

ANTHROPOMETRIC DETERMINANTS OF RUNNING PERFORMANCE IN ELITE JUNIOR ATHLETES



SPORTS SCIENCE

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ABSTRACT

The purpose of the study was to find out the anthropometrical determinants of running performance in junior elite runners. To achieve the purpose of study 61 elite level Junior Athletes from National Athletics Coaching camp at Sonipat, Haryana were selected as the subjects. Anthropometrical parameters were measured with the help of different tools, Standing height (wall mounted height measure meter), body weight (weighing machine), leg length, trunk length, arm length and hand length (non-stretchable measuring tape), calf girth, thigh girth and upper arm girth (non-stretchable measuring tape) and body compositions biceps skin fold, triceps skin fold sub-scapularis region and supra-iliac region (skin fold callipers). Descriptive statistic and Pearson's Product Moment Correlation were employed to analyze the data. Significant positive correlation was found between Standing height and performance ($r = .266^*$, $p < 0.05$), between Leg length and performance ($r = .276^*$, $p < 0.05$), b/w Trunk length and performance ($r = .359^{**}$, $p < 0.01$) between Calf girth and performance ($r = .254^*$, $p < 0.05$) and between body composition and performance ($r = .347^{**}$, $p < 0.01$). However significant negative correlation was found between Upper Arm Girth ($r = -.501^{**}$, $p < 0.01$). Body Weight, Arm length, Hand length and Thigh Girth were found to be not significantly correlated with performance.

I. INTRODUCTION

Running performance is related to a variety of Anthropometrical characteristics in national (Maldonado, Mujika, & Padilla, 2002) and elite (Rabadan, et al., 2011) level middle- and long-distance runners. Several anthropometric and body composition values are known to be associated with running performance in elite and national level runners for example, body height and mass (Maldonado, et al., 2002), fat and fat-free mass (Winter & Hamley, 1976), arm circumference Mooses, M. et al.: ANTHROPOMETRIC AND PHYSIOLOGICAL ... Kinesiology 45(2013) :154-162 155, different lower limb skin folds and circumferences (Arrese & Ostariz, 2006; Legaz & Eston, 2005;) and also sum of three (Kong & de Heer, 2008) and six (Legaz & Eston, 2005) skin folds have been related to distance running performance. Runners with a proportionally smaller amount of body mass concentrated in the extremities, particularly in the legs, would perform less work moving their body segments during running if all other factors are unchanged (Myers & Steudel, 1985). Therefore, leg mass and the distribution of leg mass might be important characteristics of distance runners' performance (Myers & Steudel, 1985). Despite a number of studies describing different anthropometric parameters related to running performance over different distances, there is paucity of studies investigating the associations between specific anthropometric ratios with the performance in junior level elite athletes.

II. METHODS

Subject:

61 elite level junior athletes from National Athletics Coaching camp at Sonipat, Haryana were selected as the subjects for the study.

Instrumentation:

Anthropometric parameters were measured with the help of different administrating tools, Standing height (wall mounted height measure meter), body weight (weighing machine), leg length, trunk length, arm length and hand length (non-stretchable measuring tape), calf girth, thigh girth and upper arm girth (non-stretchable measuring tape) and body compositions biceps skin fold, triceps skin fold sub-scapularis region and supra-iliac region (skin fold callipers).

Performance scores allocated by three experts for performance of athletes were averaged to assess the athlete's performance

Statistical analysis:

Descriptive statistics and Pearson's Product moment Correlation were computed to analyse the collected data.

II. ANALYSIS AND DISCUSSION ON FINDINGS

Table .1: Descriptive Statistics (Mean±SD) on Anthropometrical Variables to Assessed the Performance of Junior Indian National Runners

Variables	Mean	Std. Deviation	N
Standing height	164.7443	7.8258	61
Body Weight	82.9410	9.4635	61
Leg length	77.3853	14.9610	61
Trunk length	77.3672	10.2732	61
Arm length	47.5082	8.2523	61
Hand length	19.8656	1.4858	61
Calf Girth	21.7853	2.9916	61
thigh Girth	52.3262	7.9743	61
Upper Arm Girth	23.6344	3.8012	61
Body Composition	50.6557	11.3772	61

Table no. 1 depicts the descriptive result of anthropometrical variables. The descriptions of (Mean±SD) are standing height 24.24 ±2.69 (cms), Body Weight 82.94 ±9.46 (kg), Leg length 77.39 ±14.96 (cms), Trunk length 77.37±10.27 (cms), Arm length 47.51±8.25 (cms), Hand length 19.87±1.49 (cms), Calf Girth 21.79±2.99 (cms), thigh Girth 52.33±7.97 (cms), Upper Arm Girth 23.63±3.80 (cms) and Body Composition 50.66 ±11.38 (mm).

Table .2: Relations between Anthropometrical–Motor Variables and Performance

Variables	Performance Pearson Correlation (r)	Sig. (2-tailed) p-value	N
Standing height	0.266*	0.039	61
Body Weight	0.088	0.500	61
Leg length	0.276*	0.031	61
Trunk length	0.359**	0.005	61
Arm length	0.082	0.528	61
Hand length	0.019	0.884	61
Calf Girth	0.254*	0.048	61
Thigh Girth	0.024	0.855	61
Upper Arm Girth	-.501**	.000	61
Body Composition	0.347**	0.006	61

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

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

Table no. 2 presents depicts correlation between anthropometrical variables and performance of Junior Indian National runners. The results of Pearson's Product moment correlation indicated the inter-relationship of anthropometrical variables and performance of athlete's.

Significant positive correlation was found b/w between Standing height and performance ($r = .266^*$, $p < 0.05$), b/w Leg

length and performance ($r = .276^*$, $p < 0.05$), b/w Trunk length and performance ($r = .359^{**}$, $p < 0.01$) b/w Calf girth and performance ($r = .254^*$, $p < 0.05$) and b/w body composition and performance ($r = .347^{**}$, $p < 0.01$). however significant negative correlation was found b/w Upper Arm Girth ($r = -.501^{**}$, $p < 0.01$). Body Weight, Arm length, Hand length and Thigh Girth were found to be not significantly correlated with performance.

CONCLUSIONS

Significant positive correlation was found between Standing height and performance ($r = .266^*$, $p < 0.05$). Significant positive correlation was found between Leg length and performance ($r = .276^*$, $p < 0.05$). Significant positive correlation was found between Trunk length and performance ($r = .359^{**}$, $p < 0.01$) Significant positive correlation was found b/w Calf girth and performance ($r = .254^*$, $p < 0.05$). Significant positive correlation was found between body composition and performance ($r = .347^{**}$, $p < 0.01$). Significant negative correlation was found between Upper Arm Girth and performance ($r = -.501^{**}$, $p < 0.01$). Body Weight, Arm length, Hand length and Thigh Girth were not significantly correlated with the performance.

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