



Anthropometric and Motor Fitness Characteristics of Indian Soccer Players

KEYWORDS

Indian senior national football championship; Speed ability; Agility; Endurance

Somnath Saha

Research Scholar, Department of Physical Education,
University of Kalyani, W.B, INDIA

Dr. Sudarsan Bhowmick

Ex-Professor, Department of Physical Education,
University of Kalyani, W.B, INDIA

ABSTRACT *The present study was compared anthropometric (age, height, weight, leg length, arm length) and motor fitness characteristics (speed, agility, leg explosive strength, endurance, flexibility) of six (Goa, Kerala, West Bengal, Manipur, Punjab and Maharashtra) state footballers in India. Ninety male soccer players were voluntarily participated in this study. Data analysis was performed by SPSS: 11.0 version. Mean, standard deviation, and one way ANOVA were computed to identify significant anthropometric and motor fitness differences between different state footballers in India. Scheffe's F test was also performed for multiple comparisons between different state footballers. The findings of this study suggested that there were statistically significant differences of anthropometric and motor fitness characteristics between different state footballers in India.*

Introduction:

"India is a land of unity and diversity" says Dr. Rajendra Prasad. The essence of unity is football in India. Goa, West Bengal, Punjab, Sikkim, Manipur, Karnataka, Mizoram, Kerala, Maharashtra and Tamilnadu are very popular states in Indian football industry. A large number of young footballers are coming in contact with coaching for greater and better selection from these states. Modern coaching methods are improved by the application of the result of research in related sciences. The breaking and re-establishing of records is the product of anthropology, sports training, biomechanics, physiology, sports medicine, and psychological fields. The use of such fields measures the classification, prediction of success as well as assessment of capacities of footballers. Selectors and coaches are faced with the problem of selecting the players that they will use to build their team. National team means players from different parts of the country selecting into close and homogeneous unity to playing together with a common purpose. But the problem is to ensuring it not easy. There are many contrary forces at work. Football as such complex game where many factors play at a time in a very minimum time limit and those all are deceive factors. Indian footballers have shown brilliant performances on the international tournaments. They have also earned recognition from the people of many countries. Primary process is to plan which understand how the team should play. Selection process should bring out the qualities that will be needed to

produce the type of football hoped for. Kinematical analysis of football provides useful information about the performance on the selecting the players, playing style and reality of players' limitations. The present study was conducted to assess anthropometric and motor ability performance of different state footballers in India.

Methodology:

The present study was carried out on ninety male senior national footballers belonging to Goa, Kerala, Westbengal, Manipur, Punjab and Maharashtra states in India. Fifteen players were selected excluding goalkeepers from each state team. The players were assessed namely age, height, weight, arm length, leg length, speed by 30 meter dash, leg explosive strength by vertical jump, agility by 4x10 meter shuttle run and endurance by 1.61 k.m. run. Tests were performed after confirmation of permission from respective team managers and coaches. The data were collected during 64th senior national football championship. For statistical analysis software, SPSS (ver.11.0) was used to analyze the collected data. Mean, standard deviation, and one way ANOVA were computed to see significant differences among footballers. Scheffe's F test was also performed for multiple comparisons between different state footballers.

Result:

On the basis of data the following results were made.

Table-1 Mean and S.D. of Anthropometrical Characteristics of Different State Footballers in India

Variables	Goa	Kerala	WestBengal	Manipur	Punjab	Maharashtra
Age(yrs)	23.53±2.06	24.73±2.15	23.66±3.01	21.73±1.57	24.0±1.69	23.33±1.87
Height(m)	1.74±.017	1.79±.034	1.72±.029	1.73±.019	1.77±0.29	1.75±.024
Weight(k.g)	60.80±2.56	62.80±2.67	59.86±3.33	61.53±2.87	66.33±3.53	60.13±5.90
Leg Length (c.m)	87.93±1.80	88.60±2.72	86.15±1.61	87.12±1.60	88.46±1.89	88.41±1.32
Arm Length (c.m)	78.57±2.89	80.22±2.14	75.58±1.60	75.81±1.51	78.88±2.33	78.05±2.11

Table 1 showed that Kerala footballers were older, taller, and their upper and lower limb lengths were also longer. Whereas Punjab state footballers were heavier than other state footballers.

Table-2 Mean and S.D. of Motor Ability profile of Different State Footballers in India

Variables	Goa	Kerala	West Bengal	Manipur	Punjab	Maharashtra
Speed(s)	4.21±.056	4.25±.045	4.23±.053	4.16±.059	4.25±.065	4.23±.070
Agility(s)	9.29±.075	9.42±.086	9.37±.098	9.23±.059	9.39±.060	9.35±.038.
Flexibility(c.m)	20.46±1.52	21.15±1.28	20.44±1.23	21.54±1.71	19.9±1.44	20.51±1.16
Endurance(min)	6.24±.040	6.29±.083	6.25±.089	6.16±.066	6.25±.062	6.27±.084
Leg explosive strength(c.m)	49.20±1.62	51.34±2.03	49.01±1.74	50.85±1.54	50.48±1.31	49.16±1.82

Table-2 showed that Manipuri footballers were faster, agile and their flexibility and endurance ability were also high. Whereas Kerala state footballers had more leg explosive strength than other state footballers.

Table-3 Analysis of variance (ANOVA) between different state footballers in India

Variables	Sources of variance	Sum of squares	Df	Mean square	F	Significance
Age	Between Group	74.23	5	14.84	3.31*	.000
	Within Group	376.26	84	4.479		
Height	Between Group	0.052	5	.010	15.227*	.000
	Within Group	0.057	84	.001		
Weight	Between Group	435.956	5	87.191	6.497*	.000
	Within Group	1127.333	84	13.421		
Leg Length	Between Group	70.023	5	14.005	3.956*	.003
	Within Group	297.374	84	3.540		
Arm Length	Between Group	248.278	5	49.656	10.687*	.000
	Within Group	390.286	84	4.646		
Speed	Between Group	0.079	5	.016	4.581*	.001
	Within Group	0.288	84	.003		
Agility	Between Group	0.360	5	.072	13.875*	.000
	Within Group	0.436	84	.005		
Flexibility	Between Group	25.488	5	5.098	2.596*	.031
	Within Group	164.961	84	1.964		
Endurance	Between Group	0.139	5	2.785	5.286*	.000
	Within Group	0.443	84	5.268		
Leg explosive strength	Between Group	76.361	5	15.272	5.30*	.000
	Within Group	242.052	84	2.882		

It was seen from Table-3 that there were significant differences of anthropometric and motor ability performances of different state footballers in India.

Table-4 Scheffe's F test for multiple comparisons of selected anthropometric characteristics between different state footballers in India

Variables	Age	Height	Weight	Leg Length	Arm Length	
Teams						
Goa vs Kerala	-1.20	-.045*	-2.00	.670	-1.650	
	.789	.001	.814	.966	.498	Sig.
Goa vs W.B	-.133	.026	.933	1.78	2.98*	
	1.00	.203	.992	.250	.019	Sig.
Goa vs Manipur	1.80	.018	-.733	.812	2.76*	
	.375	.616	.998	.923	.039	Sig.
Goa vs Punjab	-.466	-.024	-5.533*	-.524	-.312	
	.996	.286	.007	.988	.999	Sig.
Goa vs Maharashtra	.200	-.009	.666	-.479	.519	
	1.00	.975	.998	.992	.994	Sig.
Kerala vs W.B	1.066	.071*	2.933	2.458*	4.638*	
	.860	.000	.446	.033	.000	Sig.

Variables	Age	Height	Weight	Leg Length	Arm Length	
Teams						
Kerala Vs Manipur	3.00*	.063*	1.266	1.482	4.411*	
	.015	.000	.970	.465	.000	Sig.
Kerala vs Punjab	.733	.021	-3.533	.145	1.338	
	.969	.460	.234	1.00	.716	Sig.
Kerala vs Maharashtra	1.40	.036*	2.666	.190	2.170	
	.657	.020	.556	1.00	.192	Sig.
W.B vs Manipur	1.933	-.008	-1.666	-.975	-2.27	
	.293	.982	.905	.845	1.00	Sig.
W.B vs Punjab	-.333	-.050*	-6.466*	-2.312	-3.30*	
	.999	.000	.001	.055	.006	Sig.
W.B vs Maharashtra	.333	-.035*	-.266	-2.267	-2.468	
	.999	.029	1.00	.064	.092	Sig.
Manipur vs Punjab	-2.27	-.042*	-4.80*	-1.337	-3.072*	
	.139	.003	.032	.583	.014	Sig.
Manipur vs Maharashtra	-1.60	-.027	1.40	-1.292	-2.241	
	.513	.179	.953	.620	.163	Sig.
Punjab Vs Maharashtra	.666	.015	6.20*	4.533	.831	
	.980	.765	.002	1.00	.952	Sig.

Table-4 depicted that age was statistically significant when Kerala footballers compared to Manipuri footballers. Height was statistically significant when Kerala footballers compared to Goa, West Bengal, Manipur and Maharashtra players and Punjab players to West Bengal and Manipur footballers and Maharashtra footballers to West Bengal players. Body weight was statistically significant when Punjab footballers compared to Goa, West Bengal, Manipur and Maharashtra footballers. Leg length was statistically significant when Kerala footballers compared to West Bengal footballers. Arm length was statistically significant when Goa players compared to Manipur players, Kerala players to Manipur players, West Bengal footballers compared to Goa, Kerala and Punjab players and Punjab players to Manipur footballers.

Table- 5 Scheffe's F test for multiple comparisons of selected motor ability characteristics between different state footballers in India

Variables	Speed	Agility	Flexibility	Endurance	Leg explosive strength	
Teams						
Goa vs Kerala	-.035	-.130*	0.687	-.054	-2.147*	
	0.741	0.001	0.874	0.532	0.044	Sig.
Goa vs W.B	-.014	-.081	.020	-.015	.187	
	.994	.101	1.00	.997	1.00	Sig.
Goa vs Manipur	.051	.057	-1.073	.072	-1.653	
	.340	.466	.498	.206	.224	Sig.
Goa vs Punjab	-.037	-1.00*	.567	-.019	-1.280	
	.710	.019	.941	.992	.516	Sig.
Goa vs Maharashtra	-.015	-.067	-.047	-.031	.040	
	.991	.267	1.00	.923	1.00	Sig.
Kerala vs W.B	.021	.049	.707	.039	2.333*	
	.962	.636	.860	.819	.021	Sig.
Kerala vs Manipur	.087*	.187*	.387	.126*	.493	
	.009	.000	.989	.001	.986	Sig.
Kerala vs Punjab	-.001	.030	1.253	.035	.867	
	1.00	.933	.316	.877	.854	Sig.
Kerala Vs Maharashtra	.020	.063	.640	.023	2.187*	
	.971	.348	.904	.981	.038	Sig.
W.B vs Manipur	.065	.138*	-1.093	.087	-1.840	
	.109	.000	.477	.069	.129	Sig.

Variables	Speed	Agility	Flexibility	Endurance	Leg explosive strength	
Teams						
W.B vs Punjab	-.023	-.019	.547	-.004	-1.467	
	.951	.992	.949	1.00	.356	Sig.
W.B Vs Maharashtra	-.001	.014	-.067	-.017	-.147	
	1.00	.998	1.00	.995	1.00	Sig.
Manipur vs Punjab	-.088*	-.157*	1.640	-.091*	.373	
	.008	.000	.079	.049	.996	Sig.
Manipur Vs Maharashtra	-.067	-.124*	1.027	-.103*	1.693	
	.096	.001	.549	.014	.201	Sig.
Punjab vs Maharashtra	.021	.033	-.613	-.013	1.32	
	.962	.906	.919	.999	.481	Sig.

Table -5 showed that speed was statistically significant when Manipur footballers compared to Kerala and Punjab footballers. Agility was statistically significant when Goa footballers compared to Kerala and Punjab footballers and Manipur footballers compared to Kerala, West Bengal, Punjab and Maharashtra footballers. In flexibility there was no statistically significant difference found between national level footballers of different state in India. Endurance ability was statistically significant when Manipur footballers compared to Kerala, Punjab and Maharashtra footballers. Leg explosive strength was statistically significant when Kerala players compared to Goa, West Bengal and Maharashtra footballers.

Discussion

The present study revealed that the mean values of height and weight were less than their International counterparts. However, morphological factors are not a bar to success in soccer though it might determine a positional role most appropriate for the players (Ekblom, 1994). The probable reason of the lower value in vertical jump of Indian footballers may be due to smaller body structure. Professional soccer players' running speed and agility performances are higher than amateur soccer players. Soccer players have different running speed and agility performance in accordance with their different playing positions. (Kaplan, T, Erkmén, N, & Taskin, H. 2009). The findings of this comparative study have thrown light on selected anthropometric and motor ability performance between different state footballers in India. Investigator is firm opinion that the facts revived by study will open up new trends of research in football and will add to existing research literature. The findings showed variety of senior national footballers in this study. What characteristics separate those players who will succeed at the next level from

those who will struggle and moving up to the next level of play? Factors such as physical size, speed, fitness and technical ability are all important attributes of success. Coaches also consider the ability to read the game off-the-ball skills are needed to be successful. Tactical ability of "positioning and deciding" is a key factor determining which players will reach the professional level and those who will not. At that point, they were divided into two groups based on their adult performance – those who played on a professional team (Premier or national league) and those who played for amateur clubs. The investigators also opined that the knowledge of the game did not differ between the players who reached the professional level and those who did not.

Conclusion

In summary, this paper was addressed the differences in anthropometric and motor characteristics of state footballers in India. The study suggested that there are anthropometric and motor ability differences between different state footballers in India but according to their plying positions and the correct use of these individual differences in behalf of team can contribute to the sportive success. Although Kerala footballers were older, taller and their upper and lower limb lengths were also longer. Punjab state footballers were heavier than other state footballers. Manipur footballers were faster, agile and their endurance ability was also high. Kerala state footballers had more leg explosive strength than other state footballers.

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