e-ISSN 2320 –7876 www.ijfans.org

Vol.11,S Iss.1, 2022

 UGC CARE Listed (Group -I) Journal

DEVELOPING A REGRESSION MODEL FOR PREDICTING THE BATSMEN'S PERFORMANCE IN CRICKET ON ANTHROPOMETRIC PARAMETERS

1. Neeraj Kumar

(Ph.D Research Scholar)

Department Of Physical Education

MDU, Rohtak

2. Dr. R.P. Garg

Professor

Department Of Physical Education

MDU, Rohtak

Gmail id.- neeraj.rs.phyedu@mdurohtak.ac.in

Mobile no.- 8950009906

Abstract:- This research aimed to ascertain the connection between anthropometric characteristics and cricket batting performance. Using random sampling, a total of 25 male participants were chosen from the cricket academy, practice game, and camp in Haryana. The participants were all frequent gamers with high skills, ranging in age between 17 to 28 (19.16 + 1.37). In this study, the following variables were measured: age, height, body weight, full arm length, hand length, whole leg length, chest girth, abdomen girth, hip girth, humerus bicondylar diameter, wrist diameter, thigh skinfold, calf skinfold, BMI, and fat %. The Pearson correlation approach, stepwise multiple regression, and descriptive statistics were all employed for analysis in this study. The level of significance was 0.05. The outcome of this analysis showed the only anthropometric characteristics that accurately predicted cricket batting performance were player age, chest skinfold, and thigh skinfold.

Keywords: regression, anthropometry, batting performance, cricket.

INTRODUCTION

Cricket is the most popular sport in the world, making it almost as popular as football. This is because the game has a certain charm that appeals to people on a deeper level. Cricket is no longer seen as a foreign sport in emerging and poor nations; it has essentially become a domestic sport. In a country such as India, although cricket isn't a national sport, it has gained widespread popularity throughout the years and is well-liked by people of all ages and communities. According to the appropriate environment and climatic circumstances of that particular place, The Game was played throughout the year through distinct seasons. A few

decades ago, the game, for instance, was played across Asiatic nations in the winter and over European countries in the summer. Today, the game is played all year long, giving the least importance to the season and location. As a result, the sport started to host more games throughout the year, which forced the players to participate in more consistent practices and training. The game's popularity increased as a result of the constant exposure, and as a result of this popularity, the game began to attract more players by holding more matches at lesser levels in addition to international competitions. With all these merits confirmed, cricket is today a sport that can be enjoyed by spectators and players, since there are more and better chances. (Singh, 1988). Anthropometric and physical traits have the prospective placement or desirable requirements in excellence in many games and sports. There are many other aspects that contribute to a sportsman's performance. These anthropometric measurements and morphological traits are crucial for predicting an athlete's performance (Reco-Sanz, 1998; Wilmore & Costill, 1999; Keogh, 1999). According to Heyward (2006), body mass index, height, circumference, thickness of skin folds, and widths of bones being the principal anthropometric measures, and Heyward (2006).

The present study aimed to find out the relationship between Anthropometric variables with the batting performance in cricket. Moreover, to develop reference equations of selected anthropometric variables and batting performance in cricket.

Procedure and Methodology

The study aimed to determine the relationship between Anthropometric variables and the batting performance in cricket. Total 25 male subjects were selected from cricket camp, practice match and cricket academy in Haryana by using random sampling. The age range of the subjects was from 17-28 years and all were regular players with good level of skill. The 19 predictor (independent) variables such as Age, height, weight, full arm length, hand length, full leg length, chest circumference, abdominal circumference, hip circumference, humerus bicondylour, wrist diameter, biceps skinfold, triceps skinfold, chest skinfold, thigh skinfold, calf skinfold, BMI and Fat percentage were selected. Height, leg length, arm length, hand length, chest circumference, abdominal circumference, hip circumference were measured by measuring tape, humerus bicondylour and wrist diameter were measured by sliding calliper, weight were measured by weighing machine and skinfold sites were measured by skinfold calliper.

Batting Performance (Dependent variable) Three experienced cricket coaches evaluated the playing prowess of the chosen cricket batsmen, and their evaluations served as the performance parameter. The investigator gave the assessment guidelines. The chosen players' playing abilities will be evaluated by each coach on a 10-point scale for each topic. The sum of the coaches' evaluations for each topic will be divided by 3 to get the subject's individual score. The coaches' performance evaluations were closely connected with one another.

Statistical Analysis

Means and standard deviations will be used as descriptive statistics to characterize the characteristics of the data. To determine the link between the variables, the product-moment correlation coefficient will be produced. The quantitative method of regression analysis will also be utilized to assess performance in order to explain the variance in the criterion variable. The threshold for significance will be fixed at 0.05.

Statistical methods like mean, standard deviation, and the regression analysis method will be used by SPSS software to classify the data and provide the desired results.

RESULT AND DISCUSSION

Table 1

Descriptive statistics of anthropometrics variables with the batting performance in cricket

Table 1 indicates the descriptive analysis for selected anthropometric variables of national-

Serial no.	Variables	N	Mean	Std. Deviation
1.	Batting Performance	50	8.40	.95
2.	Age	50	19.16	1.37
3.	Height	50	175.84	4.48
4.	Weight	50	68.96	5.86
5.	Full Arm Length	50	80.82	5.19
6.	Hand Length	50	19.22	1.71
7.	Full leg length	50	96.04	5.44
8.	Chest circumference	50	97.49	7.30
9.	Abdomen circumference	50	82.71	7.62
10.	Hip circumference	50	92.82	8.38
11.	Humerus bicondylar diameter	50	7.55	.55
12.	Wrist_Diameter	50	6.13	.44
13.	Biceps	50	7.91	1.46
14.	Triceps	50	12.88	3.59
15.	Chest	50	14.00	1.80
16.	Calf	50	11.60	2.65
17.	Thigh	50	11.41	1.91
18.	Fat Percentage	50	14.72	5.06
19.	BMI	50	22.52	2.01

level male cricket batsmen. The mean and standard deviation of Age is 19.16 ± 1.37, Height is 175.84 ± 4.48, weight is 68.96 ± 5.86, full arm length is 80.82 ± 5.19, hand length is 19.22 ± 1.71, full leg is 96.04 ± 5.44, chest circumference is 97.49 ± 7.30, abdomen circumference is 82.71 ± 7.62, hip circumference is 92.82 ± 8.38, Humerus bicondylar diameter is 7.55 ± .55, wrist diameter is 6.13 ± .44, biceps skinfold is 7.91 ± 1.46, triceps skinfold is 12.88 ± 3.59, chest skinfold is 14.00 ± 1.88, calf skinfold is 11.60 ± 2.65, thigh skinfold is 11.41 ± 1.91, fat percentage is 14.72 ± 5.06, BMI is 22.52 ± 2.01 and Batting performance is 8.40 ± .95. The Mean and S.D difference has been shown picturesquely in figure1.

e-ISSN 2320 –7876 www.ijfans.org

Vol.11,S Iss.1, 2022

 UGC CARE Listed (Group -I) Journal

Figure No. 1 of Mean And S.D

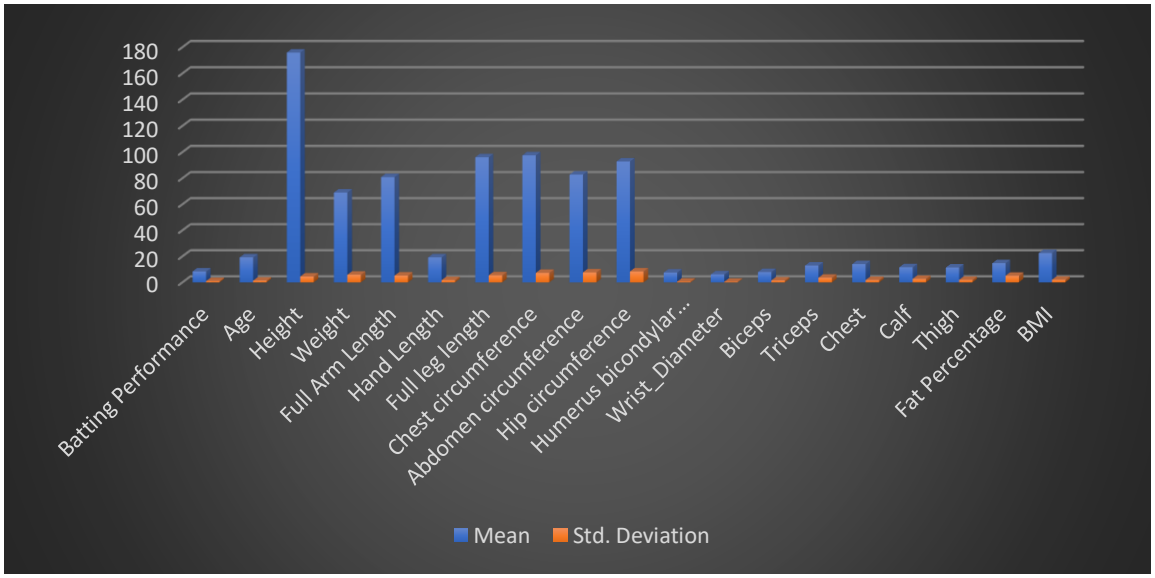

Fig.1 Mean and S.D difference of descriptive statistics.

Table 2

Product moment correlation coefficients between anthropometric variables

Factors	X1	X2	X3	X4	X5	X6	X7	X8	X9	X10	X11	X12	X13	X14	X15	X16	X17	X18
B. P	.55**	.23	.14	.20	.06	.31	.11	.43*	.19	.09	.41*	.35	.21	.50**	.20	.50*	.41*	.10
X1		.03	.04	.23	.16	.17	.01	.22	.02	.20	.37	.31	.05	.25	.25	.15	.26	.31
X2			.34	.46*	.48*	.29	.24	.31	.52	.14	.10	.02	.53	.24	.05	.21	.00	.12
X3				.29	.14	.31	.43	.37	.45	.33	.05	.32	.51	.06	.43	.25	.17	.18
X4					.79	.75	.36	.46	.37	.42	.51	.11	.25	.07	.34	.08	.20	.09
X5						.47	.32	.34	.26	.40	.43	.09	.20	.08	.37	.10	.10	.04
X6							.28	.36	.24	.46	.56	.37	.05	.14	.07	.13	.14	.31
X7								.65	.67	.081	.00	.47	.48	.27	.14	.08	.52	.00
X8									.79	.20	.16	.55	.51	.24	.10	.21	.88	.00
X9										.02	.09	.42	.73	.00	.12	.29	.63	.03
X10											.56	.28	.35	.40	.44	.25	.14	.19
X11												.07	.19	.24	.38	.01	.13	.32
X12													.18	.46	.15	.10	.52	.17
X13														.03	.13	.53	.45	.06
X14															.18	.07	.34	.05
X15																.00	.09	.21
X16																	.24	.06
X17																		.04

and batsmen performance

X1-Age
X2-height
X3-weight
X4-full arm length
X5-hand length
X6-full leg length

X7-chest circumference
X8-abdomen circumference
X9-hip circumference
X10-humerus bicondylar
X11-wrist diameter
X12-biceps skinfold
X13-triceps skinfold
X14-chest skinfold
X15-calf skinfold
X16-thigh skinfold
X17-fat percentage
X18- BMI
B.P- Batting Performance

The batting performance of the chosen cricket batters is correlated with the anthropometric characteristics, as per Table No. 2. Only six variables are found to be significantly correlated. Age, wrist diameter, chest skinfold, thigh skinfold, and fat % are found to be significantly associated with one another and with all other anthropometric variables. The correlation coefficients for age (r=.55; p=.004), Abdomen circumference (r= .43; p= .030) wrist diameter (r=.41; p=.038), chest (r=.50; p=.010), thigh (r=.50; p=.011), and fat percentage (r=.41; p=.039) demonstrate a linear and significant link between the aforementioned factors and performance. The performance is determined to be unaffected by none of the other factors, though. The correlation of batting performance and selected anthropometric variables has been shown picturesquely in figure 2.

Fig. no. 2

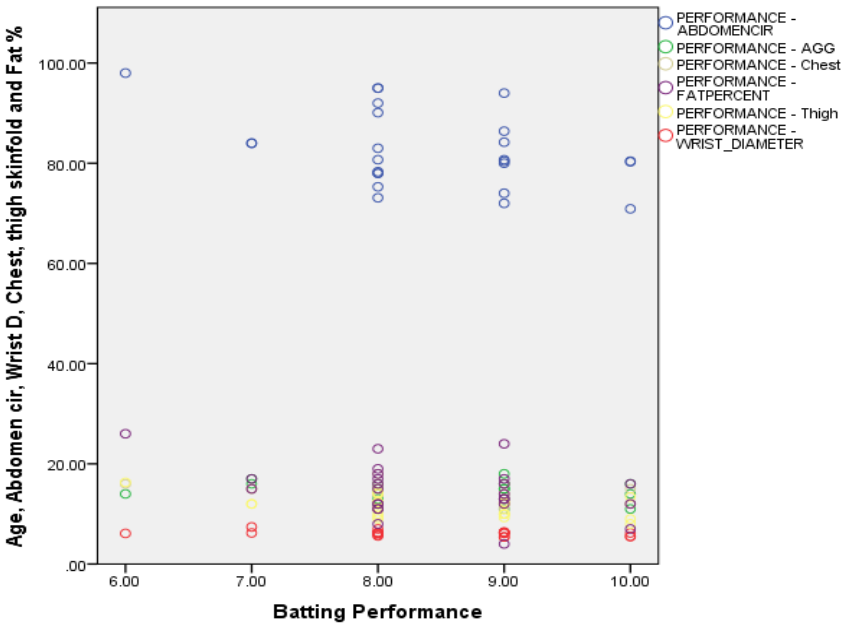

Fig. 2 scatter diagram of a correlation between batting performance and selected anthropometric variables i.e., Age, Abdomen circumference, wrist diameter, chest skinfold, thigh skinfold, and fat %.

Correlations are a very useful research tool, but they do not tell anything about the predictive power or real relationships between the variables. Even in this situation, a positive correlation does not imply that performance will get better as the value of the predicted variable increases. It will fall within a specific range and not exceed a predetermined limit. Regression analysis created a prediction model that best fit the available data in order to predict the value of dependent variables of one or even more independent variables. Given there are numerous predicted variables in this study, the researcher applied multiple regression. After confirming all the presumptions, the researcher opted to do a multiple regression analysis with the remaining variables to see whether a model could be created.

Table 3

Regression Analysis of Predictive Equation of Batting performance of cricket Players

Model	R- Value	R Square	Adjusted R2	Std. Error of Estimate
1	.551[a]	.303	.273	.81629
2	.694[b]	.481	.434	.72012
3	.783[c]	.613	.557	.63692

a. Predictors: (Constant), Age
b. Predictors: (Constant), Age, Thigh
c. Predictors: (Constant), Age, Thigh, Chest

As a key dependent variable, cricket performance was tested, and a total of 18 anthropometric factors were added into the equation by stepwise multiple regression to determine the best predictor. Age, thigh skinfold, and chest skinfold were the three strongest predictors of cricket performance out of the total of 18. The squared r value of the correlation between age and cricket performance was .303, suggesting that age is a significant predictor of performance. This variable accounted for 27.3% of the overall variation. Thigh skinfold was the second predictor, and its combined correlation was.694, while its squared r

value was.481. In all, these two factors accounted for 43.4% of the variation. The 3rd variable which entered into the equation was chest skinfold having a combined correlation of .783 and an r2 value of .613. The above-mentioned factors accounted for 55.7% of the overall explanation of performance variation. As far as anthropometric measures are concerned, however, the rest of the factors failed to predict the batting performance of the players.

Table 4 -anova [a]

Model		Sum of Squares	Degree f.	Mean Square	F- Value	Significance level
1	Regression	6.675	1	6.675	10.017	.004[b]
	Residual	15.325	23	.666		
	Total	22.000	24			
2	Regression	10.591	2	5.296	10.212	.001[c]
	Residual	11.409	22	.519		
	Total	22.000	24			
3	Regression	13.481	3	4.494	11.077	.000[d]
	Residual	8.519	21	.406		
	Total	22.000	24			

The result of the above performed regression anova distinctly exhibits the anticipated prototype with F - values of 10.017, 10.212 and 11.077 consistently, and with a significance level of .004, .001 & .000. we can say that the predicted model had a high F value.

Table 5

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t-value	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.050	2.328		.451	.656
	AGE	.384	.121	.551	3.165	.004
2	(Constant)	4.342	2.377		1.826	.081
	AGE	.339	.108	.486	3.131	.005
	Thigh	-.213	.077	-.427	-2.748	.012
3	(Constant)	8.268	2.566		3.222	.004
	AGE	.275	.099	.394	2.783	.011
	Thigh	-.205	.069	-.411	-2.989	.007
	Chest	-.199	.075	-.375	-2.669	.014

In the 1st, 2nd, & 3rd phases, the beta value for age as a predicted variable is.551,.486, and .394, respectively. At the second and third steps, the beta value for the thigh is -427 and -.411. At the third phase, the beta value for chest skinfold is -.375. For the sustained and anticipated variables the value of of t test varied from -2.669 to.451, with the level of significance ranging between 0.014 - 0.656.

Equation created: - The regression equation was generated using the regression coefficients (B) of the model provided in table 5:

Batting Performance = 1.050 + .275(X1) -.205 (X14) - .199 (X16)

X1- Age, X14- Thigh, X16- Chest

Finding

The study's findings are corroborated by a study done by Harish, P. M. (2015) to investigate the association between anthropometric factors and basketballer ability. The study's conclusion reveals a correlation between the chosen anthropometric factors and basketballer ability.

Results of study also supported by Kanaujia, S. (2014) conducted a study on "Anthropometric measurement and batsman performance of east zone inter-university cricket players" and results show that All selected Anthropometric variables have no significant relationship with Batting Performance. i.e., (weight, height, leg length, arm length, lower leg length, fore arm length, upper arm length, thigh girth, hand length, calf girth). Nagar, L., Meena, D.S., and Singh, B. (2012) also acknowledge the result of the investigate i,e; to examine the Correlation between above mentioned physical fitness and anthropometric variables with respect to basketball performance. And the results show that anthropometric variables i.e. Abdomen circumference, etc. are responsible for batting performance in cricket.

CONCLUSION

Although age, chest skinfold, & thigh skinfold were identified to be the only factors included in the regression model for the current study, this does not indicate that the other variables did not contribute in any way. They may have an effect on performance in other ways, but they were not chosen for the current model. These three variables explain 55.7% of the variation in the batting performance which means the regression model is good enough to

generalize. But still in another way it can be concluded that these three variables are the factors that may influence batting performance.

Other findings have been reached as well –

1. A significant relationship was discovered in a number of anthropometric factors (Age- r=.55; p<.05, Abdomen circumference- r= .43; p<.05, wrist diameter- r= .41; p<.05, chest skinfold- r= .50; p<.05, thigh skinfold- r= .50; p<.05 and fat percentage- r=.41; p< .05) in relation to batting performance in cricket.
2. Insignificant relationship found in height (r=.23), weight (r=.14), full arm length (r=.20), hand length (r=.06), full leg length (r=.31), chest circumference (r=.11), hip circumference(r=.19), humerus bicondoloyer (r=.09), biceps skinfold (r=.35), triceps skinfold (r=.21), calf skinfold (r=.20), and BMI (r= .10) in relation to batting performance in cricket.
3. For the current investigation, just three variables were included in the development of the regression model i.e., Age, Chest skinfold, and thigh skinfold and they explain 55.7% of the variation in the batting performance in cricket.

REFERENCES

Chawla, N. (2017, September 1). Analysis of aggression and stress vulnerability among layers of different field in cricket. Zenodo. https://zenodo.org/record/7194321

Kanaujia, S. (2014) conducted a study on Anthropometric measurement and batsman performance of east zone inter-university cricket players. International Journal of Applied Research 2014; 1(1): 358-361

Kumar, N. (2017, September 15). A comparative study of individual game player and team game player on endurance and strength ability. Zenodo. https://zenodo.org/record/5140708

Kumar, N. (2018). Comparison of physiological and psychomotor variables among football, handball and cricket game players. International Journal of Yoga, Physiotherapy and Physical Education, 3(1), 106–109.

Harish, P. M. (2015). Relationship of anthropometric variables with basketball playing ability. Academic Sports Scholar, 4(4), 1-4.

Nagar, L., Meena, D. S., & Singh, B. (2012). Correlation of Selected Anthropometric and Physical Fitness Variables to Basketball Proformance, International Scientific Journal of Sport Sciences, 1(2), 91-95.

Rico-Sanz J. (1998). Body composition and nutritional assessments in soccer. International Journal of Sport Nutrition, 8. P. 113–123.

Singh, T. N., Nain, B., Reeta, Salam, C., & Singh, S. (2012). A comparative study of anthropometric variables between residential and non-residential school students of Chandigarh. International Journal of Health, Physical Education and Computer Science in Sports, 6(1), 41-44.

Wilmore, Jh,, and Costill, D. (1999) Physiology of Sports and Exercise. Champaign: Human Kinetics.