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DIFFERENTIALS OF SELECTED PHYSICAL FITNESS QUALITIES AMONG COLLEGE MEN VOLLEYBALL BASKETBALL AND CRICKET PLAYERS

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Abstract

The purpose of this study was to compare selected physical fitness qualities among college men volleyball, basketball and cricket players. Sixty college men players were selected as subjects from JJ College of Arts and Science, Pudukkottai, comprising 20 volleyball players, 20 basketball players and 20 cricket players. The selected physical fitness variables were speed, agility and cardiorespiratory endurance, assessed through the 50-metre run, shuttle run and Cooper's 12-minute run/walk test, respectively. The collected data were analysed using one-way analysis of variance (ANOVA), and Scheffe's post hoc test was employed to identify significant pairwise differences. The level of significance was fixed at 0.05. The results revealed statistically significant differences among the three groups in speed, agility and cardiorespiratory endurance. The post hoc analysis indicated significant differences between volleyball players and basketball players and between volleyball players and cricket players in all three variables. However, no significant differences were observed between basketball and cricket players. Basketball players recorded the best mean performance in speed, agility and cardiorespiratory endurance. It was concluded that selected physical fitness qualities varied according to the sport played, highlighting the importance of sport-specific physical conditioning programmes.

INTRODUCTION

Physical fitness plays an important role in achieving excellence in sports performance. Different sports require specific combinations of physical fitness components depending on their nature, duration and movement patterns. Volleyball, basketball and cricket are popular team games that demand different levels of physical and physiological abilities. Speed, agility and cardiorespiratory endurance are considered important components of physical fitness that contribute to effective performance in these sports. Speed enables players to move rapidly during competitive situations, agility helps them change direction quickly while maintaining body control, and cardiorespiratory endurance supports continuous physical activity and delays fatigue. According to Sheppard and Young (2006), agility involves rapid whole-body movements with changes in velocity or direction in response to external stimuli. Similarly, sport-specific physical fitness characteristics are influenced by the physiological and technical demands of individual games. Morrison et al. (2022) emphasised the importance of appropriate physical fitness assessment in basketball players to evaluate their athletic capabilities and performance requirements.

Volleyball requires explosive movements, rapid jumping, lateral movements and quick reactions, whereas basketball involves repeated sprinting, acceleration, deceleration and frequent changes of direction. Cricket demands a combination of speed, agility and endurance depending on the roles of batsmen, bowlers and fielders. These differences in playing requirements may influence the development of physical fitness qualities among players. Basu et al.

(2019) examined physical fitness characteristics among basketball and volleyball players, highlighting the importance of sport-specific fitness assessment. Peña et al. (2018) also investigated anthropometric and fitness profiles among high-level basketball, cricket and volleyball players. Furthermore, Hoque (2018) examined game-specific fitness characteristics among male cricket players. Such investigations emphasise the importance of understanding the physical fitness requirements associated with different sports. Therefore, the present study was designed to compare selected physical fitness qualities, namely speed, agility and cardiorespiratory endurance, among college men volleyball, basketball and cricket players. The findings may provide useful information for physical education teachers, coaches and sports trainers in planning sport-specific conditioning programmes.

METHODOLOGY

The purpose of this study was to compare the selected physical fitness qualities among college men volleyball, basketball and cricket players. To achieve this purpose of the study, twenty men volleyball players, twenty basketball players and twenty cricket players from JJ College of Arts and Science, Pudukkottai Pradesh were selected as subjects. The data were collected for all subjects on selected physical fitness qualities such as speed, agility and cardio respiratory endurance by using 50 mts run, shuttle run and cooper's 12 min run / walk test. The one way analysis of variance was used to find out the significant difference among college men volleyball, basketball and cricket players. The Scheffe's test was used as a post hoc test to find out the paired mean differences, if any. In all cases, .05 level of confidence was fixed to test the significance, which was considered as an appropriate.

RESULTS

TABLE 1
Descriptive Statistics of Selected Physical Fitness Variables

Variables	Volleyball M ± SD	Basketball M ± SD	Cricket M ± SD
Speed (seconds)	7.85 ± 0.42	7.32 ± 0.38	7.48 ± 0.40
Agility (seconds)	7.55 ± 0.40	7.02 ± 0.36	7.18 ± 0.39
Cardiorespiratory endurance (m)	1485 ± 105	1625 ± 112	1610 ± 108

The descriptive statistics presented in Table 1 reveal variations in speed performance among college men volleyball, basketball and cricket players. Basketball players recorded the lowest mean time of 7.32 seconds, followed by cricket players with 7.48 seconds and volleyball players with 7.85 seconds. Since a lower time indicates better performance, basketball players demonstrated better speed performance than the other two groups. With regard to agility, basketball players recorded the lowest mean time of 7.02 seconds, followed by cricket players with 7.18 seconds and volleyball players with 7.55 seconds. This indicates that basketball players demonstrated better agility performance compared with volleyball and cricket players. In cardiorespiratory endurance, basketball players obtained the highest mean distance of 1,625 metres, followed by cricket players with 1,610 metres and volleyball players with 1,485 metres. This indicates that

basketball players demonstrated comparatively better cardiorespiratory endurance than the other two groups.

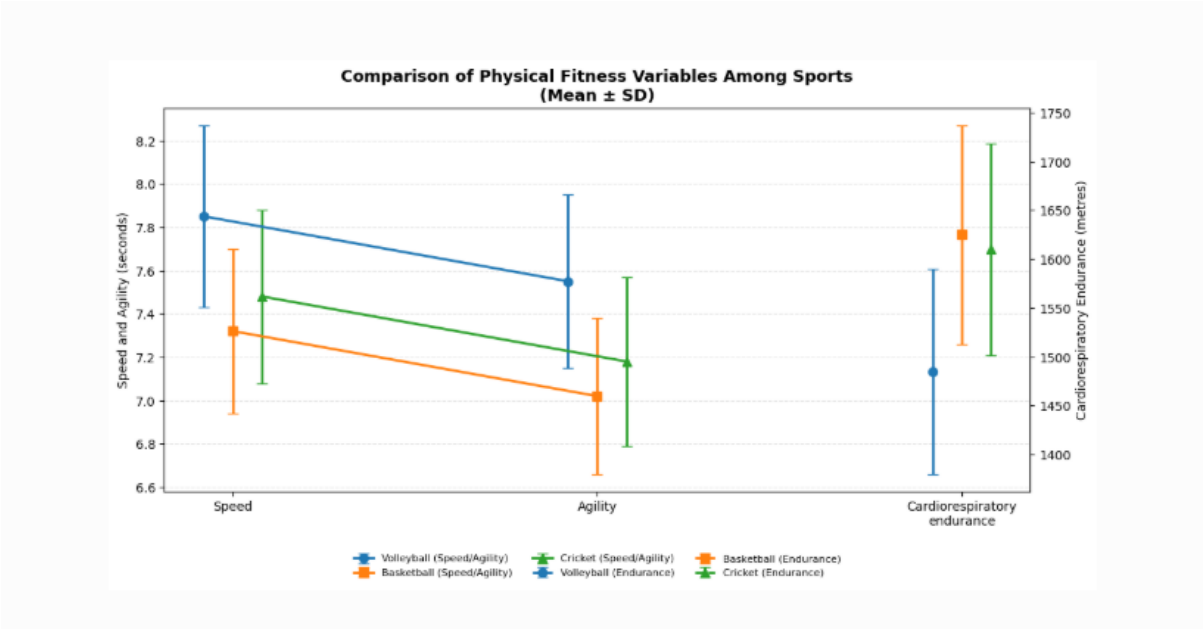

FIGURE I

TABLE 2
One-Way Analysis of Variance on Selected Physical Fitness Variables

Variable	Source	SS	df	MS	F	p	η²
Speed	**Between groups**	2.956	2	1.478	9.22*	.000	.244
	Within groups	9.135	57	0.160			
	Total	12.091	59	--			
Agility	**Between groups**	2.956	2	1.478	10.04*	.000	.260
	Within groups	8.392	57	0.147			
	Total	11.348	59	--			
Cardiorespiratory endurance	**Between groups**	236333.33	2	118166.67	10.06*	.000	.261
	Within groups	669427.00	57	11744.33			
	Total	905760.33	59	--			

Significant at the .05 level. The critical F-value for df (2, 57) is approximately 3.16.

The results presented in Table 2 reveal that significant differences existed among college men volleyball, basketball and cricket players in speed, agility and

cardiorespiratory endurance. In speed, the obtained F-ratio of 9.22 was greater than the table value of 3.16 at the 0.05 level of significance ($p < .001$). The eta-squared value of .244 indicates that approximately 24.4% of the variation in speed performance was associated with differences among the three sports groups. Similarly, in agility, the obtained F-ratio of 10.04 was greater than the required table value of 3.16 ($p < .001$). The eta-squared value of .260 indicates that approximately 26.0% of the variation in agility performance was associated with differences among the groups. This finding confirms that significant differences existed among volleyball, basketball and cricket players in agility. With regard to cardiorespiratory endurance, the obtained F-ratio of 10.06 was greater than the table value of 3.16 ($p < .001$), indicating a statistically significant difference among the three groups. The eta-squared value of .261 indicates that approximately 26.1% of the variation in cardiorespiratory endurance was associated with differences among the sports groups.

TABLE 3
Scheffe's Post Hoc Test for Pairwise Comparisons on Speed

Group comparison	Mean difference	Critical difference	Result
Volleyball – Basketball	0.53	0.318	Significant
Volleyball – Cricket	0.37	0.318	Significant
Basketball – Cricket	0.16	0.318	Not significant

The results presented in Table 3 reveal that significant differences existed between volleyball and basketball players and between volleyball and cricket players in speed. The mean differences of 0.53 and 0.37 seconds, respectively, were greater than the critical difference of 0.318 seconds. However, the mean difference of 0.16 seconds between basketball and cricket players was lower than the critical difference and was therefore not significant. Since a lower time indicates better speed performance, basketball players demonstrated better speed performance than volleyball and cricket players. No significant difference was observed between basketball and cricket players.

TABLE 4
Scheffe's Post Hoc Test for Pairwise Comparisons on Agility

Group comparison	Mean difference	Critical difference	Result
Volleyball – Basketball	0.53	0.305	Significant
Volleyball – Cricket	0.37	0.305	Significant
Basketball – Cricket	0.16	0.305	Not significant

The results presented in Table 4 indicate that significant differences existed between volleyball and basketball players and between volleyball and cricket players in agility. The mean differences of 0.53 and 0.37 seconds were greater than the critical difference of 0.305 seconds. However, the mean difference of 0.16 seconds between basketball and cricket players was lower than the critical difference and was not significant. Since a lower completion time indicates better agility, basketball players

demonstrated better agility performance than volleyball and cricket players. No significant difference was found between basketball and cricket players.

TABLE 5
Scheffe's Post Hoc Test for Pairwise Comparisons on Cardiorespiratory Endurance

Group comparison	Mean difference (m)	Critical difference (m)	Result
Volleyball – Basketball	140.00	86.14	Significant
Volleyball – Cricket	125.00	86.14	Significant
Basketball – Cricket	15.00	86.14	Not significant

The results presented in Table 5 reveal that significant differences existed between volleyball and basketball players and between volleyball and cricket players in cardiorespiratory endurance. The mean differences of 140 metres and 125 metres, respectively, were greater than the critical difference of 86.14 metres. However, the mean difference of 15 metres between basketball and cricket players was lower than the critical difference and was not significant. Basketball players recorded the highest mean distance of 1,625 metres, followed by cricket players with 1,610 metres and volleyball players with 1,485 metres. These findings indicate that basketball players demonstrated better cardiorespiratory endurance than volleyball players, while no significant difference was observed between basketball and cricket players.

DISCUSSION

The findings of the study revealed significant differences among volleyball, basketball and cricket players in speed, agility and cardiorespiratory endurance. Basketball players demonstrated better mean performance in speed and agility compared with volleyball and cricket players. This may be attributed to the movement requirements of basketball, which involve frequent acceleration, deceleration, rapid changes of direction and short-distance sprinting. These findings are consistent with the sport-specific physical demands discussed by Stølen et al. (2005) and Sheppard and Young (2006). The results also indicated significant differences in cardiorespiratory endurance among the three groups. Basketball players recorded the highest mean value, followed by cricket players and volleyball players. The intermittent nature of basketball, involving repeated high-intensity movements and recovery periods, may contribute to the development of aerobic and anaerobic fitness. Hoffman et al. (1999) discussed the physiological demands and fitness characteristics associated with basketball participation. Similarly, physical fitness requirements vary according to the nature and duration of activities involved in different sports. The Scheffe post hoc results revealed significant differences between volleyball players and basketball players and between volleyball players and cricket players in all three variables. However, no significant differences were observed between basketball and cricket players. These findings indicate that sport-specific participation may influence the development of selected physical fitness qualities. Therefore, conditioning programmes should be designed according to the specific physical and physiological requirements of individual sports.

CONCLUSIONS

It was concluded that significant differences existed among college men volleyball, basketball and cricket players in

speed, agility and cardiorespiratory endurance. Basketball players demonstrated better mean performance in all three selected variables, while volleyball players recorded comparatively lower performance. The findings highlight the importance of sport-specific physical conditioning programmes for developing the fitness requirements of different games.

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