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Relationship of selected physical anthropometrical psychological and physiological parameters to performance of university male kabaddi players

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Abstract

Kabaddi is a combative team game played with absolutely no equipment on a rectangular court either outdoor or indoor with seven players on the ground in each side. The game is played into two halves of 20 minutes each with an interval of 5 minutes. The present study was carried out with the aim to find out the relationship between kabaddi performances and selected physical fitness variables as well as physiological parameters of university male kabaddi players. One hundred and eighty kabaddi players were selected for the present study. The physical fitness variables included speed, agility, power, flexibility, pull ups and endurance. Anthropometrical variables were height, weight, arm length, leg length and trunk length. The psychological variables were anxiety, aggression and self-confidence. The physiological parameters included resting pulse rate and breath holding time. All the physical fitness variables and physiological parameters were measured by using standardized test. The performance was measured by using subjects rating of 10-point rating scale. The study revealed that speed, leg explosive power and endurance were significantly correlated with performance. Agility, arm power, flexibility, resting pulse rate and breath holding time were not significantly correlated with performance.

Keywords: Speed, agility, power, flexibility, endurance, height, weight, arm length and leg length, anxiety, aggression and self-confidence, breath holding time, resting pulse rate

Introduction

An evaluation of the exercise response of high level sports competitors during competition can form a sound basis for the players' systematic development. The demands of various sports disciplines have been extensively studied. However, studies on the physiological demands of kabaddi players are scanty.

Kabaddi is a combative team game played with absolutely no equipment, on a rectangular court either outdoors or indoors with seven players on the ground in each side. The game is played into two halves of 20 minutes each with an interval of 5 minutes. It requires courage as well as ability to concentrate and anticipate the opponent's moves. In order to facilitate further growth of Kabaddi game, in order to facilitate growth of kabaddi game valid assessment procedures to comprehensively estimate the players physical, anthropometrical, psychological and physiological.

The present study was carried out with the aim to find out the relationship between kabaddi performance and selected physical variables anthropometrical variables and physiological parameters of university male kabaddi players.

Methodology

In the South-zone inter university Kabaddi championship held at to establish the nature of relationship between the performance in Kabaddi and the study variables, the following methodology was used.

Selection of the Subjects: The Subjects for the present study were male Kabaddi players of universities who had received regular training and participated in competitive Kabaddi game. The subjects were regular participants in the south zone inter university level Kabaddi championships.

They were drawn from different universities of Karnataka State who were rated as the best players by a panel of three expert coaches. The subjects were participants Kuvempu University, Shivamogga (Karnataka) during the year 2015-16

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Sample size of the Study: The sample of the present study consisted of hundred (180) male Kabaddi players in the age group of 18 to 28 years.

Selection of the variables for the Study: After a thorough review of literature relevant to the game of Kabaddi found in books, journals, periodicals, and research articles besides detailed discussion with the experts and keeping in view feasibility of the study in terms of availability of equipment and the relevance of the variables to the present study, the following variables were selected.

Total performance of the selected subjects was rated by three experts subjectively on a ten-point rating scale. This was the dependent variable for this study.

Independent Variables: The various independent variables selected for the present study are listed below:

1) Physical fitness Variables

- 1) Speed
- 2) Agility
- 3) Power
- 4) Flexibility
- 5) Pull Ups
- 6) Endurance.

2) Anthropometrical variables

- 1) Height
- 2) Weight
- 3) Arm length
- 4) Leg length
- 5) Trunk length.

3) Psychological variables

- 1) Anxiety
- 2) Aggression
- 3) Self-confidence.

4) Physiological variables

- 1) Breath holding time
- 2) Resting pulse rate.

Table 1: Physical fitness variables

Physical Variables	Test used to Measure	Unit of Measurement
Speed	30mts run with standing start	In Secs
Agility	4 x 10 mts shuttle run	In Sec
Power-Leg explosive power	Standing broad jump	In Sec and Centimeters
Flexibility	Sit and Reach test	In Centimeters
Pull ups	Arm strength and endurance	By numbers
Endurance	1000metrs	By Mins

Objectives

- To study the relationship between Performance of Kabaddi players and study Physical variables anthropometrical variables psychological variables and physiological variables.
- To study the impact of study Physical variables on Performance of Kabaddi players

Table 2: Correlations

Correlations		Performance
Speed	Pearson Correlation	.094
	Sig. (2-tailed)	.212
	N	180
Agility	Pearson Correlation	.060
	Sig. (2-tailed)	.424
	N	180
Standing Broad jump	Pearson Correlation	.093
	Sig. (2-tailed)	.214
	N	180
Flexibility	Pearson Correlation	.066
	Sig. (2-tailed)	.381
	N	180
Pull Up	Pearson Correlation	.031
	Sig. (2-tailed)	.683
	N	180
Endurance	Pearson Correlation	.352**
	Sig. (2-tailed)	.000
	N	180

*. Correlation is significant at the 0.05 level (2-tailed).
 **. Correlation is significant at the 0.01 level (2-tailed).

From the above table following inferences were made:

- The correlation between Performance and Speed was positive $r = 0.009$ and $P = 0.924 > 0.05$, the test was not significant at 5% levels. That is, there was no significant correlation between the Performance and the Speed of the Kabaddi players at 5% levels.
- The correlation between Performance and Agility was positive $r = 0.032$ and $P = 0.726 > 0.05$, the test was not significant at 5% levels. That is, there was no significant correlation between the Performance and the Agility of the Kabaddi players at 5% levels.
- The correlation between Performance and Standing Broad Jump was positive $r = 0.054$ and $P = 0.558 > 0.05$, the test was not significant at 5% levels. That is, there was no significant correlation between the Performance and the Standing Broad Jump of the Kabaddi players at 5% levels.
- The correlation between Performance and Flexibility was positive $r = 0.137$ and $P = 0.137 > 0.05$, the test was not significant at 5% levels. That is, there was no significant correlation between the Performance and the Flexibility of the Kabaddi players at 5% levels.
- The correlation between Performance and Pull ups was positive $r = 0.137$ and $P = 0.137 > 0.05$, the test was not significant at 5% levels. That is, there was no significant correlation between the Performance and the Pull ups of the Kabaddi players at 5% levels.
- The correlation between Performance and Endurance was positive $r = 0.460$ and $P = 0.00 < 0.05$, the test was significant at 5% levels. That is, there exists significant correlation between the Performance and the Endurance of the Kabaddi players at 5% levels.

a. Dependent Variable: Performance

The estimated regression equation of Performance on the Physical variables was given by

$$\text{Performance} = 24.55 + 0.059 (\text{Endurance})$$

And the above regression equation was significant as indicated in ANOVA table with $P = 0.00 < 0.05$ at 5% level of significance.

Hence, one unit change in Endurance indicates 0.059 unit change in Performance.

- There exists significant correlation between the Performance and the Endurance of the Kabaddi players
- The regression equation of Performance and the physical variables were statistically significant with one unit change in Endurance indicates 0.059 unit change in Performance.

Table 3: Anthropometrical variables

Anthropometrical variables	Equipment used to Measure	Unit of Measurement
Height	Stadiometer	Centimeters
Weight	Weighing machine	In kilograms
Arm Length	Measuring tape	Centimeters
Leg length	Measuring tape	Centimeters
Trunk Length	Measuring Tape	Centimeters

Anthropometrical variables

Correlation analysis was used and the computations made were tabulated in the

Table 4: Correlation

	Performance	R
Height	Pearson Correlation	.208**
	Sig. (2-tailed)	.005
	N	180
Weight	Pearson Correlation	.216**
	Sig. (2-tailed)	.004
	N	180
Arm	Pearson Correlation	.132
	Sig. (2-tailed)	.078
	N	180
Leg	Pearson Correlation	-.017
	Sig. (2-tailed)	.822
	N	180
Trunk	Pearson Correlation	.160*
	Sig. (2-tailed)	.032
	N	180

** Correlation is significant at the 0.01 level (2-tailed).

* Correlation is significant at the 0.05 level (2-tailed).

- The correlation between performance and height was positive, $r = 0.208$ with $P = 0.005 < 0.05$, the test was significant at 5% levels, that is, there exists significant positive correlation between performance and height of Kabaddi players.
- The correlation between performance and weight was positive, $r = 0.216$ with $P = 0.005 < 0.05$, the test was significant at 5% levels, that is, there exists significant

positive correlation between performance and weight of Kabaddi players.

- The correlation between performance and arm length was positive, $r = 0.132$ with $P = 0.078 > 0.05$, the test was not significant at 5% levels, that is, there was no significant positive correlation between performance and weight of Kabaddi players.
- The correlation between performance and leg length was negative, $r = -0.017$ with $P = 0.822 > 0.05$, the test was not significant at 5% levels, that is, there was no significant negative correlation between performance and leg length of Kabaddi players.
- The correlation between performance and Trunk length was positive, $r = 0.160$ with $P = 0.032 < 0.05$, the test was significant at 5% levels, that is, there exists significant positive correlation between performance and trunk length of Kabaddi players.

The estimated regression equation of Performance on the Anthropometrical variables was given by

$$\text{Performance} = -2.333 - 0.013 (\text{Height}) + 0.231 (\text{Weight}) + 0.360 (\text{Arm length}) + 0.039 (\text{Trunk length})$$

And the above regression equation was significant as indicated in ANOVA table with $P = 0.00 < 0.05$ at 5% level of significance.

Table 5: Psychological variables

Psychological variables	Test and Unit of Measurement
Anxiety	Rainer Martins Questionnaire-1977
Aggression	Anand Kumar and Prem Shankar shulka Questionnaire-1989
Self Confidence	Rekha Agnihotri Questionnaire-1987

Table 6: Descriptive Statistics of Psychological variables

Psychological variables	N	Minimum	Maximum	Mean	Std. Deviation
Anxiety	180	18.00	40.00	28.5111	4.03683
Aggression	180	6.00	24.00	14.9000	3.19409
Self Confidence	180	18.00	56.00	34.2278	7.18691
Valid N (list wise)	180				

From the above table following details were given:

- The average Anxiety score of the players was 28.51 with standard deviation 4.04.
- The average Aggression score of the players was 14.90 with standard deviation 3.19.
- The average Self Confidence score of the players was 34.23 with standard deviation 7.19

Correlation analysis was used and the computations made were tabulated in the table

Table 7: Correlations

Psychological variables	Performance	Anxiety	Aggression	Self Confidence
Performance	Pearson Correlation	1	.012	-.083
	Sig. (2-tailed)		.869	.268
	N	180	180	180
Anxiety	Pearson Correlation	.012	1	-.217**
	Sig. (2-tailed)	.869		.003
	N	180	180	180
Aggression	Pearson Correlation	-.083	-.217**	1
	Sig. (2-tailed)	.268	.003	
	N	180	180	180
Self Confidence	Pearson Correlation	-.008	-.157*	.515**
	Sig. (2-tailed)	.916	.035	.000
	N	180	180	180

** Correlation is significant at the 0.01 level (2-tailed).

* Correlation is significant at the 0.05 level (2-tailed).

From the above table following inferences were drawn:

- The correlation between Performance and Anxiety was positive, $r = 0.012$ with $P = 0.869$ the test was not significant at 5% levels that is, there was no significant positive correlation between Performance and Anxiety.
- The correlation between Performance and Aggression was negative, $r = - 0.083$ with $P = 0.268$ the test was not significant at 5% levels that is, there was no significant negative correlation between Performance and Aggression.
- The correlation between Performance and Self Confidence was negative, $r = - 0.008$ with $P = 0.916$ the test was not significant at 5% levels that is, there was no significant negative correlation between Performance and Self Confidence.

Since the calculated Chi-square value was greater than table value, the test was significant at 5% levels, that is, the level of Self Confidence of Kabaddi players were not equally distributed. Among 180 Kabaddi players 30 (16.7%) were at below average level of Self Confidence, 118 (65.6%) were at average level of Self Confidence, and 32 (17.8%) were at above average level of Self Confidence and it was found to be statistically significant at 5% level of significant.

The correlation between Breath and Performance was negative, $r = - 0.005$ with $P = 0.942 > 0.05$, the test was not

significant at 5% levels. That is, there was no significant correlation between Breath and Performance at 5% levels.

Table 8: Physiological Variables

Physiological Variables	Equipment used to Measure	Unit of Measurement
Breath holding time	Manual nose clip	Second
Resting pulse rate	Digitalized heart rate monitor	Monitor Beats per minute

Breathe Holding time

The correlation between Breath holding time and Performance

Table 9: Correlation

Breath holding time		Breath	Performance
Breath holding time	Pearson Correlation	1	-.005
	Sig. (2-tailed)		.942
	N	180	180
Performance	Pearson Correlation	-.005	1
	Sig. (2-tailed)	.942	
	N	180	180

Resting Pules rate

The correlation between Resting pulse rate and Performance

Table 10: Correlations

Resting Pules rate		Performance	Resting
Performance	Pearson Correlation	1	.078
	Sig. (2-tailed)		.295
	N	180	180
Resting Pules rate	Pearson Correlation	.078	1
	Sig. (2-tailed)	.295	
	N	180	180

The correlation between Resting and Performance was negative, $r = - 0.005$ with $P = 0.295 > 0.05$, the test was not significant at 5% levels. That is, there was no significant correlation between Resting and Performance at 5% levels. The estimated regression equation of Performance on Breath and Resting was given by

$$\text{Performance} = 38.459 - 0.004 (\text{Breath}) + 0.051 (\text{Resting})$$

Since $P = 0.578 > 0.05$, the test was not significant at 5% levels (ANOVA table), that is the above estimated regression equation of Performance on Physiological variables was statistically not significance at 5% levels.

Since the calculated Chi-square value was greater than table value, the test was significant at 5% levels, that is, the level of Breath of Kabaddi players were not equally distributed. Among 180 Kabaddi players 25 (13.9%) were at below average level of Breath, 128 (71.1%) were at average level of Breath, and 27 (15.0%) were at above average level of Breath and it was found to be statistically significant at 5% level of significant.

Since the calculated Chi-square value was greater than table value, the test was significant at 5% levels, that is, the level of Resting of Kabaddi players were not equally distributed. Among 180 Kabaddi players 22 (12.2%) were at below average level of Resting, 140 (77.8%) were at average level of Resting, and 18 (10.0%) were at above average level of Resting and it was found to be statistically significant at 5% level of significant.

Results and Discussion

With the emphasis made by the investigator in the of Introduction about eight variables under study were essential qualities of good performance in Kabaddi. The multiple regression analysis was conducted and the following regression equation of performance in Kabaddi on the thirteen variables under the study were obtained.

With the findings narrated earlier the investigator found that not all thirteen variables were significantly correlated with the performance in Kabaddi, step wise regression analysis was conducted for performance in Kabaddi on two classified categories-physical variables, anthropometrical variables and physiological variables the study variables separately, the analysis have been presented earlier.

Considering the physical variables only as independent variables in the step wise regression analysis, leg explosive power, speed and cardio vascular endurance would act as predictors for performance in kabaddi. The other three variables agility, flexibility and arm strength endurance were found to be not significantly associated with the performance in Kabaddi

Considering the anthropometrical variables only as independent variables in the step wise regression analysis Height, Weight, Arm length, Trunk length, would act as predictors for performance in kabaddi. The other leg length variable was found to be not significantly associated with the performance in kabaddi

Considering the psychological variables only as independent variables in the step wise regression analysis anxiety,

aggression, and self-confidence, would act as predictors for performance in kabaddi. were at above average level of Self Confidence and it was found to be statistically significant with the performance in kabaddi.

Considering the physiological variables only as independent variables in step wise regression analysis with the performance in Kabaddi, breath holding time and resting pulse rate were found to be not significantly associated with the performance in Kabaddi.

In the light of discussion and the step wise regression analysis in respect of performance in Kabaddi and the eight study variables, the investigator has arrived at the following conclusions.

The estimated multivariate stepwise regression of Performance on the study variables was given by
 Performance = - 28.967 + 5.242 (Speed) + 6.491 (Standing broad jump) +0.056 (Endurance) + 0.152 (Weight)-0.316 (Aggression)

That is, for one unit change in Speed score indicates 5.242 unit change in Performance; for one unit change in Standing Broad Jump score indicates 6.491 unit change in Performance; for one unit change in Endurance score indicates 0.056 unit change in Performance; for one unit change in Weight indicates 0.152 unit change in Performance; and for one unit change in Aggression score indicates 0.316 unit change in Performance.

Conclusion

Among the physical variables agility, arm power, flexibility found statistically not significant, with kabaddi performance. Among the five Anthropometrical variables only height, weight and trunk length act on a dominate predator variables for the performance in kabaddi. Among the six physical variables only speed, leg explosive power, and Endurance act on a dominate predator variables for the performance in kabaddi. Among the psychological variable anxiety aggression, and self-confidence found only aggression act on a dominate predator variables for the performance in kabaddi. Among the physiological variables breath holding time and resting Pules rate found statistically not significant, with kabaddi performance. The investigator therefore, concludes that speed, leg explosive power, endurance, weight and aggression in the same order, act as dominant predictors of performance in Kabaddi

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