

Analysis Of Flexibility Leg Length and Height on Basketball Playing Ability of Inter University Male Basketball Players

Mr. P.S. Vignesh¹, Dr. P. Mohan Antharias²

¹ *Ph.D., Research Scholar, Department of Physical Education, Annamalai University*

² *Assistant Professor, Department of Physical Education, Annamalai University*

Abstract—The purpose of the study was to analysis on flexibility, leg length and height and basketball playing ability of inter university male basketball players. To achieve this purpose of the study, various basketball teams participated in the South Zone Inter University Basketball Tournament for men and those teams, which entered into the pre-quarter finals stage were contacted and selected for present study. From that one hundred and fifty-six university male basketball players from thirteen universities (n = 12), were selected. The age of the subjects was ranged between 18 and 25 years. Flexibility was assessed by administering sit and reach test, leg length was measured by measuring tape, and height was measured by using stadiometer and playing ability was assessed with the help of two coaches and national basketball referee. The Pearson Product Moment correlation was used to find out the relationship between the flexibility, leg length, height and playing ability. Further, the one-way ANOVA was used to find out the significant difference between the selected university male basketball players on selected criterion variables. There was a significant relationship between the flexibility, leg length, height and playing ability among male university basketball players.

Index Terms—flexibility, leg length, height and basketball playing ability.

I. INTRODUCTION

In the modern day, "sports" are a popular spectacle and a widespread social movement. Over the course of history, sports have had a significant position in a society's moral culture. Its societal relevance keeps growing. The phrase "sports for all" has gained a lot of popularity in recent years. Everyone will benefit from doing sports and becoming as physically fit as possible. People need to exercise more in the hectic world of today in order to maintain the physical and

mental fitness necessary to carry out daily tasks efficiently.

Basketball is without a doubt the most popular sport in the world in terms of "Action Occurrence." There are more events per second compared to other games of the same kind. Basketball is played all over the world. This adaptable game has gained a sizable fan base over the years because of its incredible dynamics as well as its educational and recreational advantages.

Basketball is a fast-paced game that is played according to time. In terms of action incidence, basketball is arguably the most popular ball game in the world. This is among the factors contributing to the game's rise to prominence as one of the world's most popular sports [Thomas, 1972].

Basketball is an intermittent sport that is physically demanding and requires players to regularly switch between bursts of intense activity (sprinting, shuffling, and jumping) and jogging, walking, or short rest intervals, according to Abdelkrim, Fazaa, and Ati (2006) and McInnes et al. (1995). According to Tessitore et al. (2006) and Narazaki, Berg, and Stergiou (2008), it encompasses both anaerobic and aerobic energy processes.

Therefore, in order to play effectively, basketball players need to be physically fit and possess appropriately developed levels of explosive power, agility, anaerobic power, and anaerobic capacity [Apostolidis, Nassis and Geladas, (2004), Abdelkrim, et al., (2010), Delextrat and Cohen, (2008), Hoffman, et al., 1996]. In addition to being very physically active, basketball players must possess superior technical skills, which have been shown to be strongly correlated with their level of physical fitness.

II. METHODOLOGY

The purpose of the study was to analysis on flexibility, leg length, height and basketball playing ability of inter university male basketball players. To achieve this purpose of the study, various basketball teams participated in the South Zone Inter University Basketball Tournament for men which was held at Christ University, Bangalore and those teams, which entered into the pre-quarter finals stage were contacted and selected. From that one hundred and fifty-six university male basketball players from thirteen universities ($n = 13$), were selected. The selected universities such as, University of Madras, Chennai, Jain University, Bangalore, Sathyabama University, Chennai, Hindustan University, Chennai, Christ University, Bangalore, SRM University, Chennai, University of Calicut, Calicut, University of Kerala, Thiruvananthapuram, Anna University, Chennai, M.G.

Table-I Descriptive Statistics on Selected Criterion Variables

Sl. No.	Variables	Mean	S.D.
1.	Flexibility	5.26	0.082
2.	Leg length	85.42	4.17
3.	Height (in cms)	175.89	5.50
4.	Playing ability (in points)	7.00	0.08

Table – II indicates the Pearson Product Moment Correlation between the selected independent and dependent variables.

Table – II Correlation Between Selected Criterion Variables Of Male University Basketball Players

	Flexibility	Leg length	Height	Playing Ability
Flexibility	1.00	0.242**	-0.023	0.133*
Leg Length	-	1.00	0.324**	0.230**
Height	-	-	1.00	0.718**
Playing Ability	-	-	-	1.00

* Correlation is significant at the 0.01 level of confidence.

** Correlation is significant at the 0.05 level of confidence.

From the scores exhibited in Table – II following inferences were drawn:

1. The correlation between flexibility and leg length was positive and $r = 0.242$ and it was as much as higher than the 0.0001 ($p < 0.05$) and found to be statistically significant.

2. The correlation between flexibility and height was negative and $r = -0.023$ and it was as much as lesser

University, Kottayam, Bharathidasan University, Tiruchirappalli, Bharathiar University, Coimbatore, and Kakathiya University, were selected as subjects. The age of the subjects was ranged between 18 and 25 years. Flexibility was assessed by administering sit and reach test, leg length was measured by measuring tape, and height was measured by using stadiometer and playing ability was assessed with the help of two coaches and national basketball referee. The Pearson Product Moment correlation was used to find out the relationship between the flexibility, leg length, height and playing ability. Further, the one-way ANOVA was used to find out the significant difference between the selected university male basketball players on selected criterion variables.

A. Analysis of the data and results of the study

The descriptive statistics of the study, the selected criterion variables were tabulated below in Table – I.

than the 0.153 ($p > 0.01$) and found to be statistically significant.

3. The correlation between flexibility and playing ability was positive and $r = 0.133$ and it was as much as higher than the 0.001 ($p < 0.01$) and found to be statistically significant.

4. The correlation between leg length and height was positive and $r = 0.324$ and it was as much as lesser than the 0.0001 ($p < 0.05$) and found to be statistically significant.

5. The correlation between leg length and height was positive and $r = 0.230$ and it was as much as lesser than

the 0.0001 ($p > 0.01$) and found to be statistically significant.

6. The correlation between height and basketball playing ability was positive and $r = 0.718$ and it was as

much as higher than the 0.0001 ($p > 0.05$) and found to be statistically significant.

Table – III Pearson Product Moment Correlation Between the Selected Variables and Basketball Playing Ability

	Variables	'r' value
Basketball Playing Ability	1. Flexibility	0.133*
	2. Leg length	0.230*
	3. Height	0.718**

* Correlation is significant at the 0.01 level of confidence.

** Correlation is significant at the 0.05 level of confidence.

It is evident from the Table - III that there is significant relationship between basketball playing ability flexibility, leg length and height of male university basketball players. 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 enter selection method on data obtained for the male basketball players in basketball playing ability and the results were presented in Table - IV.

Table – IV Multiple Correlation Co-Efficient for The Predictors of Basketball Playing Ability of Male Basketball Players

S. No	Variables (Backward Selection)	R	R Square	Adjusted R Square	R Square Change
1.	Leg length, flexibility and height	0.735	0.540	0.531	0.540
2.	Flexibility and height	0.733	0.537	0.530	-0.003

From the Table - IV, it is found out that the multiple correlations co-efficient for predictors, such as leg length, flexibility, and height, is 0.735 which produces highest multiple correlations with basketball playing ability of male university basketball players. R square values show that the percentage of contribution of predictors to the basketball playing ability (dependent variable) is in the following order.

About 54% of the variation in basketball playing ability was explained by the regression model with three predictors, such as, leg length, flexibility and height.

About 70% of the variation in basketball playing ability was explained by the regression model with two predictors, such as, flexibility and height.

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

Table – V Regression Co-Efficient for The Predicted Variables with Basketball Playing Ability of Male University Basketball Players

S. No	Variables	B	Std. Error	Beta Weights
1	(Constant)	- 24.695	3.649	
	Flexibility	1.80	0.625	0.167
	Leg length	0.130	0.010	0.740
	Height	-0.012	0.013	-0.058
2	(Constant)	- 24.148	3.602	
	Flexibility	1.61	0.593	0.149
	Height	0.127	0.010	0.721

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

Regression Equation in obtained scores form = X_c

$$X_c = (1.80) X_1 + (0.130) X_2 + (-0.012) X_3 + -24.695$$

Where, X_c = Basketball playing ability, X_1 = Flexibility, X_2 = Leg length, X_3 = Height.

2. Regression Equation in standard scores form = Z_c

$$Z_c = (0.149) Z_1 + (0.721) Z_2$$

Where, Z_c = Basketball playing ability, Z_1 = Flexibility, Z_2 = height

The regression equation for the prediction of basketball playing ability of male basketball players

Table – VI One Way Anova for Mean Scores on Flexibility of University Male Basketball Players

Variable		Sum of Squares	df	Mean Squares	'F' - ratio
Flexibility (Inches)	Between	0.407	12	0.034	7.75*
	Within	0.63	143	0.004	

* Significant at 0.05 level of confidence. (The table value required for significant at 0.05 level of confidence with df 12 and 143 is 1.751).

Table – VI shows that the mean values of various university male basketball players on flexibility were University of Madras, Chennai, 5.37 ± 0.11 , Jain University, Bangalore, 5.32 ± 0.074 , Sathyabama University, Chennai, 5.34 ± 0.073 , Hindustan University, Chennai, 5.30 ± 0.095 , Christ University, Bangalore, 5.26 ± 0.064 , SRM University, Chennai,

Table – VII Scheffé S Post-Hoc for The Difference Between the Means on Flexibility

	Mean Values							CI
	6	7	8	10	11	12	13	
1	0.13*	0.13*	0.14*	0.12*	0.13*	0.13*	0.20*	0.12
2	-	-	-	-	-	-	0.15*	
3	-	-	-	-	-	-	0.171*	
4	-	-	-	-	-	-	0.13*	

1. University of Madras, Chennai, 2. Jain University, Bangalore, 3. Sathyabama University, Chennai, 4. Hindustan University, Chennai, 5. Christ University, Bangalore, 6. SRM University, Chennai, 7. University of Calicut, Calicut, 8. University of Kerala, Thiruvananthapuram, 9. Anna University, Chennai, 10. M.G. University, Kottayam, 11. Bharathidasan University, Tiruchirappalli, 12. Bharathiar University, Coimbatore, and 13. Kakathiya University, Warangal. From the above Table – VII, that the University of Madras, basketball players were better flexibility than

includes flexibility, leg length and height predictive. As the multiple correlations on basketball 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. Thus, this equation may be successfully utilized in selecting university male basketball players. To test the hypotheses, one way ANOVA was applied and the results have been presented below:

5.25 ± 0.053 , University of Calicut, Calicut 5.24 ± 0.068 , University of Kerala, Thiruvananthapuram, 5.23 ± 0.046 , Anna University, Chennai, 5.25 ± 0.047 , M.G. University, Kottayam, 5.246 ± 0.046 , Bharathidasan University, Tiruchirappalli, 5.23 ± 0.03 , Bharathiar University, Coimbatore, 5.24 ± 0.05 and Kakathiya University, Warangal, 5.24 ± 0.04 . Further, to know which basketball team players have better in flexibility, the Scheffé S post hoc test was applied.

the SRM University, Chennai, University of Calicut, Calicut, University of Kerala, Thiruvananthapuram, Anna University, Chennai, M.G. University, Kottayam, Bharathidasan University, Tiruchirappalli, Bharathiar University, Coimbatore, and Kakathiya University, Warangal. Further it shows that Jain University, Sathyabama University and Hindustan University players basketball players have better in flexibility than University of Kerala, and Kakathiya University basketball players.

Table – VIII One Way Anova for Mean Scores on Height of University Male Basketball Players

Variable		Sum of Squares	df	Mean Squares	'F' - ratio
Height (Centimeters)	Between	440.27	12	36.69	1.52
	Within	3444.69	143	24.09	

(The table value required for significant at 0.05 level of confidence with df 12 and 143 is 1.751).

Table – VIII shows that the mean values of various university male basketball players on height were University of Madras, Chennai, 171.50 ± 6.11 , Jain University, Bangalore, 170.58 ± 5.25 , Sathyabama University, Chennai, 171.00 ± 4.88 , Hindustan University, Chennai, 170.33 ± 4.14 , Christ University, Bangalore, 169.67 ± 3.53 , SRM University, Chennai, 165.67 ± 3.73 , University of Calicut, Calicut $167.75 \pm$

3.99 , University of Kerala, Thiruvananthapuram, 166.65 ± 5.28 , Anna University, Chennai, 166.83 ± 2.37 , M.G. University, Kottayam, 169.25 ± 5.88 , Bharathidasan University, Tiruchirappalli, 169.22 ± 6.78 , Bharathiar University, Coimbatore, 168.42 ± 5.35 and Kakathiya University, Warangal, 167.75 ± 3.67 . Further, it was concluded that there was no significant difference was found between various university basketball players on height.

Table – IX One Way Anova for Mean Scores on Leg Length of University Male Basketball Players

Variable		Sum of Squares	df	Mean Squares	'F' - ratio
Leg length (Centimeters)	Between	1137.50	12	94.79	8.71*
	Within	1556.74	143	10.88	

* Significant at 0.05 level of confidence. (The table value required for significant at 0.05 level of confidence with df 12 and 143 is 1.751).

Table – IX shows that the mean values of various university male basketball players on leg length were University of Madras, Chennai, 90.50 ± 3.48 , Jain University, Bangalore, 90.67 ± 3.73 , Sathyabama University, Chennai, 86.52 ± 3.53 , Hindustan University, Chennai, 86.33 ± 3.70 , Christ University, Bangalore, 86.17 ± 4.58 , SRM University, Chennai,

84.42 ± 4.17 , University of Calicut, Calicut 85.75 ± 3.77 , University of Kerala, Thiruvananthapuram, 84.08 ± 4.25 , Anna University, Chennai, 83.83 ± 2.25 , M.G. University, Kottayam, 84.08 ± 2.15 , Bharathidasan University, Tiruchirappalli, 83.25 ± 1.252 , Bharathiar University, Coimbatore, 83.83 ± 2.04 and Kakathiya University, Warangal, 80.58 ± 1.83 . Further, to know which basketball team players have better in leg length, the Scheffé *S* post hoc test was applied.

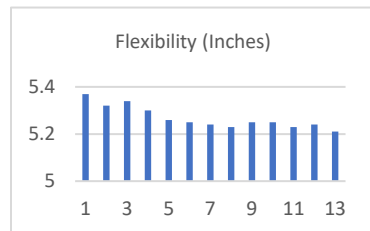
Table – X Scheffé *S* Post-Hoc Test for The Difference Between the Means on Leg Length

	Mean Values							CI
	6	8	9	10	11	12	13	
1	6.19*	6.42*	6.67*	6.42*	7.25*	6.67*	9.91*	6.17
2	6.26*	6.58*	6.83*	6.58*	7.42*	6.83*	10.08*	
3	-	-	-	-	-	-	6.33*	

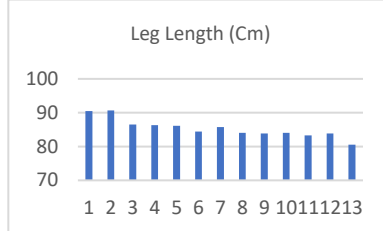
1. University of Madras, Chennai, 2. Jain University, Bangalore, 3. Sathyabama University, Chennai, 4. Hindustan University, Chennai, 6. SRM University, Chennai, 7. University of Calicut, Calicut, 8. University of Kerala, Thiruvananthapuram, 9. Anna University, Chennai, 10. M.G. University, Kottayam, 11. Bharathidasan University, Tiruchirappalli, 12. Bharathiar University, Coimbatore, and 13. Kakathiya University, Warangal

From the above Table – X, that the University of Madras, and Jain University basketball, were better leg length than the SRM University, Chennai, University of Calicut, Calicut, University of Kerala, Thiruvananthapuram, Anna University, Chennai, M.G. University, Kottayam, Bharathidasan University, Tiruchirappalli, Bharathiar University, Coimbatore, and Kakathiya University, Warangal. Further it shows that Sathyabama University

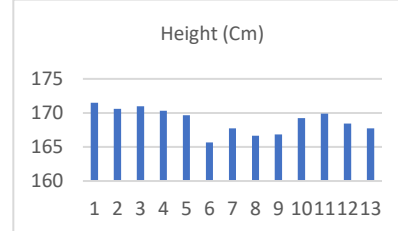
basketball players have better in leg length than the Kakathiya University basketball players.



Bar diagram showing the mean values of Flexibility of university basketball players



Bar diagram showing the mean values of leg length of university basketball players



Bar diagram showing the mean values of height of university basketball players

III. DISCUSSION

Based on the results of the study the following findings were drawn:

1. The correlation between the flexibility and playing ability was positive. But there was a negative correlation between flexibility and height. Gangey and Singh, (2016); Endris and Kumar, (2018) and Ohlyan, (2016), were found that there was a significant correlation between flexibility and basketball playing ability. Devi, Sakthivel, and Prasanna, (2022) found that the flexibility was highly correlated with basketball playing ability and other physical fitness variables. But Meena and Singh, (2013) found that a negative correlation with insignificant relationship with flexibility and basketball playing ability.
2. The correlation between the leg length and height and basketball playing ability was positive. Meena and Singh, (2013); Sindhu, (2013) and Viswanathan and Chandrasekaran, (2011) found that there was a significant relationship between the leg length and basketball playing ability
3. The correlation between the height and playing ability was positive. Gomes, *et al.*, (2014) and Meena and Singh, (2013) found that there was a positive correlation between the height and basketball playing ability. Gryko, *et al.*, (2018) also found that selection for basketball playing positions should include the analysis of body height. Sowmiya and Mahaboojan, (2020) that there was a significant relationship between playing ability on height among south zone inter university women basketball players.
4. There was a significant positive relationship between basketball playing ability and flexibility, leg length and height of male university basketball players.

5. It is found out that the multiple correlations coefficient for predictors, such as flexibility, leg length and height with basketball playing ability of male university basketball players.

6. The regression equation for the prediction of basketball playing ability of male basketball players includes flexibility, leg length and height were predictive.

7. In flexibility, University of Madras, basketball players were better flexibility than the SRM University, Chennai, University of Calicut, Calicut, University of Kerala, Thiruvananthapuram, Anna University, Chennai, M.G. University, Kottayam, Bharathidasan University, Tiruchirappalli, Bharathiar University, Coimbatore, and Kakathiya University, Warangal. Further it shows that Jain University, Sathyabama University and Hindustan University players basketball players have better in flexibility than University of Kerala, and Kakathiya University basketball players.

8. In height, it was concluded that there was no significant difference was found between various university basketball players.

9. In leg length, the University of Madras, and Jain University basketball, were better leg length than the SRM University, Chennai, University of Calicut, Calicut, University of Kerala, Thiruvananthapuram, Anna University, Chennai, M.G. University, Kottayam, Bharathidasan University, Tiruchirappalli, Bharathiar University, Coimbatore, and Kakathiya University, Warangal. Further it shows that Sathyabama University basketball players have better in leg length than the Kakathiya University basketball players.

10. In basketball playing ability, the University of Madras, basketball players have better basketball playing ability than the SRM University, Chennai.

IV. CONCLUSION

Based on the results of the study, the following conclusion were drawn:

1. The relationship between the flexibility, leg length and height and playing ability was positive.
2. There was a significant difference in flexibility, leg length, and playing ability between various university basketball players. But there was no significant difference between various university basketball players on height.

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