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Identification of Dominant Factors in Assessing the Offensive Skill Ability from the Selected Kinanthropometric Physical and Physiological Variables among Kabaddi players

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Abstract

The purpose of the study was to identify the dominant factors in assessing the offensive skill ability from the selected kinanthropometric, physical and physiological variables among Kabaddi players. One hundred and fifty eight male inter-collegiate offensive Kabaddi players were selected purposively as subjects from various colleges in Tamilnadu state, India and their age ranged between 18 and 25 years. Those Kabaddi players were taken as subjects who have represented their respective college teams and their weight was not more than ninety kilo gram. The subjects had past playing experience of at least three years in Kabaddi. A series of kinanthropometric measurements were carried out on each subject. These included standing height measured by stadiometer in centimeters, body weight measured by weighing machine in kilo grams, one length measurements (cm) - Leg length. Three Girth measurements (cm) -, Hip, Thigh and Calf girth measured by Lufkin anthropometric tape. One Breadth measurement (cm) –Femur breadth measured by small bone caliper. The data were collected by following standard testing protocol of International Society for the Advancement of kinanthropometry. Physical variables were measured by the following tests. Speed was assessed by 50 metre run in seconds, Leg explosive strength assessed by standing broad jump in meters and Muscular enduranceassessed by Modified sit ups in numbers. The physiological variables namely resting heart rate assessed by digitalized heart rate monitor in beats per minute, breath holding time was assessed by manual nose clip method in seconds. The offensive skill of leg thrust reach ability was taken as the performance factor which was assessed by foot touch reach test. All testing was done two days before inter-collegiate competition by using scientifically approved equipment's and standardized test. Mean and standard deviations were calculated for each of the selected variables. The interrelationship among the selected kinanthropometric, physical, physiological variables and offensive skill ability were computed by using Pearson product-moment correlation coefficients. All selected kinanthropometric, physical and physiological variables that statistically correlated with offensive skill ability were used to form respective linear predictive models (step-wise argument selection). The result of the study fact that an inter relationship exists significantly between the kinanthropomtric, physical, physiological and offensive skill ability among male inter-collegiate Kabaddi players. The result also revealed that leg explosive strength, breath holding time, thigh girth, muscular endurance, weight, calf girth, leg length and height become the common characteristics which can predict the offensive skill of leg thrust reach ability among kabaddi players.

Keywords: Kinanthropometric, Physical, Physiological, Kabaddi.

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. Kabaddi is one of the popular team sports which require a high standard of preparation in order to complete 40 minutes of speed with control. Once control is lost, the athlete is no competitive play and to achieve success. In this game movement patterns are characterized as intermittent and change continuously in response to different offensive and defensive situations. Anthropometric factors and morphological characteristics can influence the effectiveness of such responses, as has been observed in other sports. In modern sports, successful performance is determined by number of factors. For optimum performance at elite level, variety of areas must be addressed. Further, Kabaddi is the game where size, shape and body composition play an important part in providing distinct advantage for specific playing positions. These include the skill level, flexibility, endurance and most importantly the specific use of anthropometric measurements which plays a vital role in complex team based games. Since success in the game

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depends among other things, on how the individual characteristics of some players fit into the whole, thus creating a coherent team. Kabaddi is one of the complex technical team based game and performance differences between players of varying ability levels are different.

Methodology

The purpose of the study was to identify the dominant factors in assessing the offensive skill ability from the selected kinanthropometric, physical and physiological variables among kabaddi players. One hundred and fifty eight male inter-collegiate offensive Kabaddi players were selected purposively as subjects from various colleges in Tamilnadu state, India and their age ranged between 18 and 25 years. Those Kabaddi players were taken as subjects who have represented their respective college teams and their weight was not more than ninety kilo gram. The subjects had past playing experience of at least three years in Kabaddi. A series of kinanthropometric measurements were carried out on each subject. These included standing height measured by stadiometer in centimeters, body weight measured by weighing machine in kilo grams, one length measurements (cm) - Leg length. Three Girth measurements (cm)-, Hip, Thigh and Calf girth measured by Lufkin anthropometric tape. One Breadth measurement (cm) –Femur breadth measured by small bone caliper. The data were collected by following standard testing protocol of International Society for the Advancement of kinanthropometry. Physical variables were measured by the following tests. Speed was assessed by 50 metre run in seconds, Leg explosive strength assessed by Standing broad jump in meters and Muscular endurance by Modified sit ups in numbers. The physiological variables namely resting heart rate assessed by digitalized heart rate monitor in beats per minute, breath holding time was assessed by manual nose clip method in seconds. The offensive skill of leg thrust reach ability was taken as the performance factor which was assessed by foot touch reach test. All testing was done two days before inter-collegiate competition by using scientifically approved equipment's and standardized test. Mean and standard deviations were calculated for each of the selected variables. The inter relationship among the selected kinanthropometric, physical, physiological variables and offensive skill ability were computed by using Pearson product-moment correlation coefficients. All selected kinanthropometric, physical and physiological variables that statistically correlated with offensive skill ability were used to form respective linear predictive models (step-wise argument selection).

Results

Table I. Descriptive statistics of college level kabaddi players

S. No	Variables	Mean	SD	N
1	Leg thrust reach ability	1.2456	±.06150	158
2	Height	170.8291	±4.91221	158
3	Weight	69.5709	±8.46091	158
4	Leg length	96.4823	±3.82800	158
5	Hip girth	76.9886	±3.21156	158
6	Thigh girth	46.1722	±3.95502	158
7	Calf girth	32.3506	±2.59691	158
8	Femur breadth	10.1367	±8.01311	158
9	Speed	7.3089	±.39251	158
10	Leg explosive strength	2.3470	±.17924	158
11	Muscular endurance	30.6392	±4.25047	158
12	Breath holding time	40.1835	±25.33184	158
13	Resting heart rate	66.7595	±8.19121	158

Table I showed the descriptive statistics – mean and standard deviations of kinanthropometric, physical, physiological variables and leg thrust reach ability of Kabaddi players. The inter relationship between selected kinanthropometric, physical and physiological variables and offensive skill of leg thrust reach ability was computed using Pearson product moment correlation was presented in the Table II.

Table II. Inter relationship of selected kinanthropometric, physical and physiological variables and offensive skill of leg thrust reach ability of 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}
C.R	.435	.426	.471	.092	.194	.101	.148	.021	.818	.419	.556	.007
X_1		.473	.210	.051	.340	.047	.011	.073	.311	.186	.358	.001
X_2			.278	.171	.400	.077	.043	.281	.338	.062	.246	.052
X_3				.053	.183	.058	.068	.117	.418	.170	.220	.067
X_4					.206	.191	.004	.086	.102	.253	.057	.001
X_5						.523	.074	.030	.158	.211	.105	.010
X_6							.080	.021	.291	.066	.107	.122
X_7								.095	.125	.146	.051	.083
X_8									.038	.042	.073	.032
X_9										.366	.398	.112
X_{10}											.115	.009
X_{11}												.023

***Significant at 0.05 level of confidence**

C.R	Leg thrust reach ability	X_7	Femur breadth
X_1	Height	X_8	Speed
X_2	Weight	X_9	Leg explosive strength
X_3	Leg length	X_{10}	Muscular endurance
X_4	Hip girth	X_{11}	Breath holding time
X_5	Thigh girth	X_{12}	Resting heart rate
X_6	Calf girth		

Table II shows that the there was a correlation exists between the offensive skill ability of leg thrust reach and height (X_1), weight (X_2), leg length (X_3), thigh girth (X_5), leg explosive strength (X_9), muscular endurance (X_{10}) and breath holding time (x11) in each variables separately. The result shows that selected kinanthropometric, physical and physiological variables such as height (r=0.43), weight (r=0.42), leg length (r=0.47), thigh girth (r=0.19), leg explosive strength (r=0.81), muscular endurance (r=0.41) and breath holding time (r=0.55) were significantly correlated with the offensive skill of leg thrust reach ability the required 'r' value of 0.16 was found at 0.05 level of confidence.

Table III. Step-wise multiple regression between offensive skill ability and independent variables of kabaddi players

Model	Variables	R	R change	Adjusted R Square	Std. Error of the Estimate
1	Leg explosive strength	.818(a)	.669	.667	.03551
2	Breath holding time	.855(b)	.732	.728	.03205
3	Calf girth	.867(c)	.751	.747	.03096
4	Muscular endurance	.877(d)	.769	.763	.02996
5	Weight	.884(e)	.781	.774	.02923
6	Thigh girth	.890(f)	.793	.785	.02854
7	Leg length	.894(g)	.799	.790	.02818
8	Height	.897(h)	.805	.794	.02789

From Table III, it was found that the multiple correlations co-efficient for predictors, such as leg explosive strength, Breath holding time, Calf girth, Muscular endurance, Weight, Thigh girth, Leg length and Height was 0.897 which produce highest multiple correlations with offensive skill ability. 'R' square values show that the percentage of contribution of predictors to the offensive skill ability.

Table IV. Regression analysis of prediction equation of kabaddi players

Model		Unstandardized Coefficients		Standardized Coefficients
		B	Std. Error	Beta
1	(Constant)	.587	.037	
	Leg explosive strength	.281	.016	.818
2	(Constant)	.583	.034	
	leg explosive strength	.243	.016	.709
	Breath holding time	.002	.000	.274
3	(Constant)	.436	.053	
	Leg explosive strength	.258	.016	.752
	Breath holding time	.002	.000	.273
	Calf girth	.003	.001	.146
4	(Constant)	.422	.052	
	Leg explosive strength	.239	.016	.696
	Breath holding time	.002	.000	.278
	Calf girth	.003	.001	.140
	Muscular endurance	.002	.001	.141
5	(Constant)	.416	.050	
	Leg explosive strength	.223	.017	.650
	Breath holding time	.002	.000	.262
	Calf girth	.003	.001	.116
	Muscular endurance	.002	.001	.151
	Weight	.001	.000	.123
6	(Constant)	.406	.049	
	Leg explosive strength	.231	.016	.673
	Breath holding time	.002	.000	.264
	Calf girth	.005	.001	.199
	Muscular endurance	.003	.001	.176
	Weight	.001	.000	.166
	Thigh girth	-.002	.001	-.148
7	(Constant)	.314	.064	
	Leg explosive strength	.218	.017	.635
	Breath holding time	.002	.000	.260
	Calf girth	.004	.001	.180
	Muscular endurance	.003	.001	.173
	Weight	.001	.000	.154
	Thigh girth	-.002	.001	-.143
	Leg length	.001	.001	.092
8	(Constant)	.160	.099	
	Leg explosive strength	.217	.017	.632
	Breath holding time	.002	.000	.239
	Calf girth	.004	.001	.183
	Muscular endurance	.002	.001	.166
	Weight	.001	.000	.124
	Thigh girth	-.002	.001	-.159
	Leg length	.001	.001	.092
	Height	.001	.001	.090

From the Table IV, the following regression equations were derived for offensive skill of leg thrust ability of Kabaddi players. Regression Equation in obtained scores form = CR. **Leg thrust reaching ability (CR) =.587+.217 (X_9) +0.002 (X_{11}) +0.004 (X_6) + 0.002(X_{10}) + 0.001 (X_2) - 0.002(X_5) +0.001(X_3) + 0.001 (X_1).** The regression equation for the offensive skill of leg thrust reach ability includes Leg explosive strength, Breath holding time, Calf girth, Muscular endurance, Weight, Thigh girth, Leg length and Height. The kinanthropometric variables leg length, thigh girth, calf girth, weight and height were found to be significantly

correlated with leg thrust reach ability. While executing the leg thrust during raid. The longer length of leg is helpful for the raider to reach more distance. These findings are in accordance with the findings of (Dey, et.al. (1993). Among the physical and physiological variables leg explosive strength, muscular endurance and breath holding time was found to be the best predictor for leg thrust reach ability. These findings are in accordance with the study of (Devaraju & Needhiraja, (2012).

Conclusion

1. The result revealed that correlation exists between the offensive skill of leg thrust reach ability with Leg explosive strength, Breath holding time, Calf girth, Muscular endurance, Weight, Thigh girth, Leg length and Height.
2. The results also revealed that Leg explosive strength, Breath holding time, Calf girth, Muscular endurance, Weight, Thigh girth, Leg length and Height become the common characteristics which can predict the offensive skill of leg thrust reach ability among Kabaddi players.

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