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Prediction of Playing Ability from Selected Physical and Anthropometrical Variables among College Level Men Soccer Players

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Abstract

The purpose of the study was to predict the soccer playing ability from selected physical and anthropometrical variables among college level men players. To achieve the purpose, three hundred and eighteen men soccer players were randomly selected from various colleges in Tamilnadu state, India and their age ranged from 17 to 25 years. The subjects had the past playing experience of at least three years in soccer and only those who represented their respective college teams were taken as subjects. In this study, the soccer playing ability was predicted from three hundred and eighteen college level men players selected with the help of predictor variables such as the Physical variables namely – Speed, Agility, Flexibility, Leg Explosive Power, Muscular endurance, Cardio Respiratory Endurance; Anthropometrical variables namely – Body Weight, Thigh Girth, Calf Girth, Hand length and Chest girth. The playing ability which was taken as the performance factor was subjectively assessed by three qualified soccer coaches. The present study consisted of one dependent variable, namely playing ability of soccer players and eleven independent variables. Collected data was subjected to statistical analysis as explained below. The inter - relationship among the selected physical and anthropometrical variables and the soccer playing ability, were computed by using Pearson product moment correlation coefficients. The computation of multiple regressions was also used. In multiple regressions, a criterion variable from a set of predictors was predicted. Step wise argument methods of multiple regressions were used in this study to find out the predictor variable that had the highest correlation with the criterion variables entered in the equation depending on the contribution of each predictor. The results revealed that an Inter – relationship exists significantly between the physical and anthropometrical variables among college level men soccer players. The size of multiple correlation is sufficiently large and hence regression equation developed by thirteen variables can be put in to prediction equation of soccer players. The results revealed that the cardio respiratory endurance, calf girth, agility and thigh girth become the common characteristics which can predict the Soccer playing ability among college level men players.

Keywords: Physical, Physiological, College, Men Players.

Introduction

Football is a game which calls for strenuous, continuous and thrilling action and therefore, appeals to the youth the world over. The skills involved in the game are simple, natural and yet are highly stimulating and satisfying to anyone who participates in the game. Football as it is seen today has undergone a tremendous improvement since its birth. Of all the events in human history the one to attract the largest audience is neither a great political occasion nor a special celebration of some complex achievements in the art or science, but simple ball game a football match. If we examine it more carefully we would soon realize, that each football match is a symbolic event of some complexity. One of the greatest strengths of the game is its simplicity. At its crudest level all that are needed is a ball and an open space with something to act as a goal post. No other sport is so easily available and so immediately inspiring (Reily, 1996).

One of the goals of scientific research is to predict future events or results from present or past data. There are different types of prediction that we come across in our daily life, such as wealth-forecast, market-forecast, share market-forecast, election trends etcetera. These are based upon some known facts and so they are reliable prediction. Research in the field of sports and games had proved that the future performance of an individual or a team could be predicted through the analysis of certain variables, which are found to be the basis for total performance. Among many factors, the following variables, such as physical, physiological, psychological, skill performance and anthropometrical variables that decide the playing ability of an individual are more important. Since, the researcher is a player, official and coach in soccer game; he felt that there is a

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need for an analytical study in order to discriminate the factors associated in predicting the success in soccer among the college level men players. Moreover, a very little research had been done on soccer players, which motivated the investigator to take up the study.

Methodology

The purpose of the study was to predict the soccer playing ability from selected physical and anthropometrical variables among college level men players. To achieve the purpose, three hundred and eighteen men soccer players were randomly selected from various colleges in Tamilnadu state, India and their age ranged from 17 to 25 years. The subjects had the past playing experience of at least three years in soccer and only those who represented their respective college teams were taken as subjects. In this study, the soccer playing ability was predicted from three hundred and eighteen college level men players selected with the help of predictor variables such as the Physical variables namely – Speed, Agility, Flexibility, Leg Explosive Power, Muscular endurance, Cardio Respiratory Endurance; Anthropometrical variables namely – Body Weight, Thigh Girth, Calf Girth, Hand length and Chest girth. The playing ability which was taken as the performance factor was subjectively assessed by three qualified soccer coaches. The present study consisted of one dependent variable, namely playing ability of soccer players and eleven independent variables. Collected data was subjected to statistical analysis as explained below. The inter - relationship among the selected physical and anthropometrical variables and the soccer playing ability, were computed by using Pearson product moment correlation coefficients. The computation of multiple regressions was also used. In multiple regressions, a criterion variable from a set of predictors was predicted. Step wise argument methods of multiple regressions were used in this study to find out the predictor variable that had the highest correlation with the criterion variables entered in the equation depending on the contribution of each predictor.

Results

Table I. Descriptive statistics of playing ability in soccer from selected physical and anthropometrical variables among college level men players

S.No	Variables	Range	Minimum	Maximum	Mean	SD (±)
1	Speed	0.82	7.19	8.01	7.52	0.24
2	Agility	1.32	11.17	12.49	11.83	0.40
3	Flexibility	12.20	36.60	48.80	42.50	3.03
4	Leg Explosive Power	0.16	1.76	1.92	1.83	0.04
5	Muscular Endurance	9.00	46.00	55.00	50.03	2.43
6	Cardio Respiratory Endurance	300	2100	2400	2241.47	89.47
7	Body Weight	20.30	58.50	78.80	68.96	5.98
8	Thigh Girth	38.65	43.35	82.00	63.35	13.28
9	Calf Girth	9.20	30.12	39.32	33.99	2.87
10	Hand length	3.57	18.38	21.95	20.22	0.92
11	Chest Girth	22.34	76.01	98.35	85.47	7.10
12	Playing Ability	3.00	6.00	9.00	7.09	1.03

Table – I showed the descriptive statistics – Range, Minimum, Maximum, Mean and Standard deviation of playing ability in soccer from selected physical and anthropometrical variables and the playing ability among college level men Players. The present study attempted to link the coaches rating as measure of playing ability in soccer from selected physical and anthropometrical variables among college level men Players. Pearson's product moment correlation analysis was made and results were presented in Table – II.

Table II. Inter-correlation of selected variables with the playing ability in soccer among college level men players

S.No	C.R	V_1	V_2	V_3	V_4	V_5	V_6	V_7	V_8	V_9	V_{10}	V_{11}
V_1	0.03	1										
V_2	0.07	0.44**	1									
V_3	0.11*	0.55**	0.12*	1								
V_4	0.06	0.24**	0.30**	0.20**	1							
V_5	0.07	0.11*	0.23**	0.17**	0.63**	1						
V_6	0.68**	0.05	0.03	0.08	0.11*	0.06	1					

V_7	0.02	0.57**	0.22**	0.05	0.07	0.23**	0.02	1				
V_8	0.10	0.48**	0.19**	0.38**	0.06	0.10	0.06	0.33**	1			
V_9	0.14**	0.04	0.05	0.05	0.01	0.02	0.01	0.18**	0.03	1		
V_{10}	0.01	0.02	0.07	0.03	0.01	0.03	0.02	0.03	0.03	0.03	1	
V_{11}	0.07	0.27**	0.02	0.06	0.12*	0.13*	0.05	0.15**	0.14**	0.01	0.07	1

The result proved that the selected variables flexibility (r = 0.11), cardio respiratory endurance (r = 0.68) and calf girth (r = 0.14) were significantly correlated with the soccer playing ability and were greater than the required table 'r' value of 0.11 to be significant at 0.05 level. And there was no significant relationship between the soccer playing ability and speed (r = 0.03), agility (r = 0.07), leg explosive power (r = 0.06), muscular endurance (r = 0.07), body weight (r = 0.02), thigh girth (r = 0.10), hand length (r = 0.01) and chest girth (r = 0.07).

Table III. Analysis of variance for the influence of independent variables on playing ability in soccer among college level men players

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	157.517	1	157.517	274.014*	.000[b]
	Residual	181.653	316	.575		
	Total	339.170	317			
2	Regression	165.479	2	82.739	150.053*	.000[c]
	Residual	173.691	315	.551		
	Total	339.170	317			
3	Regression	187.956	8	23.494	48.010*	.000[i]
	Residual	151.214	309	.489		
	Total	339.170	317			
4	Regression	191.041	9	21.227	44.136*	.000[j]
	Residual	148.129	308	.481		
	Total	339.170	317			

It was clear from the table – III that the obtained F value, 274.014, 150.053, 48.010 and 44.136 respectively were significant at 0.05 level. It revealed that all the independent variables were collectively influenced on the playing ability in soccer among college level men players. As the F ratio was significant, multiple regressions were computed. Multiple regression equation was computed only because the multiple correlations were sufficiently high to warrant prediction from it. Then, the correlation identified 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 Soccer players and the results were presented in Table – IV.

Table IV. Step wise multiple regression between playing ability in soccer and independent variables among college level men players

Model	Variables	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	Cardio Respiratory Endurance	.681[a]	.464	.463	.75819
2	Calf Girth	.698[b]	.488	.485	.74256
3	Agility	.744[h]	.554	.543	.69955
4	Thigh Girth	.751[i]	.563	.550	.69350

From Table – IV, it was found out that the multiple correlations co – efficient for predictors, such as cardio respiratory endurance, calf girth, peak expiratory flow rate, self confidence, dribbling, somatic anxiety, resting heart rate, agility, thigh girth and shooting was 0.755 which produced highest multiple correlations with soccer playing ability. 'R' square values showed that the percentage of contribution of predictors to the Soccer playing ability (Dependent variables) is in the following order.

1. About 68% of the variation of playing ability in soccer was explained by the regression model with one predictor cardio respiratory endurance.
2. About 69% of the variation of playing ability in soccer was explained by the regression model with two predictors - cardio respiratory endurance and calf girth. An additional 1% of the variance in the soccer playing ability was contributed by calf girth.
3. About 74% of the variation of playing ability in soccer was explained by the regression model with three predictors - cardio respiratory endurance, calf girth and agility. An additional 1% of the variance in the Soccer playing ability was contributed by agility.
4. About 75% of the variation of playing ability in soccer was explained by the regression model with four predictors - cardio respiratory endurance, calf girth, agility and thigh girth. An additional 1% of the variance in the Soccer playing ability was contributed by thigh girth.

Multiple regression equation was computed and the results were presented in Table – V.

Table V. Regression analysis of prediction equation of college level men soccer players

Model		Unstandardized Coefficients		Standardized Coefficients	Sig.	Partial Correlations	Collinearity Statistics
		B	Std. Error	Beta			
Step1	(Constant)	-10.564	1.068		.000		
	Cardio Respiratory Endurance	.008	.000	.681	.000	.681	1.000
Step 2	(Constant)	-12.473	1.160		.000		
	Cardio Respiratory Endurance	.008	.000	.683	.000	.690	1.000
	Calf Girth	.055	.015	.153	.000	.209	1.000
Step 3	(Constant)	-14.982	2.443		.000		
	Cardio Respiratory Endurance	.007	.000	.635	.000	.675	.924
	Calf Girth	.074	.014	.204	.000	.279	.902
	Agility	.325	.103	.128	.002	.178	.867
Step 4	(Constant)	-17.466	2.746		.000		
	Cardio Respiratory Endurance	.007	.000	.632	.000	.679	.924
	Calf Girth	.085	.015	.237	.000	.313	.828
	Agility	.317	.102	.125	.002	.175	.866
	Thigh Girth	-.010	.003	-.130	.003	-.171	.764

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

Regression Equation in obtained scores from = CR

Playing Ability (CR) = (CR) = -10.564 +0.007(V_6) +0.085(V_9) +0.317(V_2) -0.010(V_8)

C.R	Playing ability
V_6	Cardio Respiratory Endurance
V_9	Calf Girth
V_2	Agility
V_8	Thigh Girth

The regression equation for the prediction of playing ability in soccer includes cardio respiratory endurance, calf girth, agility and thigh girth. As the multiple correlations on Soccer 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 physical and anthropometrical variables among college level men soccer players.
2. The size of multiple correlation is sufficiently large and hence regression equation developed by thirteen variables can be put in to prediction equation of soccer players.

3. The results revealed that the cardio respiratory endurance, calf girth, agility and thigh girth become the common characteristics which can predict the Soccer playing ability among college level men players.

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