Prediction the Playing Ability in Volleyball from Selected Anthropometrical and Physical Variables among College Level Volleyball Players

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Abstract

The purpose of the study was to predict the playing ability in volleyball from selected anthropometrical and physical among college level male volleyball players. To achieve the purpose two hundred and sixty one volleyball players were randomly selected from various colleges in Tamilnadu state, India and their age ranged from 18 to 25 years. The subjects had past playing experience of at least three years in volleyball and only those who represented their respective college teams were taken as subjects. As the performance is concerned, the anthropometrical and physical variables play a vital role in overall performance. The anthropometrical variables namely – standing height, body weight, arm length, leg length, calf girth, thigh girth; physical variables namely – speed, Strength, agility, flexibility. The playing ability is the dependant variable. It was taken as the performance factor, which was subjectively assessed by three qualified volleyball coaches. The computation of multiple regression was also used. In multiple regressions, a criterion variables from a set of predictors was predicted. Step wise argument methods of multiple regression was used in this study to find out the predictor variable that has the highest correlation with the criterion variables were entered in the equation depending on the contribution of each predictor. The SPSS 15 version package was used to determine the predictive equation. The results revealed that the leg length, standing height, agility, arm length and calf girth become the common characteristics which can predict the Volleyball playing ability among college level men players.

Keywords: Prediction, Anthropometrical, Physical, Volleyball Players.

Introduction

Predicting potential events or outcomes from current or historical evidence is one of the aims of science research. In our everyday lives, there are numerous ways of prediction we come across, such as wealth forecast, business forecast, share market forecast, election patterns, etc. These are based on some established facts and are thus accurate predictions. Research in the field of sports and games has shown that an individual or team's future performance can be predicted by analysing certain variables that are found to be the basis for total performance. Volleyball requires the athlete to jump as high as possible while attacking the ball with upper body movements. Vertical jump is important in volleyball because of the need to hit the ball around the opponent on the opposite side of the net. The higher a players' vertical jump height, the less likely it is that the ball will be blocked by the opponent on defense. Vertical jump is a major determinant of volleyball performance and many researchers have studied different

aspects of vertical jumping. According to Gutierrez & Marcos (2009), the factors that affect vertical jump are height reached by the center of gravity, time required for execution, and the spatial orientation of the corporal segments (Rexhepi et al. 2012).

Materials and Methods

The purpose of the study was to predict the playing ability in volleyball from selected anthropometrical and physical among college level male volleyball players. To achieve the purpose two hundred and sixty one volleyball players were randomly selected from various colleges in Tamilnadu state, India and their age ranged from 18 to 25 years. The subjects had past playing experience of at least three years in volleyball and only those who represented their respective college teams were taken as subjects. As the performance is concerned, the anthropometrical and physical variables play a vital role in overall performance. The anthropometrical variables namely – standing height, body weight, arm length, leg length, calf girth, thigh girth; physical variables namely – speed, Strength, agility, flexibility. The playing ability is the dependant variable. It was taken as the performance factor, which was subjectively assessed by three qualified volleyball coaches. The computation of multiple regression was

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entered in the equation depending on the contribution of each predictor. The SPSS 15 version package was used to determine the predictive equation.

Results

Table 1. *Descriptive statistics*

S.No	Variables	Minimum	Maximum	Range	Mean	SD (±)
1	Standing Height	1.63	1.87	0.24	1.76	0.05
2	Body Weight	58.50	78.80	20.30	68.99	5.99
3	Arm Length	70.00	88.50	18.50	78.93	5.53
4	Leg Length	89.10	118.00	28.90	104.55	7.00
5	Calf Girth	30.10	38.90	8.80	35.20	2.77
6	Thigh Girth	40.20	77.60	37.40	57.65	11.10
7	Speed	6.80	7.10	0.30	6.93	0.08
8	Strength	45.80	63.86	18.06	56.01	3.28
9	Agility	10.07	11.39	1.32	10.75	0.37
10	Flexibility	36.60	48.80	12.20	42.55	3.03
11	Playing Ability	6.00	9.00	3.00	7.21	0.99

Table – 1 showed the descriptive statistics – Range, Minimum, Maximum, Mean and Standard deviation of playing ability in volleyball from selected

anthropometrical and physical variables and the playing ability among college level volleyball Players.

Table 2. *Analysis of variance*

	Model	Sum of Squares	df	Mean Square	F	Sig.
1	Regression	216.302	1	216.302	1432.511*	.000[b]
	Residual	39.108	259	0.151		
	Total	255.410	260			
2	Regression	225.382	2	112.691	968.231*	.000[c]
	Residual	30.028	258	0.116		
	Total	255.410	260			
3	Regression	231.661	3	77.220	835.656*	.000[d]
	Residual	23.749	257	0.092		
	Total	255.410	260			
4	Regression	233.667	4	58.417	687.792*	.000[e]
	Residual	21.743	256	0.085		
	Total	255.410	260			
5	Regression	234.605	5	46.921	575.102*	.000[f]
	Residual	20.805	255	0.082		
	Total	255.410	260			

It is clear from table – 2 that the obtained F value 1432.51, 968.23, 835.65, 687.79 and 575.10 respectively are significant at 0.05 level. It reveals that all the independent variables are collectively influenced on the playing ability of volleyball players. As the F ratio is significant multiple regression is computed. Multiple regression equation was computed only for the reason

that the multiple correlation were sufficiently high to warrant prediction from it. Then, the correlation recognized the independent variables to be included and their order in the regression equation. Multiple correlations were computed by step wise argument method on data of Volleyball players and the results were presented in Table – 3.

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Table 3. *Step wise multiple regression*

Model	Variables	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	Leg Length	.920[a]	.847	.846	.38858
2	Standing Height	.939[b]	.882	.882	.34116
3	Agility	.952[c]	.907	.906	.30399
4	Arm Length	.960[f]	.922	.920	.28008
5	Calf Girth	.961[g]	.923	.921	.27825

From Table – 3, it is found out that the multiple correlations co – efficient for predictors, such as leg length, standing height, agility, arm length and calf girth was 0.961 which produce highest multiple correlations with volleyball playing ability. 'R' square values show that the percentage of contribution of predictors to the Volleyball playing ability (Dependent variables) is in the following order.

1. About 92% of the variation in the volleyball playing ability was explained by the regression model with one predictor leg length.
2. About 93% of the variation in the volleyball playing ability was explained by the regression model with two predictors, leg length and standing height. An additional 1% of the variance in the volleyball playing ability is contributed by standing height.
3. About 95% of the variation in the volleyball playing ability was explained by the regression model with three predictors, leg length, standing height and agility. An additional 2% of the variance in the volleyball playing ability is contributed by agility.
4. About 96% of the variation in the volleyball playing ability was explained by the regression model with four predictors, leg length, standing height, agility and arm length. 1% of the variance in the volleyball playing ability is contributed by arm length.
5. About 96% of the variation in the volleyball playing ability was explained by the regression model with five predictors, leg length, standing height, agility, arm length and calf girth. Multiple regression equation was computed and the results were presented in Table – 4.

Table 4. *Regression analysis*

Model		Unstandardized Coefficients		Standardized Coefficients	Sig.	Partial Correlations	Collinearity Statistics
		B	Std. Error	Beta			
Step1	(Constant)	-6.400	.360		.000		
	Leg Length	.130	.003	.920	.000	.920	1.000
Step 2	(Constant)	-11.431	.652		.000		
	Leg Length	.111	.004	.784	.000	.880	.655
	Standing Height	4.005	.453	.233	.000	.482	.655
Step 3	(Constant)	-3.654	1.108		.001		
	Leg Length	.095	.004	.671	.000	.839	.490
	Standing Height	3.735	.405	.217	.000	.498	.651
	Agility	-.524	.064	-.199	.000	-.457	.622
Step 4	(Constant)	-3.290	1.065		.002		
	Leg Length	.089	.004	.627	.000	.818	.438
	Standing Height	3.402	.395	.198	.000	.474	.631
	Agility	-.529	.061	-.201	.000	-.477	.622
	Arm Length	.032	.007	.105	.000	.291	.713
Step 5	(Constant)	-4.708	1.124		.000		
	Leg Length	.088	.004	.620	.000	.820	.435
	Standing Height	3.676	.395	.214	.000	.503	.605
	Agility	-.519	.060	-.197	.000	-.478	.620
	Arm Length	.032	.007	.106	.000	.298	.713

Calf Girth	.001	.000	.062	.001	.208	.955

In the Table – 4, the following regression equations were derived for playing ability of volleyball players with dependent variables.

Regression Equation in obtained scores from = CR

Playing Ability (CR) = -6.400 +0.088(X_4) +3.676(X_1) -0.519(X_9) +0.032(X_3) +0.001(X_5)

C.R	Playing Ability	X_9	Agility
X_4	Leg Length	X_3	Arm Length
X_1	Standing Height	X_5	Calf Girth

The regression equation for the prediction of Volleyball playing ability includes leg length, standing height, agility, arm length and calf girth. As the multiple correlations on Volleyball playing ability with the combined effect of these independent variables are highly significant, it is apparent that the obtained regression equation has a high predictive validity.

Conclusion
1. The results revealed that an Inter – relationship exists significantly between the anthropometrical and physical variables among college level men volleyball players.
2. The results revealed that the leg length, standing height, agility, arm length and calf girth become the common characteristics which can predict the Volleyball playing ability among college level men players.

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