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Prediction Of Handball Playing Ability From Anthropometrical And Physical Ability Variables Among Inter University Players

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***Abstract*— Sport being integral part of human life is getting more competitive and knowledge driven these days. The coaches are challenged with selection of best playing team and the criterion for their selection is getting systematic. The present study intended to evaluate the anthropometric and physical ability variables that most importantly influence the University handball players' performance. The necessary data was collected during the training sessions using panel of judges. The data was analyzed using step-wise regression. The analysis indicated the anthropometric variables viz., height, hand span and leg length and the physical ability variables, arm power, leg power and hand grip strength could be crucial factors.**

***Index Terms*—Handball, Performance, physical ability, anthropometric variables, University handball players,**

I. INTRODUCTION

Handball is one of the most popular sports in the world in terms of spectator sports and players participation. It is one of the fastest games in the world involving continuous movement and actions. These ingredients make it challenging in many ways for the participant and a thrilling experience for the spectator. This game is usually played indoors and occasionally outdoors. It is played as an inter-school, inter-collegiate, inter-university and professional sport.

The game is contested between two teams. Each team comprises of twelve players, among them six players and a goal keeper play inside and remaining five players will be the substitutes. The game is played for 60 minutes with two halves of 30 minutes each. Each team has its own Goal at opposite ends of a court. The size of the court is 40metersx20 meters. In this game all the seven players make aggressive, concentrated and fast movement to meet the defensive and offensive situation of the game, E.g., quick start, quick passes, quick and accurate throw, abrupt changes of places, sudden changes of direction and vigorous jumps for shooting.

A. Anthropometry and handball

Several studies have discussed the importance of anthropometric variables in youth and adult team handball players. In adult handball team, back players are taller and have a greater body mass compared to wings, which helps when shooting from distance. Since, players positioned on the wing rarely engage in physical contact with the opposing defenders, a tall stature and high body weight are of less importance to successful performance in this position. Pivots play within the opponent's defensive formation with the back or flank

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facing the goal and the defenders themselves. To perform well on the pivot position, a strong upper part of the body and a relatively large total body mass are needed to engage in physical contact for favorable positions. Finally, the goalkeeper should ideally possess a large stature and relatively long limbs. This helps in covering bigger goal areas and implementing save movements in parts of the goal. In conclusion, there appears to be a great difference in the anthropometric characteristics of players playing in different field positions in adult handball.

B. Physical ability and handball

Every individual must know the need of physical exercise. Physical fitness is the capacity of a person to function steadily and smoothly when a situation arises. A physical exercise makes one mentally sharpe, physically comfortable and ease with his body to be better able to cope with the demands that everyday life makes upon him.

An increased physical quality not only improves health but improves performance at work. Hundreds of American companies have backed this idea financially by employing full time directors of fitness for their work.

C. Performance assessment

The present study collected the data pertaining to the performance ability university handball players by adopting rating method. A panel of three expert coaches rate the subject's performance in various factors like skill, technique and application of skill in the game situation, such as passing, dribbling, shooting, offensive and defensive ability etc., are assessed on 10 point rating scale, the rating was based on subjective evaluation to predict the performance ability of handball players. The overall score for individual players was calculated by averaging the scores by three coaches.

D. Methodology

To achieve the purpose of the study, the investigator has selected men Handball players who represented their university in Inter-University Handball championship. The subjects identified for present study were forty five (N=45) from four universities of Karnataka state –Bangalore University, Mangalore University, Gulbarga university and Visvesvaraya Technological University. The subjects were aged between 18-25 years .In order to get sufficient number of subjects, the data was collected during the coaching camps of the Inter-University Handball tournament at their coaching camp venue during 2010.The data on anthropometric and physical abilities of the players and their performance was elicited.

E. Selection of variables and tests

After a thorough review of literature related to the game of Handball in books, journals, periodicals and research articles besides detailed discussion with the experts and keeping in view of the feasibility of the study in terms of availability of equipment and the relevance of the variables to the present study, the following variables were selected.

F. Statistical techniques

After obtaining the data the below mentioned statistical technique were used to analyze and to interpret the study.

- Stepwise Regression multiple

II. RESULT AND DISCUSSION

The regression coefficients and their significance for each of the three regression models is presented in table 1. It is clear from the table that addition of each variable to the model had significant influence the dependent variable, performance, as is evident from the high values of 't'. The final model of step-wise multiple regression presented in the table shows that while the hand span and height had positive influence on the player's performance, the leg length exhibited a negative influence. The results were as anticipated and is explained as follows. A higher hand span would help player to both collect, hold and throw the hand ball with better accuracy and aiming and power. Every one unit increase in hand span would increase the performance by 1.36 units. As is known universally, height is a crucial and determining factor for most of the sports events and thus, it showed a positive influence on hand ball players also. The coefficient value of 0.84

indicates that the every one unit increase in the player's height would improve the player's performance by 0.84 units. players leg length had a considerable negative bearing (-0.4) on their performance.

TABLE I STEP-WISE REGRESSION COEFFICIENTS OF PERFORMANCE AGAINST ANTHROPOMETRIC VARIABLES

Model		Unstandardized Coefficients		Standardized Coefficients	t	Significance	R Square
		B	Std. Error	Beta			
1	(Constant)	-6.983	7.479		-.934	0.356	0.311
	Hand span	1.492	.339	0.558	4.405	0.000	
2	(Constant)	-133.518	30.453		-4.384	0.000	0.518
	Hand span	1.268	.292	0.474	4.348	0.000	
	Height	.718	.169	0.463	4.248	0.000	
3	(Constant)	-115.989	28.312		-4.097	0.000	0.610
	Hand span	1.361	.267	0.509	5.093	0.000	
	Height	.839	.159	0.541	5.282	0.000	
	Leg length	-.399	.129	-0.316	-3.100	0.003	

The regression coefficients and their significance

TABLE II STEP-WISE REGRESSION COEFFICIENTS OF PERFORMANCE AGAINST PHYSICAL ABILITY VARIABLES

Model		Unstandardized Coefficients		Standardized Coefficients	T	Significance	R Square
		B	Std. Error	Beta			
1	(Constant)	-14.052	7.787		-1.805	0.078	0.380
	Arm power	6.530	1.271	0.617	5.139	0.000	
2	(Constant)	-27.949	8.172		-3.420	0.001	0.509
	Arm power	4.968	1.238	0.469	4.013	0.000	
	Leg power	1.817	0.548	0.388	3.314	0.002	
3	(Constant)	-8.730	11.693		-0.747	0.460	0.561
	Arm power	5.420	1.202	0.512	4.510	0.000	
	Leg power	2.220	0.555	0.473	3.998	0.000	
	Grip strength	-0.541	0.245	-0.254	-2.210	0.033	

The regression coefficients and their significance for each of the three regression models is presented in table 2. It is clear from the table that addition of each variable to the model had significant influence the dependent variable, performance, as is evident from the high values of 't'. The final model of step-wise multiple regression presented in the table shows that while the arm power and leg power had positive influence on the player's performance, the hand grip strength exhibited negative influence. The results were as anticipated and

is explained as follows. Arm power would also help players in applying maximum force during shooting and giving quick and accurate passes to partners. A strong leg power would help player to increasing stride length and taking strong take off from 9 or 7 meters. Every one unit increase in arm power would increase the performance by 5.42 units and thus emerged as one of the crucial variable influencing players performance. Leg power is also important in handball and it showed a positive influence on hand ball players also. The coefficient value of .541indicates that the every one unit increase in the player's hand grip strength would decrease the player's performance by .541 units.

Discussion

The results of present study are discussed briefly so as to give justification to our findings by providing suitable explanation and comparing the results of other similar studies. Comparing other's results provides empirical support for accepting/rejecting the results.

Step-wise regression was employed to predict the influence of anthropometric and physical ability variables on handball player's performance, separately. Out of the 5 anthropometric variables considered in the analysis, 3 variables viz., hand span height and arm span were found to be significant determinants of performance. Debanne and Laffaye (2011) study (through regression analysis) found that the anthropometric variables, body mass, medicine ball throwing performance and power output in 20-kg bench press to be explaining a maximum of 74% variation among players in ball velocity.

Physical abilities seem to have received higher attention by several researchers to evaluate its influence on handball players' performance. In the present study, leg power, arm power and grip strength significantly influenced the performance. The first two variables exerted a positive influence and the negative sign for the coefficient of grip strength indicating that a higher strength can bring down the players' performance. Cavala & Katic (2010) following the ANOVA and discriminative analysis techniques found that the successful female handball players differed from unsuccessful ones, in terms of the physical ability factors such as throw strength, movement without and with ball, agility and ball manipulation abilities. Predicting the handball players performance due to the physical ability variables of national players of Greece and Serbia, Oxyzoglou et al (2008) found the goalkeepers to possess highly developed pelvic flexibility and well developed level of explosive force. Classifying the school women handball players (over a 7 years of training period) as elite hand ball players and dropouts using discriminative analysis, Vatromir et al (2006) found the elite players to possess better coordination, explosive strength and speed and concluded that these variables could be reliable criteria for player selection. Thus, in selection of players, the anthropometric variables viz., height, hand span and leg length and the physical ability variables, arm power, leg power and hand grip strength could be crucial factors.

III. CONCLUSION

The present study undertook an assessment of player's performance as influenced by the anthropometric and physical ability variables among the young university handball players. The study measured these different variables by using appropriate equipment during training session of the university sports. Stepwise regression analysis was employed to establish the relationship. The study concluded that the anthropometric variables viz., height, hand span and leg length and the motor ability variables, arm power, leg power and hand grip strength could be crucial factors.

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