Analysis of Selected Motor Fitness and Anthropometric Variables in Association with Winning Performance in Basketball

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Abstract

The purpose of the study was to analyze the selected motor fitness and anthropometric variables associated with winning performance of basketball players. To achieve the purpose of the study, forty eight university men basket ball players who participated in the inter university men basketball tournament and reached semi finals in the tournament were selected as subjects namely SRM University, University of Madras, Punjab University and Punjabi University during the academic year 2007-2008 organized by University of Madras, at Chennai. The age of the subjects ranged from 18 to 25 years. The following motor fitness and anthropometrical variables namely speed; agility, leg strength, reaction time, height, weight, leg length, arm length, thigh girth and arm girth were selected as criterion variables. The step wise discriminate analysis was applied to find the variables which have contributed for the success of the competition of the players. The results of the study showed that three variables speed, agility and reaction time were the factors associated with the winning performance in basketball players of SRM University, University of Madras, Punjab University and Punjabi University teams.

Key words: Motor fitness, Anthropometric variable.

Introduction

Basketball is probably the leading ball game in the world as far as action occupancy is concerned. In modern sports, basketball has advanced scientifically to approach that from time to time to produce the best performance from the players of varying calibers with in the prescribed period and with available facilities. The game is fast, aggressive and attractive. Since it is a strenuous game, it demands a high degree of fitness.

Motor fitness variables may be defined as those variables which are essential for efficient functioning in the psychomotor domain. The variables are performance oriented and are dependent upon the functioning of different of different systems of the body in an integrated manner. (Yobu, 1983)

Speed is the ability to execute motor action under given condition in the shortest possible time. Agility is an important physical fitness component, often stated as maneuverability or mobility. It is the ability to change the direction of the body and its parts rapidly. Agility is a combination of several athletic traits such as strength, reaction time, speed, movement, power and co-ordination. Its display becomes essential in such movements as dodging, zigzag running, stopping and starting and changing body positions rapidly. The agility was measured to the nearest one hundredth of a second by shuttle run test. (Singh, 1991)

Leg strength can be defined as the maximal rate at which a person can exert his strength in performing a jump and was measured by standing broad jump test and was expressed in centimeters (Fox and Mathews, 1985).

Reaction time is defined as the length of time elapsed between the presentation of the stimulus and the actual beginning of the movement. Reaction time is defined as the length of time that it takes to respond to a stimulus, that is.; the time elapsed between the presentation of the stimulus and the initiation of the movement. (Safit, 1986)

Anthropometric variable are dimensions of the structure of human body taken at specific sites to give measures of length, girth and width. Weight of the nude body with empty bowels is known as body weight. Body height is the maximum height of the individual taken standing erect on a horizontal surface with his head and face in the straight height of the subject up to the point of vertex. The arm length is the distance from the rod held by the subject tightly in his hands to the acromion process. Leg length may be calculated by subtracting sitting height from standing height. Arm girth is the maximum circumference of the arm and was measured to the nearest centimeter at the bulkiest portion. Thigh girth is the maximum circumference of the thigh in the plane at right angle to its body axis, about two third distances from the mid knee to the crotch and was measured to the nearest centimeter. (Clarke and Clarke, 1989)

Hypothesis

It was hypothesized that the selected motor fitness variables would discriminate better followed by anthropometric variables among All India inter University men basketball players.

Purpose of the Study

Purpose of the study was to analyze selected motor fitness and anthropometric measurements in association with winning performance in basketball.

Review of Related Literature

Periaya (2003) made an analysis of morphological factors associated with success in soccer. Morphological characteristics may become important in determining success in games and it can contribute to a great deal in providing distinct physical advantage according to the nature of the game. To achieve the objective, fifty two football players were selected from among the competitors who participated in the Tamil Nadu State level inter-physical Education Tournament held at Annamalai University. The variables selected were age, weight, height, length of the arm, length of the leg, skill tests in volleying and soccer dribble test. One way ANOVA and discriminant analysis were used to analyse the data. It was concluded that (1) the selected four professional training colleges soccer teams were not of the same level among the selected variables and (2) volleying test, leg length, arm length and age may be considered as best morphological variables while selecting soccer players.

Methodology

To achieve the purpose of this study, forty eight university men basket ball players who participated in the All India Inter University men Basketball Tournament and reached semi finals in the tournament were selected as subjects namely SRM University, University of Madras, Punjab University and Punjabi University during the academic year 2007-2008 organised by University of Madras, at Chennai. The age of the subjects ranged from 18 to 25 years. The following table shows the variables selected and Test adopted in the study.

Table-I
Showing the Variables Selected and Test / Method Adopted

S. No.	Criterion variables	Test / Method
1.	Speed	50 meters run
2.	Agility	Shuttle Run
3.	Leg Strength	Standing Broad Jump Test
4.	Reaction time	Reaction Timer
5.	Height	Stadio meter
6.	Weight	Weighing Machine
7.	Arm Length	Flexible Measuring Tape
9.	Leg Length	Flexible Measuring Tape
10.	Thigh Girth	Flexible Measuring Tape
11.	Arm Girth	Flexible Measuring Tape

Statistical Techniques

The step wise discriminant analysis was applied to find the variables which have contributed for the success of the competition of the players. In all cases, .05 level was fixed as level of confidence to test the significance which was considered as appropriate.

Results and Discussions

To assess the key factors which would have contributed for the success in a competition, the stepwise discriminant analysis was used.**(Mardia, Kent, and Bibby (1979).** The Wilk's Lambda value for the selected variables by stepwise discriminant analysis was presented in Table II.

Table-II
Wilk's Lambda Value for the Selected Variables by Stepwise Discriminant Analysis

S.No	Variables	Wilks' Lambda
1	Agility	0.408
2	Speed	0.304
3	Reaction time	0.237

The discriminant analysis presented in Table II showed that out of the four motor fitness and seven anthropometric variables, the following three variables, namely agility, speed and reaction time were selected as the best discriminated variables. The percentage of association of the selected four discriminator variables with dependent variables that is successful and unsuccessful team players, the canonical correlation was computed through Wilk's Lambda test. The obtained Wilk's Lamda value for gility was 0.408, speed was 0.304 and reaction time was 0.237. Table II shows the standardized discriminant function scores of the basketball players.

Table-II
The Standardized Discriminant Function Scores for Basketball Players

S.No	Variables	Score
1	Agility	0.075
2	Speed	0.115
3	Reaction time	0.594

The standardized discriminant function coefficient score, as presented in Table II gives an idea that reaction time was the best discriminant variable followed by with 0.594 then by speed 0.115 and agility with value of 0.075.

Keeping the three discriminating variables, namely, agility, speed and reaction time, a separate discriminate analysis was done for the final winners and runner up in the All India Inter University Basketball Tournament during the year 2007-2008. Keeping SRM University players as successful team players and University of Madras players as unsuccessful team players, a discriminate analysis was done and the comparison of actual predicted winner and runners up of basketball team in the final was presented in Table III.

Table-III

Comparison of Actual Predicted Winner and Runners up of Basketball Team in the Finals

Position of the group	No. of cases	Predicted group membership	
		Winner	Looser
Winner (SRM University)	12	91.7	8.3
Runners – up (University of Madras)	12	8.3	91.7

From table III, it can be inferred that based on the three variables namely, agility, speed and reaction time, a winning team can be predicted by the number of successful players a team has, among the teams participated in a tournament. The results presented in Table III shows that SRM University basketball team which won the tournament had more number of successful players than University of Madras basketball team.

The results of the study showed that three variables, speed, agility and reaction time were the factors associated with the winning performance in basketball players of SRM University, University of Madras, Punjab University and Punjabi University teams. Hence, the research hypothesis was partially accepted.

Conclusions

Within the limitations and delimitations of this study, the following conclusions were drawn,

1. The results of the study showed that three variables, speed, agility and reaction time were the factors associated with the winning performance in basketball players of SRM University, University of Madras, Punjab University and Punjabi University teams.
2. 91.7% of the predicted winning team members were in SRM University Basketball team and only 8.3% of members were in runners up team, that is, in University of Madras basketball team. Thus, it was proved for prediction of basketball ability, speed, agility and reaction time may be considered.

References

Clarke. H & Clarke. D.H, (1989), ***A Physical and Motor test in the Melfort Boys Growth Study*****,** Englewood Cliffs, N.J: Prentice Hall, Inc., 219.

Mardia. K.V, Kent. J.T & Bibby, J.M, (1979), ***Multivariate Analysis*****,** Academic Press.

Mathews. D.K & Fox. E.L, (1985), ***Physiological Basis of Physical Education and Athletics***, Philadelphia: W.B.Saunders Co, 28.

Periaya, (2003), An analysis of morphological factors associated with success in soccer, ***Journal of Physical Education and Sports,*** 13(1).

Safit. Marget J, (1986), ***Introduction to Measurement in Physical Education and Exercise Science*****,** St. Louis: Mirror / Mosby College Publishing Ltd., 245.

Hardayal Singh, (1991), ***Science of Sports Coaching*****,** New Delhi: D.V.S Publication, 156-157.

Yobu. A, (1983), ***Test Measurement and Evaluation***, Chennai: Grace Printers, 422-425.

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