



Correlation between Selected Anthropometric Parameters and Performance of Water Polo Players

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Abstract:

The purpose of this study was to investigate the anthropometrical measures and its correlation with the performance of Water Polo players. To collect the Data, subjects were selected from different Universities who played at National level Water Polo tournaments. Hundred Water Polo players were selected as the subjects of the study. The subjects were selected on simple random sampling method. Obtained data was statistically analysed by using descriptive and differential analyses. Mean and Standard Deviation were calculated for descriptive analysis and Pearson Product Moment Coefficient of Correlation was used for deferential analysis. Proposed Hypothesis was tested at the level of significance in 0.05. It was observed that the anthropometrical parameters viz. Shoulder-girth, sitting height, & Chest circumference shown very high relationship in positive significance. Wherein Calf circumference & standing height shown substantial relationship and biceps circumference shown slight relationship. On the contrary, though body weight shown slight relationship but was in negative significance. Thereby, it was concluded that Water Polo sports need special type of anthropometrical measures at its variability. Further, the parameter with optimal strengthen capacity viz. Shoulder Girth, Sitting Height, Chest Circumference, Calf Circumference and Standing Height contributed to enhance the performance of Water Polo players accordingly.

Keywords: Anthropometric Parameters, Water Polo Performance.

Introduction:

Anthropometry is an external measurement of human body parts. These measurements may be held either objectively or subjective. In the field of sports & games and in Physical education, the anthropometrical measures are commonly used to associate with physical performance. On conducting a research study, Cureton was observed that all round athletic ability is characterized by wide shoulder width compared to hip width. Davenport's Crural has also established an Index, which is found as a valuable guide for the selection of individual's build in an agility pattern for bony leverage. Higher values of leg length, trunk length indicated agility types. Ability to putting and throwing is indicated by relatively greater height and arm span etc. Garary, Levine and Carter after an intensive study of Anthropometric Measurements of Olympic Athletes concluded that, top level performance in particular event demands particular type of body size and shape. They established strong relationship between the structure of an athlete and the specific task (event) in which he excelled.

Considering all above cited and in special interest of the scholar, he has conducted a research study under the heading "Correlation between selected anthropometric parameters and performance of water polo players". Thus, the observations and conclusions are presented in this publication.

Methodology:

Present research study was basically designed as Status-survey descriptive type. It was conducted during the All India Inter zone Water polo championship held at Panjab University, Chandigarh in Oct. 2016. Hundred Water Polo players participated at the level of National tournament were selected to conduct the study.

The subjects were selected on simple random sampling method from different Universities. Subjects were male players and of 18 to 28 years old.

To evaluate the performance of Water Polo players, AAPHER Youth Physical Fitness Test with six variables (viz. Pull-ups, Sit-ups, Standing Broad Jump, Shuttle-Run, 50 Yds. dash & 600 Yds. Run/&walk) was administered.

Measuring Equipments:

In the present study, to obtain required data the anthropometrical parameters were measured. For this, the equipments that had been used are given as follows-

1. Body weight was measured by Weighing Machine.
2. Standing Height was measured by Stadiometer and Scale.
3. Sitting Height & Biceps Circumference were measured Steel tape.
4. Shoulder Girth, Chest Circumference and Calf Circumference were measured by Flexible- tape.

Performance Evaluation:

To evaluate the performance of the Water Polo players, six skills viz. Hand to hand pass, Wet pass, Shooting, Dribbling, Defensive and Offensive skill test were tried out. Thus the performances score exhibited by the Water Polo players were observed by the three judges, appointed by the investigator.

Total scoring was calculated from sums of the score allotted for the cited six skills. Finally, correlation between anthropometric parameters and the selected variables were drawn out and the inferences were fixed.

Statistical treatment:

Collected data was tabulated and analysed by administering the **statistical treatment**. The inferences and conclusions were made by using descriptive and deferential analysis. Mean and Standard Deviation were finds out for descriptive analysis and The Pearson Product Moment Coefficient of Correlation was used for differential analysis.

Proposed Hypothesis was tested at the level of significance in 0.05.

Thus, these are presented in the following table and depicted graphically in the respective figures.

Table - 1 Table showing, Mean and Standard Deviation in regards the anthropometric parameters and the performances scores exhibited by the Water Polo players

Variables	Mean	SD	Correlation Coefficient
Performance	31.10	3.78	
Body Weight	76.20	11.87	-0.309*
Standing Height	175.03	5.56	0.459*
Sitting Height	34.63	2.63	0.755*
Biceps Circumference	14.30	3.90	0.213 [@]
Shoulder Girth	18.13	3.23	0.785*
Chest Circumference	39.13	4.13	0.743*
Calf Circumference	16.80	1.88	0.550*

*Significant at .05 level of confidence

r .05 (28) 0.361

Above table No. 1 showing the correlation between the performances exhibited by the Water Polo players and the relative anthropometric measures. It further reveals the Mean-scores and standard deviation of selected anthropometric variables and thereby obtained the values of correlations. Viz. Performance (31.10 ± 3.78); Body weight (76.20 ± 11.87), -0.309*; Standing Height (175.03 ± 5.56), 0.459*; Sitting Height (34.63 ± 2.63), 0.755*; Biceps Circumference (14.30 ± 3.90), 0.213*; Shoulder Girth Circumference (18.13 ± 3.23), 0.785*; Chest Circumference (39.13 ± 4.13), 0.743* and Calf Circumference (16.80 ± 1.88), 0.550*.

Thus, it is observed that, with respect to Body weight, obtained value of coefficient Correlation was ($r = -0.309$) which was less than the tabulated value (0.361) at 0.05 level with 28 degree of freedom. Though, statistically the Correlation was found insignificant, there exists slight negative correlation. Thus, it was concluded that, in regards with performance of Water Polo players, Body weight may be the negative affecting factor i.e. greater the body weight, negative effect will also be the greater. In other words average body weight will be more beneficial to enhance the performance.

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The same is depicted graphically in figure No. 1.

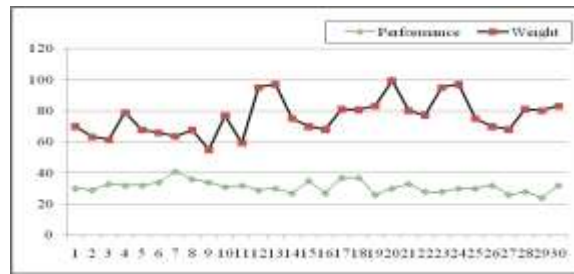


Figure-1: Showing, values of performance exhibited by Water Polo players and body weight score.

Controversially to body weight, it was observed that, with respect to Standing Height, obtained value of r (0.459) was greater than the tabulated value (0.361) at 0.05 levels with 28 degree of freedom. It indicates that, there exists substantial positive significant correlation. Thus it was concluded that, in regards with performance of Water Polo players, Standing Height, plays the substantial role to enhance the performance. In other words greater the standing height will give greater contribution towards the enhancement in performance of Water Polo.

The same is presented graphically in figure No. 2.

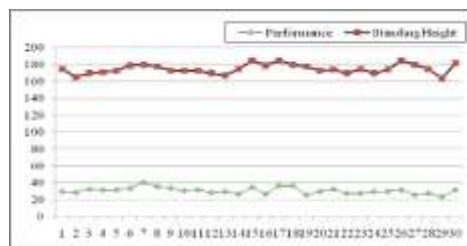


Figure-2: Showing, values of performance exhibited by Water Polo players and Standing Height score.

Similarly, it was observed that, with respect to Sitting Height, obtained value of r is (= 0.755), which was greater than the tabulated value (0.361) at 0.05 level with 28 degree of freedom. It indicates that, significance exist in very high positive correlation. Thus it was concluded that, in regards with performance of Water Polo players, Sitting Height plays very

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high role in positive ways. In other words greater the sitting height will last for greater performance of the Water Polo players.

The same is depicted graphically in figure No. 3.

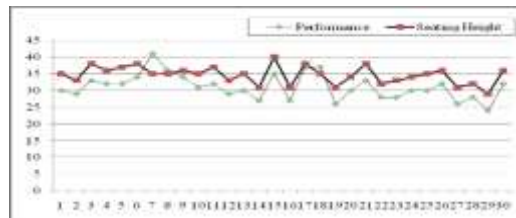


Figure-3: Showing, values of performance exhibited by Water Polo players and Sitting Height score.

It was further, observed that, with respect to Biceps circumference, obtained r value was ($= 0.213$), which was lesser than the tabulated value (0.361) at 0.05 level with 28 degree of freedom. It indicates that, though statistically the Correlation was found insignificant, there exists slight negative correlation. Thus it was to be concluded that, in regards with performance of Water Polo players, Biceps circumference do not help much to be performed in better ways.

The same is presented graphically in figure No. 4.



Figure-4: Values of performance exhibited by Water Polo players and Biceps circumference score.

It was further observed that, with respect to Shoulder Girth, obtained value of r was ($= 0.785$), which was much greater than the tabulated value (0.361) at 0.05 level with 28

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degree of freedom. It indicates that, significance exists in very high positive correlation. Thus it was concluded that, in regards with performance of Water Polo players, Shoulder Girth plays very high role in positive ways. In other words greater the shoulder girth, will assures for best performance of the Water Polo players.

The same is presented graphically in figure No. 5.

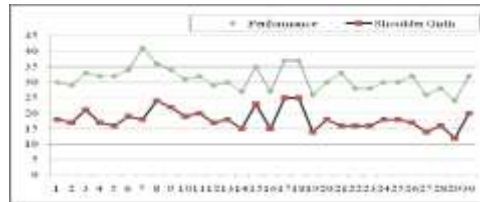
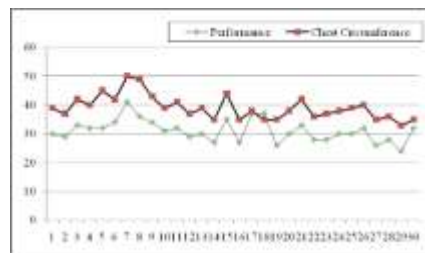


Figure-5: Showing, values of performance exhibited by Water Polo players and Shoulder Girth score.

It was further observed that, with respect to Chest Circumference, obtained value ($r = 0.743$) of coefficient Correlation was greater than the tabulated value (0.361) at 0.05 level with 28 degree of freedom. It indicates that, significance exists in very high positive correlation. Thus it was to be concluded that, in regards with performance of Water Polo players, Chest Circumference, have greater role in enhancing the performance i.e. greater the chest circumference will help to exhibits higher level of performance.

The same is presented graphically in figure No. 6.



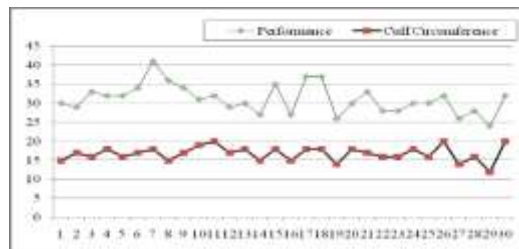
Graph-6: Shows values of water performance and chest circumference score.

It was further observed that, with respect to Calf Circumference, obtained value ($r=0.550$) of coefficient Correlation was greater than the tabulated value (0.361) at 0.05 level

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with 28 degree of freedom. It indicates that, there exists positive significant correlation. Thus it was to be concluded that, in regards with performance of Water Polo players, Calf Circumference, is beneficial i.e. bigger Calf may give greater propelling speed of swimming.

The same is depicted graphically in figure No. 7.



Graph-7: Shows values of water performance and Calf circumference score.

Conclusion:

In overall, it was concluded that, amongst the evaluated variables, Shoulder-girth, Sitting-height, Chest-circumference, Calf-circumference and standing-Height) shown positive significant relationship and thus contributing to higher level of performance to be exhibited by the Water Polo players in the given sequential order. Whereas, other 2 variables (viz. body weight, biceps circumference) shown low significant relationship i.e. in regards with performance of Water Polo players, Body weight may be the negative affecting factor (greater the body weight, negative effect will also be the greater). In other words average body weight will be more beneficial to enhance the performance. Further Biceps circumference may not assist to perform better or lose anything.

Thus, it can be said the sport like Water Polo requires specially sized of constituting body parts to enhance the performance at the National level tournament of water polo.

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