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Determination of Performance Variables from Selected Anthropometric and Biomotor Variables among Basketball Players

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Abstract
The purpose of the study was determination of performance variables from selected anthropometric and biomotor variables among basketball players. For the purpose of the study, thirty female basketball players were selected as subjects. The age of the subjects was ranged from 17 to 25 years. For this study, Dribbling and Passing were selected as performance variables. Height, Arm length, and Leg length were selected as anthropometric variables where as Speed, Agility and Grip strength were selected as Biomotor variables. The data was collected from the dependent and independent variables and the collected data was analyzed by Pearson product moment correlation and Multiple correlation to find out the relationship between dependent and independent variables separately and whole. Based on the results, it was concluded that significant relationships were found between dribbling performance and speed, agility grip strength separately and between passing performance and grip strength. Moreover, there was a significant relationships found between dribbling and passing performances and combined effect of anthropometric and biomotor variables namely height, arm length, leg length speed, agility and grip strength.

Keywords: Biomotor, Grip Strength, Agility, Grip Dynamometer, Dribbling

Introduction

Basketball is a complex skilled game which includes passing, dribbling, shooting, rebounding, throwing, pivoting, ball handling etc. and they are collectively playing a vital role in determining the performance of a player. Anthropometric measurements have revealed correlation between body structure and physical characteristics and sports capabilities. The physical structure especially the height, weight and leg length have definite decisive advantage in many games and sports. Similarly segmental length of individual body parts, specially the 'leg length', 'arm length' are at considerable advantage in certain athletic events (Zeigler and Earle T., 1982) . Height of the player is advantage for the game like basketball, volleyball and high jumpers; because they can be easy to reach the maximum height (A.S Hornby and E.C Parnwell, 1962).

Arm length is used for the volleyball players to reach a maximum height to strike and block the ball, for the cricket bowler it is used for bowled a good length, for kabaddi player can use his arm length advantage to touch the players when raiding. (Barry L. Johnson and Jack. K. Nelson, 1982). Leg length is advantage to the sprinters and jumpers because they can measure the stride length and also reach maximum height.

Motor ability is one of the important aspects for physical activities. A totally fit individual must have the motor ability. The components of motor ability are strength, speed, endurance, explosive power, agility, co-ordination etc. Motor ability reflects an individual's present ability to perform motor skills. Sports activity is a physical activity, which is not possible without these motor qualities. (Harold M. Barrow, 1977).

Methodology

For the purpose of the study, thirty female basketball players were selected as subjects during the Madurai Kamaraj University inter-collegiate Basketball tournament for women held at Lady Doak College, Madurai. The age of the subjects was ranged from 17 to 25 years. For this study, Dribbling and Passing were selected as performance variables. Height, Arm length, and Leg length were selected as anthropometric variables where as Speed, Agility and Grip strength were selected as Biomotor variables.

Sl.No	Variables	Test
1	Dribbling	Speed dribble test
2	Passing	Speed Pass Test
3	Height	Stadiometer
4	Arm length	Measuring tape
5	Leg length	Measuring tape
6	Speed	50 yds dash
7	Agility	Shuttle run
8	Grip strength	Grip Dynamometer

Analysis of the Data

The data was collected from the dependent and independent variables and the collected data was analyzed by Pearson product moment correlation and Multiple correlation to find out the relationship between dependent and independent variables separately and whole. The mean and standard deviation for the dependent and independent variables have been given in table I.

Table 1 Mean and Standard Deviation for the Dribbling and Passing Performance of Basketball Players and Selected Anthropometric Measurements and Biomotor Variables

Variable	Mean	Standard Deviation
Dribbling	12.6240	1.0546
Passing	75.3000	13.5752
Height	159.6667	5.6161
Arm length	72.9667	3.2000
Leg length	99.6333	4.1146
Speed	8.7800	.7819
Agility	10.3333	.8957
Grip strength	23.0667	3.9735

Table 2 Pearson Product Moment and Multiple Correlation Coefficients between the Dribbling Performance of Basketball Players and Selected Anthropometric Variables

Dependent Variable	Independent Variable	Obtained Zero Order 'r'	$R_{1.234}$ Value
1. Dribbling	2. Height 3. Arm Length 4. Leg Length	0.047 0.033 0.163	0.378

Significant at 0.05 level with df 58 is 0.258 and df 116 is .274.

From the table II, the Pearson product moment 'r' value for the dribbling performance with independent variables are .047, .033, and .163 which are lower than the tabulated 'r' value of 0.258 with df 58 at 0.05 level of confidence. It was concluded that there was no relationship between dribbling performance of basketball players and selected anthropometric measurement height, arm length and leg length separately. Moreover, Multiple correlation 'R' Value for dribbling performance with anthropometric measurements are .378 which is higher than the tabulated 'R' value of 0.274 with df 116 at 0.05 level of confidence. It was concluded that there was high relationship between dribbling performance of basketball players and the combined effect of selected anthropometric measurements namely height, arm length and leg length.

Table 3 Pearson Product Moment and Multiple Correlation Coefficients between the Dribbling Performance of Basketball Players and Selected Biomotor Variables

Dependent Variable	Independent Variable	Obtained Zero Order 'r'	$R_{1.234}$ Value
1. Dribbling	2. Speed 3. Agility 4. Grip Strength	0.431 0.413 0.508	0.620

Significant at 0.05 level with df 58 is 0.258 and df 116 is .274

From the table III, the Pearson product moment 'r' value for the dribbling performance with independent variables are .431, .413 and .508 which are higher than the tabulated 'r' value of 0.258 with df 58 at 0.05 level of confidence. It was concluded

that there was significant relationship between dribbling performance of basketball players and selected biomotor variables namely speed, agility and grip strength separately. Moreover, Multiple correlation 'R' value for dribbling performance with biomotor variables are .620 which is higher than the tabulated 'R' value of .274 with df 116 at 0.05 level of confidence. It was concluded that there was a significant relationship between dribbling performance of basketball players and the combined effect of selected biomotor variables namely speed, agility and grip strength.

Table 4 Pearson Product Moment and Multiple Correlation Coefficients between the Passing Performance of Basketball Players and Selected Anthropometric Variables

Dependent Variable	Independent Variable	Obtained Zero Order 'r'	$R_{1.234}$ Value
1. Passing	2. Height 3. Arm Length 4. Leg Length	0.220 0.110 0.082	0.548

Significant at 0.05 level with df 58 is 0.258 and df 116 is .274.

For the table IV, the Pearson product moment 'r' value for the passing performance with independent variables are .220, .110 and .082 which are lower than the tabulated 'r' value of 0.258 with df 58 at 0.05 level of confidence. So it was concluded that there was no relationship between passing performance of basketball players and selected anthropometric measurements namely height, arm length and leg length separately. Moreover, Multiple correlation 'R' value for passing performance with anthropometric measurements are .548 which is higher than the tabulated 'R' value of .274 with df 116 at 0.05 level of confidence. It was concluded that there was significant relationship between passing performance of basketball players and the combined effect of selected anthropometric measurements namely height, arm length and leg length.

From the table V, the Pearson product moment 'r' value for the passing performance of independent variables speed and agility are .185 and .060 which are lower than the tabulated 'r' value of 0.258 with df 58 at 0.05 level of confidence. From the same table, the Pearson product moment 'r' value for the passing performance of independent variable grip strength is .363 which is higher than the tabulated 'r' value of 0.258 with df 58 at 0.05 level of confidence. So it was concluded that there was no relationship between passing performance of basketball players and selected biomotor variables namely speed and agility separately, and there was a high relationship between passing performance of basketball players and grip strength. Moreover, Multiple correlation 'R' value for passing performance with biomotor variables are .484, which is higher than the tabulated 'R' value of .274 with df 116 at 0.05 level of confidence. It was concluded that there was high relationship between passing performance of basketball players and the combined effect of selected biomotor variables namely speed, agility and grip strength.

Table 5 Pearson Product Moment and Multiple Correlation Coefficient between the Passing Performance of Basketball Players and Selected Biomotor Variables

Dependent Variable	Independent Variable	Obtained Zero Order 'r'	$R_{1.234}$ Value
1. Passing	2. Speed 3. Agility 4. Grip Strength	0.185 0.060 0.363	0.484

Significant at 0.05 level with df 58 is 0.258 and df 116 is .274

Results and Conclusions

1. There was no significant relationship between dribbling performance and anthropometric measurements namely height, arm length and leg length separately. Moreover, there was a significant relationship between dribbling performance and combined effect of anthropometric measurements namely height, arm length and leg length.
2. There was significant relationship between dribbling performance and biomotor variables namely speed, agility and grip strength separately. Moreover, there was a significant relationship between dribbling performance and combined effect of biomotor variables namely speed, agility and grip strength.

3. There was no significant relationship between passing performance and anthropometric measurements namely height, arm length and leg length separately. Moreover, there was a significant relationship between passing performance and combined effect of anthropometric measurements namely height, arm length and leg length.
4. There was no significant relationship between passing performance and selected biomotor variables namely speed and agility separately, and there was a significant relationship between passing performance and biomotor variable grip strength. Moreover, there was a significant relationship between passing performance and combined effect of biomotor variables namely speed, agility and grip strength.

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