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A Comparative Study of Selected Physical Fitness Factors among Varsity Level Basketball Handball and Volleyball Women Players

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Abstract

The purpose of the study was to compare selected Physical fitness factors among varsity level Basketball, Handball and Volleyball Women players. Seventy five (N=75) varsity level Basketball (n=25) Handball (n=25) and Volleyball (n=25) Women players were randomly selected from various Arts and Science colleges from Tiruchirappalli city for the study. The selected subjects were tested on speed by 50 yard dash, agility by shuttle run, muscular endurance by sit ups, leg explosive power by vertical jump and upper explosive power by medicine ball throw. The collected data was analyzed using descriptive and one way ANOVA to find out the significant difference among Basketball, Handball and Volleyball players. The result of the study showed that Handball players were better in speed and agility than basketball and volleyball players. The result also indicates that volleyball players have greater muscular endurance, leg explosive power and upper explosive power than Basketball and Handball players.

Keywords: Basketball, Handball, Volleyball, Physical Fitness.

Introduction

Physical fitness is a very important concept of physical education and can't be neglected, it is a very important determinant, (Harre, 1979). It is an essential first and foremost criterion in every game. Without having physical fitness no one can elicit their amble performance level.(Ajoy Bag, 2015). There are different kinds of sports and games which are performed all over world. Some are related to each other but some are entirely different (Keshav and Singh, 2014). Court games are unique that they are played in the relatively small area and involve the handling of a ball or similar object and often an implement. It requires a high degree of running, manoeuvre ability and total body agility in order to gain good court position and compete with one's opponent on both offensive and defensive manoeuvres (Thomas, 1972). Basketball has become one of the most popular court sports in many countries. (Paiva Neto and Cesar, 2005). There are a lot of internal and external factors affecting the players' performance during the game. Among the physical performance characteristics, one of the important factors for basketball is the fact that it is a complex intermittent team sport which requires performing a lot of multidirectional movements such as dribbling, running, sprinting and shuffling at various velocities and intensities during the game. These movements represent the physical activities that are considered as the important aspects of the game and contribute to the high performance of the players.

Handball is a combination of basketball, soccer and netball. It is played indoors on a court about the size of two basketball courts. Performance in handball depends upon a variety of individual skills and the interaction among different players within the team. Technical and tactical efficiency are predominant factors, but physical capabilities must also be well developed in order to become a successful player. Volleyball is a complex game of simple skills. Volleyball players require well-developed muscular strength, power and endurance, speed, agility, and flexibility, and have a high level of jumping ability, fast reaction time and swift movements (She, 1999). Lower body power, speed, and agility are important indicators of volleyball performance (Vescovi and Mcguigan, 2008).Volleyball requires athletes to be explosive in the lower limbs; this is especially emphasized in the front row hitting positions when attacking on offense or blocking on defense.

Basketball, handball and volleyball games which are similar in many aspects are taken for the study. In these three games the players mostly used upper extrimities for their play and also the playing area of these games are small (court games). So a high level of efficiency in techniques and tactics is very important in these three games, which warrants a high level of physical fitness to excel in these games. This study was

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undertaken to compare selected physical fitness factors such as speed, agility, muscular endurance, leg explosive power and upper explosive power of varsity level basketball, handball and volleyball women players.

Objective of the Study

Objective of the study was to compare the selected physical fitness factors among varsity level basketball, handball and volleyball women players.

Methodology

To achieve the purpose of the study seventy five (N=75) varsity level Basketball (n=25) Handball (n=25) and Volleyball (n=25) women players were selected randomly from various Arts and Science colleges from Tiruchirappalli city for the study. The age of the subjects ranged from 17 to 22 years. The selected physical fitness variables were speed, agility, muscular endurance, leg explosive power and upper body explosive power, and four years of past experience.

Statistical Technique

The collected data was analyzed using descriptive and one way ANOVA to find out the significant difference among varsity level basketball, handball and volleyball women players on selected Physical fitness factors. Level of significance was set at 0.05 level.

Table I. One way analysis of variance for basketball handball and volleyball women players on speed

Source	**df**	**SS**	**MS**	**GAME**	**Mean**	**SD(±)**	**Statistical Inference**
Speed				Basketball	9.523	1.0621	f =12.354
Between Groups	2	19.801	9.901	Handball	8.959	.703	P < 0.05
Within Groups	72	57.703	.801	Volleyball	10.216	.883	**Significant**

***Significant at 0.05 level of confidence**

(The table value required for significance at 0.05 level with df 2 and 72 was 3.12)

Table I indicate that the mean value of speed for basketball, handball and volleyball are 9.523, 8.959 & 10.216 respectively. The obtained 'f' ratio of speed was 12.354 .The obtained f ratio was greater than the table value of 3.12 for df 2 and 72 required for significance at 0.05 level of confidence. So it was concluded that the varsity level basketball, handball and volleyball women players had significant difference in the performance of speed.

Table II. The scheffe's post hoc test for the difference among varsity level basketball handball and volleyball women players on speed

SPEED			
Scheffe[a]			
		Subset for alpha = 0.05	
GAMES	N	1	2
Handball	25	8.959	
Basketball	25	9.523	
Volleyball	25		10.216
Sig.		.091	1.000

***Significant at 0.05 level of confidence**

The table II shows that the mean difference on speed between handball and basketball, handball and volleyball, basketball and volleyball are 8.959 &9.523, 8.959 & 10.216 and 9.523 & 10.216 respectively. It shows that handball players have better speed than compared to basketball and volleyball players.

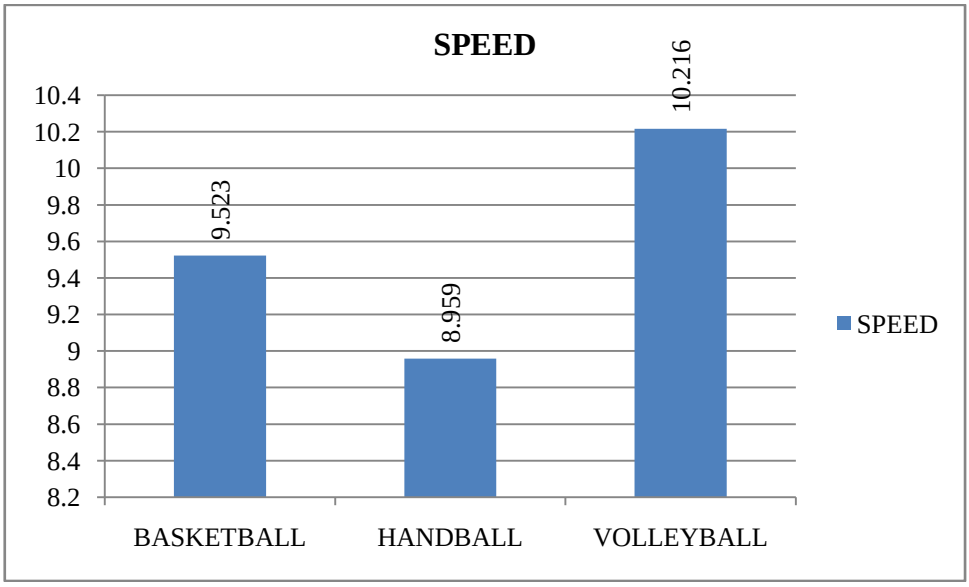

Figure I. Graphical representation of mean values of speed among basketball handball and volleyball players

Table III. One way analysis of variance for basketball, handball and volleyball women players on agility

Source	df	SS	MS	GAME	Mean	SD(±)	Statistical Inference
Agility				Basketball	11.901	.857	f =5.100
Between Groups	2	6.325	3.162	Handball	11.343	.706	P < 0.05
Within Groups	72	44.642	.620	Volleyball	12.004	.790	**Significant**

***Significant at 0.05 level of confidence**

(The table value required for significance at 0.05 level with df 2 and 72 was 3.12)

Table III indicate that the mean value of agility for basketball, handball and volleyball are 11.901, 11.343& 12.004 respectively. The obtained 'f' ratio of speed is 5.100. The obtained 'f ' ratio was greater than the table value of 3.12 for df 2 and 72 required for significance at 0.05 level of confidence. So it was concluded that the varsity level basketball, handball and volleyball women players had significant difference in the performance of agility.

Table IV. The scheffe's post hoc test for the difference among varsity level basketball, handball and volleyball women players on agility

AGILITY			
Scheffe[a]			
		Subset for alpha = 0.05	
GAMES	N	1	2
Handball	25	11.343	
Basketball	25		11.901
Volleyball	25		12.004
Sig.		1.000	.900

***Significant at 0.05 level of confidence**

The table IV shows that the mean difference on agility between handball and basketball, handball and volleyball & basketball and volleyball are 11.343 &11.901, 11.343 & 12.004 and 11.901 & 12.004 respectively. It shows that handball players have better agility than basketball and volleyball players.

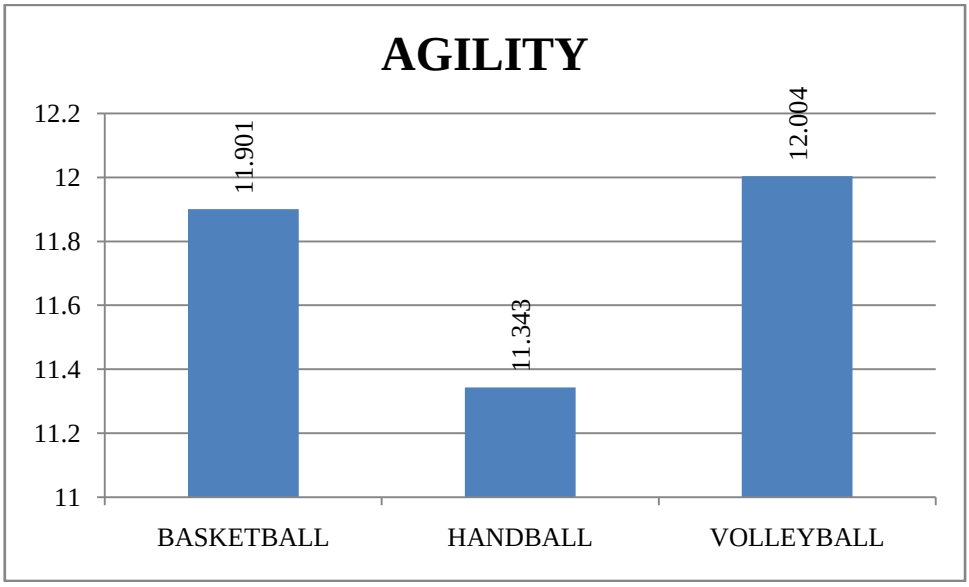

Figure II. Graphical representation of agility among basketball, handball and volleyball players\

Table V. One way analysis of variance for basketball handball and volleyball women players on muscular endurance

Source	df	SS	MS	GAME	Mean	SD(±)	Statistical Inference
Muscular Endurance				Basketball	22.68	4.973	f =8.699
Between Groups	2	470.747	235.373	Handball	26.64	5.915	P < 0.05
Within Groups	72	1948.240	27.059	Volleyball	28.72	4.632	**Significant**

***Significant at 0.05 level of confidence**

(The table value required for significance at 0.05 level with df 2 and 72 was 3.12)

Table V indicate that the mean value of muscular endurance for basketball, handball and volleyball are 22.68, 26.64 & 28.72 respectively. The obtained 'f' ratio of muscular endurance is 8.699. The obtained 'f' ratio was greater than the table value of 3.12 for df 2 and 72 required for significance at 0.05 level of confidence. So it was concluded that the varsity level basketball, handball and volleyball women players had significant difference in the performance of muscular endurance.

Table VI. The scheffe's post hoc test for the difference among varsity level basketball handball and volleyball women players on muscular endurance

MUSCULAR ENDURANCE			
Scheffe[a]			
		Subset for alpha = 0.05	
GAMES	N	1	2
Handball	25	22.68	
Basketball	25		26.64
Volleyball	25		28.72
Sig.		1.000	.373

***Significant at 0.05 level of confidence**

The table VI shows that the mean difference on muscular endurance between Handball and Basketball, Handball and Volleyball, Basketball and Volleyball are 22.68 & 26.64, 22.68 & 28.72 and 26.64 & 28.72 respectively. It shows that Volleyball players have better Muscular endurance than Basketball and Handball players.

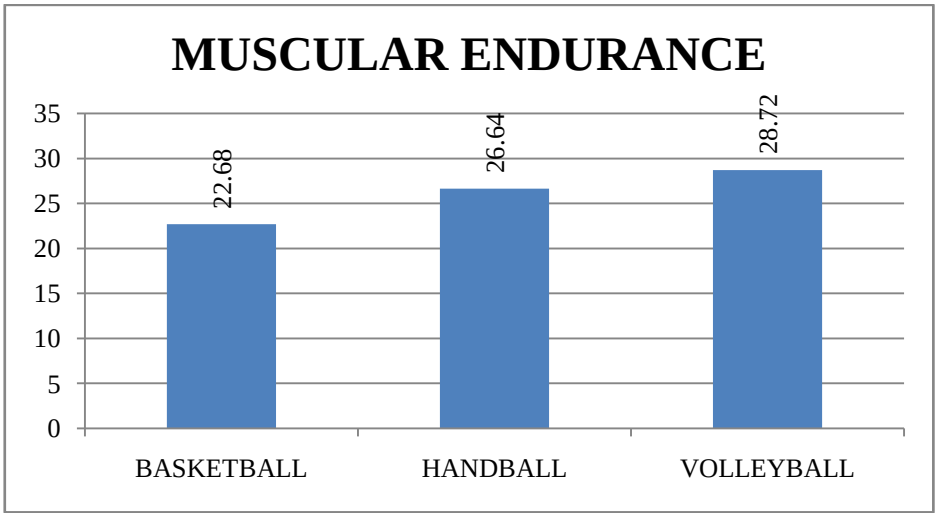

Figure III. Graphical representation of muscular endurance among basketball handball and volleyball players

Table VII. One way analysis of variance for basketball handball and volleyball women players on leg explosive power

Source	df	SS	MS	GAME	Mean	SD(±)	Statistical Inference
Leg Explosive Power				Basketball	28.32	4.854	f =28.242
Between Groups	2	826.747	413.373	Handball	28.56	3.305	P < 0.05
Within Groups	72	1053.840	14.637	Volleyball	35.48	3.070	**Significant**

***Significant at 0.05 level of confidence**

(The table value required for significance at 0.05 level with df 2 and 72 was 3.12)

Table VII indicate that the mean value of leg explosive power for basketball, handball and volleyball are 28.32, 28.56 & 35.48 respectively. The obtained 'f' ratio of leg explosive power is 28.242. The obtained 'f' ratio is greater than the table value of 3.12 for df 2 and 72 required for significance at 0.05 level of confidence. So it was concluded that the varsity Basketball, Handball and Volleyball women players had significant difference in the performance of leg explosive power.

Table VIII. The scheffe's post hoc test for the difference among varsity level basketball handball and volleyball women players on leg explosive power

LEG EXPLOSIVE POWR			
Scheffe[a]			
		Subset for alpha = 0.05	
GAMES	N	1	2
Handball	25	28.32	
Basketball	25	28.56	
Volleyball	25		35.48
Sig.		.976	1.000

***Significant at 0.05 level of confidence**

The table VIII shows that the mean difference on leg explosive power between handball and basketball, handball and volleyball & basketball and volleyball are 28.32 & 28.56, 28.32 & 35.48 and 28.56 & 35.48 respectively. It shows that volleyball players have better leg explosive power than basketball and handball players.

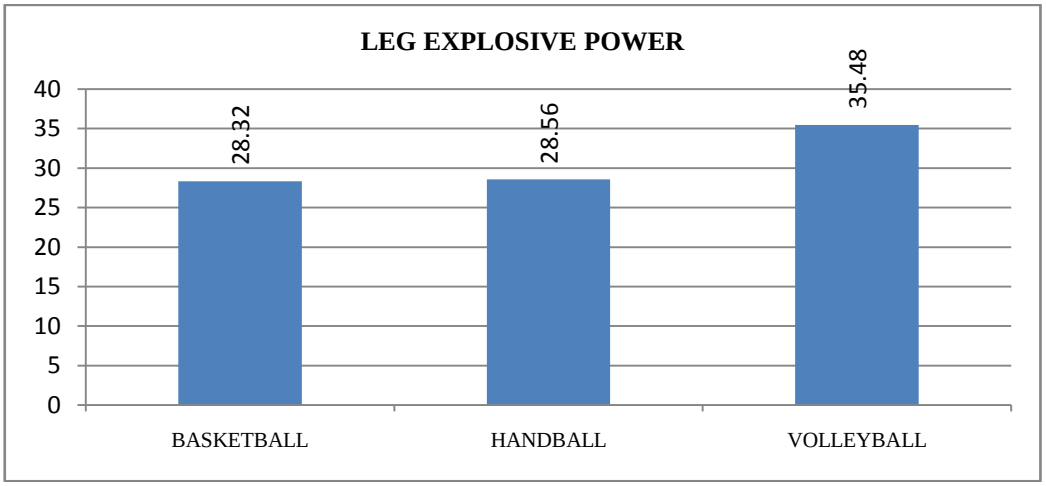

Figure IV. Graphical representation of leg explosive power among basketball handball and volleyball players

Table IX. One way analysis of variance for basketball handball and volleyball women players on upper explosive power

Source	df	SS	MS	GAME	Mean	SD(±)	Statistical Inference
Upper explosive power				Basketball	2.552	.211	f =4.677
Between Groups	2	.779	.389	Handball	2.445	.135	P < 0.05
Within Groups	72	5.994	.083	Volleyball	2.694	.431	**Significant**

***Significant at 0.05 level of confidence**

(The table value required for significance at 0.05 level with df 2 and 72 was 3.12)

Table IX indicate that the mean value of upper explosive power for basketball, handball and volleyball are 2.552, 2.44 & 2.694 respectively. The obtained 'f' ratio of upper explosive power is 4.677. The obtained 'f' ratio was greater than the table value of 3.12 for df 2 and 72 required for significance at 0.05 level of confidence. So it was concluded that the varsity level basketball, handball and volleyball women players had significant difference in the performance of upper explosive power.

Table X. The scheffe's post hoc test for the difference among varsity level basketball handball and volleyball women players on upper explosive power

UPPER EXPLOSIVE POWER			
Scheffe[a]			
		Subset for alpha = 0.05	
GAMES	N	1	2
Handball	25	2.445	
Basketball	25	2.552	2.552
Volleyball	25		2.694
Sig.		.426	.229

***Significant at 0.05 level of confidence**

The table X shows that the mean difference on upper explosive power between handball and basketball, handball and volleyball & basketball and volleyball are 2.445 & 2.552, 2.445 & 2.694 and 2.552 & 2.694 respectively. It shows that volleyball players have better upper explosive power than basketball and handball players.

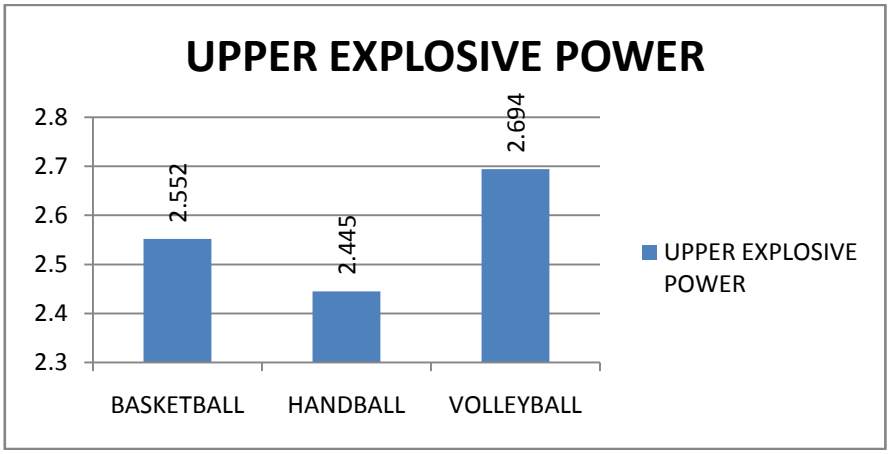

Figure V. Graphical representation of upper explosive power among basketball handball and volleyball players

Discussion on Findings

Physical fitness is the fundamental necessity for any sporting activity. Motor qualities such as speed, strength, endurance, and flexibility along with physical fitness are essential for excellence in sports (Mayur M. Patel, Nisith K. Datta,2014).The findings of the study showed that there was significant difference in speed and agility among varsity level basketball, handball and volleyball women players. Optimum physical performance is a combination of all the components of fitness; depending on the specific demands of the sport or activity. Some components will require more attention than others, but each should be present as a part of an integrated training program. (Garzon, M.J.C, 2009). Various studies also substantiate the findings that there would be difference in the physical fitness components depending upon the demands of the game. P.Karthikeyan,2014 in his study 'Physical fitness differentials among university men basketball volleyball and handball players' has concluded that there was a significant difference among university men basketball, volleyball and handball players on selected criterion variables namely speed and agility. However the findings showed that there was no significant difference in muscular endurance, leg explosive power and upper explosive power which may be due to the trained status of the players of these games which are identical in many ways and hence there is a chance of the players of these three games receiving similar training for physical fitness.

Conclusion

1. The basketball, handball and volleyball women players of varsity level differ in speed and the handball players were found to have better in speed than basketball and volleyball Players.
2. The basketball, handball and volleyball women players of varsity level differ in agility and the handball players were found to have better in agility than Basketball and volleyball players.
3. However there was significant difference in the other three variables namely muscular endurance, leg explosive power and upper explosive power among varsity level basketball, handball and volleyball women players. Volleyball players are better in these three variables compared to basketball and handball players.

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