginal, suggesting limited effectiveness of the training for this group.

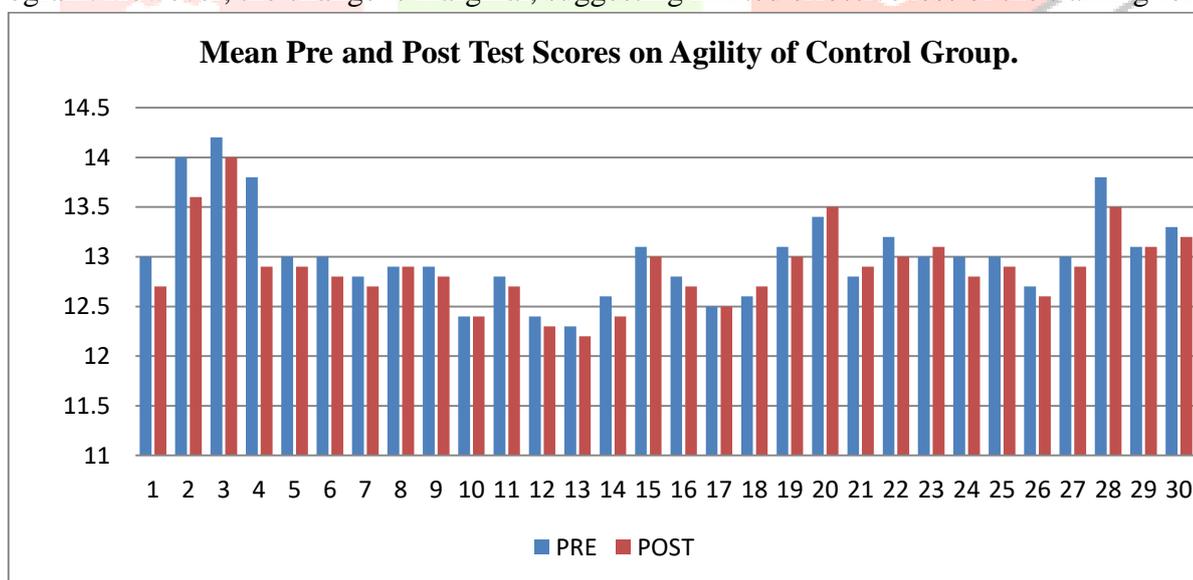
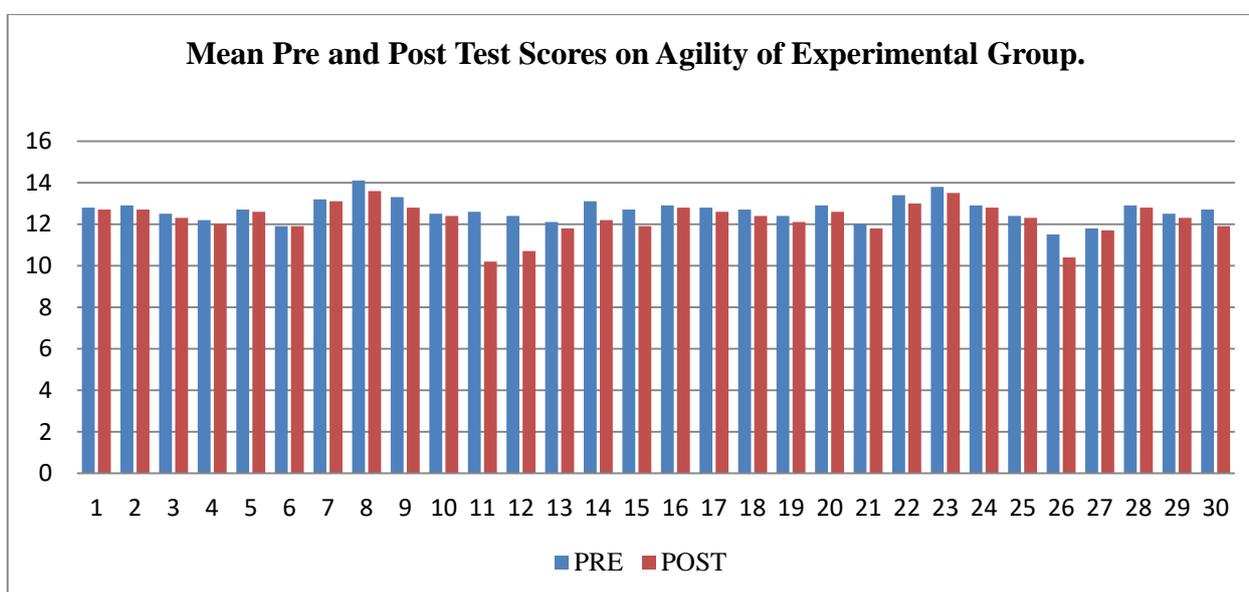


Figure 1: Graphical Representation mean pre and post test scores on agility of Control Group.

Table 2: Mean Pre and Post Test Score on Agility of Experimental Group.

	n	ΣX	ΣX^2	SS	Mean	Mean a — Mean b	df	t	LoS
Pre- Experimental	30	380.59	4837.57	9.0347	12.6867	0.4033	29	+2.28	0.026302
Post Experimental	30	368.49	4544.69	18.2817	12.2833				

The mean gain in agility scores for the experimental group of kho-kho players between pre- and post-tests are 0.4033. The calculated t-value is +2.28 (0.026302), with degrees of freedom $df=29$ at a 5% level of significance. This indicates a strongly improvement in the agility of kho-kho players with the plyometric training program. However, the change is marginal, suggesting limited effectiveness of the training for this group.

**Figure 2:** Graphical Representation mean pre and post test scores on agility of Experimental Group.**Table 3:** Mean Post Test Scores on Agility for the Control and Experimental Groups.

	n	ΣX	ΣX^2	SS	Mean	Mean a — Mean b	df	t	LoS
Post Control	30	386.69	4989.009	4.447	12.89	0.6067	58	+3.75	0.000530
Post Experimental	30	368.49	4544.69	18.2817	12.2833				

The statistical analysis of post-test agility scores highlights the effects of plyometric training on male Kho-Kho players. The experimental group ($n = 30$), which participated in a structured plyometric training program, demonstrated a significant improvement in agility with a mean score of 12.2833, compared to the control group's mean score of 12.89.

The mean gains in agility of Male kho-kho players 0.6067, the calculated t for the observed values is +3.75 ($p = 0.000530$) for $df = 58$ at 5% level of significance, which is highly significant, hence the agility is improved significantly with the plyometric training.

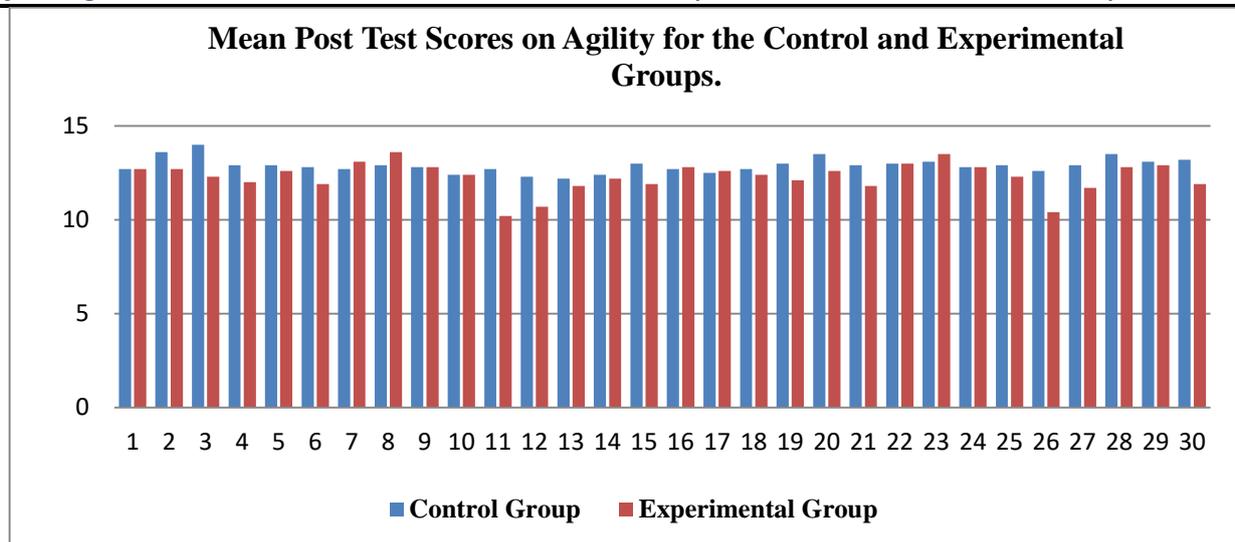


Figure 3: Graphical Representation of the mean post test scores on agility for the Control and Experimental Groups.

Conclusion

Plyometric exercises have a transformative impact on improving agility in state-level male Kho-Kho players from Mumbai Suburban and Thane districts. Coaches and trainers are advised to incorporate these exercises into their training sessions to boost player performance and competitiveness. Research has shown that plyometric training is an effective method for enhancing agility, and when integrated into an athlete's program, it can lead to better performance and reduced injury risks. Additionally, with proper technique, gradual progression, and safety precautions, plyometric training can be beneficial for athletes at various fitness levels, making it a valuable component of any sports training plan.

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