

ANALYSIS OF ANTHROPOMETRIC, BIO-MOTOR, PHYSIOLOGICAL, AND PSYCHOLOGICAL FACTORS INFLUENCING PLAYING ABILITY AMONG FEMALE KABADDI PLAYERS

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Abstract: *The present study aimed at examining a comprehensive set of anthropometric, bio-motor, physiological, and psychological factors that influence playing ability among female kabaddi players. The study was conducted on 85 district-level female Kabaddi players of Manipur with age ranging from 18-25 years. The data were analyzed using descriptive statistics and correlation analysis to determine the relationship between playing ability and the selected variables. The results indicate that playing ability is significantly correlated with variables such as weight ($r = 0.988, p < 0.05$), arm length ($r = 0.758, p < 0.05$), grip strength ($r = 0.978, p < 0.05$), explosive power ($r = 0.901, p < 0.05$), VO_2 Max ($r = 0.970, p < 0.05$), breath holding time ($r = 0.960, p < 0.05$), sports achievement motivation test ($r = 0.222, p < 0.05$) and Rosenberg self-esteem ($r = 0.993, p < 0.05$). The findings indicate that weight and arm length positively correlate with performance, enhancing stability and reach. Among bio-motor factors, grip strength and explosive power are significant contributors, facilitating effective raids and defensive maneuvers. Physiological parameters, including VO_2 max and breath-holding time, also exhibit a positive relationship with playing ability, highlighting the importance of endurance. Furthermore, psychological factors demonstrate a significant association with performance, emphasizing the role of mental well-being in competitive success. These results suggest that Kabaddi training programs should focus on enhancing strength, power, endurance, and psychological resilience. The study provides a foundation for talent identification, player selection, and performance optimization, with implications for future research across different competitive levels and playing positions.*

Keywords: Kabaddi, Playing Ability, Anthropometry, Bio-Motor, Physiological and Psychological factors

Introduction:

Kabaddi is a traditional contact sport that originated in South Asia and has gained international recognition due to its unique blend of strength, agility, and strategic gameplay. The sport involves two teams alternating between offense and defense, where the attacking player, known as the raider, must tag opponents and return to their half while holding their breath. The defensive team, in turn, aims to stop the raider using various tactics. Kabaddi requires a combination of physical fitness, mental resilience, and tactical intelligence, making it a multidimensional sport (Singh *et al.*, 2018). In Kabaddi,

anthropometric factors such as weight, height, and limb dimensions play a significant role in determining the player's ability to execute offensive and defensive moves effectively. Proper anthropometric analysis provides insights into an athlete's suitability for specific positions and their potential for improvement (*Bompa & Haff, 2009*). Body weight is a fundamental anthropometric measurement that reflects the mass of the body. In sports, an optimal body weight is often crucial as it impacts speed, endurance, and strength. In Kabaddi, body weight plays a critical role in performance, particularly for effective tackling and raiding (*Koley & Sandhu, 2005*). Arm length is another crucial factor in kabaddi, particularly for raiders. A longer arm reach provides a significant advantage in scoring points, as it allows raiders to touch defenders from a safer distance while minimizing the risk of being tackled. Studies indicate that a longer arm span contributes to better reachability and leverage, aiding both raiders and defenders in executing effective handholds and strategies (*Rajesh & Sudhakar, 2018*). Bio-motor variables are essential components of physical fitness that describe an athlete's ability to perform specific motor tasks. These include speed, agility, explosive power, grip strength, and muscular endurance. Grip strength is essential for holding onto opponents during a raid or tackle, while explosive power contributes to rapid movements, sudden accelerations, and forceful actions necessary for successful raiding and defensive maneuvers (*Singh et al., 2018; Kumar & Sharma, 2020*). Grip strength, a key component of muscular endurance and upper body power, allows players to maintain firm holds on their opponents, aiding in defensive strategies such as chain tackles and dashes (*Rajasekaran & Arumugam, 2019*). A strong grip also enhances the effectiveness of offensive skills like hand touches and escapes from defensive holds (*Kumar et al., 2021*). Explosive power, particularly in the lower body, enables quick lunges, high jumps, and forceful movements crucial for raiders to evade defenders and for defenders to execute sudden tackles (*Patel & Mehta, 2022*). Kabaddi is a high-intensity contact sport that requires players to possess exceptional physiological and psychological attributes to perform optimally. The game involves continuous anaerobic and aerobic efforts, including rapid offensive raids and defensive tackles, demanding a well-developed cardiorespiratory system and enhanced breath control. Among the various physiological factors contributing to playing ability, maximal oxygen uptake (VO_2 max) and breath-holding time (BHT) are critical determinants of a player's endurance, recovery, and overall performance. VO_2 max, the maximum amount of oxygen a player can utilize during intense exercise, is a key indicator of aerobic capacity (*Bassett & Howley, 2000*). Kabaddi requires repeated bursts of high-intensity effort, where a higher VO_2 max enables players to sustain performance levels, delay fatigue, and recover faster between raids and defensive maneuvers (*Bal & Sandhu, 2007*). Players with superior VO_2 max can maintain agility and speed, essential attributes for successful raiding and tackling (*Singh et al., 2011*). Breath-holding time (BHT) is crucial in Kabaddi, especially for raiders who must hold their breath while attempting to tag defenders. Prolonged breath-holding ability allows players to execute well-planned strategies and evade opponents effectively (*Chaudhari et al., 2019*). Psychological factors play a crucial role in determining an athlete's performance across various sports, including kabaddi. Among these, sports achievement motivation and self-esteem are two significant parameters that influence an athlete's playing ability. Kabaddi, a sport that demands agility, endurance, strategic thinking, and resilience, requires players to possess not only physical fitness but also strong psychological attributes to excel in competitive environments. Sports achievement motivation refers to an athlete's intrinsic drive to achieve success in their respective sport, overcome challenges, and demonstrate excellence (*Gill & Deeter, 1988*). It has been widely studied in sports psychology, with research indicating that athletes with high achievement motivation tend to exhibit superior performance, better-coping mechanisms, and sustained focus during the competition (*Deci & Ryan, 1985*). Similarly, self-esteem—an individual's overall evaluation of their self-worth—has a profound impact on sports performance. The Rosenberg Self-Esteem Scale (*Rosenberg, 1965*) is one of the most widely used tools to measure self-

esteem, providing insights into an athlete's confidence and self-perception. In kabaddi, where players face intense physical and mental challenges, self-esteem can influence decision-making, risk-taking behaviour, and overall gameplay. This article explores how anthropometric, bio-motor, physiological, and psychological factors influence playing ability among female kabaddi players.

Objective of the Study:

The objective of this study is to analyze the influence of anthropometric, bio-motor, physiological, and psychological factors on the playing ability of female Kabaddi players.

Materials and Methods:

The study involved 85 female kabaddi players aged between 18 and 25 years, all of whom were district-level athletes with a minimum of two years of competitive experience. The selected parameters for the study included anthropometric, bio-motor, physiological, and psychological variables. Specifically, weight and arm length were chosen as anthropometric variables, with weight measured using a weighing machine and arm length assessed using a non-stretchable steel tape. For the bio-motor variable, grip strength was measured using a grip dynamometer standing broad jump was used for measuring explosive strength. Physiological variables included VO₂ max and breath-holding time. VO₂ max was estimated using the Cooper 12-minute run/walk test, while breath-holding time was measured using a nose clip and stopwatch. Psychological variables consisted of sports achievement motivation, assessed using Kamlesh's (1998) Sports Achievement Motivation Questionnaire, and self-esteem, measured using Rosenberg's (1965) Self-Esteem Questionnaire. The overall playing ability of the participants was evaluated by three expert coaches, who used a 100-point scale based on ten different factors. The investigator provided detailed guidelines for the ratings, which are presented in Table I. Descriptive statistics, including means and standard deviations, were calculated for all variables. Pearson correlation analysis was performed using SPSS software to examine the relationships between playing ability and the independent variables. Statistical significance was determined at the $p < 0.05$ level.

Table-I
Rating Scale for Evaluation of Kabaddi Playing Ability

Sl. No.	Factors	Points									
		1	2	3	4	5	6	7	8	9	10
1.	Touching Skill	1	2	3	4	5	6	7	8	9	10
2.	Kicking Skill	1	2	3	4	5	6	7	8	9	10
3.	Other Offensive Skills	1	2	3	4	5	6	7	8	9	10
4.	Foot Work	1	2	3	4	5	6	7	8	9	10
5.	Catching Skill	1	2	3	4	5	6	7	8	9	10
6.	Movement in Chain	1	2	3	4	5	6	7	8	9	10
7.	Other Defensive Skills	1	2	3	4	5	6	7	8	9	10
8.	Team coordination	1	2	3	4	5	6	7	8	9	10
9.	Tactics	1	2	3	4	5	6	7	8	9	10
10.	Improvisation	1	2	3	4	5	6	7	8	9	10

ANALYSIS

Table-II

Descriptive Statistic of Playing Ability and Selected Variables of Female Kabaddi Players

Variables	Mean	Std. Deviation
Playing Ability	61.6706	8.21350
Weight	61.0918	6.73157
Arm Length	72.1294	3.51794
Grip Strength	37.2941	2.76812
Explosive Power	182.3059	7.76289
VO2max	34.7424	0.89208
Breath Holding Time	59.2918	12.02692
Sports Achievement Motivation Test	26.5529	3.94155
Rosenberg Self-Esteem	19.2588	3.29196

Table II presents the mean values for kabaddi playing ability and various anthropometric measurements, which are recorded: playing ability at 61.67, weight at 61.09, and arm length of 72.13. Additionally, the mean values for bio-motor skills demonstrate grip strength at 37.29 and explosive power at 182.30. Furthermore, the physiological variables exhibit a mean VO₂ max of 34.74 and breath-holding capacity at 59.29. Lastly, the psychological variables reveal the mean scores for the Sports Achievement Motivation Test and the Rosenberg Self-Esteem Scale as 26.55 and 19.25, respectively.

Table-III

Correlation between Kabaddi Playing Ability and Selected Variables

Sl. No.	Variables	Mean(M)	'r' Value
1.	Weight	61.0918	0.988**
2.	Arm Length	72.1294	0.758**
3.	Grip Strength	37.2941	0.978**
4.	Explosive Power	182.3059	0.901**
5.	VO2max	34.7424	0.970**
6.	Breath Holding Time	59.2918	0.960**
7.	Sports Achievement Motivation Test	26.5529	0.222*
8.	Rosenberg Self-Esteem	19.2588	0.993**

*Significance levels were set at $p < 0.05$ (Required table value ' r ' = 0.217).

Table III presents the Pearson correlation coefficients between the criterion variable (kabaddi playing ability) and various anthropometric, bio-motor, physiological, and psychological variables. The variables are listed in the following order: weight, arm length, grip strength, explosive power, VO₂ max, breath-holding capacity, sports achievement test scores, and Rosenberg self-esteem scores. The correlation analysis revealed that kabaddi playing ability is significantly associated with several of these variables. Specifically, weight ($r = 0.988$), arm length ($r = 0.758$), grip strength ($r = 0.978$), explosive power ($r = 0.901$), VO₂ max ($r = 0.970$), breath-holding capacity ($r = 0.960$), sports achievement test scores ($r = 0.222$), and Rosenberg self-esteem scores ($r = 0.993$) all showed positive

correlations with playing ability. Notably, all the obtained 'r' values exceeded the critical table value of 0.217 at the 0.05 level of confidence, indicating statistically significant relationships.

DISCUSSION & FINDINGS

The correlation analysis revealed significant associations between Kabaddi playing ability and multiple anthropometric, bio-motor, physiological and psychological variables among district-level female players in Manipur. Specifically, weight, arm length, grip strength, explosive power, VO₂ max, breath holding capacity, sports achievement test score, and Rosenberg self-esteem scores exhibited a positive correlation with playing ability. Among these, Rosenberg self-esteem scores ($r = 0.993$), weight ($r = 0.988$), grip strength ($r = 0.978$), VO₂ max ($r = 0.970$), breath holding capacity ($r = 0.960$), explosive power ($r = 0.901$) and arm length ($r = 0.758$) demonstrated the strongest relationships. The positive correlation between weight and playing ability aligns with previous research by Singh et al. (2019), which found that increased body mass enhances stability and tackling effectiveness in contact sports like Kabaddi. Similarly, arm length and leg length, which influence reach and movement efficiency, were also found to be positively correlated, consistent with the findings of (Sharma & Yadav, 2021), who emphasized their role in effective raiding and defensive maneuvers. Arm length significantly affects performance in sports requiring reach, grip, and control, such as Kabaddi. Longer arms enable players to execute effective raids and defend by holding opponents at a distance (Singh, J., & Singh, A. 2014). Grip strength exhibited the strongest correlation with playing ability, reinforcing earlier studies by Kumar et al. (2018) that identified handgrip strength as a crucial predictor of performance in combat and grappling sports. Previous studies have demonstrated a significant correlation between grip strength and success in combat sports and body-contact sports (Chaubey & Singh, 2017). Similarly, explosive power has been identified as a key determinant in team sports requiring rapid bursts of strength and agility (Verma et al., 2020). Explosive power, another significant predictor, has been widely recognized in Kabaddi literature (Reddy et al., 2020), as it contributes to quick acceleration and powerful movements essential for raiders and defenders. Previous research suggests that athletes with high self-esteem demonstrate greater resilience, better focus, and improved performance in competitive scenarios (Baumeister, 1999).

CONCLUSION

The findings of this study indicate that the ability to perform in Kabaddi is significantly influenced by specific anthropometric, bio-motor, physiological, and psychological variables. Notably, weight and arm length exhibit a positive correlation with performance, suggesting that these characteristics contribute to enhanced stability, reach, and overall effectiveness within the game. Among the bio-motor variables, grip strength and explosive power are positively correlated with playing ability, highlighting the critical role of strength and power in executing successful raids and defensive strategies. In terms of physiological factors, VO₂ max and breath-holding time also demonstrate a positive relationship with playing ability, underscoring the significance of physiological variables for overall performance in the sport. Additionally, psychological variables show a positive association with playing abilities, indicating that mental well-being is vital for achieving overall effectiveness in the game. In conclusion, the results emphasize the necessity for Kabaddi training programs to prioritize the development of strength, explosive power, and endurance, while also placing a focus on the mental advancement of players. These findings may serve as a foundation for talent identification, player selection, and performance enhancement strategies specifically tailored for district-level female Kabaddi players. Future research at higher competitive levels and across various playing positions could yield deeper insights into the influence of these variables on Kabaddi performance.

References

1. Bal, B. S., & Sandhu, J. S. (2007). The effects of high-intensity interval training on aerobic capacity and performance in team sports. *Journal of Sports Sciences*, 25(7), 757-765.
2. Bassett, D. R., & Howley, E. T. (2000). Limiting factors for maximum oxygen uptake and determinants of endurance performance. *Medicine and Science in Sports and Exercise*, 32(1), 70-84.
3. Baumeister, R. F. (1999). The self in social psychology. *Psychology Press*.
4. Bompa, T. O., & Haff, G. G. (2009). Periodization: Theory and methodology of training (5th ed.). *Human Kinetics*.
5. Chaudhari, D., Patel, H., & Bhatt, S. (2019). The influence of lung capacity and breath-holding ability on kabaddi performance. *International Journal of Sports Science & Coaching*, 14(3), 289-298.
6. Deci, E. L., & Ryan, R. M. (1985). Intrinsic motivation and self-determination in human behaviour. Springer.
7. Gill, D. L., & Deeter, T. E. (1988). Development of the Sport Orientation Questionnaire. *Research Quarterly for Exercise and Sport*, 59(3), 191-202.
8. Kamlesh, M. L. (1998). Psychology in Physical Education and Sports. New Delhi: Metropolitan, p-44.
9. Koley, S., & Sandhu, J. S. (2005). An anthropometric study on Indian inter-university male Kabaddi players. *Journal of Sports Science and Medicine*, 4(3), 35-38.
10. Kumar, R., & Sharma, V. (2020). Anthropometric and bio-motor variables as predictors of Kabaddi performance. *International Journal of Sports Studies*, 8(2), 78-91.
11. Kumar, R., Singh, A., & Sharma, P. (2018). "The role of grip strength in Kabaddi performance among elite players." *Journal of Sports Science and Medicine*, 17(2), 201-207.
12. Kumar, S., Verma, A., & Singh, R. (2021). The role of grip strength in performance enhancement of Kabaddi players. *Indian Journal of Sports Science*, 11(3), 155-168.
13. Rajasekaran, S., & Arumugam, R. (2019). Grip strength as a determinant of defensive performance in Kabaddi: A biomechanical analysis. *Journal of Strength and Conditioning Research*, 33(4), 764-770.
14. Rajesh, P., & Sudhakar, R. (2018). Relationship of selected anthropometric variables with the performance of kabaddi players. *International Journal of Physical Education and Sports Sciences*, 13(1), 45-52.
15. Reddy, N. P., Prasad, K., & Choudhary, V. (2020). Explosive power and its impact on performance in Kabaddi players. *International Journal of Sports Physiology*, 12(3), 145-152.
16. Rosenberg, M. (1965). Society and the adolescent self-image. Princeton University Press.
17. Patel, M., & Mehta, S. (2016). "Anthropometric predictors of playing ability in Kabaddi." *Indian Journal of Sports Science & Physical Education*, 8(1), 55-61.
18. Singh, H., & Brar, R. S. (2010). A study of speed and agility in Indian Kabaddi players. *Asian Journal of Physical Education and Computer Science in Sports*, 3(1), 49-53.
19. Singh, H., Gupta, R., & Verma, S. (2018). Kabaddi: A traditional sport with modern relevance. *Asian Journal of Physical Education*, 6(4), 210-225.
20. Singh, J., & Singh, A. (2014). Anthropometric measurements, body composition, and somatotyping of Indian Kabaddi players. *Journal of Human Sport and Exercise*, 9(1), 71-81.
21. Singh, R., Bhatia, P., & Ghosh, A. (2011). Relationship of aerobic endurance and agility with playing ability in Kabaddi players. *Indian Journal of Physiology and Sports Sciences*, 25(2), 112-118.
1. Sharma, R., & Yadav, P. (2021). The influence of limb length on performance in contact sports: A study on Kabaddi players. *Asian Journal of Physical Education & Sport Science*, 9(4), 67-75.