



Relationship between Selected Physical Fitness Variables and Performance of Kabaddi Players

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Abstract

Kabaddi is a physically demanding team sport in which success depends on the combined contributions of several fitness components. The present review examines the relationship between selected physical fitness variables and the performance of kabaddi players, with particular emphasis on speed, agility, muscular strength, explosive power, endurance, and flexibility. Available research indicates that these variables contribute differently to raiding, defending, tackling, rapid directional changes, and repeated high-intensity efforts. Agility and explosive power have frequently been shown to be meaningfully associated with playing ability, while endurance supports the capacity to sustain repeated efforts throughout a match. Strength is important during tackles, holds, and resistance against opponents, whereas speed contributes to rapid offensive and defensive movements. Flexibility may facilitate efficient movement and execution of sport-specific skills, although its relationship with overall performance is less consistent across studies. The literature also indicates that the relative importance of individual fitness components may vary according to playing position, competitive level, and methods used to assess performance. Overall, kabaddi performance appears to depend on an integrated physical fitness profile rather than a single fitness attribute. Understanding these relationships can help coaches develop more specific fitness assessment and conditioning programs for kabaddi players.

Keywords: Kabaddi, physical fitness, playing performance, agility, explosive power, strength, endurance.

1. Introduction

Kabaddi is a competitive contact sport that combines short-duration high-intensity movements with technical skill, tactical decision-making, and repeated physical effort. During a match, players are required to accelerate, change direction, dodge opponents, perform tackles, resist physical



contact, and recover quickly for subsequent actions. Consequently, successful performance depends on a combination of physical fitness and sport-specific abilities rather than on any single physical characteristic [1], [2].

The physical demands of raiding and defending are different but closely related. Raiders require quick movement, agility, explosive power, and sufficient flexibility to execute touches, escapes, turns, and sudden directional changes. Defenders depend considerably on strength, power, agility, and movement control when performing holds, blocks, and tackles. Endurance is also important because these actions are repeated throughout the competition.

Research involving kabaddi players has demonstrated relationships between playing performance and several physical fitness components. Agility, power, respiratory endurance, movement speed, dynamic balance, and active flexibility have been reported to be significantly associated with playing ability, although not all physical variables show equally strong relationships [3]. This suggests that the contribution of physical fitness to kabaddi performance is multidimensional and may vary according to the specific demands of play.

Recent evidence further indicates that structured conditioning programs can improve strength, speed, agility, flexibility, and kabaddi-specific performance [4]. Understanding which physical fitness variables are most closely associated with performance is therefore important for player assessment, training prescription, and performance development. The present review examines the relationship between selected physical fitness variables, particularly speed, agility, muscular strength, explosive power, endurance, and flexibility, and the performance of kabaddi players.

2. Physical and Performance Demands of Kabaddi

Kabaddi involves repeated bouts of high-intensity activity separated by relatively short recovery periods. The nature of the game requires players to combine physical fitness with technical execution and rapid decision-making. During a raid, a player enters the opponent's court, attempts to score through a touch or other successful offensive action, avoids defensive contact, and returns safely. Defenders, in contrast, attempt to restrict the raider through coordinated movements, blocks, holds, and tackles [1], [5].



These actions create different but overlapping physical demands. Raiders frequently depend on rapid acceleration, agility, explosive movements, and the ability to change direction under pressure. Defenders require considerable muscular strength and power to control an opponent, together with agility and reaction ability to respond to sudden movements. All-round players are required to perform both offensive and defensive roles and therefore need a relatively broad range of physical fitness.

Kabaddi also places considerable demands on both aerobic and anaerobic capacities. Earlier physiological investigations of Indian national-level players demonstrated that match play produces substantial cardiovascular and metabolic stress [5]. Although individual actions are often brief and explosive, players must repeatedly perform these actions throughout competition, making recovery capacity and endurance important for maintaining performance.

The physical requirements of kabaddi may also differ according to playing position. Research involving Indian junior kabaddi players has identified positional differences in physiological characteristics, particularly aerobic capacity, and has also observed relationships between muscle mass and anaerobic power [6]. Thus, the contribution of individual fitness variables should be considered in relation to the specific playing role and demands of competition.

Overall, competitive kabaddi requires an integrated combination of speed, agility, strength, explosive power, endurance, and movement efficiency. The interaction of these qualities provides the physical foundation for the effective execution of raiding and defensive skills.

3. Selected Physical Fitness Variables

3.1 Speed

Speed enables a kabaddi player to execute rapid movements during both offensive and defensive situations. Raiders require quick acceleration to approach opponents and return to their court, while defenders use speed to close space and support tackling actions. Although speed is an important conditioning component, its direct relationship with playing performance may vary with players' level and role [3], [7].



3.2 Agility

Agility is particularly important in kabaddi because players repeatedly change direction in response to opponents. Raiders use agile movements for dodging, turning, and escaping, whereas defenders require agility to adjust their position and respond to sudden changes in a raider's movement. Previous research has reported a significant relationship between agility and kabaddi playing performance [3].

3.3 Muscular Strength

Muscular strength contributes to the ability to produce and resist force during physical contact. It is especially relevant during ankle holds, thigh holds, blocks, and other defensive actions. Strength also helps raiders resist tackles and maintain effective body position. However, its contribution to overall playing performance may depend on the type of strength measured and the player's specific role.

3.4 Explosive Power

Explosive power represents the ability to generate high levels of force rapidly. Kabaddi players frequently require explosive actions during sudden acceleration, jumping, lunging, escaping, and tackling. Evidence suggests that power is significantly associated with playing performance and may be an important physical determinant of successful kabaddi performance [3], [8].

3.5 Endurance

Kabaddi consists of repeated high-intensity efforts performed throughout a match. Adequate endurance helps players recover between successive raids and defensive actions and maintain physical effectiveness as competition progresses. Both muscular and cardiorespiratory endurance may therefore contribute to sustained match performance.

3.6 Flexibility

Flexibility facilitates the range of motion required for reaching, turning, bending, kicking, and escaping from defensive situations. It may be particularly useful during technically demanding movements in which players must extend the body while maintaining control. However, evidence



suggests that the relationship between flexibility and overall kabaddi performance depends on the type of flexibility assessed and the player's specific movement requirements [3].

4. Relationship between Physical Fitness and Kabaddi Performance

Physical fitness and kabaddi performance are closely interconnected because most technical actions in the game require simultaneous contributions from several motor abilities. The importance of an individual fitness variable depends on the playing situation, the player's role, and the specific skill being performed.

4.1 Speed and Agility

Speed enables players to accelerate quickly during raids, pursuits, and defensive movements, while agility allows them to change direction efficiently in response to an opponent. These qualities are particularly important for raiders, who frequently use sudden turns and evasive movements to avoid tackles. Defenders also depend on rapid directional movement to close space and coordinate defensive actions. Kabaddi-specific studies have reported significant relationships between agility and playing ability [3], [7].

4.2 Strength and Explosive Power

Strength is important during direct physical contact between raiders and defenders. Defensive skills such as ankle holds, thigh holds, blocks, and tackles require players to generate sufficient force to control an opponent. Raiders also require strength to resist tackles and continue movement toward their own court.

Explosive power enables actions that require rapid force production, including jumping, lunging, sudden acceleration, and forceful escapes. Previous research has identified explosive power as one of the physical variables significantly associated with kabaddi playing ability [3], [8].

4.3 Endurance

Although individual raids are relatively short, a kabaddi match involves repeated high-intensity efforts. Endurance helps players maintain physical effectiveness and recover between successive



offensive and defensive actions. Adequate cardiorespiratory and muscular endurance may therefore help limit performance decline as a match progresses.

4.4 Flexibility

Flexibility supports the execution of movements involving reaching, bending, twisting, kicking, and extending the limbs. These movements are frequently observed during raiding and attempts to escape defensive holds. However, the relationship between flexibility and overall playing performance appears less consistent than that of agility or explosive power and may depend on the specific type of flexibility assessed [3].

Overall, the available evidence suggests that kabaddi performance results from the interaction of multiple fitness components rather than the dominance of a single variable. Speed and agility support rapid movement; strength and power facilitate forceful actions; endurance enables repeated performance; and flexibility contributes to movement efficiency. Their combined development is therefore important for effective kabaddi performance.

5. Evidence from Previous Studies

Research on physical fitness and kabaddi performance generally indicates that successful play is associated with a combination of physical attributes rather than a single fitness component. However, the strength of these relationships differs across studies and participant groups.

Naidu and Mohan [3] examined 82 male senior- and junior-national-level kabaddi players and reported significant positive relationships between playing performance and respiratory endurance, dynamic balance, reaction ability, movement speed, agility, active flexibility, coordination, accuracy, and power. Among the selected variables, respiratory endurance, power, and agility showed comparatively stronger relationships with playing performance.

Evidence from women's kabaddi players also supports the importance of fitness characteristics. Deepa and Dhanaraj [9] studied 50 women kabaddi players and found significant positive correlations between playing ability and speed, agility, and explosive power. Explosive power demonstrated the strongest relationship among the three variables investigated.



Comparative research on indigenous sports has further shown that kabaddi players possess distinct profiles of power, agility, strength, speed, flexibility, and endurance [10]. These characteristics reflect the game's multidirectional and intermittent nature and reinforce the need to evaluate multiple fitness components when examining player performance.

Recent systematic evidence provides additional support for the role of physical conditioning in kabaddi. González-Devesa et al. [4] reviewed ten randomized controlled trials involving 458 players and found that structured training interventions commonly improved strength, speed, agility, and other fitness characteristics. Some interventions also improved kabaddi-specific playing ability and technical skills.

Table 1. Selected Evidence on Physical Fitness and Kabaddi Performance

Study	Participants	Variables Examined	Major Finding
Naidu and Mohan [3]	82 male national-level players	Agility, power, endurance, balance, speed, flexibility and others	Several variables, particularly respiratory endurance, power and agility, were significantly related to playing performance
Deepa and Dhanaraj [9]	50 women kabaddi players	Speed, agility, explosive power	All three variables showed significant positive relationships with playing ability
Singh and Singh [10]	Kabaddi, kho-kho and wrestling players	Power, agility, strength, speed, flexibility, endurance	Different indigenous sports demonstrated distinct physical fitness profiles
González-Devesa et al. [4]	10 RCTs; 458 kabaddi players	Strength, speed, agility, flexibility and performance	Structured training generally improved important fitness variables and some sport-specific outcomes

Taken together, the literature indicates that agility and explosive power are particularly relevant to kabaddi performance, while endurance, movement speed, strength, flexibility, balance, and



coordination may also contribute, depending on the playing situation and the athlete's characteristics. The evidence, therefore, supports a multidimensional approach to the assessment of physical fitness in kabaddi players.

6. Discussion

The available evidence indicates that physical fitness contributes substantially to kabaddi performance, but the influence of individual fitness variables is not uniform. Kabaddi is characterized by short, explosive, and unpredictable movements; therefore, physical qualities that enable players to respond rapidly and control their movements appear particularly relevant to successful performance.

Among the selected variables, agility and explosive power emerge as important performance-related qualities. Agility allows players to accelerate, decelerate, and change direction during raids and defensive actions, while explosive power assists in sudden lunges, jumps, escapes, and forceful tackles. The significant relationships reported between these variables and playing ability support their importance in the physical preparation of kabaddi players [3], [9].

Strength and speed are also important from a functional perspective, although their statistical relationship with overall playing performance has not been consistent across studies. This may occur because general strength or straight-line speed tests do not fully represent the complex movements performed during actual kabaddi competition. Sport-specific forms of strength, movement speed, and explosive ability may therefore provide more meaningful indicators of playing performance.

Endurance contributes differently because kabaddi combines brief high-intensity actions with repeated recovery periods. Adequate aerobic and anaerobic capacities allow players to repeat demanding movements and maintain their effectiveness throughout competition. Similarly, flexibility can assist in reaching, turning, escaping, and performing technically demanding movements, but its contribution may depend on the specific playing situation.

An important observation from the literature is that no single physical fitness variable can adequately explain kabaddi performance. Technical skill, tactical awareness, reaction ability, coordination, playing position, and experience interact with physical fitness during competition.



Therefore, physical fitness should be considered an important foundation for performance rather than an isolated determinant of success.

Overall, the evidence supports a multidimensional approach to kabaddi conditioning. Training programs should develop agility, explosive power, strength, speed, endurance, and flexibility while integrating these qualities with sport-specific technical and tactical practice.

7. Practical Implications

Understanding the relationship between physical fitness variables and kabaddi performance has important implications for coaches, trainers, and players. A physical fitness assessment can be used to identify individual strengths and limitations and to develop training programs tailored to the player's specific requirements.

Training should emphasize agility and explosive power, as these variables have demonstrated meaningful relationships with kabaddi playing ability. Drills involving rapid changes of direction, acceleration, jumping, and explosive movements may therefore be incorporated into regular conditioning. Strength development should also remain an important component, particularly for defensive players who frequently perform tackles, holds, and blocks [3], [4].

The physical preparation of players should also take into account their playing roles. Raiders may benefit particularly from agility, speed, explosive power, and movement efficiency, whereas defenders require greater emphasis on strength, power, and the ability to repeatedly perform forceful actions. Endurance training is relevant to both groups because players must sustain repeated high-intensity efforts throughout competition.

Fitness testing may additionally support player selection and talent identification. Rather than relying on a single physical test, coaches should assess a combination of speed, agility, strength, explosive power, endurance, and flexibility. Such a multidimensional approach can provide a more complete understanding of a player's physical readiness and help guide individualized training.

Overall, physical conditioning should be integrated with technical and tactical practice. Developing fitness variables in situations that resemble actual kabaddi movements may provide greater transfer to competitive performance than developing these qualities in isolation.



8. Research Gap and Future Directions

Although previous studies have established relationships between physical fitness variables and kabaddi playing ability, several gaps remain in the available literature. Many studies have been conducted with relatively small or specific samples, such as male college or national-level players, which limits the generalization of findings to players of different ages, competitive levels, and sexes [3], [9].

Another limitation is the variation in methods used to assess kabaddi performance. Some studies have relied on coaches' ratings, while others have considered match-related skills or performance indicators. Differences in fitness testing procedures also make direct comparison between studies difficult. Consequently, the relative contributions of speed, agility, strength, power, endurance, and flexibility to actual competitive performance have not yet been fully established.

Playing position is another area requiring greater attention. Raiders, defenders, and all-rounders perform different technical actions and may therefore require different physical fitness profiles. Existing research has identified position-related differences in physiological characteristics, but more comprehensive investigations are required to determine which fitness variables are most important for each playing role [11].

Future studies should include larger, more diverse samples, standardized fitness tests, and objective match performance indicators. Longitudinal studies are also needed to determine whether improvements in specific fitness variables translate into corresponding improvements in competitive kabaddi performance. Such evidence would help develop more precise, position-specific training and talent-identification strategies.

9. Conclusion

The present review indicates that selected physical fitness variables are strongly related to the performance of kabaddi players. The physical demands of kabaddi require players to combine speed, agility, muscular strength, explosive power, endurance, and flexibility while performing repeated offensive and defensive actions.



Among these variables, agility and explosive power appear to have particularly strong associations with playing ability, as they contribute directly to rapid changes in direction, acceleration, tackling, dodging, and escape movements. Endurance supports sustained high-intensity effort, while strength is essential in physical contact and defensive actions. Speed and flexibility also contribute to effective movement, although their relationships with overall performance have varied across studies.

Available evidence further demonstrates that kabaddi performance cannot be explained by physical fitness alone. Technical skill, coordination, reaction ability, tactical decision-making, playing position, and experience interact with physical characteristics during actual competition. Therefore, successful kabaddi performance should be viewed as the result of an integrated combination of physical and sport-specific abilities.

Overall, the evidence supports comprehensive fitness assessment and systematic conditioning of kabaddi players rather than emphasizing a single physical variable. Further research using standardized fitness measures and objective match performance indicators is required to clarify the relative contributions of individual fitness components to competitive kabaddi performance.

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