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## A Comparative Study of $VO_2$ Max among the Basketball, Football, Volleyball and Hockey Male Players

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### Abstract

**Purpose:** main purpose of the study was to compare the maximum oxygen consumption of male players of different games.

**Methodology: Selection of subjects-** For the purpose of present study 59 male players of different games from G.G.V, Bilaspur were selected randomly as the subjects for the study. The age of the subjects were ranging from 20-25 years.

**Criterion Measures-** Maximum Oxygen Consumption ( $VO_2$  Max) was determined by the Rockport walking test (Kline et. al., 1987)<sup>[17]</sup> was used.

**Statistical Method-** Descriptive statistics, one way ANOVA and Post-Hoc Test (Scheffe's Test) were used with SPSS 16.0 version. The level of significance was set at 0.05.

**Result:** The results of the study indicate that the significant difference was found among Basketball, Volleyball, Football and Hockey in relation to  $VO_2$  Max ( $F= 4.927$ ,  $p<0.05$ ). Another result of the study shows that the Football players (67.6700) have highest level of  $VO_2$  Max in comparison to Basketball (65.5550), Volleyball (60.2667) and Hockey players (62.3858).

**Keywords:**  $VO_2$  Max, Basketball, Football, Volleyball and Hockey players.

### Introduction

By nature human being are competitive and aspire from excellence in every field. Sport is not an exception. Changes are the order of the day. Changes are taking place every day in every walk of life. Life of people, their philosophy, ways of living etc. are undergoing changes due to basic and applied research in various fields. Man has reached the space age from the primitive Stone Age because of continuous change. Records have been sprucing and the athletes as a result of combined improvement in the technique of training and coaching. New techniques are developed in laboratories and scientific methods are applied to obtain top-level performance. Sports by their vary nature are enjoyable, challenging, absorbing and require a certain amount of skill and physical condition (Doncash Seaton *et al*, 1956)<sup>[9]</sup>.

Same is true in training of games such as Football, Basketball, Volleyball, Swimming etc. The complex nature of physical fitness includes the muscular strength, muscular endurance, cardio- respiratory endurance and the most important of them is the cardio- respiratory endurance (Peter V. Karpovich and Wayne E)<sup>[18]</sup>.

Cardio-vascular efficiency reflects the capacity of an individual to undertake and continues physical efforts of sub-maximal nature for a relatively longer period of time. To measure cardio-vascular efficiency, tests of physical work capacity and  $vo_2$  max. have been developed to use in laboratory and field situations to assist the scientists, physical educators and coaches.

The demand of oxygen differs from one sports to other sports. It's a common observation that whenever athlete go for anaerobic type of training his/her anaerobic capacity is enhanced but along with this it is also observed that after anaerobic type of training the aerobic capacity of the athlete is also improves. Thus it is very essential to know that which type of training (aerobic/anaerobic) dominates to particular sports, or whether combination training is needed.

**Objectives of the study**

- To find out the level of maximum oxygen consumption of male players of different games.
- To compare the maximum oxygen consumption of male players of different games.

**Methodology**

**Selection of Subjects**

A total of 59 university level male players were randomly selected from different games of Guru Ghasidas Vishwavidyalaya, Bilaspur. Age of the subjects was ranging between 20 to 25 years.

**Selection of Variables**

Keeping the feasibility criterion in mind, Maximum Oxygen Consumption (VO<sub>2</sub> Max) was selected by the researcher as variable for the present study.

**Criterion Measures**

Maximum Oxygen Consumption (VO<sub>2</sub> Max) was determined by the Rockport walking test (Kline et. al. 1987). Formula for the calculating Maximum Oxygen Consumption (VO<sub>2</sub> Max) was –

$$\text{VO}_2 \text{ Max (ml/kg. min}^{-1}\text{)} = 132.853 - .0769 \times \text{Weight (lbs)} - .3877 \times \text{Age (yr)} + 6.315 \times \text{Sex}^* - 3.2649 \times \text{Walk time (min.)} - .1565 \times \text{Heart Rate (bpm.)}$$

\*Where, Male = 1 and Female = 0.

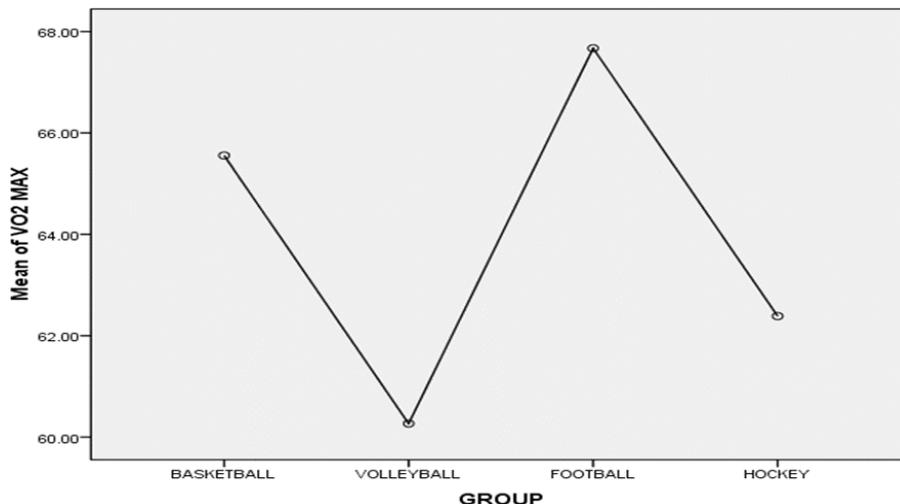
**Statistical Analysis**

For determining the comparison of VO<sub>2</sub> Max of different games descriptive statistics, one way ANNOVA and Post-Hoc Test (Scheffe’s Test)was used, the data analyzed with the help of SPSS (16.0 version) software and the level of significance was set at 0.05 level of confidence.

**Result and Findings of the Study**

**Table 1:** Descriptive table of VO<sub>2</sub> Max of male players belonging to different games

Game	N	Mean	SD	Std. Error	Min.	Max.
Basketball	16	65.5550	3.65299	.91325	61.31	72.86
Volleyball	15	60.2667	7.26678	1.87627	46.63	70.69
Football	16	67.6700	7.33230	1.83307	54.15	80.13
Hockey	12	62.3858	2.86084	.82585	58.03	65.94



**Fig 1:** Graphical representation of Mean scores of VO<sub>2</sub> max of male players belonging to different games

Table 1 shows that the descriptive statistics i.e. Mean, SD, Std. Error, Min. Max. etc. of VO<sub>2</sub> Max of male players of different games.

**Table 2:** Comparison of VO<sub>2</sub> Max of male players belonging to different games

Variance	Sum of Squares	Df	Mean Square	F	Sig.
Between Groups	493.376	3	164.459	4.927*	.004
Within Groups	1835.916	55	33.380		
Total	2329.292	58			

\*Significant of .05 level of Significance.

The above table-2 indicates that there is a significant difference between different games in relation to maximum oxygen consumption. As the Sig. values were less than 0.05.

**Table 3:** Scheffe’s Post Hoc test of Maximum Oxygen Consumption of different games

Group		Mean Differences (I-J)	Std. Error	Sig.
I	J			
Basketball	Volleyball	5.28833	2.07644	.103
	Football	-2.11500	2.04268	.784
	Hockey	3.16917	2.20635	.563
Volleyball	Football	-7.40333*	2.07644	.009
	Hockey	-2.11917	2.23764	.826
Football	Hockey	5.28417	2.20635	.138

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

Table 3 shows that the insignificant differences between the mean values of Basketball & Volleyball players (5.28833), Basketball & Football players (2.11500), Basketball & Hockey players (3.16917), Volleyball & Hockey players (2.11917) and Football & Hockey players (5.28417). Table 3 also shows that the significant difference between the mean values of Volleyball & Football players (7.40333), in relation to VO<sub>2</sub> Max.

### Discussion of the Findings

Singh Dhananjay and Patel Shrikrishna (2014) [21] have conducted a study on Comparative study of maximum oxygen consumption of different game players. They also found the significant difference in  $VO_2$  max. Of different games and sports groups.

To conclude the discussion of finding it can be stated that subject chosen in this above study were mainly selected from different match practice groups, but the fact stands that even when they were grouped in various games/sports, they were also involved with overall physical education activity programme as academic requirement of each subject, therefore the impact of other activities could not be nullified and thus above variations in  $VO_2$  max. Of different games and sports groups were observed. But one finding is very clear that on an average the  $VO_2$  max. Of all the subjects irrespective of their games/sports were higher than the  $VO_2$  max. Values of normal sedentary individuals between 38-40 ml/kg. This might be attributed by the fact that regular participation in physical education programme influenced the overall  $VO_2$  max.

### Conclusion

On the basis of findings of the study, the following conclusions may be drawn:

- Football players (67.6700) have highest level of  $VO_2$  Max in comparison to Basketball (65.5550), Volleyball (60.2667) and Hockey players (62.3858).
- The result of the study shows that there is a significant difference between the players different games in relation to maximum oxygen consumption ( $F=4.927$ ,  $p<0.05$ ).
- On the basis of Scheffe's Post Hoc test we can conclude that the insignificant differences between the mean values of Basketball & Volleyball players, Basketball & Football players, Basketball & Hockey players, Volleyball & Hockey players and Football & Hockey players. It also shows that the significant difference between the mean values of Volleyball & Football players.

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