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Correlation between physical fitness components and playing ability among rural area women Kabaddi players

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Abstract

Background: Kabaddi is a dynamic sport requiring a high level of physical fitness, including Speed, agility, explosive power, grip strength, and cardiorespiratory endurance. Understanding the correlation between these physical fitness components and playing ability among women Kabaddi players in rural areas can provide insights into optimizing training and improving performance.

Aim: This study aims to explore the correlation between key physical fitness components (speed, agility, explosive power) and the playing ability of women Kabaddi players from rural areas.

Method: A total of 50 women Kabaddi players from rural regions in Coimbatore were selected for this study. Physical fitness components were assessed using standardized tests: laying ability was gauged based on performance metrics such as successful raids, successful tackles, and overall match performance, recorded through observation and match statistics. Correlation analyses were conducted to determine the relationship between the physical fitness components and playing ability.

Results: The study found a strong positive correlation between playing ability and key physical fitness components among women Kabaddi players. Speed ($r=0.873r = 0.873r=0.873$), agility ($r=0.854r = 0.854r=0.854$), and explosive power ($r=0.901r = 0.901r=0.901$) were all significantly associated with improved playing ability, with $p=0.000p = 0.000p=0.000$ for each correlation. These findings highlight the importance of these fitness components in enhancing performance in Kabaddi.

Conclusion: The study concludes that physical fitness components, particularly speed, agility, explosive power significantly influence the playing ability of women Kabaddi players in rural areas. Enhancing these fitness components through targeted training could improve overall performance in Kabaddi. These findings underscore the importance of incorporating comprehensive physical fitness training into preparation programs for rural women Kabaddi players.

Keywords: Kabaddi, physical fitness, playing ability, rural area women

Introduction

Kabaddi, a traditional Indian sport with roots tracing back over 4,000 years, has long been a vital part of rural culture, particularly in the Indian subcontinent (Ramesh & Rao, 2019) ^[13]. The game, which was initially played as a means of physical exercise and recreation, has evolved into a competitive sport, with structured rules and organized tournaments that have elevated it to national and international prominence (Kumar *et al.*, 2023) ^[7]. Despite its modernization, kabaddi remains a cornerstone of rural life, offering a unique blend of physical challenge and communal participation, especially for women in these regions (Sharma & Gupta, 2020) ^[17].

For women in rural areas, kabaddi is more than just a game; it is a powerful tool for empowerment and social change. In societies where women often face restrictions in various aspects of life, kabaddi has emerged as a platform for them to assert their physical capabilities and gain recognition beyond traditional roles (Singh & Kaur, 2022) ^[18]. The sport's accessibility, requiring minimal equipment and space, makes it particularly suitable for rural communities where resources are scarce (Verma & Devi, 2021) ^[21]. Kabaddi provides these women with an opportunity to engage in physical activity, build self-confidence, and foster a sense of community, all of which contribute to their overall social and physical development (Verma & Devi, 2021) ^[21].

Despite the lack of access to formal training facilities and infrastructure, rural women have demonstrated remarkable levels of fitness and skill in kabaddi (Rao, 2017) ^[14].

This can largely be attributed to their physically demanding daily routines, which naturally enhance their endurance, strength, and agility (Rao, 2017) ^[14]. However, these players often rely on innate talent and community-based learning rather than structured training programs, which could further refine their abilities and optimize their performance on the field (Sharma & Das, 2019). The need for targeted fitness training becomes apparent when considering the physical demands of kabaddi, which require players to develop key fitness components such as speed, agility, and explosive power (Patil *et al.*, 2023) ^[11].

Speed is a critical component in kabaddi, enabling players, particularly raiders, to move quickly and outmaneuver opponents during a raid (Singh *et al.*, 2018) ^[19]. The ability to execute swift movements can be the difference between success and failure in the game (Patil *et al.*, 2023) ^[11]. Agility, another essential fitness component, allows players to make rapid changes in direction, a necessity in kabaddi's fast-paced environment where players must constantly evade or confront opponents (Singh *et al.*, 2018) ^[19]. Explosive power is equally important, providing the strength needed for dynamic actions such as jumping, tackling, and resisting tackles, all of which are integral to both offensive and defensive play (Singh *et al.*, 2018) ^[19]. These physical attributes are interdependent and collectively contribute to a player's overall effectiveness in kabaddi (Singh *et al.*, 2018) ^[19].

Research has highlighted the importance of specific training programs aimed at enhancing these fitness components (Gaurav & Thakur, 2020) ^[5]. Agility drills, sprint training, and plyometric exercises are among the most effective methods for improving speed, agility, and explosive power, respectively (Gaurav & Thakur, 2020) ^[5]. When such training programs are tailored to the unique needs and existing fitness levels of rural women players, they have the potential to significantly elevate the standard of kabaddi in these regions (Joshi & Mehta, 2021) ^[6]. By addressing the gaps in training and focusing on developing these critical physical attributes, rural women can enhance their performance, thereby increasing their chances of success in competitive settings (Joshi & Mehta, 2021) ^[6].

To further explore these relationships, this paper aims to investigate the correlation between physical fitness components and playing ability in kabaddi, emphasizing the sport's importance beyond mere recreation in rural India (Verma & Sharma, 2022) ^[22]. For women, kabaddi serves as a powerful tool for empowerment, physical fitness, and social recognition (Singh & Kaur, 2022) ^[18]. The strong link between fitness attributes such as speed, agility, and explosive power, and a player's performance underscores the need for targeted training programs (Patil *et al.*, 2023) ^[11]. By enhancing these critical fitness components, rural women kabaddi players can elevate their performance, contributing to the sport's growth and success on both national and international stages (Joshi & Mehta, 2021) ^[6]. Continued support through structured training and resources is essential not only for improving their competitive edge but also for fostering a more inclusive and equitable future in sports (Verma & Sharma, 2022) ^[22].

Review of Literature

Kumar *et al.* (2023) ^[8] aimed to assess the impact of circuit training on the physical fitness of Kabaddi players. The research involved 120 male Kabaddi players, aged 20 to 30, who were divided into an experimental group that underwent

an 8-week circuit training program. Training sessions were held five days a week, with pre- and post-tests conducted to measure the players' physical fitness levels. The data was analyzed using a t-test with a significance level of 0.05. The findings revealed a significant improvement in the physical fitness of the Kabaddi players following the circuit training. Bhavya and Hanumanthayya (2021) ^[2] aimed to identify the physical and psychological variables that best predict Kabaddi performance among female players. Fifty female Kabaddi players, aged 14 to 17, from various schools in Mandya district were selected. Physical variables assessed included leg and shoulder explosive strength, abdominal strength endurance, flexibility, and agility. Psychological variables included sports competition anxiety and self-confidence. Playing ability was rated by three experts on a ten-point scale. Data collection involved standardized tests, and statistical analysis was conducted using descriptive statistics, Pearson correlation, and linear regression at a 0.05 significance level. The findings showed that all physical variables were significantly correlated with playing ability, while the psychological variables were not. Regression analysis indicated that muscular endurance and flexibility were the most significant predictors of Kabaddi playing ability.

Yallappa (2020) ^[24] explored the relationship between Kabaddi performance and selected physical and psychological variables in university male Kabaddi players. A total of 180 players were assessed for physical fitness variables, including speed, agility, power, flexibility, pull-ups, and endurance, as well as psychological variables like anxiety, aggression, and self-confidence. Performance was rated using a 10-point scale. The findings showed that speed, leg explosive power, and endurance were significantly correlated with Kabaddi performance, while agility, arm power, flexibility, resting pulse rate, and breath-holding time were not significantly correlated.

Aggarwala *et al.* (2019) ^[1] evaluated and compare selected physical and physiological variables among Indian male junior Kabaddi players based on their playing positions - all-rounders, raiders, and covers - and to establish relationships between these variables. The study involved 24 players, with measurements taken for height, body mass, BMI, body fat ratio, muscle mass, aerobic power (VO₂max), and anaerobic power. Significant differences were found in VO₂max among the groups. Strong positive correlations were identified between muscle mass and various measures of anaerobic power, as well as between body mass and anaerobic power. BMI also showed moderate positive correlations with anaerobic power. These findings provide valuable insights for coaches to tailor training programs according to the specific needs of players in different positions.

Ryagia and Bhairaddy (2017) ^[15] aimed to explore the relationship between motor fitness variables and the playing ability of intercollegiate Kabaddi players. A sample of 100 players from colleges affiliated with Gulbarga University, Karnataka, was selected, with participants aged 18-25 years. The motor fitness variables examined included speed, explosive strength, cardiorespiratory endurance, coordinative ability, and flexibility. These were assessed using various tests: 50-meter run (speed), standing broad jump (explosive strength), 600-yard run/walk test (cardiorespiratory endurance), 4x10-meter shuttle run (coordinative ability), and sit-and-reach test (flexibility). Playing ability was evaluated based on skills like touching, kicking, footwork, catching,

chin movements, defensive skills, and tactics. Using the Pearson Product Moment Coefficient of Correlation, the study found a significant correlation between all motor fitness variables and playing ability at a 0.05 significance level, highlighting the importance of motor fitness in enhancing Kabaddi players' performance.

Methodology

The research employs a cross-sectional design to explore the correlation between physical fitness components and playing ability among rural area women Kabaddi players. Focusing on three key physical fitness variables speed, agility, and explosive power the study aims to assess their impact on the players' overall performance. The participant pool consists of 50 rural women in Coimbatore aged 18 to 20 years, selected based on a screening test to ensure they have been actively participating in Kabaddi for at least two years.

Speed is measured using the 50-meter dash, agility is assessed through the Shuttle Run test, and explosive power is evaluated by the Standing Broad Jump test. The dependent variable, playing ability, is assessed based on players' Kabaddi skills and performance, with scores derived from competitive matches and evaluated by coaches using a standardized scoring system for consistency and reliability. Descriptive statistics summarize the scores of physical fitness components and playing ability, while the Pearson correlation coefficient is calculated to determine the strength and direction of the relationships, with significance tested at the 0.05 level. This methodological approach is designed to provide valuable insights into how specific fitness components influence performance, ultimately aiding in the development and enhancement of these athletes. A flowchart (Figure 1) illustrates the study protocol.

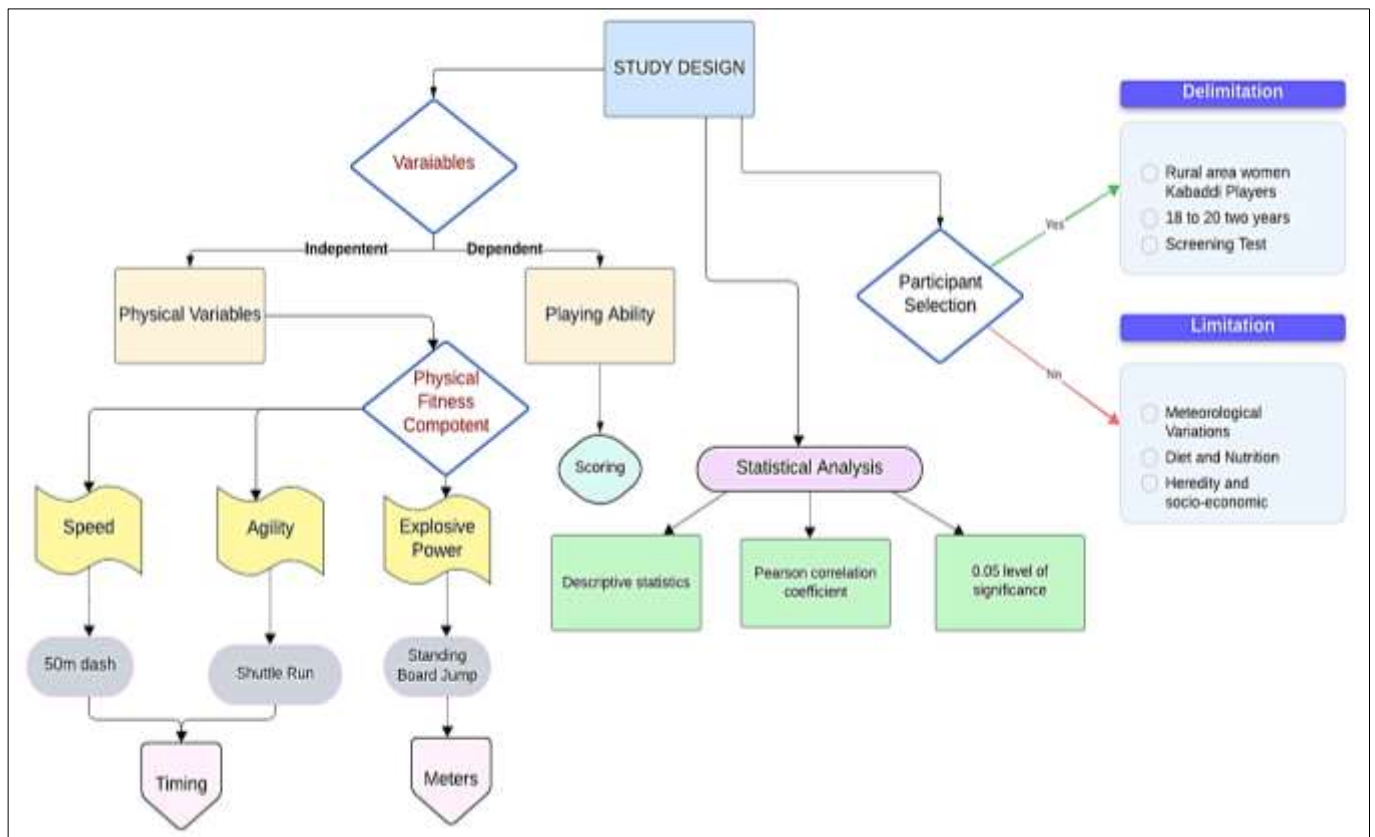


Fig 1: Flow Chart

Results

Table 1: Shows the descriptive statistics results

Variable	Mean	SD	N
Speed	8.37	0.24	50
Agility	15.15	0.40	50
Explosive	1.46	0.10	50
Playing	8.02	0.62	50

Table 2: Shows the correlation value between independent and dependent variables

Correlation between		r value	Sig.
Playing Ability	Speed	.873**	.000
	Agility	.854**	.000
	Explosive	.901**	.000

The analysis reveals a very strong positive correlation between playing ability and the variables of speed, agility, and explosive power, with all relationships being statistically significant. The correlation between playing ability and speed is $r=.873$ with a significance value of $p=.000$, indicating that as speed improves, playing ability increases significantly. Similarly, the correlation between playing ability and agility is $r=.854$, also with $p=.000$, suggesting that greater agility is strongly associated with better playing ability. The strongest relationship is observed between playing ability and explosive power, with a correlation of $r=.901$ and $p=.000$, highlighting that enhancements in explosive power are closely linked to improved playing ability. The significance values for all these correlations are $.000.000.000$, providing strong evidence that speed, agility,

and explosive power are critical factors influencing playing ability.

Discussion and Conclusion

The results of this study reveal very strong positive correlations between playing ability and the variables of speed, agility, and explosive power among kabaddi players. Specifically, the correlations are $r=.873$ for speed, $r=.854$ for agility, and $r=.901$ for explosive power, with all correlations being statistically significant at $p=.000$. These findings suggest that as kabaddi players improve their speed, agility, and explosive power, their overall playing ability significantly enhances.

Kabaddi is a dynamic and high-intensity sport that requires players to perform rapid, forceful movements, and make quick decisions in a constrained space. The strong correlation between speed and playing ability can be attributed to the sport's reliance on rapid sprints and quick reflexes, particularly during raids and defensive strategies. Players who can accelerate quickly and maintain high speed are more effective in evading tackles and pursuing opponents, which directly contributes to their overall playing ability.

The strong correlation between agility and playing ability reflects the importance of quick directional changes, balance, and body control in kabaddi. Agility is crucial for players to evade defenders, dodge tackles, and maintain a stable stance during intense movements. The ability to rapidly shift direction and maintain balance is essential for both raiders and defenders in kabaddi, allowing them to perform complex maneuvers efficiently.

Explosive power, which shows the strongest correlation with playing ability, is critical in kabaddi for executing powerful bursts of movement. Whether in offense or defense, players need explosive power to initiate sudden movements, escape tackles, or apply forceful tackles to opponents. The ability to generate quick and powerful force is a key determinant of success in kabaddi, explaining the strong association between explosive powers and playing ability.

The findings of this study are consistent with previous research in sports science, particularly studies that have focused on contact sports and activities requiring high levels of physical fitness. For example, Sinha *et al.* (2016) [20] conducted a study on kabaddi players and found that speed and agility were critical determinants of performance. Their research emphasized the need for specialized training to enhance these physical attributes, which are directly linked to successful performance in kabaddi.

Similarly, Verma and Prakash (2018) [23] highlighted the role of explosive strength in improving kabaddi performance, noting that it is essential for both offensive and defensive actions. The strong correlation observed between explosive power and playing ability in this study supports their findings, indicating that explosive power is a vital component for excelling in kabaddi.

Additional support for these findings comes from studies in other sports with similar physical demands. For instance, Gabbett (2002) [4] examined rugby players and found that speed and agility were significant predictors of success in high-contact sports. This mirrors the strong correlations found in kabaddi, a sport where rapid movements, quick directional changes, and powerful actions are necessary.

In the context of agility, a study by Young *et al.* (2001) [25] on team sports athletes also found that agility is a critical factor

in sports requiring quick changes in direction and speed, similar to kabaddi. They emphasized that agility training could significantly enhance sports performance, supporting the findings of the current study.

Furthermore, research by Chaouachi *et al.* (2009) [3] on handball players, a sport that shares the physical demands of kabaddi, found that explosive power was a strong predictor of performance. Their study showed that athletes with higher explosive power were more effective in executing powerful actions, such as jumps and rapid sprints, which are also critical in kabaddi.

A study by Rajesh and Arumugam (2014) [12] specifically focused on kabaddi players, indicating that a combination of speed, agility, and explosive power training could significantly improve the players' overall performance. Their findings align closely with the results of the present study, further validating the importance of these physical attributes in kabaddi.

In conclusion, the strong correlations between speed, agility, explosive power, and playing ability among kabaddi players are consistent with the physical demands of the sport and are supported by extensive research in both kabaddi and other contact sports. These results underscore the importance of targeted physical conditioning, particularly focusing on speed, agility, and explosive power, to enhance playing ability in kabaddi. The evidence from previous studies provides robust support for the current findings, suggesting that these physical attributes are critical for success in kabaddi and should be prioritized in training programs.

Recommendation

To enhance the playing ability of kabaddi players, it is essential to incorporate targeted physical conditioning focused on speed, agility, and explosive power, given their strong correlation with performance. Regular speed training sessions, including sprint drills and plyometric exercises, should be emphasized to improve acceleration, maximum speed, and speed endurance. Agility development is also crucial, with training programs incorporating ladder drills, cone drills, and shuttle runs to enhance quick directional changes, balance, and body control. Explosive power training, which showed the strongest correlation with playing ability, should include exercises like jump squats, box jumps, and power cleans to build the explosive strength required in kabaddi. Integrating plyometric and strength training will further maximize the benefits of these physical attributes, enabling players to develop the power necessary for high-intensity performance.

Moreover, conditioning programs should be sport-specific, simulating the movements and physical demands of kabaddi, such as tackling, evading, and quick bursts of speed in confined spaces. Regular assessments of speed, agility, and explosive power are recommended to track progress and adjust training programs as needed, using tools like timing gates, agility tests, and power measurements. Recovery protocols and injury prevention strategies, including dynamic warm-ups, stretching, and targeted strength exercises, should be integrated to ensure consistent training and minimize the risk of injury. Training should also be tailored to the specific needs of players based on their positions, ensuring that raiders, defenders, and all-rounders develop the physical attributes most critical to their roles. Lastly, utilizing sports science and technology, such as wearable devices and performance tracking software, can provide valuable insights into players' physical performance, allowing for fine-tuning of training programs and optimization of player development.

Implementing these strategies will significantly enhance playing ability and lead to improved performance on the kabaddi court.

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