

A Comparative Study of Motor Fitness Components of Kho-Kho and Kabaddi Players

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Abstract—Motor fitness is a vital element in competitive sports and, hence, in enhancing an athlete's aerobic power. Games like Kho-Kho and Kabaddi are indigenous sports played in India that combine human abilities such as speed, agility, strength, endurance, flexibility, and coordination. Although both sports share commonalities, they differ in movement, physiological demands, and tactical play, and these differences can affect players' motor fitness characteristics in the two sports. The present study is designed to evaluate Kho-Kho and Kabaddi players on selected motor fitness parameters and to compare the two in this context. Sixty (30 Kho-Kho and 30 Kabaddi players, age 18-25) were selected for the study. Each athlete performed a series of standardized motor tests for the purpose of assessing speed, agility, endurance, flexibility and explosive power. Descriptive statistics were used, and an independent-samples t-test was performed to assess significant differences between the groups. The results indicated significant differences among sports with regard to specific motor fitness components, due to their differing physical requirements. The information presented in this study will benefit coaches, trainers, and physical educators in developing sport-specific conditioning regimens and improving elite athletes.

Keywords — Physical Education, Motor Fitness, Kho-Kho, Kabaddi, Sports Performance, Agility, Endurance, Speed, Strength, Flexibility, Explosive Power, Comparative Analysis, Sports Science.

I. INTRODUCTION

Physical fitness is a key factor in sports performance and an essential influence on an athlete's efficiency in training and competition. Physical fitness is a key determinant in movement efficiency, skill production, injury prevention and athletic success. Motor fitness, among all physical fitness components, is one of the most important factors affecting the performance of competitive sports [1]. Motor Fitness – The ability of the person to engage in physical activity involving speed, agility, strength, endurance, flexibility, balance, coordination and power. Successful high-quality athletes can respond to game conditions, perform their activities under fatigue, and act sport-specifically more effectively [2]. The wisdom of indigenous games in India is vast and holds great importance in both physical development/education and cultural heritage. Of these sports, Kho-Kho and Kabaddi are the two most popular and fiercely played sports in the country. The two games are physically demanding, and both have a high strategic element, but their physiological and action requirements are very different. It is really important to understand these differences to develop effective training initiatives and improve sports performance Effectiveness [3].

Kho-Kho is a game of tagging, played at a very fast pace and requiring players to react quickly, accelerate, and sprint. Chasers have to be quick, agile and have good balance and coordination. The game requires a great deal of agility, quickness,

reaction time and neuromuscular coordination. In Kho-Kho, players routinely perform running, dodging, and turning movements, so agility is one of the most important factors determining successful performance [4]. Kabaddi is an anaerobic, endurance-based, contact-based team game that requires physical strength, tactical intelligence, and the ability to make quick decisions. Players need to use explosive actions during raids or defensive situations, negotiate physically, and control their bodies under stress. This sport requires a high level of muscular strength, power, anaerobic fitness, and muscular endurance. Besides, being physically and mentally ready for tactical operations such as raid, block, hold, and escape [5].

Motor fitness is considered a fundamental factor in sports performance, encompassing speed, agility, strength, endurance, flexibility, and power. Many studies have examined the effects of these components on performance across various sports. These are the indigenous sports in India that require a high amount of motor fitness, for example, Kho-Kho, kabaddi and so on [7]. Recent research has stressed the need to evaluate motor fitness characteristics, determine the physical demands of a sport, and design a training plan that matches the sport's requirements. Comparative studies comparing players of Kho-Kho and Kabaddi have reported differences in agility, strength, endurance, and flexibility due to differences in the game actions, physiological requirements, etc., of both games [8].

A comparative study by Varsha Gautam (2022) involving 40 university-level Kho-Kho and Kabaddi players assessed motor fitness variables (speed, agility, endurance, and strength). There were significant differences in agility, endurance, and strength between the two groups, but no significant difference in speed (independent-samples t test). Kabaddi players proved to be stronger and more endurance, while Kho-Kho players proved to be

more agile [9]. A comparative evaluation of physical fitness variables of female Kho-Kho and Kabaddi players was published in 2024. The findings indicated that Kho-Kho players possessed better agility, speed, and flexibility than Kabaddi players due to the involvement of chasing and the fast-paced nature of Kho-Kho [10].

To compare motor fitness components between Kho-Kho and Kabaddi athletes, Chikkagoudra and Kellur (2026) conducted a study and found significant differences in the selected performance variables. They said the special physiological demands of the two sports give rise to differences in motor fitness profiles.

Physiology of Muscle Cell – In recent years, a growing area of interest in sports has focused on muscle cell physiology, resulting in physical preparation that optimizes performance. The results revealed that structured training interventions significantly improved physical fitness, physiological adaptations, and sports participation performance of Kabaddi players (González-Devesa et al. 2026). It is indicative of the development of a systematic training program to improve the fitness and physiological adaptations of Kabaddi players.

Many studies have been conducted separately on the physiological responses and physical fitness of Kho-Kho and Kabaddi players. Few studies, however, have compared them.

A majority of studies have concentrated on fitness variables and/or a restricted athlete population. It is essential to do a comparative study of the different components of motor fitness between Kho-Kho and Kabaddi players of different sports organizations so that we can know the demands of their respective sports and ground their training practices on evidence [12].

A. Research Gap: Certain research has focused on the motor fitness of individual sports, but not much has been conducted to compare the motor fitness of Kho-Kho & Kabaddi Players. Past studies generally

focused on elite athletes in a single sport and/or on specific fitness factors. Without detailed and high-quality analysis, the comparison of the components of motor fitness is possible due to differences in the nature of the game, playing style, as well as physiological load. This study can be highly beneficial for identifying and determining the specific fitness needs of the sport, which will further help coaches and trainers design training programs that focus on these needs [6].

II. RESEARCH METHODOLOGY

A. Research Design: The present study was descriptive and comparative, examining and comparing the motor fitness components of both Kho-Kho and Kabaddi players. This was deemed suitable because it would enable the researcher to establish differences in the physical fitness characteristics between two groups, and no variables would need to be altered. This study was designed to determine whether significant differences existed between the two groups of athletes and to evaluate selected motor fitness parameters [13].

B. Participants: In total, 100 male players were assessed. The sample was selected from Kho-Kho and Kabaddi players at 50 colleges, universities, and sports academies. The participants were individuals aged 18-25 with at least 2 years of competitive playing experience in their sport(s). At the time of data collection, all participants were physically fit and engaged in physical training, and competition regularly.

C. Sampling Technique: Purposive sampling was used to select the participants. This method was used since people with specific characteristics (active participation and experience in competitive Kho-Kho or Kabaddi) were required for the study. The sole criterion for selecting the players was that they were part of the target population and deemed suitable for measuring their sport-specific motor fitness characteristics.



Figure 1. Research Methodology Flowchart

D. Motor Fitness Variables: Motor fitness is the ability required for good sports performance. The motor fitness variables that were selected for assessment were based on the physiological needs of Kho-Kho and Kabaddi:

TABLE I
MOTOR FITNESS VARIABLES AND TESTS

Variable	Test Used
Speed	50 Meter Dash
Agility	4 × 10 Shuttle Run
Explosive Power	Standing Broad Jump
Flexibility	Sit and Reach Test
Strength	Push-Up Test
Endurance	600 Meter Run

E. Fitness Tests Employed: The motor fitness test was used to evaluate the selected variables, and it was standardized. They are generally suitable for sports science studies and are reliable indicators of physical performance.

• **Speed Test:** 50 Meter Dash: To measure speed,

the 50 Meter Dash was employed. All participants were asked to run 50m as fast as possible. A stopwatch was used to measure the time, in seconds, required to complete the distance.

- **Agility Test:** 4 X 10m Shuttle Run: 4 × 10 Meter Shuttle Run Test was used to determine agility. The participants would run in a square formation from line to line, 10 m apart, and changing direction quickly. The time necessary to complete the test was noted.
- **Explosive Power Test:** Standing Broad Jump: Lower-body explosive power was determined using the Standing Broad Jump Test. Participants started from a standing position and jumped forward; the furthest distance jumped was recorded in centimeters.
- **Flexibility Test:** Sit and Reach Test: Sit and Reach Test was used to measure flexibility. With their legs fully straightened, participants sat on the floor, reaching as far as possible. All tubing measurements were taken to the maximum reach (cm).
- **Strength Test: Push-up Test:** Strength and muscle capability assessment was conducted in terms of the Push-Up Test. Participants did as many pushups as they could get right without resting. The total number completed was scored as the final score.
- **Endurance Test:** 600 Meter Run: The 600m Run Test was used to assess cardiovascular endurance. The try was a 600-meter sprint for the lowest possible time. The times (in minutes and seconds) were recorded.

F. Data Collection Procedure: The data collection method was adopted as acceptable conditions in order to guarantee that the facts are valid and reliable.

Permission was obtained from the institutions/sports authorities before the test. The participants were explicitly informed about the purpose of this study, and they agreed to participate and provided consent.

All fitness assessments took place at a standard sports field and in ideal climatic conditions. Prior to the start of the testing session, a warm-up was conducted, including light jogging, stretching, and mobility drills for 10-15 minutes. The goal of the warm-up was to prepare your body for action. It was also to reduce the chances of you getting injured.

Participants were provided with specific information on the tests. Demonstration exercises of all fitness tests were performed to ensure uniformity of understanding. All tests were given one after the other, and sufficient rest was allowed between repeated tests to prevent fatigue effects.

After every test, an assessment was done immediately with assessment sheets. To avoid measurement errors, they were checked. All participants must do their utmost for the test.

Safeguards were observed during data collection. Sufficient water and first aid were provided, and appropriate staff were on hand. Any participant who found any discomfort or injury was prohibited from proceeding with further testing.

G. Statistical Analysis: All the gathered data were arranged, tabulated and analysed by suitable statistical methods. Descriptive (frequencies, percentages, etc.) and inferential (Means, Mann-Whitney Test, etc.) statistics were used to summarize the performance characteristics of the two groups and to identify significant differences between them.

The following statistics were used:

- **Mean:** Arithmetic mean was computed for each motor fitness variable to provide an average of each.

$$\bar{x} = \frac{\sum_{i=1}^N X_i}{N}$$

Where:

- $\bar{x}$ = Mean score
- $\sum X_i$ = Sum of observations
- N = Total number of observations

- **Standard Deviation:** Standard deviation was computed to determine the variation and the extent to which scores spread out from the average (mean).

$$SD = \frac{\sqrt{\sum_{i=1}^N (X_i - \bar{x})^2}}{N}$$

Where:

- SD = Standard deviation
- X = Individual score
- $\bar{x}$ = Mean score
- N = Number of observations

- **Independent Sample t-Test:** Thus, the averaged values for each motor fitness variable for both Kho-Kho and Kabaddi players were compared using an independent sample t-test.

$$t = \frac{\bar{x}_1 - \bar{x}_2}{\sqrt{\left(\frac{SD_1^2}{n_1}\right) + \left(\frac{SD_2^2}{n_2}\right)}}$$

Where:

- $\bar{x}_1$ = Mean score of Kho-Kho players
- $\bar{x}_2$ = Mean score of Kabaddi players
- SD_1 = Standard deviation of Kho-Kho players
- SD_2 = Standard deviation of Kabaddi players
- n_1 = Number of Kho-Kho players
- n_2 = Number of Kabaddi players

- **Level of Significance:** The criterion of significance for all of the statistical tests was set at: $p < 0.05$

A value of $p < 0.05$ was taken as significant, indicating the difference between the motor fitness characteristics of Kho-Kho and Kabaddi players was meaningful.

III. Results Analysis and Discussion

Descriptive and inferential Statistical techniques were used to analyses the collected data. The means and SDs for each of the motor fitness variables were determined. An independent sample t-test was used to identify the significant difference between Kho-Kho players and Kabaddi player at 5% level of significance.

- **Interpretation:** The findings showed that both the

50m running and Kho-Kho players has traversed the said distance in lesser time as compared to the Kabaddi players. This implies that the Kho-Kho athletes are able to perform their game faster.

TABLE II
COMPARISON OF SPEED PERFORMANCE
(50 METER DASH)

Group	Mean (sec)	SD	t-value	p-value
Kho-Kho Players	7.12	0.38	3.84	<0.05
Kabaddi Players	7.45	0.41	-----	-----

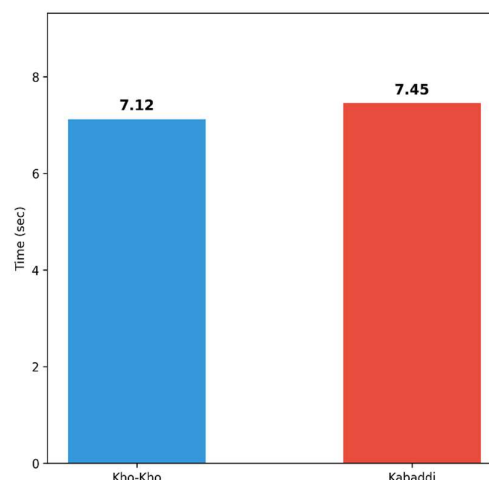


Figure 2. Comparative Speed Performance

- **Interpretation:** Kho-Kho players had a significantly higher level of agility performance than Kabaddi players. The game moves at a fast pace and often features rapid shifts in emphasis; these features may further boost agility.

TABLE III
COMPARISON OF AGILITY
PERFORMANCE (4 × 10 M SHUTTLE RUN)

Group	Mean (sec)	SD	t-value	p-value
Kho-Kho Players	10.21	0.52	4.26	<0.05
Kabaddi Players	10.86	0.57	-----	-----

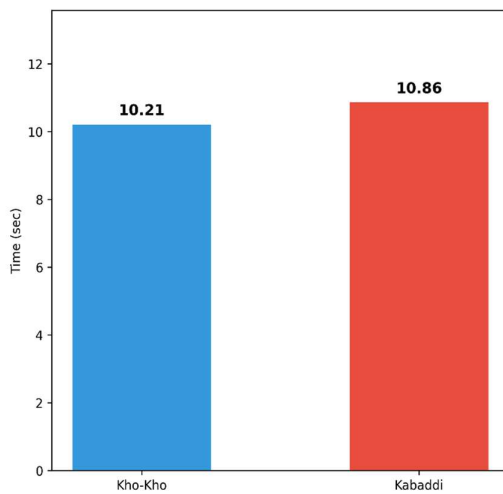
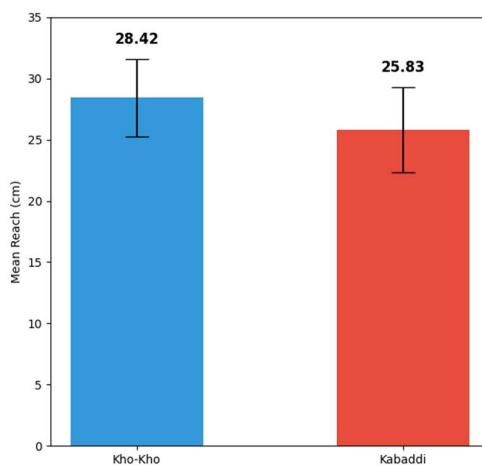


Figure 3. Comparative Agility Performance

•**Interpretation:** Kho-Kho players had also demonstrated significant flexibility as compared to Kabaddi players which is an inference of better joint mobility and movement efficiency in Kho-Kho players.

TABLE IV
COMPARISON OF FLEXIBILITY
PERFORMANCE (SIT AND REACH TEST)

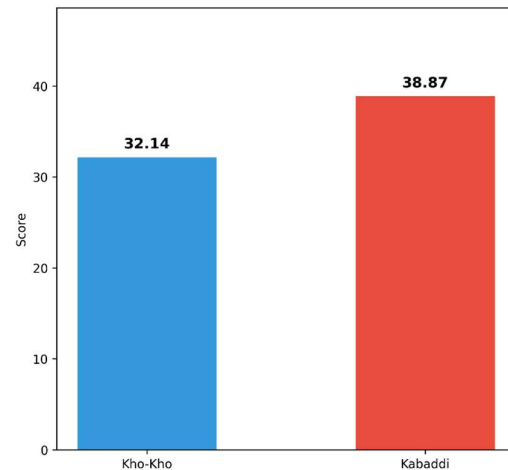
Group	Mean	SD	t-value	p-value
Kho-Kho Players	28.42	3.14	2.71	<0.05
Kabaddi Players	25.83	3.48	-----	-----



•**Interpretation:** The strength score of Kabaddi players was much higher than that of Kho-Kho players. Since Kabaddi is a contact sport, the players' muscles are likely more developed as a result.

TABLE V
COMPARISON OF MUSCULAR STRENGTH
(PUSH-UP TEST).

Group	Mean	SD	t-value	p-value
Kho-Kho Players	32.14	4.25	4.63	<0.05
Kabaddi Players	38.87	4.68	-----	-----



•**Interpretation:** The repeated endurance phase was done by Kho-Kho players in less time as compared to Kabaddi players, thus showing better cardiovascular endurance.

TABLE VI
COMPARISON OF CARDIOVASCULAR
ENDURANCE (600 M RUN)

Group	Mean	SD	t-value	p-value
Kho-Kho Players	2.08	0.16	3.11	<0.05
Kabaddi Players	2.21	0.18	-----	-----

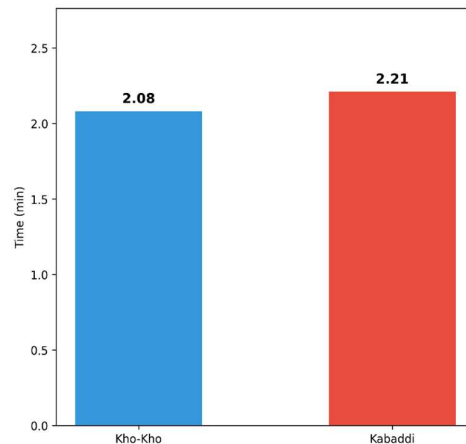


Figure 6. Comparative Endurance Performance

•**Interpretation:** The standing broad jump distances of kabaddi players were significantly higher than the duration of their action compared to other players, suggesting that they have more explosive capacity in their lower body, which can be utilized in playing the game.

TABLE VII
COMPARISON OF EXPLOSIVE POWER
(STANDING BROAD JUMP)

Group	Mean (cm)	SD	t-value	p-value
Kho-Kho Players	208.5	12.4	3.92	<0.05
Kabaddi Players	221.8	14.1	----	----

• **Overall Comparative Analysis:** The statistical difference showed that there is a significant difference between the players of the two games, Kho-Kho and Kabaddi, in all selected MFVs. Kho-Kho players showed greater speed, agility, flexibility, and cardiovascular endurance than Kabaddi players, who showed greater muscular strength and explosive power.

In the present study, the motor fitness components of Kho-Kho and Kabaddi players were compared, and significant differences were found between the two groups. The results indicate that specific sports elicit distinct fitness profiles due to the distinct physiological and movement demands they impose on the body.

• **Speed Performance:** Kho-Kho players showed their speed performance with significant superiority as compared to Kabaddi players. This result could be explained due to the repetitive nature of Kho-Kho which consist of numerous sprinting, chasing opponents and acceleration movements in short bursts. Players execute fast movements all game long, so they can improve their sprinting skills and neuromuscular efficiency.

• **Agility Performance:** The results revealed that Kho-Kho players had better agility. Being agile is an essential part of Kho-Kho, as players often have

to evade opponents and quickly respond to the changing dynamics and situations while shifting their body movement. Multi-directional movement improves agility performance through continuous exposure to this type of movement, which helps develop coordination, balance, and reaction speed.

• **Flexibility Performance:** The score of flexibility was greater for Kho-Kho players as compared to Kabaddi players. This frequent motion of bending, turning, stretching, and evasion throughout the game allows for greater joint mobility and muscle flexibility. New flexibility benefits may even decrease the likelihood of injury and increase movement efficiency in competition.

IV. CONCLUSION

The present study has been undertaken to compare the motor fitness components of Kho-Kho Man Players and Kabaddi Man Players and to identify any sport-specific differences in the selected motor fitness components. The analysis results indicated substantial differences between the two groups across many of the motor fitness parameters studied. This shows that the sports channels' physiological and movement requirements affect the development of motor fitness attributes.

The Kho-Kho players were found to be faster than the other players in terms of gameplay speed, as well as in agility, flexibility, and cardio-respiratory endurance. The advantages of these features can be seen in Kho-Kho's fast, continuous movement towards and around blocks, chasing plays, and consistent movement patterns. On the other hand, better muscle strength and explosive power were exhibited by kabaddi team players due to the presence of confrontation (tackles) and resistance (opponent) in raids, as well as anaerobic (high-intensity) activities.

Statistical analysis revealed that the differences were significant at the 0.05 level. Hence, the motor fitness profiles of Kho-Kho and Kabaddi players differ, and

vice versa. The study demonstrates the impact of sport-specific physical conditioning and good programs on sport performance: implications for practitioners.

From the coach's perspective, this information will be useful for coaches, trainers, sport scientists, and physical educators. A coach of Kho-Kho Players should develop agility, sprinting, flexibility, and aerobic conditioning. On the other hand, Kabaddi coaches must focus on developing strength, power, resistance, and aerobic training to improve the physical aspect of Kabaddi.

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