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Correlationship between Anthropometric Variables and Performance Abilities among Handball Players of Haryana, India

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Abstract

Aim of study was to find out co-relationship between anthropometric variables and performance abilities among Handball players of Haryana. A sample of 102 Men Handball players were selected on purposive selection basis between age group of 18 to 24 years among last three position holder teams at Kurukshetra University, Kurukshetra, M.D. University, Rohtak, and Haryana State Handball Championships. Standard materials were used to measure the Anthropometric variables, where as playing abilities were judged by a panel of three judges on fives scale point during Inter-college and State championships. Data was interpreted by applying mean, S.D., stepwise regression analysis and Pearson's product moment statistical techniques.

Correlation Matrix between playing abilities and Anthropometric variables confirmed that age, height, biacromion width, arm length, upper arm length, leg length, calf circumference, sitting height and supra iliac skinfold, thigh skinfold, sub scapular skinfold, calf skinfold, bicep skinfold, triceps skinfold were essential parameters for the performance in handball game, whereas weight and shoulder width were found non significant. Multiple regressions on all the 17, on 16 exceeding height and on 15 parameters excluding sitting height and length, was applied to solve multicollinary of height with sitting height and leg length. Therefore, the final equation of 2nd set was chosen for the study because by applying this height itself came to be a significant contribution towards playing abilities and R2 also improves slightly. In conclusion of final equation namely height, calf circumference, supra iliac skinfold, thigh skinfold, bicep skinfold and triceps abilities were found very powerful in predicting the playing ability of handball players.

Keywords: Anthropometric variables, playing abilities of handball players.

Introduction

Games and sports have gained tremendous importance in almost all the countries of the world. Every country is trying to win more modals in international sports competitions and has its eyes set on international recognition while organizing sports at the grass root level. New incentives sufficient infrastructure and standardized sports equipments are being provided by the agencies interested in the development in sports to see their nations at the top of the medal winning countries in the world competitions. A lot of research is being done on all aspects of sports. Performance at international level not only requires certain physical and physiological qualities of fitness but also a good physical structure. Now a days body build gets physical attention at the time of selection of players for games and sports where high level competition is required. In modern sports anthropometric measurements and their relationship with morot abilities are matter of importance for coaches as well as players for making training schedule. Handball is a fast game, characterized by incredible athletic performance, during a handball match players performs 190 rhythm variations, 279 change of directions, 16 jumps and 485 high intensity movements in 60 minutes. Physical conditioning in handball is extremely important for top performance along with appropriate physical structure and body size suitable for this game. That's why we say, "Athletes are born but not made." The above statement states the importance of anthropometric variables in the process of athletes nurturing to elite level.

Anthropometry, according to Phillips and Hornack (1979) "The measurement of structure and proportion of the body is called anthropometry." Parnell (1951) Tanner (1964) De Garay et al. (1974), Hirata (1979), Kansal et al. (1980), Uppal and Roy (1986), Chauhan (1986), Sodhi (1991) etc. have given the characteristics of various sportsmen for specific events relationship of body measurement physical fitness with specific events and games to assist in the team selection of sportsmen. Measurements of body size include such descriptive information as height, weight and surface area, while measures body proportions describes in relationship between height and weight among lengths, widths and circumsfereces of various body segments.

An evidence of this, we observe the well proportionate physique of state, and university level handball players of Haryana. Inter-relations between the physique and performance have led to more systematic examinations of the physical requirements necessary to achieve the performance in Handball Championships at University and State level. Hence, the present investigators are interested in finding the relationship and prediction of selected anthropometric variables with performance in handball at University and State Level Championship of Haryana.

Purpose of the study: Purpose of the study was to find out the correlation ship between anthropometric parameters and their effects on playing abilities on university and state level handball players.

Significance: The results of the study may be significant to physical education teachers and coaches for screening and selection of teams, designing suitable training schedule and a feed back for players to further improve their performance.

Method and Procedure

To achieve the objectives of the study a purposive sampling technique was sued among the Men Handball teams securing first three places in the Inter-college championships of Kurukshetra Unviersity, M.D. University, Rohtak and Haryana State. Total 12 players were considered as subjects for collection of data between age group of 18 to 24 years. The measurements of height, sitting height, truck length, leg length, fore arm length, calf circumferences, thigh skin fold, supra iliac skin fold, sub scapular skin fold, bicep skin fold and triceps skin fold etc. were taken with help of anthrop meter. The circumference with steel tape and skinfold measure with skinfold caliper. All measurements were taken according to the instructions given by Weiner and Lourie (1969).

The panel of three judges measured the playing abilities of the subjects during the Inter-college and State Men Handball competitions on five point scale: on the basis of their all round performance. The average of scores given by three judges was considered as final score.

Analysis of Data

Data was interpreted by applying mean, S.D., step wise regression analysis and Pearson's product moment statistical techniques.

Results and Discussion

Table 1.1: The results of the study were presented and interpreted as under.

Sr.No	Parameters	Mean	S.D.	C.V.%
1.	Age (Years)	22.18	1.96	8.84
2.	Height (cm)	174.31	5.07	2.91
3.	Weight (kg)	65.85	7.10	10.78
4.	Shoulder width (mm)	79.13	5.71	7.22
5.	Bi-accordion width (mm)	45.08	2.32	5.15
6.	Arm length (cm)	79.10	3.43	4.33
7.	Upper arm length (cm)	36.33	1.70	4.68
8.	Forearm length (cm)	28.54	1.71	5.99
9.	Leg length (cm)	87.24	3.85	4.42
10.	Call circumferences (cm)	34.01	2.20	6.47
11.	Sitting height (cm)	87.08	2.96	3.40
12.	Supra iliac skin fold (mm)	10.97	5.18	47.10
13.	Thigh skin fold (mm)	8.59	2.96	34.46
14.	Sub scapular skin fold (mm)	7.27	2.43	33.43
15.	Calf skin fold (mm)	7.23	2.55	35.27
16.	Bicep skin fold (mm)	2.55	0.84	32.94
17.	Tricep skin fold (mm)	4.03	1.28	31.76

30% and above are significant.

Table 1.1 shows the mean values, standard deviations and coefficients of variation of anthropometric variables. It is therefore, evident that the variation in age, height, weight, shoulder width, biacromion width, arm length, leg length calf circumference and sitting height ranged between 2.91 to 10.71 percent according to the values of coefficients of variation and these variation were insignificant because these were less than 30 percent, whereas variations of sacroiliac skinfold, thing skin fold, sub-scapular skin fold, calf skin fold, bicep skinfold and triceps skin fold variables had more than 30 percent or more. So this level of variations might have its on playing abilities.

Table 1.2: Correlation Matrix Between Playing Ability and Anthropometric Variables.

Sr. No.	Variables	Correlation	Level of significance
1.	Age (Years)	0.287	< 01
2.	Height (cm)	0.674	< 01
3.	Weight (kg)	0.128	NS
4.	Shoulder width (mm)	0.093	NS
5.	Bi-acromion width (mm)	0.358	< 0.01
6.	Arm length (cm)	0.547	<0.01
7.	Upper arm length (cm)	0.494	<0.01
8.	Forearm length (cm)	0.117	NS
9.	Leg length (cm)	0.450	< 0.01
10.	Call circumferences (cm)	0.480	<0.01
11.	Sitting height (cm)	0.578	< 0.01
12.	Supra iliac skin fold (mm)	0.199	<0.05
13.	Thigh skin fold (mm)	0.491	<0.01
14.	Sub scapular skin fold (mm)	0.280	< 0.01
15.	Calf skin fold (mm)	0.497	<0.01
16.	Bicep skin fold (mm)	0.282	< 0.01
17.	Tricep skin fold (mm)	0.616	< 0.01

Table 1.2 reveals that age, height, biacromion width, arm length, upper arm length, leg length, calf circumference, sitting height, thigh skin fold, sub scapular fold, calf skin fold, bicep skin fold, and triceps skin fold were found essential parameters for performance in Handball game at 0.01 level of significance; whereas supra-iliac skin fold was found essential at significance 0.05 level. Weight and shoulder width were not found significant at any level to performance in Handball.

Table 1.3: Effect of Anthropometric Parameters on Playing Ability.

Sr. No.	Variable	Regression Coefficient	R2 value	Contribution towards R_2	Level of Significance	% contribution towards R2
2	Height	0.036	0.6945	13.11	< 0.05	18.18
10	Calf circumference	0.100		11.21	< 0.01	16.14
12	Supra – iliac skin fold	-0.046		4.99	<0.01	7.18
13	Thigh skin fold	-0.094		14.31	<0.01	20.60
16	Bicep skin fold	-0.311		7.68	<0.01	11.06
17	Tricep skin fold	-0.218		18.15	< 0.01	26.14
(a)	Intercept (a)	-4.22		-------	NS	----

R_2 = 6945
F- ratio = 36.50
Level of significance < 01
Difference in R_2 of first and final equation = 0.7224 – 0.6945 = 0.279
The equation is as under:
$Y = 4.22 + 36\ X_2 + 0.100\ X_2 + 0.46\ X_2 – 0.94\ X_{13} – 0.311\ X_{16} – 0.218\ X_{17}$
Where Y is playing ability.

The results of the combined contribution of anthropometric variables, through the application of multiple regressions have been presented in Table 1.3. Logically there were two types of combinations of anthropometric parameters. First of all, all the 17 parameters were tried out, but there was a problem of multicollinearity of height with sitting height and leg length. These three variables cancel the effect of each other in the final equation in this trial. In order to overcome this problem, two different sets of parameters were tried. First set include sixteen variables including sitting height and leg length excluding height. The final equation came out to be the same as was found in case of first trial when all seventeen parameters were tried. Therefore, another set of parameters including 15 parameters was tried which included height and excluded sitting height and leg length. Now height came to be a significant contribution towards playing abilities and R2 also improved slightly. Therefore, the final equation of 2^{nd} set was chosen for the study. When the regression analysis found that all the skin fold except supra iliac skin fold needs to be controlled while height calf circumference and supra iliac skin fold still have their role to play towards the preliminary multiple regression which was found 72.24 percent variation in playing abilities of handball players, while variables included in the final run equation, namely height, calf circumference, supra iliac skin fold, thigh skin fold, bicep skin fold, and tricep variables are found important in the playing abilities of handball players. This shows that nine variables other than mentioned above secured a negligible share to the tune of only 2.79 percent of variation. This revealed that five

variables including in the final run equation were very powerful in predicting the player's ability in handball.

Conclusion

The anthropometric variables namely age, height, biacromion width, arm length, upper arm length, leg length, calf circumference, sitting height, supra iliac skin fold were found to be positively significant in the performance of handball players. However, following anthropometric variables considered meaningful to draw out the final equation.

1. Height (2)
2. Calf circumference (10)
3. Supra-iliac skin fold (12)
4. Thigh skin fold (13)
5. Bicep skin fold (16)
6. Tricep skin fold (17)

$Y= 4.22 + 36X_2 + 0.100X_2 + 0.46X_2 – 0.94X_{13} – 0.311X_{16} – 0.218X_{17}$ where Y is playing ability.

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