



AN ESTIMATION OF KABADDI PERFORMANCE ON THE BASIS OF SELECTED PHYSICAL FITNESS COMPONENTS

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ABSTRACT

The purpose of this study was to find out correlation between Independent Variables (Cardiovascular Endurance, Flexibility, Agility, Speed and Explosive Strength) and Dependent Variable (Kabaddi Performance). To study the joint contribution of Independent Variables in predicting Dependent variable and to establish regression equation for predicting Dependent Variable on the basis of Independent Variables. Selected Variables were Endurance, Flexibility, Agility, Speed and Explosive Strength (Independent Variables). Methodology: - for this study 30 University level male Kabaddi players from GGV, Bilaspur (C. G.) were selected. Age of the subjects was ranging between 16 to 21 years. Kabaddi Performance was considered as Dependent Variable. The selected physical fitness Variables were measured by different tests. To find out correlation between Independent Variables (Cardiovascular Endurance, Flexibility, Agility, Speed and Explosive Strength) and Dependent Variable (Kabaddi Performance), Product Moment Method of correlation was used. To study the joint contribution of Independent Variables in estimating Dependent Variable, Multiple correlation method was used. Regression equation was established for predicting Dependent Variable on the basis of Independent Variables. Findings: - There exists a significant relationship between Kabaddi Performance and Cardiovascular Endurance . Agility and Explosive Strength. There exists an insignificants relationship between Kabaddi Performance and Flexibility and Speed. Regression equation for Kabaddi Performance, Cardiovascular Endurance, Flexibility, Agility Speed and Explosive Strength was found fructiferous in estimating Kabaddi Performance on the basis of selected Independent variables (Cardiovascular Endurance, Flexibility, Agility, Speed, Explosive Strength).

Key words: Kabaddi Performance, Physical Fitness, Cardiovascular Endurance, Strength, Agility, Speed.

INTRODUCTION

Kabaddi has gained fame all over the world. Kabaddi is a attacking and defensive game. Especially of the attack is an individual effort while defence is a combined effort. Physical fitness is an inseparable part of sports performance and achievements. The quality of its utilization value is directly proportional to the level of performance. That means the greater the level of fitness. The greater the ability of a person to attain higher level of performance (J. G. P. Williams, 1962)

Kabaddi is a team game of speed, stamina, endurance, strength and skill. Although it is a team event, individual fitness plays a vital role in the success of the team. Many a times, it is a missing link of the team. During the practice, of course for winning matches, players must plan for individual fitness as well as team fitness. The individual fitness will be tailor made to meet the need of each individual separately, to suit his/her physique. Fitness consists of four parts namely 1) Physical Fitness, 2) Mental Fitness, 3) Social Fitness and 4) Spiritual Fitness. It also can be thought in terms of short time/temporary fitness and long time/permanent fitness.

Physical fitness comprises two related concepts: general fitness (a state of health and well-being) and specific fitness (a task-oriented definition based on the ability to perform specific aspects of sports or occupations). Physical fitness is generally achieved through exercise, correct nutrition and enough rest. It is an important part of life. In previous years, fitness was commonly defined as the capacity to carry out the day's activities without undue fatigue. Physical fitness, as one aspect of total fitness, is a means for development of individual personality as a whole. Physical fitness includes adequate degrees of health, posture, physique, proper functioning of vital organs, nutrition, and good health habits, along with an adequate amount of endurance, strength, stamina, and flexibility.

For performance excellence, in any activity, Anthropometric measurements, Physical fitness and psychological profiles of sports participants are three important factors besides technical & tactical efficiency and intellectual soundness. It is a well known fact that players, of one game differ from the players of other games in their body measurement, physical fitness levels and personality traits (**Carrom, 1980**)

The numerous studies were conducted in prediction of performance on major games like basketball, football, hockey, volleyball, cricket gymnastics etc. Kabaddi is an indigenous game and its popularity is less than other games. So the prediction of performance related studies in the game of Kabaddi is less. Therefore, research scholars are interested to conduct this type of study.

Objectives of the Study:

1. To establish regression equation for predicting Dependent Variable on the basis of Independent Variables
2. To find out correlation between Independent Variables (Cardiovascular Endurance, Flexibility, Agility, Speed and Explosive Strength) and Dependent Variable (Kabaddi Performance).
3. To study the joint contribution of Independent Variables in estimating Dependent Variable.

METHODOLOGY

Selection of Subjects:

For this study 30 University level male Kabaddi players from GGV, Bilaspur (C. G.) were selected. Age of the subjects was ranging between 16 to 21 years.

Selection of Variables:

Following Dependent and Independent Variables were selected:

Dependent Variable- Kabaddi Performance

Independent Variables-

1. Explosive strength
2. Speed
3. Agility
4. Flexibility &
5. Cardiovascular Endurance

Criterion Measures:

Measurement of Flexibility was measured by sit and reach test, Explosive strength was measured by Standing Broad Jump and recorded in meters, Speed was measured by 50 yard dash and recorded in seconds, Agility was measured by 4x10m shuttle run and recorded in seconds, Cardiovascular Endurance was measured by 12 minute run/walk cooper test and recorded in meters. Kabaddi performance was measured by the five experts on the basis of these five criteria like as 1) Smoothness of movements during raid and catching raider, 2) Dodging movements during raid, 3) Total number of defensive and offensive skill used, 4) Total number of out done by offender and defender, 5) Overall behave during match. For each criteria maximum 10 marks and over all 50 marks were awarded for measuring the performance.

RESULT AND DISCUSSION

To find out correlation between Independent Variables (Explosive strength, Speed, Agility, Flexibility and Cardiovascular Endurance) and Dependent Variable (Kabaddi performance), Product Moment Method of correlation was used. To study the joint contribution of Independent Variables in estimating Dependent Variable, Multiple correlation method was used. Regression equation was established for predicting Dependent Variable on the basis of Independent Variables.

TABLE 1
DESCRIPTIVE STATISTICS OF KABADDI PERFORMANCE) AND PHYSICAL COMPONENTS

Variable	Mean	Std. Deviation	N
Cardiovascular Endurance	2334.2	181.71100	30
Flexibility	14.5233	1.84833	30
Agility	8.3177	1.47907	30
Speed	8.8647	.76329	30
Explosive Strength	2.3167	.48071	30
Kabaddi Performance	31.1000	3.87165	30

TABLE 2
CORRELATION BETWEEN DEPENDENT VARIABLE (KABADDI PERFORMANCE) AND
INDEPENDENT VARIABLES (CARDIOVASCULAR ENDURANCE, FLEXIBILITY,
AGILITY, SPEED AND EXPLOSIVE STRENGTH)

Independent Variables	N	Correlation Coefficient (r)	Sig.(2-tailed)
Cardiovascular Endurance	30	.569*	.001
Flexibility	30	.224	.235
Agility	30	-.687*	.000
Speed	30	.057	.764
Explosive Strength	30	.552*	.002

***Correlation is significant at the 0.05 level (2-tailed), $r_{.05}(28) = 0.361$**

Table - 2 clearly indicates that there exists a significant relationship between Kabaddi Performance *and* Independent Variables *i.e.* Cardiovascular Endurance, Agility and Explosive strength as the correlation coefficient values were found higher than the tabulated value at .05 level of significance. On the other hand there exists an insignificant relationship between Kabaddi Performance *and* Independent Variable Flexibility and speed, as the correlation coefficient value was found lower than the tabulated value at .05 level of significance.

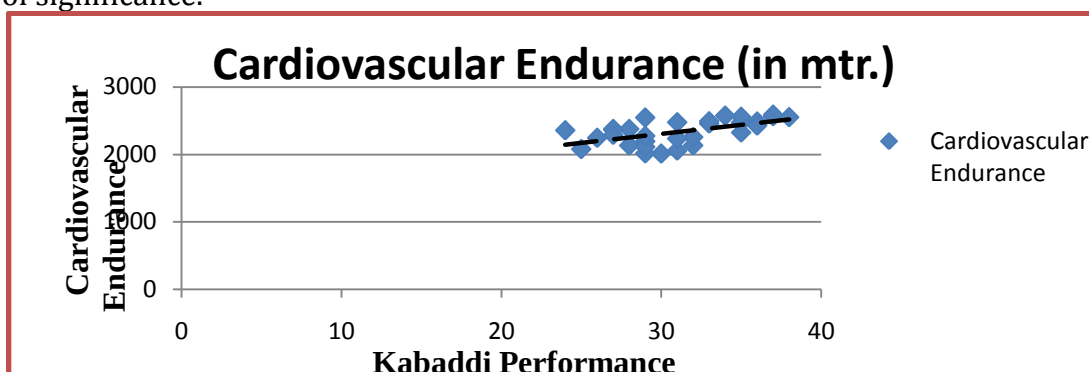


Figure 1: Correlation between Dependent Variable (Kabaddi Performance and Independent Variables (Cardiovascular Endurance)

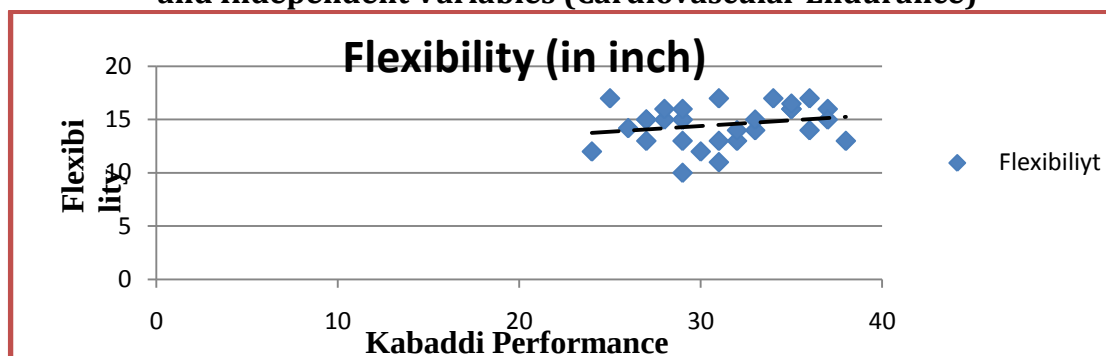


Figure 2: Correlation between Dependent Variable (Kabaddi Performance) and Independent Variables (Flexibility)

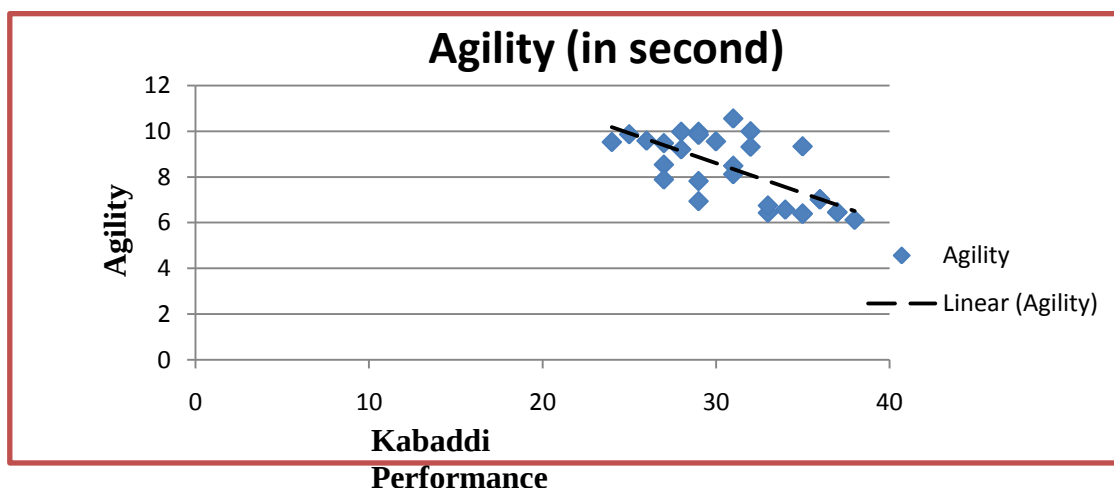


Figure 3Correlation between Dependent Variable (Kabaddi Performance) and Independent Variables (Agility)

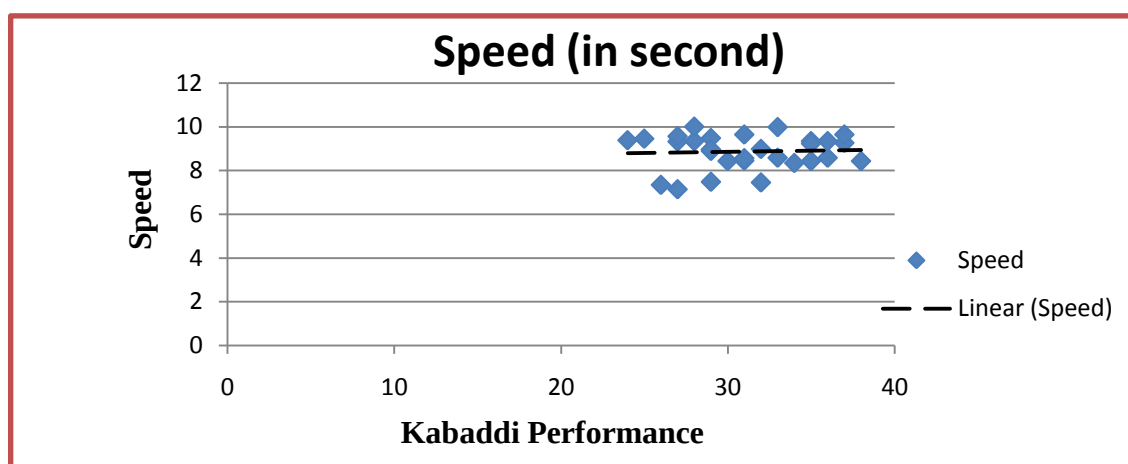


Figure 4:Correlation between Dependent Variable (Kabaddi Performance) and Independent Variables (Speed)

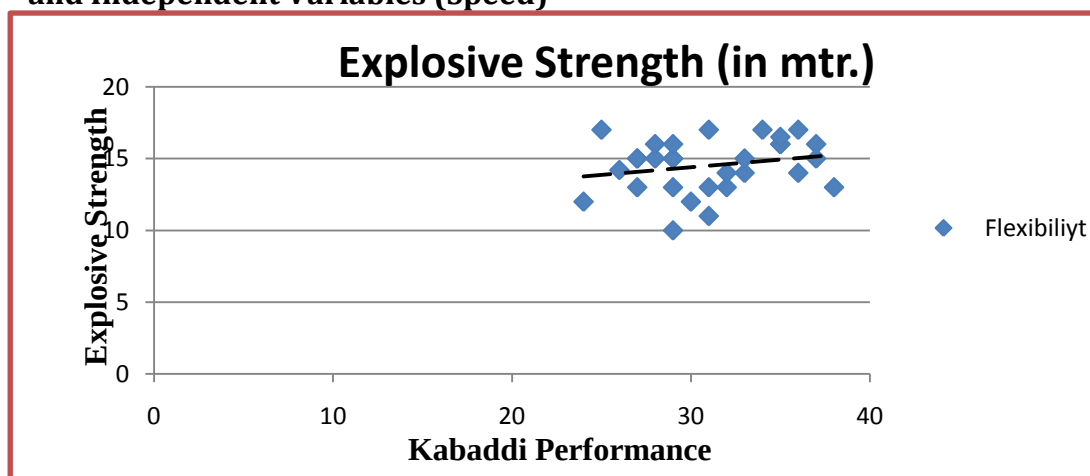


Figure 5; Correlation between Dependent Variable (Kabaddi Performance) and Independent Variables (Explosive Strength)

TABLE 3
CORRELATION MATRIX AMONG VARIABLES

Variables	Flexibility	Speed	Explosive Strength	Agility	Cardiovascular Endurance
Flexibility	1.000	.430	.378	-.208	.284
Speed	.430	1.000	.291	-.225	.186
Explosive Strength	.378	.291	1.000	-.429	.433
Agility	-.208	-.225	-.429	1.000	-.819
Cardiovascular Endurance	.284	.186	.433	-.819	1.000

TABLE 4
JOINT CONTRIBUTION OF INDEPENDENT VARIABLES IN PREDICTING DEPENDENT VARIABLE

Model	R	R ²	Adjusted R Square	Std. Error of the Estimate	Sig.
	.766 ^a	.587	.500	2.73644	.000 ^a

a. Predictors: (Constant), Cardiovascular Endurance, Speed, Flexibility, Explosive strength, Agility

Table-4 indicates that significant relationship was found between criterion variable (Kabaddi Performance) and independent variables (Cardiovascular Endurance, Speed, Flexibility, Explosive strength and Agility) as coefficient of multiple correlations (R) was found significant at 0.05 level of significance with 24 degree of freedom which is higher than the tabulated value (0.388).

The above table showed that R² was found .587 considering Explosive strength, Flexibility, Speed, Cardiovascular endurance and Agility as predictor was included in enter method, which means that 58.7% of the variance in Kabaddi performance was associated with Explosive strength, Flexibility, Speed, Cardiovascular endurance and Agility.

TABLE 6
REGRESSION COEFFICIENT OF SELECTED VARIABLE IN PREDICTING DEPENDENT VARIABLE (KABADDI PERFORMANCE)

Model	Unstandardized Coefficients		Standardized Coefficients		
	B	SEB	β	t	Sig
(Constant)	50.116	17.150		2.922	.007
Cardiovascular Endurance	-.002	.005	-.091	-.387	.702
Flexibility	.151	.324	.072	.466	.645
Agility	-1.686	.614	-.644	-2.744	.011
Speed	-1.028	.754	-.203	-1.364	.185
Explosive strength	2.794	1.252	.347	2.231	.035

The above table displayed the values of the coefficient in the regression equation and measures the probability that a linear relationship existed between Kabaddi performance and the independent variables.

Multiple Regression Analysis

$$Y = 50.116 - .002 X_1 + .151 X_2 - 1.686 X_3 - 1.028 X_4 + 2.794 X_5$$

Where-

Y = Estimation of Kabaddi Performance

X₁ = Cardiovascular Endurance

X₂ = Flexibility

X₃ = Agility

X₄ = Speed

X₅ = Explosive Strength

Table-5

ANOVA Table of Dependent Variable (Kabaddi Performance)

Model	df	Sum of Squares	Mean Square	F-ratio	Sig.
1 Regression	5	254.986	50.997	6.810	.000 ^a
Residual	24	179.714	7.488		
Total	29	434.700			

a. Predictors: (Constant), Cardiovascular Endurance, Speed, Flexibility, Explosive strength, Agility

ANOVA tests the null Hypothesis that there was no linear relationship between the Kabaddi performance and Explosive strength, Flexibility, Speed, Cardiovascular endurance, Agility of University level players. In the above table the significance level associated with observed value of F (6.810) was found greater than the tabulated value. Thus, the null hypothesis could be rejected and we may conclude that there was a significant linear relationship between the dependent variable (Kabaddi performance) and independent variable (Cardiovascular endurance, Explosive strength, Flexibility, Speed, and Agility).

DISCUSSION

The statistical analysis of data revealed that Kabaddi playing ability significantly related to, endurance, explosive power, and agility. The findings of the study are in agreement with conclusion reached by K. Devaraju, Apparently the agility, muscular power and circulatory respiratory endurance are essential for Kabaddi players in order to give efficient performance.

Dey (2012) revealed that the game of Kabaddi requires many essential components i.e. aerobic-anaerobic capacity, strength, power, neuromuscular coordination and muscular endurance. Strength play an important components in this game. Specific fitness is achieved, when a player acquires the required motor ability at the higher level for the particular sport. In Kabaddi, specific fitness consisted of strength, speed and coordination. component (Verma, 2011).

Kabaddi favours body development with a muscular strength stamina and endurance; attributable to breath holding, which correspond to cardio-respiratory endurance. Individual needs to move faster in such a small area of 20'--30'[10-12mts], need to develop the flexibility and agility which indicates the player's eyes and body movement become quicker. If your body is flexible then only, you can kick, swirl grapple with ankle legs and things. Speed acceleration is also a important parameter through which strong leg muscles give more punch to the player. Agility and stamina are also very essentials. These findings are in accordance with the Jadhav, 2011.

The other characteristics of the game of Kabaddi is the multiplicity of skills involving movement running forward, sideways and backwards with or without halt, dogging and body severs. Modern Kabaddi demands that the player are not only masters all

these movements and understands exactly when to use them but also that he can perform quickly and as accurately as possible as and when demanded. Agile and sprightly players who are capable of following each situation as it arises by skillful and quick movement have a great advantage over those players, who, for instance are not agile enough to shake off the mean who is marking them out of game, or to do the same to an opposing forward for a player to be able to escape from a man marking him or for a defender to be able to mark his opposite number out of game, the player, apart from being a top class agility and cardiovascular endurance qualities that are displayed in sudden stops, unexpected change in direction, body revenue etc. which occur repeated every second of match. Because of such demands Kabaddi playing ability has been found to be significantly related to agility and cardiovascular endurance.

CONCLUSIONS

1. Significant relationship was found between Kabaddi Performance and Cardiovascular Endurance ($r = .569$, $p < .05$).
2. Insignificant relationship was found between Kabaddi Performance and Flexibility ($r = .224$, $p > .05$).
3. Significant relationship was found between Kabaddi Performance and Agility ($r = -.687$, $p < .05$).
4. Insignificant relationship was found between Kabaddi Performance and Speed ($r = .224$, $p > .05$).
5. Significant relationship was found between Kabaddi Performance and Explosive Strength ($r = .552$, $p < .05$).
6. Significant relationship was found between criterion variables (Kabaddi Performance) and Independent Variables i.e. Cardiovascular Endurance, Flexibility, Agility, Speed, and Explosive Strength, ($R = .766$, $p < .05$).
7. Regression equation (Kabaddi Performance = $50.116 - .002$ Cardiovascular Endurance + $.151$ Flexibility - 1.686 Agility - 1.028 Speed + 2.794 Explosive Strength) was found fructiferous in estimating Kabaddi Performance on the basis of selected variables (Cardiovascular Endurance, Flexibility, Agility, Speed, Explosive Strength).

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