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Prediction of playing ability in Kabaddi from selected anthropometrical, physical, physiological and psychological variables among college level players

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ABSTRACT

The purpose of the study was to predict the playing ability in Kabaddi from selected Anthropometrical, Physical, physiological and psychological variables among College level Players. One hundred and twenty six male inter collegiate Kabaddi players were randomly selected from various colleges in Tamilnadu state, India and their age ranged between 18 and 28 years. The subjects had past playing experience of at least three years in Kabaddi and only those who represented their respective college teams were taken as subjects. A series of anthropometrical measurements was carried out on each participant. *These included Standing height measured by Stadiometer; Body weight measured by weighing machine, Two Length measurements - Arm length, Leg length, measured by Lufkin Anthropometric Tape.* The data were collected by following standard testing protocol of International Society for the Advancement of Kinanthropometry. Physical fitness components were measured by the following tests. *Speed were assessed by 50 meter dash, Flexibility assessed by Sit and reach test, Leg explosive strength assessed by Standing broad jump, Muscular power assessed by* Modified sit – ups *and Muscular endurance assessed by 2.4 km run.* The Physiological parameters namely *Resting heart rate by Digitalized heart rate monitor, Peak expiratory flow rate was assessed by Peak flow meter and Breath holding time was assessed by Manual nose clip method.*

Introduction

Kabaddi is a traditional outdoor game played with minor variations in all regions of India - in fact, in most parts of Asia. It is an ancient backyard and homegrown game. Kabaddi requires tremendous physical stamina, agility, individual proficiency, neuromuscular coordination, lung capacity, quick reflexes, intelligence and presence of mind on the part of both attackers and defenders.

It needs a small playing area, 14 players (seven on each side) take part and no equipment is required. The dimensions of the playing field are 12.5 x 10m (for adults) divided by a mid-line into two equal halves (each 6.25 x 10 m). Each half is the territory of a team (one for the raiders and the other for the defenders). The game is supervised by a referee, two umpires and a scorer. The side winning the toss has the option of sending their raiders first, or choosing a particular side. The raider takes the maximum possible inspiration and then moves to the other side of the field, uttering a continuous chant 'Kabaddi' without any further inspiration, to try to touch one of the defending players. The defenders try to hold the raider within their area and the raider tries to force his way back to his own side without discontinuing the chant. If the raider is able to come back to his area after touching a defender a point is credited to his group and the person touched is put out of the game. On the other hand, the defending group gets a point if they can hold the raider, who then has to drop out. If a player is put out from one side, a player who had earlier been eliminated from the opposite group then rejoins his own side. A person from each group alternately raids the opposite side. This process continues until a team succeeds in putting out the entire opposing team. The successful side is then credited with two additional points (Lona). Also if any player goes out of the boundary line during the course of play, or if any part of his body touches the ground outside the boundary, he will be out (except during a struggle). The side scoring maximum points at the end of play is declared the winner. The time of play is 40 min with an interval of 5 min. Since kabaddi is an intermittent type of sport, it requires both aerobic, anaerobic endurance with a well built physique. These findings are in accordance with the Dey (2012). No prediction study of Kabaddi playing ability in anthropometrical, physical and performance variables among male inter-collegiate Kabaddi players. The purpose of the study was to predict the playing ability in Kabaddi from selected Anthropometrical, Physical, physiological and psychological variables among College level Players.

Methodology

Selection of subjects

One hundred and twenty six male inter collegiate Kabaddi players were randomly selected from various colleges in Tamilnadu state, India and their age ranged between 18 and 28 years. The subjects had past playing experience of at least three years in Kabaddi and only those who represented their respective college teams were taken as subjects.

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Selection of variables and tests

A series of anthropometrical measurements was carried out on each participant. *These included Standing height measured by Stadiometer; Body weight measured by weighing machine, Two Length measurements - Arm length, Leg length, measured by Lufkin Anthropometric Tape.* The data were collected by following standard testing protocol of International Society for the Advancement of Kinanthropometry. Physical fitness components were measured by the following tests. *Speed were assessed by 50 meter dash, Flexibility assessed by Sit and reach test, Leg explosive strength assessed by Standing broad jump, Muscular power assessed by* Modified sit – ups *and Muscular endurance assessed by 2.4 km run.* The Physiological parameters namely *Resting heart rate by Digitalized heart rate monitor, Peak expiratory flow rate was assessed by Peak flow meter and Breath holding time was assessed by Manual nose clip method.* Psychological factors namely *Somatic anxiety, Cognitive anxiety and Self confidence were assessed by Competitive Sports Anxiety Inventory – II (CSAI - 2) questionnaire developed by Martens, Burton, Vealey, Bump and Smith (1990)* and *Sports achievement motivation* level was assessed by Kamlesh (1983) SAMT questionnaire.

Performance Evaluation

The criterion variable, playing ability of the selected Kabaddi players were assessed by three qualified Kabaddi coaches which was taken as the performance factor. The guidelines for assessment were provided by the investigator. Each coach will rate the playing ability of the selected players in 10 points scale for each subject. The ratings given by the coaches on each subject will be added and will be divided by three to make the individual score of the subject. The correlation between the coaches on performance ratings was highly correlated (r = 0.87). Model has been calculated, as well as correlation of all variables in the system, finally, the interpretation of the results has been done.

Statistical Analysis

All testing was done two day before inter - collegiate competition by using scientifically approved equipments. Mean and Standard deviations were calculated for each of the selected variables. The inter-relationship among the selected anthropometrical, physical, physiological, psychological variables and Kabaddi playing ability, were computed by using Pearson' product-moment correlation coefficients. All selected anthropometrical, physical, physiological and psychological variables that statistically correlated with performance were used to form respective linear predictive models (step-wise argument selection).

Results and Discussions

Table – 1 showed the descriptive statistics – Mean and Standard deviation of Anthropometrical characteristics, Physical fitness component, physiological parameters, psychological factors & playing ability of College level Kabaddi Players. The present study attempted to link the coaches rating as measure of playing ability with the anthropometric characteristics, Physical fitness component, physiological parameters, and psychological factors of college level Kabaddi Players, correlation analysis was made.

Table – 2 shows that there was a correlation exists between the playing ability versus leg length (r = 0.34), arm length (r = 0.27), speed (r = 0.46), Leg Explosive strength (r = 0.60), Breath holding time (r = 0.59), Muscular endurance (r = 0.56), Muscular Power (r = 0.35) and Self confidence (r = 0.46) variables showed correlation with the playing ability. Rest of other all characteristics shows low correlation with the playing ability of college level Kabaddi players. Next, by means of stepwise selection, the best models of linear regression for predicting the playing ability of college level Kabaddi players was analysed. In each model, only the variable that achieved significance with the cut-off criteria set at probability of F < equal to or less than 0.001, 0.01 and 0.05 level was listed. The predictor variables and their importance in predicting the playing ability of Kabaddi players are presented in the table – 3.

Table – 3 shows the Regression Analysis of Predictive Equation in college level Kabaddi Players in the samples. Among the anthropometrical, physical, physiological and psychological variables, Leg Explosive strength scores accounted for 60% in the first model of the performance ability. Speed, Self confidence, Muscular endurance, Muscular power subsequently added significantly (0.01 and 0.05 levels) to the prediction of the playing ability in college level Kabaddi Players up to the final model. The R^2 value for the combination of Leg explosive strength, Speed, Self confidence, Muscular endurance, Muscular power on playing ability was .739 (74 %) with the R^2 change (ΔR^2) .546 for the final model.

This study has provided the most comprehensive predictions of anthropometric characteristics, physical fitness components, physiological parameters and psychological factors of college level Kabaddi players. The present study indicated that a relationship exists between playing ability versus leg length, arm length, speed, Leg Explosive strength, Breath holding time, Muscular endurance, Muscular Power and Self confidence. Kabaddi requires many essential components such as strength, power, aerobic-anaerobic capacity, neuromuscular coordination and muscular endurance. Strength is one of the most important components of this game. These findings are in accordance with the Dey,(2012). Every sport demands motor abilities at various levels above the average. Specific fitness is achieved when a player acquires the required motor ability at the intensified level for the particular sport. For example, specific fitness in kabaddi is with reference to strength, speed and co-ordination. These findings are in accordance with the Verma (2011).

Kabaddi favors body development with a muscular strength stamina and endurance; because of its special feature "Cant holding" enriches cardiovascular endurance and resistance. Fine flexibility and agility is developed as one needs to move faster in such a small area of 20'--30'[10-12mts]. Player's eyes and body movement become quicker. On the other hand in physical skills speed, power [strength], endurance, flexibility, swift action, and proper coordination between hand eyes and limbs. If your body is flexible then only you can kick, swiral grapple with ankle legs and things. Here more than speed acceleration is paramount; strong leg muscles give more punch to the player. Agility and stamina are also very essentialy. These findings are in accordance with the Jadhav (2011).

Conclusions

The results obtained in the present study illustrated the formation of anthropometrical characteristics, physical fitness component, physiological parameters and psychological factors optimum predictive equation models in male college level Kabaddi players. From the analysis of data,

Table – 1 Descriptive Statistics of College level Players

S.No	Variables	Mean (N=126)	SD
1	Playing ability	7.9206	± .96003
2	Height	170.8175	± 6.70570
3	weight	62.8413	± 6.90902
4	Leg Length	99.3651	± 5.86052
5	Arm Length	73.1349	± 3.96253
6	Speed	6.3746	± 0.44108
7	Flexibility	17.9365	± 2.93052
8	Leg Explosive strength	1.8732	± 0.23607
9	Muscular Power	10.6252	±0.65064
10	Muscular Endurance	50.3571	± 7.02050
11	Resting heart rate	69.3968	± 4.68372
12	Peak expiratory flow rate	385.3254	± 55.81410
13	Breath holding time	69.1190	± 8.78508
14	Somatic anxiety	21.1587	± 4.41889
15	Cognitive anxiety	17.6429	± 5.81785
16	Self confidence	23.5952	± 5.78713
17	Sports achievement motivation	23.6270	± 4.69337

Table - 2. Inter-Correlation of Selected Anthropometrical, Physical, physiological and psychological Variables with the Playing Ability of college level Kabaddi Players

Variables	X_1	X_2	X_3	X_4	X_5	X_6	X_7	X_8	X_9	X_{10}	X_{11}	X_{12}	X_{13}	X_{14}	X_{15}	X_{16}
C.R	.08	.26	.34	.27	.46	.17	.60	.35	.56	.04	.37	.59	.01	.27	.46	.11
X_1		.36	.87	.81	.11	.08	.14	.15	.08	.25	.18	.06	.02	.00	.04	.05
X_2			.20	.18	.13	.27	.46	.07	.13	.19	.22	.03	.02	.24	.09	.22
X_3				.79	.07	.10	.16	.07	.04	.26	.25	.18	.07	.01	.00	.06
X_4					.06	.06	.16	.19	.01	.13	.20	.03	.07	.11	.01	.02
X_5						.07	.34	.30	.12	.02	.34	.08	.18	.00	.01	.20
X_6							.28	.10	.06	.16	.15	.15	.03	.08	.01	.01
X_7								.16	.01	.09	.37	.10	.00	.32	.18	.08
X_8									.02	.28	.09	.28	.16	.03	.07	.12
X_9										.26	.14	.28	.07	.00	.02	.00
X_{10}											.06	.07	.11	.02	.10	.09
X_{11}												.00	.05	.12	.14	.08
X_{12}													.10	.17	.12	.19
X_{13}														.11	.19	.06
X_{14}															.10	.11
X_{15}																.07

C.R	Playing ability	X_9	Muscular Endurance
X_1	Height	X_{10}	Resting heart rate
X_2	weight	X_{11}	Peak expiratory flow rate
X_3	Leg Length	X_{12}	Breath holding time
X_4	Arm Length	X_{13}	Somatic anxiety
X_5	Speed	X_{14}	Cognitive anxiety
X_6	Flexibility	X_{15}	Self confidence
X_7	Leg Explosive strength	X_{16}	Sports achievement motivation
X_8	Muscular Power		

Table - 3
Regression Analysis of Predictive Equation in college level Kabaddi Players

Model	Variables	R	R Square	Unstandardized Coefficients		Standardized Coefficients
		R Square Change	F Change	B	Std. Error	Beta
1	(Constant)			3.311	.549	
	Leg Explosive strength	.605(a)	.366	2.461	.291	.605
2	(Constant)			7.922	1.299	
	Leg Explosive strength			2.070	.293	.509
	Speed	.660(b)	.435	-.609	.157	-.280
3	(Constant)			8.279	1.258	
	Leg Explosive strength			2.245	.288	.552
	Speed			-.585	.152	-.269
	Self confidence	.692(c)	.479	-.035	.011	-.213
4	(Constant)			10.967	1.463	
	Leg Explosive strength			2.199	.278	.541
	Speed			-.453	.151	-.208
	Self confidence			-.037	.011	-.225
	Muscular endurance	.722(d)	.521	-.320	.098	-.217
5	(Constant)			9.554	1.530	
	Leg Explosive strength			2.215	.272	.545
	Speed			-.407	.149	-.187
	Self confidence			-.037	.010	-.221
	Muscular endurance			-.322	.095	-.218
	Muscular power	.739(e)	.546	.022	.008	.160

(n=126) :(R^2 = .605 for step 1: ΔR^2 = .546 for final step) Significant at * p < 0.5.

Playing ability = 3.311+ 2.215 (X_7) -.407 (X_5) -.037 ($X1_5$) -.322 (X_9) + .022 (X_8)

C.R	Playing ability	X_9	Muscular Endurance
X_1	Height	X_{10}	Resting heart rate
X_2	weight	X_{11}	Peak expiratory flow rate
X_3	Leg Length	X_{12}	Breath holding time
X_4	Arm Length	X_{13}	Somatic anxiety
X_5	Speed	X_{14}	Cognitive anxiety
X_6	Flexibility	X_{15}	Self confidence
X_7	Leg Explosive strength	X_{16}	Sports achievement motivation
X_8	Muscular Power		

1. The results revealed that there was a correlation exists between the playing ability versus leg length, arm length, speed, Leg Explosive strength, Breath holding time, Muscular endurance, Muscular Power and Self confidence.
2. The results also revealed that Leg explosive strength, Speed, Self confidence, Muscular endurance, and Muscular power become the common characteristics which can predict the playing ability in Kabaddi players.

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