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A Comparative Study of Selected Kinanthropometric Parameters between Tribal and Non-Tribal Field Hockey Players of Chhattisgarh

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Abstract

This study set out to compare selected kinanthropometric parameters between tribal and non-tribal field hockey players. Kinanthropometry deals with the measurement of human size, shape, proportion, body composition, maturation and gross function, and it offers a useful quantitative link between human structure and physical performance. Assessing kinanthropometric characteristics is of particular value in sport, since body dimensions and proportions can affect movement efficiency, skill execution and overall performance. A sample of 60 male field hockey players, comprising 30 tribal and 30 non-tribal players, was drawn for the study. The kinanthropometric parameters examined included age, height, weight, shoulder length, total arm length, upper arm length, lower arm length, hand length, hand width, waist/hip circumference, total leg length, upper leg length, lower leg length, foot length and foot width. Standardised anthropometric procedures and appropriate instruments were used to collect the data. Mean and standard deviation were computed for each variable, and an independent-samples t-test was applied to test for differences between the two groups at the 0.05 level of significance. The results are expected to shed light on the structural characteristics of field hockey players and to be of use in athlete profiling, talent identification and the planning of sports training.

Keywords: Kinanthropometry, anthropometric parameters, tribal players, non-tribal players, field hockey.

Introduction

Kinanthropometry is a growing area of scientific study concerned with human size, shape, proportion, composition, maturation and gross function as they relate to growth, exercise, performance and nutrition. It establishes a quantitative link between human structure and function and finds application in sport, medicine, education and several other fields. A number of earlier studies have likewise pointed out that kinanthropometry has grown in importance for talent identification and performance enhancement in sport.

Anthropometric characteristics carry particular weight in sports performance, since athletes in different sports tend to show distinctive body dimensions and proportions. Height, body mass, limb lengths, and hand and foot dimensions can all influence mechanical advantage, movement patterns and technical execution. For this reason, a systematic anthropometric assessment can offer useful information for athlete selection, classification and training. Field hockey is a fast-paced team sport that involves repeated running, acceleration, deceleration, changes of direction and technical skill execution. Players must move efficiently while carrying out sport-specific actions under competitive pressure, which makes an assessment of their structural characteristics a useful source of information about their physical profile.

India is marked by considerable geographical, cultural and socio-economic diversity, and tribal and non-tribal populations often differ in environmental exposure, lifestyle, nutrition, access to sporting opportunities and exposure to organised training. Whether such differences translate into measurable physical differences, however, is a question that needs to be examined empirically rather than assumed.

Earlier research in this area has found that some kinanthropometric variables differ significantly between groups while others do not. For instance, hand width, upper arm length, upper leg length, foot length and foot width have been reported to show significant differences in some populations, while several other measurements have not.

Although kinanthropometric characteristics have been studied in various sporting populations, comparatively little work has focused specifically on tribal and non-tribal field hockey players. The present study was therefore undertaken to compare selected kinanthropometric parameters between the

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two groups.

Objectives of the Study

i). To assess selected kinanthropometric parameters of tribal field hockey players.
ii). To assess selected kinanthropometric parameters of non-tribal field hockey players.
iii). To compare the selected kinanthropometric parameters between tribal and non-tribal field hockey players.
iv). To determine whether significant differences exist between the two groups in selected body dimensions and proportions.
v). To identify the kinanthropometric parameters that show the greatest differences between the two groups.

Hypothesis of the Study

For the purpose of this study, the investigator formulated the following null hypothesis:
H_0: There will be no significant difference in selected kinanthropometric parameters between tribal and non-tribal field hockey players at the 0.05 level of significance.

Methodology

Sampling

A total of 60 field hockey players who had taken part in national- and state-level tournaments were drawn from various sports institutions and training centres in Chhattisgarh. The players were divided into two groups: Group A consisted of 30 tribal field hockey players, and Group B consisted of 30 non-tribal field hockey players. Subjects ranged in age from 18 to 28 years.

Tools Used

Data were collected using a score sheet, a flexible steel measuring tape, a stopwatch, a weighing scale and a standing height stand (stadiometer).

Statistical Analysis

The mean, standard deviation and independent-samples t-test were computed for the scores obtained, in order to compare tribal and non-tribal field hockey players of Chhattisgarh.

Discussion and Findings

Table 1: Descriptive Statistics of Selected Kinanthropometric Parameters of Tribal and Non-Tribal Field Hockey Players

Parameter	Tribal Mean	Tribal SD	Non-Tribal Mean	Non-Tribal SD
Age (years)	20.84	1.42	21.16	1.35
Height (cm)	169.72	5.84	172.46	5.67
Weight (kg)	61.84	6.21	64.72	6.48
Shoulder Length (cm)	38.26	2.31	39.14	2.24
Total Arm Length (cm)	74.38	3.62	76.21	3.71
Upper Arm Length (cm)	32.18	1.86	33.07	1.92
Lower Arm Length (cm)	25.84	1.72	26.48	1.69
Hand Length (cm)	18.36	1.04	18.91	1.08
Hand Width (cm)	8.21	0.58	8.43	0.61
Waist/Hip (cm)	76.48	4.73	78.36	4.81
Total Leg Length (cm)	91.84	4.26	94.17	4.38
Upper Leg Length (cm)	43.76	2.83	45.12	2.91
Lower Leg Length (cm)	40.18	2.47	41.32	2.54
Foot Length (cm)	25.63	1.21	26.14	1.27
Foot Width (cm)	9.34	0.52	9.51	0.55

Table 1 sets out the descriptive statistics — mean and standard deviation — for the kinanthropometric variables examined in this study, including age, height, weight, shoulder length, arm and hand measurements, waist/hip circumference, leg measurements, and foot dimensions, for both groups of players.

Among the tribal players, the mean age was 20.84 years (SD = 1.42), the mean height was 169.72 cm (SD = 5.84), and the mean body weight was 61.84 kg (SD = 6.21).

Their mean shoulder length was 38.26 cm (SD = 2.31), and mean total arm length was 74.38 cm (SD = 3.62). Mean upper arm length was 32.18 cm (SD = 1.86), and mean lower arm length was 25.84 cm (SD = 1.72).

Mean hand length among tribal players was 18.36 cm (SD = 1.04), and mean hand width was 8.21 cm (SD = 0.58). The mean waist/hip measurement was 76.48 cm (SD = 4.73).

For the lower limb, tribal players recorded a mean total leg length of 91.84 cm (SD = 4.26), a mean upper leg length of 43.76 cm (SD = 2.83), and a mean lower leg length of 40.18 cm (SD = 2.47). Mean foot length and foot width were 25.63 cm (SD = 1.21) and 9.34 cm (SD = 0.52), respectively.

Among the non-tribal players, the mean age was 21.16 years (SD = 1.35), mean height was 172.46 cm (SD = 5.67), and mean body weight was 64.72 kg (SD = 6.48).

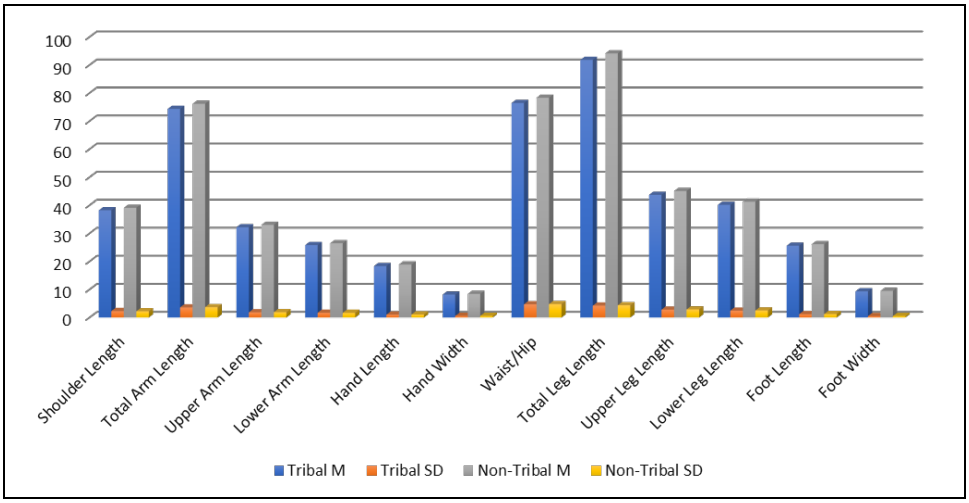
Their mean shoulder length was 39.14 cm (SD = 2.24), and mean total arm length was 76.21 cm (SD = 3.71). Mean upper arm length was 33.07 cm (SD = 1.92), while mean lower arm length was 26.48 cm (SD = 1.69).

Mean hand length among non-tribal players was 18.91 cm (SD = 1.08), and mean hand width was 8.43 cm (SD = 0.61). The mean waist/hip measurement was 78.36 cm (SD = 4.81).

For the lower limb, non-tribal players recorded a mean total leg length of 94.17 cm (SD = 4.38), a mean upper leg length of 45.12 cm (SD = 2.91), and a mean lower leg length of 41.32 cm (SD = 2.54). Mean foot length was 26.14 cm (SD = 1.27), and mean foot width was 9.51 cm (SD = 0.55).

Table 2: Independent-Samples t-Test Comparing Tribal and Non-Tribal Field Hockey Players on Selected Kinanthropometric Parameters.

Parameter	Tribal M	Tribal SD	Non-Tribal M	Non-Tribal SD	Mean Diff.	t	df	p
Shoulder Length	38.26	2.31	39.14	2.24	-0.88	-1.49	58	.142
Total Arm Length	74.38	3.62	76.21	3.71	-1.83	-1.93	58	.059
Upper Arm Length	32.18	1.86	33.07	1.92	-0.89	-1.82	58	.074
Lower Arm Length	25.84	1.72	26.48	1.69	-0.64	-1.45	58	.152
Hand Length	18.36	1.04	18.91	1.08	-0.55	-2.00	58	.050
Hand Width	8.21	0.58	8.43	0.61	-0.22	-1.43	58	.158
Waist/Hip	76.48	4.73	78.36	4.81	-1.88	-1.51	58	.136
Total Leg Length	91.84	4.26	94.17	4.38	-2.33	-2.08	58	.042*
Upper Leg Length	43.76	2.83	45.12	2.91	-1.36	-1.84	58	.071
Lower Leg Length	40.18	2.47	41.32	2.54	-1.14	-1.77	58	.082
Foot Length	25.63	1.21	26.14	1.27	-0.51	-1.60	58	.115
Foot Width	9.34	0.52	9.51	0.55	-0.17	-1.24	58	.219



Note: *p < .05 indicates statistical significance.*

Fig 1: Descriptive Statistics of Selected Kinanthropometric Parameters of Tribal and Non-Tribal Field Hockey Players.

The independent-samples t-test showed no statistically significant difference between tribal and non-tribal field hockey players in age, height, weight, shoulder length, total arm length, upper arm length, lower arm length, hand width, waist/hip measurement, upper leg length, lower leg length, foot length, or foot width ($p > .05$).

A statistically significant difference did emerge for total leg length, $t(58) = -2.08$, $p = .042$, with non-tribal players recording a greater mean total leg length (94.17 cm) than tribal players (91.84 cm). The effect size (Cohen's $d = 0.54$) suggests a moderate difference between the two groups.

The difference in hand length sat right at the conventional significance threshold, $t(58) = -2.00$, $p = .050$, with a moderate effect size (Cohen's $d = 0.52$); non-tribal players had a slightly greater mean hand length than their tribal counterparts.

Although non-tribal players tended to record higher mean values across most of the parameters studied, these differences did not reach statistical significance for the majority of variables.

Conclusion

On the whole, non-tribal field hockey players recorded higher mean values than tribal players for height, weight, shoulder length, arm dimensions, hand dimensions, waist/hip measurement, leg dimensions and foot dimensions. The independent-samples t-test, however, showed that most of these differences were not statistically significant.

A significant difference was found in total leg length, with non-tribal players showing greater values than tribal players, and a difference close to the conventional significance level was found for hand length. Taken together, the findings suggest that certain lower- and upper-limb dimensions may help distinguish tribal from non-tribal field hockey players, even though the size and significance of these differences varied across the parameters measured.

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