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Assessment of body composition and somatotype between high and low achievers of RTM Nagpur university handball players

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Abstract
The aim of this paper was to compare high and low achievers on Body Composition and Somatotype of Handball players from RTM Nagpur University, Nagpur, Maharashtra. To achieve this purpose, a total of 29 boys from RTM Nagpur University, Nagpur, were considered. These players were classified into two group's namely high achievers (17) and low achievers (12), on the basis of level of participation in tournaments. This data was collected during the academic year 2018-19. The anthropometric measures height, weight, % BF was measured initially for all the subjects. The criterion variables chosen for this study were body composition which was measured by body fat % is an easy method of discovering correct body weight and composition. Beneath the skin is a layer of subcutaneous fat, and the % of total body fat can be measured by taking the 'skinfold' at selected points on the body with a pair of calipers. This test only requires four measurements. And an anthrop meter for measuring the height, a skin fold caliper, a small sliding caliper for the breadths and a flexible steel or fiber glass tape for the girths. ANOVA of unequal sample was employed to know the difference between high and low achievers handball players. The percent body fat content is greater in low achievers will act as a hindrance in their performance. The high achievers (40.00) LBM is greater than low achievers (35.99).The somatotype of high and low achievers is mesomorphic ectomorph because ectomorphy is dominant, with mesomorph second in dominance.

Keywords: body composition, somato type, handball players, training

Introduction
Handball is a team sport in which two teams of seven players each (six out court players and a goalkeeper) pass a ball using their hands with the aim of throwing it into the goal of the other team. A standard match consists of two periods of 30 minutes, and the team that scores more goals wins.
Modern Handball is played on a court of 40 by 20 metres (131 by 66 ft), with a goal in the middle of each end. The goals are surrounded by a 6-metre (20 ft) zone where only the defending goalkeeper is allowed; goals must be scored by throwing the ball from outside the zone or while "diving" into it. The sport is usually played indoors, but outdoor variants exist in the forms of field handball, Czech handball (which were more common in the past) and beach handball. The game is fast and high-scoring: professional teams now typically score between 20 and 35 goals each, though lower scores were not uncommon until a few decades ago. Players may score hat tricks. Body contact is permitted for the defenders trying to stop the attackers from approaching the goal. No protective equipment is mandated, but players may wear soft protective bands, pads and mouth guards.

Methodology
The study was proposed to compare RTM Nagpur University Handball male players of high and low achievers in terms of morphophysiological variables. To accomplish the purpose of the study, twenty nine (29) male youth Handball players were selected at random as subjects, who volunteered to participate in this study. These players were classified into two groups namely high and low achievers. The high achievers group constitutes of 17 players and low achievers group constitutes of 12 players. High achievers subjects who represented highest level of competition and low achievers are immediately below high achievers level. The mean age of the selected subjects was 4.9 ± 2.1.

Results

The data collected on selected criterion variables for Handball players of different levels of achievement was subjected to statistical analysis and it was presented in this tables.

Table 1: Mean (SD) and Results of ANOVA for Percent Body Fat among Handball Players Classified by Level of Performance

Groups	Mean ± SD	SOV	Sum of square	df	Mean square	F ratio	P value
Total subjects (29)	8.55±3.16	B	32.755	1	32.755		
High achievers (17)	7.65 ± 3.20	W	246.938	27	9.146	3.581	.069
Low achievers (12)	9.81 ± 2.73	T	279.692	28	–		

SOV – Source of variance, B – Between groups, W – Within groups, T – Total

The mean value and standard deviation of high and low achievers on percent body fat are 7.65 ± 3.20 and 9.81 ± 2.73 respectively. Levine's test has shown that the variance is not significant since p = 0.739. So Homogeneity of variance is assumed. The results of the ANOVA on percent body fat showed no significant difference between high and low achievers Handball players from RTM Nagpur University, Nagpur, Maharashtra (see Table 1). Since the obtained F ratio of 3.581 is less than the required table value of 4.20 at a = 0.05 for the df of 1and 27. Hence the null hypothesis is rejected since $p < 0.05$.

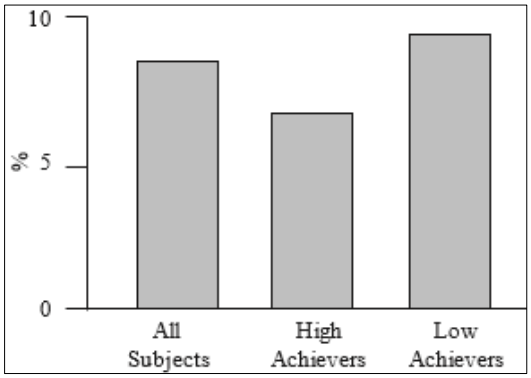

Fig 1: Percent Body Fat of High and Low Achievers Handball Players

Table 2: Mean (SD) and Results of ANOVA for Lean Body Mass among Handball Players Classified by Level of Performance

Groups	Mean ± SD	SOV	Sum of square	df	Mean square	F ratio	P value
Total subjects (29)	38.39 ± 6.21	B	118.368	1	118.368		
High achievers (17)	40.09 ± 6.22	W	962.444	27	35.646	3.321	.080
Low achievers (12)	35.99 ± 5.58	T	1080.812	28	–		

SOV – Source of variance, B – Between groups, W – Within groups, T – Total

The mean value and standard deviation of high and low achievers on lean body mass are 40.09±6.22 and 35.99±5.58 respectively. Levene's test has shown that the variance is not significant since p = 0.403. So Homogeneity of variance is assumed. The results of the ANOVA on lean body mass showed no significant difference between high and low achievers Handball players from RTM Nagpur University, Nagpur, Maharashtra (see Table 2). Since the obtained F ratio of 3.321 is less than the required table value of 4.20 at a = 0.05 for the df of 1and 27. Hence the null hypothesis is rejected since $p < 0.05$.

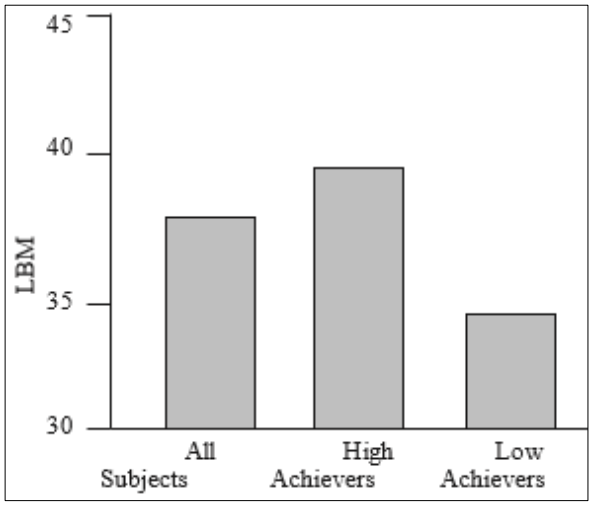

Fig 2: Lean Body Mass of High and Low Achievers Handball Players

Somatotype

Table 3: Mean Scores (SD) and ANOVA of Somatotypes of Handball Players Classified by Level of Performance

	Groups	Mean ± SD	SOV square	Sum of	df square	Mean	F ratio	P value
	Total Subjects (29)	1.68 ± 0.62	B	.954	1	.954		
Endomorph	High Achievers (17)	1.53 ± 0.64	W	9.930	27	.368	2.594	.119
	Low Achievers (12)	1.90±0.54	T	10.884	28			

(Contd....)

	Groups	Mean ± SD	SOV square	Sum of	df square	Mean	F ratio	P value
Mesomorphy	Total Subjects(29)	3.19 ± 0.78	B	1.679	1	1.679	2.940	.098
	High Achievers (17)	3.39 ± 0.80	W	15.415	27	.571		
	Low Achievers (12)	2.90 ± 0.68	T	17.093	28			
Ectomorphy	Total Subjects (29)	4.72 ± 0.81	B	.132	1	.132	.194	.663
	High Achievers (17)	4.66 ± 0.83	W	18.350	27	.680		
	Low Achievers (12)	4.80 ± 0.81	T	18.482	28			

SOV – Source of variance, B – Between groups, W – Within groups, T – Total

Table 3 shows that Handball players from RTM Nagpur University, Nagpur, Maharashtra, showed mesomorphic ectomorph (1.68 - 3.19 - 4.72). When they are classified into two groups based on performance level high achiever showed mesomorphic ectomorph (1.53-3.39-4.66) and low achievers also possessed mesomorphic ectomorph (1.90 - 2.90 - 4.80). The somatotype of high and low achievers is mesomorphic ectomorph because ectomorphy is dominant, with mesomorph second in dominance. The obtained p value for endomorph - 0.608, mesomorph – 0.614 and ectomorph – 0.894 in Levene's test has shown that the variance is not significant. So Homogeneity of variance is assumed. The study also reveals that there is no significant difference on endomorph, mesomorph and ectomorph of high and low achievers Handball players from RTM Nagpur University, Nagpur, Maharashtra (see Table 3). Since the obtained F ratio of endomorph - 2.594, mesomorph - 2.940 and ectomorph - 0.194 is less than the required table value of 4.20 at a = 0.05 for the df of 1and 27.

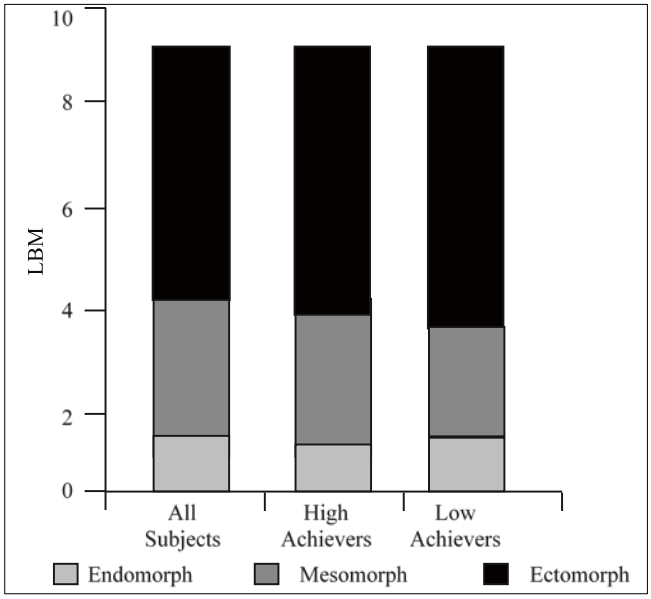

Fig 3: Somatotype of High and Low Achievers Handball Players

Discussion

The present data of percent body fat accords with the proposal that percent body fat value among high and low achievers Handball players should be within the range of 6-14% and 6-15%, respectively. Percent body fat level of high achievers is 7.65 and low achiever is 9.81. As mentioned earlier low achiever is heavier than high achievers thereby their percent body fat level is higher than high achievers. The percent body fat content is greater in low achievers will act as a hindrance in their performance (Bandyopadhyay, 2007; Bandyo padhyay & Chatterjee, 2003; Chatterjee *et al*., 2005) [1, 2, 3]. The high achievers (40.00) lean body mass is greater than low achievers (35.99), who will therefore achieve better performance since the more the lean body mass the greater will be the energy output and the higher will be the cardio respiratory fitness (Bandyopadhyay, 2007; Bandyopadhyay & Chatterjee, 2003; Chatterjee *et al*., 2005) [1, 2, 3]. These are the two reasons for differentiating RTM Nagpur University, Nagpur, Maharashtra players as high and low achievers on performance aspect: greater percent body fat and lower lean body mass existing among low achievers. In this study, somatotype values of the Handball Players from RTM Nagpur University, Nagpur, Maharashtra, are determined as 1.68 -3.19- 4.72 (mesomorphic ectomorph); the value of high achievers group as 1.53 3.39-4.66 (mesomorphic ectomorph); and the values of the low achievers group as 1.90 2.90 - 4.80 (mesomorphic ectomorph). The somatotype of high and low achievers is mesomorphic ectomorph because ectomorphy is dominant, with mesomorph second in dominance.

Conclusion

The high and low achievers youth Handball players have no significant difference in percent body fat and lean body mass. Percent body fat level of high achievers is 7.65 and low achiever is 9.81. As mentioned earlier low achiever is heavier than high achievers thereby their percent body fat level is higher than high achievers. The high achievers (40.00) lean body mass is greater than low achievers (35.99), the high and low achievers youth Handball players have no significant difference in endomorph, mesomorph and ectomorph. Somatotype of Handball Players from RTM Nagpur University, Nagpur, Maharashtra showed mesomorphic ectomorph (1.68 - 3.19 - 4.72), when they are classified into two groups based on performance level high achiever showed mesomorphic ectomorph (1.53 -3.39 - 4.66) and low achievers also possessed mesomorphic ectomorph (1.90 - 2.90 - 4.80). The somatotype of high and low achievers is mesomorphic ectomorph because ectomorphy is dominant, with mesomorph second in dominance.

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