

# Physical Fitness Attributes among the Team Game Players of Vidyasagar University

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## Abstract

In the present study an attempt has been made to compare the physical fitness attributes among the male team game players of Vidyasagar University, Paschim Midnapore, West Bengal. Out of forty two (42) subjects; eighteen (18) football players, twelve (12) volleyball players and twelve (12) kho-kho players were purposively selected from the different colleges affiliated to Vidyasagar University during their respective residential coaching camps for the participation of east zone inter university tournaments. The age of the subjects ranged between 19 to 25 years. Physical fitness attributes among the team game players of Vidyasagar University were assessed by AAHPER Youth Fitness Test. One way analysis of variance (ANOVA) was used to observed differences of mean among the team game players. The level of significance was set at 0.05. The results showed that there were significant differences in arms and shoulders strength, speed, explosive legs strength, agility and cardiovascular endurance between the games of football and volleyball players and also volleyball and kho-kho players. No significant differences were found in arms and shoulders strength, speed, explosive legs strength, agility and cardiovascular endurance between the team game of football and kho-kho players. The result of the findings also revealed that no significant differences were noted in sit up test of physical fitness attributes to measure the abdominal muscular strength among the team game players. Therefore, more researches must be conducted in order to understand better talent identification and team selection that considers the physical fitness attributes among the team game players.

**Keywords:** *Physical fitness, AAHPER Youth Fitness Test, explosive legs strength, cardiovascular endurance.*

## Introduction

Physical fitness is the most important factor for the progress in the general life as well as, field of sports if the citizens of the country want to improve in any field may be sports or general life. Physical fitness plays an important role of a normal individual as well as in an individual who is there participating in some kind of sports events. Physical fitness is the ability to function efficiently and effectively without injury, to enjoy leisure, to be healthy, to resist disease, and to cope up with emergency situations. It is the state of well-being with low risk of premature health problems and energies to participate in a variety of physical activities (Tanaka K. et al., 2004)<sup>[15]</sup>. Physical fitness is generally achieved through proper nutrition, exercise, and enough rest. Regular physical activities prevent or limit the body weight and gain in Body Mass Index

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(BMI). Every person has a different level of physical fitness which may change with time, place of work, situation and there is also an interaction between the daily activities and the fitness of an individual. Physical fitness characteristics of the players are more important as these have marked effects on the skill of players and the tactics of the teams because ball games require repeated maximum exertion such as dashing and jumping (Tsunawake et al., 2003) <sup>[16]</sup>.

Physical fitness is considered as one of the prominent components of an athlete to excel in sports arena. Physical fitness, in a very broad sense is determined by the individual's capacity for optional work and motor and sport performance (Astrand & Rodahl, 1986)<sup>[11]</sup>. The performance of a sportsman in any game or event also depends on physical fitness. The physical fitness or condition is the sum total of five motor abilities namely muscular strength, agility, power, speed and cardiovascular endurance. Therefore, the sports performance in all sports depends to a great extent on these abilities. Improvement and maintenance of physical fitness is the most important aim of sports training (Uppal AK, 1980)<sup>[17]</sup>.

Muscular power, often referred to as explosive power, is a combination of speed and strength which is important in vigorous performance since it determines how hard a person can hit, jump and push etc. Agility is the ability to change the direction of body or its parts rapidly which is dependent on strength, reaction time, speed of movement and muscular coordination. Quick start and stops and quick changes in direction are fundamental for good performance in athletics. Running speed is not only an athletic event itself, but it is an important factor in almost all court and field games; it can result the difference in whether a performer is able to gain an advantage over his/her opponent. Man's existence and effectiveness depend upon his physical fitness. Physical fitness affects ones life's activities, not only the physical well being and mental effectiveness but also the personal and social adjustment.

High-intensity, intermittent team sports such as water polo, football and hockey require athletes to have well developed speed, muscular strength and power, agility, and maximal aerobic power (Reilly & Gilbourne, 2003) <sup>[12]</sup>. However, while well-developed physiological capacities are important for team sports, athletes are also required to have well-developed technical skill and decision-making ability. In addition, athletes are often required to demonstrate these qualities under high levels of pressure and fatigue. Game-based training is increasingly being used to improve the skill and physical fitness of team-sport athletes (Light R, 2004; Bunker & Thorpe R, 1982; Bunker & Launder, 2001; Wein H, 2001) <sup>[9,5,4,18]</sup>. The use of games in training is based

on the premise that the greatest improvements in performance occur when the physiological demands and movements patterns replicate the demands of the sport (Rushall & Pyke, 1990) [13].

Football is the most universal and popular sport across the world. It is actively played and watched by great number of people with close interest in all countries around the world. Fitness training of a soccer player is a psychophysical adaptation process, on the basis of which one can start to perform activities with a ball. Frequent repetitions of tasks which emerge during trainings and competitions lead not only to developing motor abilities or mastering energetic processes, but also to establishing particular bonds between them. A characteristic feature of physical activities involved in football during a game is that a player performs efforts which often reach their maximum psychophysical abilities (Herbin & Rethacker, 1984) [6]. The game of volleyball offers opportunities for the development of strength, endurance, speed, agility, and neuromuscular skills and immediate action along with many precise educational outcomes. The game of volleyball requires a training programme which develops muscle flexibility, strength, power and agility all of which must be integrated to achieve the best skill performance from each player (Olson L, 2005) [11]. Kho-kho positions as a standout amongst the most well-known traditional sports in India. Kho-kho is an amazingly complicated and strategic game. Kho-kho is a pursuit and label game where a chaser chases the sprinter to expel him/her from the game. The game of Kho-kho can comprehensively be trailed by resolving the fundamental aptitudes and techniques of pursue and abilities and techniques of fleeing and avoiding the chasers and not permitting any of the chasing rivals contact your individual or the apparels worn by the sprinter (Biddle & Mohan, 2012) [3]. The pursuit could be effectively finished up by jumping at the sprinter and contacting his impact point of the rear foot while running (Bal BS et al., 1012) [2]. This is the most beyond any doubt and safe strategy to score a sprinter. Running was supported in three fundamental strategies. Running crisscross in the mid-line in single, twofold or triple chain is a conventional method (Heyward VH, 2007) [7]. The aim of the present study was to determine the differences of physical fitness attributes among the male team game players of Vidyasagar University.

### **Materials and Methods**

**Selection of Subjects:** The present study was conducted on a total of forty two (N=42) male subjects which includes eighteen (N<sub>1</sub>=18) football players mean  $\pm$  SD of age=22.50  $\pm$  1.72 years, twelve (N<sub>2</sub>=12) volleyball players mean  $\pm$  SD of age=22.58  $\pm$  1.50 years and twelve

(N<sub>3</sub>=12) kho-kho players mean  $\pm$  SD of age=23.58  $\pm$  1.84 years. The age of the subjects ranged between 19 to 25 years. The subjects were selected from the different colleges affiliated to Vidyasagar University, Paschim Midnapore, West Bengal irrespective of their caste, religion, dietary habits and socioeconomic status during their respective residential coaching camps for the participation of east zone inter university tournaments in the year 2016.

**Measurements of Physical Fitness Components:** The physical fitness attributes were measured through AAHPER Youth Fitness Test (Kansal DK, 2012) [8]. The AAHPER Youth Fitness Test items, purpose of test items and measurement units of physical fitness attributes among the team game players of Vidyasagar University, West Bengal are presented in table 1.

**Table 1**

**Table 1 represents the physical fitness attributes, purpose of test items and measurement units of physical fitness attributes among the team game players of Vidyasagar University.**

Test item	Purpose of the test	Measuring unit
<b>Pull ups</b>	Arms and shoulders strength	Total number of pull ups/min.
<b>Sit ups</b>	Abdominal muscular strength	Total number of sit ups/ min.
<b>50 yard dash</b>	Speed	Second
<b>Standing broad jump</b>	Explosive legs strength	Centimeter
<b>Shuttle run</b>	Agility	Second
<b>600 yard run &amp; walk</b>	Cardiovascular endurance	Minute

**Statistical Analysis:** For the purpose of analysis of data descriptive statistics the mean, standard deviation and mean difference were obtained through the Statistical Package for Social Studies (SPSS, Version 20, Inc., Chicago, Illinois). To check the difference of mean scores among team game players the One way analysis of variance (ANOVA) was applied to observe the differences of mean among the team game players. The level of significance was set at 0.05.

## Results

The research that was conducted aimed to determine the differences of physical fitness attributes among the team game players of Vidyasagar University were computed. The results have been depicted in table 2.

**Table 2**

**Table 2 represents the mean and standard deviation (SD) of physical fitness attributes among the team game players of Vidyasagar University.**

Physical Fitness Components	Football (N <sub>1</sub> =18)		Volleyball (N <sub>2</sub> =12)		Kho-kho (N <sub>3</sub> =12)	
	Mean	SD	Mean	SD	Mean	SD
<b>Pull ups</b>	14.11	±1.87	16.16	±1.58	13.66	±1.87
<b>Sit ups</b>	31.50	±2.99	29.91	±3.26	30.66	±2.11
<b>50 yard dash</b>	7.02	±0.30	7.41	±0.38	7.05	±0.27
<b>Standing broad jump</b>	267.00	±9.17	280.75	±9.84	266.58	±11.3
<b>Shuttle run</b>	10.12	±0.21	10.47	±0.25	9.97	±0.20
<b>600 yard run &amp; walk</b>	1.52	±0.08	1.64	±0.10	1.49	±0.08

**Table 3**

**Table 3 shows the results of one way analysis of variance (ANOVA) of physical fitness attributes among the team game players of Vidyasagar University.**

Physical Fitness Attributes		Sum of Squares	df	Mean Square	F	Sig.
<b>Pull ups</b>	Between Groups	44.175	2	22.087	6.941	<b>0.003*</b>
	Within Groups	124.111	39	3.182		
	Total	168.286	41	-		
<b>Sit ups</b>	Between Groups	18.393	2	9.196	1.114	0.339
	Within Groups	322.083	39	8.259		
	Total	340.476	41	-		
<b>50 yard dash</b>	Between Groups	1.242	2	0.621	5.924	<b>0.006*</b>
	Within Groups	4.089	39	0.105		
	Total	5.331	41	-		
<b>Standing broad jump</b>	Between Groups	1661.310	2	830.655	8.249	<b>0.001*</b>
	Within Groups	3927.167	39	100.697		
	Total	5588.476	41	-		
<b>Shuttle run</b>	Between Groups	1.595	2	0.798	15.737	<b>0.000*</b>
	Within Groups	1.977	39	0.051		
	Total	3.572	41	-		
<b>600 yard run &amp; walk</b>	Between Groups	0.149	2	0.074	10.329	<b>0.000*</b>
	Within Groups	0.280	39	0.007		
	Total	0.429	41	-		

**Table 4 Table 4 represents the LSD Post hoc multiple comparisons of physical fitness attributes among the team game players of Vidyasagar University.**

Physical Fitness Attributes	Football	Volleyball	Kho-kho	Mean Difference	SD of Error	P Value	S/ NS
Pull ups	14.1111	16.1667	-	<b>-2.0556*</b>	0.66482	<b>0.004</b>	<b>S</b>
	14.1111	-	13.6667	0.4444	0.66482	0.508	NS
	-	16.1667	13.6667	<b>2.5000*</b>	0.72828	<b>0.001</b>	<b>S</b>
Sit ups	31.5000	29.9167	-	1.5833	1.07099	0.147	NS
	31.5000	-	30.6667	0.8333	1.07099	0.441	NS
	-	29.9167	30.6667	-0.7500	1.17321	0.526	NS
50 yard dash	7.0217	7.4150	-	<b>-0.3933*</b>	0.12067	<b>0.002</b>	<b>S</b>
	7.0217	-	7.0567	-0.03500	0.12067	0.773	NS
	-	7.4150	7.0567	<b>0.3583*</b>	0.13219	<b>0.010</b>	<b>S</b>
Standing broad jump	267.0000	280.7500	-	<b>-13.7500*</b>	3.73974	<b>0.001</b>	<b>S</b>
	267.0000	-	266.5833	0.4167	3.73974	0.912	NS
	-	280.7500	266.5833	<b>14.1667*</b>	4.09668	<b>0.001</b>	<b>S</b>
Shuttle run	10.1256	10.4758	-	<b>-0.3502*</b>	0.08390	<b>0.000</b>	<b>S</b>
	10.1256	-	9.9775	0.1481	0.08390	0.085	NS
	-	10.4758	9.9775	<b>0.4983*</b>	0.09191	<b>0.000</b>	<b>S</b>
600 yard run & walk	1.5250	1.6442	-	<b>-0.1192*</b>	0.03160	<b>0.001</b>	<b>S</b>
	1.5250	-	1.4992	0.0258	0.03160	0.419	NS
	-	1.6442	1.4992	<b>0.1450*</b>	0.03462	<b>0.000</b>	<b>S</b>

\* The mean difference is significant at the 0.05 level.

### Discussion of findings

The purpose of conducting the present study was to investigate the physical attributes among the team game players of Vidyasagar University, West Bengal. The result of the present study shows that the physical fitness physical attributes among the team game players of Vidyasagar University. ANOVA results of table 3 regarding physical fitness attributes clearly indicated that significant differences were found in pull ups among the team game players of Vidyasagar University. Table 2 indicates that the team game of volleyball players are superior in arms and shoulders strength than football players followed by kho-kho players. LSD Post hoc multiple comparisons results indicate that there was significant difference exists in arms and shoulders strength between football and volleyball as well as volleyball and kho-kho team games. This may be due to the fact that among the university level team game players in this study only in volleyball players are used frequently their arms and shoulders strength during jump service,

smashing, blocking in game situation as compared with football and kho-kho team games players. Results of table 4 also clearly indicates that there was an insignificant difference exists between football and kho- kho games because in these two team games arms and shoulders strength are not frequently used during game situations.

In sit ups p-value of table 4 shows that insignificant difference was found in abdominal muscular strength among the team game players of Vidyasagar University i.e. between the game of football and volleyball players, football and kho-kho players as well as volleyball and kho-kho players though football players performed better in abdominal muscular strength than kho-kho and volleyball players. It may be due to the fact that the nature of football, volleyball and kho-kho games are mainly cardiovascular oriented, which demands a lots of abdominal muscular endurance capacity during game situations.

The result of table 2 clearly indicates that the team game of football and kho-kho players were superior in speed than volleyball players. The results from table 4 regarding 50 yard dash test shows that there were significant differences in speed ability of the players between football and volleyball games as well as volleyball and kho-kho games but insignificant difference was found between football and kho-kho games; this may be due to the fact that top level performance of football and kho-kho games demands a lot of acceleration and deceleration ability which may fulfill by the speed ability of physical fitness attributes. On the other hand nature of volleyball game is not demand such kinds of speed ability.

The results of the present study from table 3 show that significant differences exists in standing broad jump for measuring explosive legs strength among the team game players of Vidyasagar University. Table 2 clearly indicated that the team game of volleyball players is superior in explosive legs strength than football and kho-kho players. Table 4 of LSD Post hoc multiple comparisons results indicated that there was significant difference exists in explosive legs strength between the game of volleyball and football players as well as volleyball and kho-kho players but insignificant difference was observed between football and kho-kho team game players. The possible explanations for this results may be due to the fact that the movement patterns observed in volleyball players were in explosive in natures for their effective jump service, spiking and blocking during game situation (Sheppard et al., 2009) <sup>[14]</sup>. Another reason could be explained by fact that stretch-shortening cycle movement patterns are performed in all volleyball positions (Marques et al., 2009) <sup>[10]</sup>. On the other hand football and kho-kho games

demands moderate level of muscular strength of legs for better performance during game situations.

The result of table 2 clearly indicates that the team game of kho-kho and football players are superior in agility attribute than volleyball players. The results from table 4 regarding shuttle run shows that the significant differences were found to measure the agility attribute by shuttle run between football and volleyball games as well as volleyball and kho-kho games. But insignificant difference exists between the team game of football and kho-kho players. The football and kho-kho team game players were superior in agility attribute due to the fact that the different movements patterns of football and kho-kho players during game situations demands high level agility for applications of their respective skills during game situation like dribbling, feinting, dodging, back heel passing etc. in football game and pole drive, judgement kho, monkey style, different types of chain attack, pole turn, tapping, diving, etc. in kho-kho game. Whereas the nature of volleyball game does not demand such kinds of agility attribute except libero category player.

ANOVA results of table 3 regarding physical fitness attributes clearly indicated that significant differences were found among the team game players in 600 yard run & walk. Table 2 indicate that the team game of kho-kho players were better in cardiovascular endurance than volleyball players followed by football players. LSD Post hoc multiple comparisons results also indicates that there were significant differences observed in cardiovascular endurance between football and volleyball games as well as kho-kho and volleyball games. No significant difference was found in kho-kho and football team game players. The reason may be due to the fact that the kho-kho and football games demand high level of cardiovascular endurance for intermittent application of different sports skills and also the frequency of legs movements were faster in kho-kho and football players in compare with volleyball players.

### **Conclusions**

From the above discussion about physical fitness attributes among the team game players of Vidyasagar University, it may safely be concluded that the arms and shoulders strength the team game of volleyball players performed better to football and kho-kho players. In abdominal muscular strength there were no significant differences among the team game players but football players performed better in sit ups test in compare to kho-kho players followed by volleyball players. In speed ability the team game of football players also performed better than



kho-kho players followed by volleyball team game players. Among the physical fitness attributes in standing broad jump to measure the explosive legs strength the team game of volleyball players covered more distances than football and kho-kho players. Finally in score of agility and cardiovascular endurance of physical fitness attributes the team game of kho-kho players exhibited superior to football players and also followed by volleyball players.

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