



ISSN: 2456-0057  
IJPNPE 2018; 3(2): 632-634  
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www.journalofsports.com  
Received: 29-05-2018  
Accepted: 30-06-2018

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## A study on peak flow rate among inter university water polo teams

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### Abstract

The purpose of the present study was to compare the Peak Flow Rate (lungs function) among the Inter-university male teams of Water-Polo. Fifty-two Inter-university male players (N=52), between the 18 to 25 years of age, thirteen (13) players from each semi-finalist University teams namely Calcutta University, Guru Nanak Dev University, Panjab University, and University of Kerala were selected purposively during the All India Inter University Aquatics Championship (M&W), 2016, which was held at Panjab University Swimming Pool, Chandigarh from 24<sup>th</sup> Oct to 28<sup>th</sup> Oct. The Peak Flow Rate (lungs function) was measured by administering the Peak Flow Meter. Analysis of Variance (ANOVA) was employed to compute the significant differences among the teams and tested the hypothesis at 0.05 level of confidence. Significant difference was found between Panjab University and University of Kerala, whereas no significant difference was found between Calcutta University and Guru Nanak Dev University Amritsar.

**Keywords:** Peak flow meter, peak flow rate, water-polo

### Introduction

Water Polo is a very popular and physically challenging sport that makes large demands on aerobic and anaerobic systems. It is an aquatic contact team sport consisting of 6 field players and one goalkeeper in the water. Above this, the teams have their substitute players i.e. field players as well as goalkeeper. It is a game that combines the sport of swimming with ball handling. The basic skills of throwing and catching by using single hand except the goalkeeper are combined into a fast moving exciting game.

Swimming itself utilizes 15.7-20.0 kilocalories per minute, more than any other form of physical activity (Wilmore and Costil, p.148). In addition, swimming has been found to have a Metabolic Equivalent (MET) value of 20-30, roughly the same as running (Wilmore & Costil, p.622). The variety of work involved in the game water polo for field players can be broken down as roughly 50-60% aerobic, 30-35% anaerobic, and 10-15%, immediate energy (ATPPC) system (Smith, p.331). The third component listed – immediate energy – is largely the result of the physical contact involved in the game. It has been observed that elite male water polo players have approximately 6-20% greater oxygen consumption than competitive swimmers (Smith, p.328).

Team games were sports where size, shape, body composition and fitness all play an important part in providing distinct advantage for specific playing positions particularly at the higher level, where there is a high degree of player specialization (Dey, Kar & Debray, 2010). As the game water polo is played inside the water pool of 7 feet deep, players should possess a high level of stamina and endurance to play the game. So, the purpose of the present study was to compare the Peak Flow Rate (lungs function) among the Inter-varsity male teams of Water-Polo.

### Materials and Methods

**Samples and variable:** Fifty-two varsity male players (N=52), between the 18 to 25 years of age, thirteen (13) players from each semi-finalist University teams namely Calcutta University, Guru Nanak Dev University, Panjab University, and University of Kerala were selected purposively during the All India Inter University Aquatics Championship (M&W), 2016,

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which was held at Panjab University Swimming Pool, Chandigarh from 24th Oct to 28th Oct. The Peak Expiratory Flow (PEF) was selected as variable of the study.

**Procedure:** The Peak Flow Rate (lungs function) was measured by administering the Peak Flow Meter.

**Statistical Analysis:** Analysis of Variance (ANOVA) was employed to compute the significant differences among the teams and tested the hypothesis at 0.05 level of confidence.

**Results and Discussion on Findings**

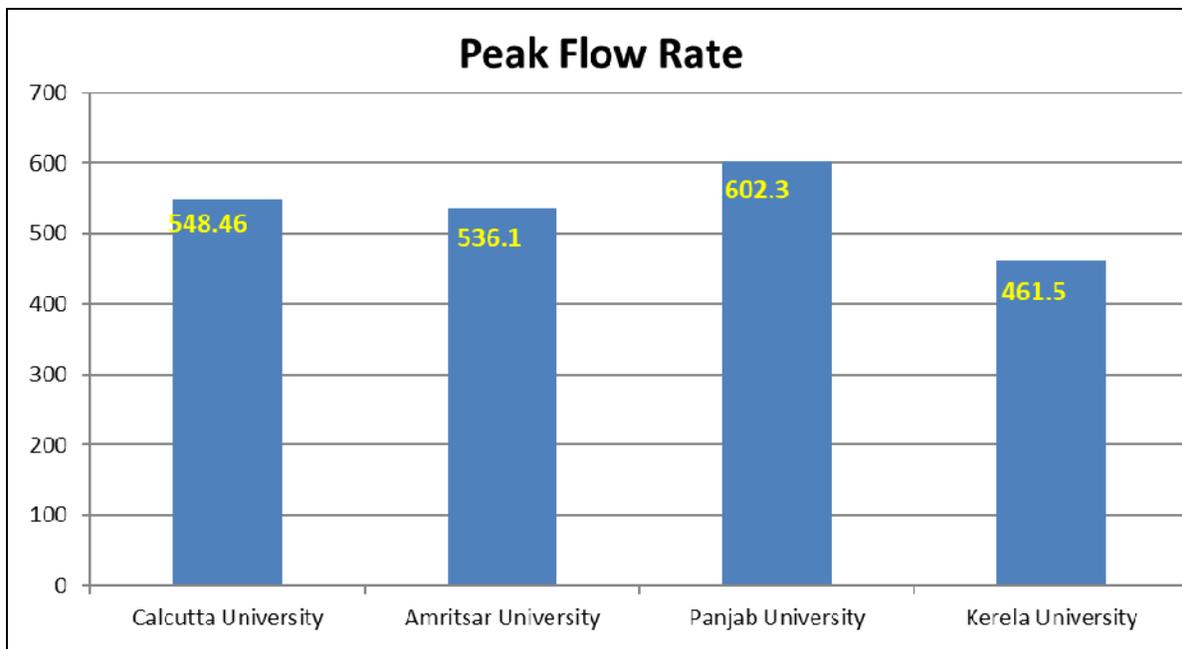
The statistical analyses of peak flow meter of inter university water polo players are presented. The collected data was tabulated and computerized to draw out the desired results. For testing the significance in peak flow meter among top four universities of water polo players, the level of significance was chosen 0.05.

Descriptive analysis of peak flow meter among difference universities of water polo players of boys has been presented in table 1.

**Table 1:** Descriptive Analysis of Peak Flow Meter among Inter University Water Polo Players

Variables	Number	Mean	Std. Deviation	Std. Error
Calcutta University	13	548.4615	89.05487	24.69938
Amritsar University	13	536.1538	69.82579	19.36619
Panjab University	13	602.3077	81.05079	22.47944
Kerala University	13	461.5385	90.35542	25.06009

The peak flow meter of Panjab University was the highest, with a mean value of 602.3077 and SD value of 81.05079, followed by Calcutta University, Amritsar University and Kerala University with mean values of 548.4615, 536.1538 and, 461.5385 and SD values 89.05, 69.82 and, 90.35542 respectively. Mean scores of different four universities of inter university level water polo players are depicted graphically in fig. 1.



**Fig 1:** Mean Score of Inter University Water Polo Players on Peak Flow Meter

The analysis of variance of peak flow meter among difference universities of inters university water polo players are

presented in table- 2.

**Table 2:** Anovas For Inter University Water Polo Players on Peak Flow Rate.

Variables	Source of Variance	Sum of Square	Df	Mean Square	F-Value	Sig
Peak Flow Rate	Between Groups	131190.385	3	43730.128	6.352	.001
	Within Groups	330476.923	48	6884.936		
	Total	461667.308	51			

\*significant at .05level  
F<sub>.05</sub>(3,48)=2.80

The above results indicate that there has been a significant difference found among difference universities of inters university level water polo players on variable peak flow meter as the F value (6.352) was found to be greater than the table value (2.80), in level of significant 0.05. Further,

Scheffe’ s Post Hoc test of significant was applied to find out the actual significant difference on Peak Flow Meter among water polo university level players existed. The results of Post Hoc Test of significance have been presented in tables-3.

**Table 3:** Significant Differences Between the Paired Means of Peak Flow Meter Among Different Universities of Inter University Level Water Polo Players

(I) group	(J) group	Mean Difference (I-J)	Std. Error	Sig.
Calcutta	Amritsar	12.30769	32.54567	.986
	Panjab	-53.84615	32.54567	.442
	Kerala	86.92308	32.54567	.081
Amritsar	calcutta	-12.30769	32.54567	.986
	Panjab	-66.15385	32.54567	.261
	Kerala	74.61538	32.54567	.169
Panjab	calcutta	53.84615	32.54567	.442
	amritsar	66.15385	32.54567	.261
	Kerala	140.76923*	32.54567	.001
Kerala	calcutta	-86.92308	32.54567	.081
	amritsar	-74.61538	32.54567	.169
	Panjab	-140.76923*	32.54567	.001

Tables 3 clearly indicates that the significant differences existed in Punjab University and Kerala University on Peak Flow Meter since the value obtained was 140.76 and -140.76 and no significant differences existed in Calcutta University and Amritsar University.

### Conclusion

Comparing among the teams, it was found that there was significant difference between two team and no significant difference existed between two team. By nature, Water Polo is a physically challenging sport that makes large demands on aerobic and anaerobic systems. Thus, better peak flow rate contributes to the cardio-respiratory endurance and it was concluded that higher the peak flow rate will obviously well in their sports performance.

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