



SOMATOTYPES CHARACTERISTIC OF BASKETBALL, VOLLEYBALL AND HANDBALL PLAYERS: A SPECIAL REFERENCE TO VIDARBHA REGION OF MAHARASHTRA

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Abstract :

The importance of sports and games is being increasingly recognised in India, from both the educational and social points of view. More and more funds are being allocated for encouraging sports in schools, colleges and universities; in fact, sports have become an essential part of the curricula. Time was when only a few students, who were fond of games like hockey, football, cricket or tennis, were allowed special facilities. But now regular programmes are drawn up in all educational institutions to persuade as many students as possible, regardless of special aptitudes, to participate in games, and not merely watch matches occasionally to cheer up their favourite teams or



attend the prize distribution functions at the end of a sports season. The importance of sports and games is being increasingly recognised in India, from both the educational and social points of view. More and more funds are being allocated for encouraging sports in schools, colleges and universities; in fact, sports have become an essential part of the curricula. Time was when only a few students, who were fond of games like hockey, football, cricket or tennis, were allowed special facilities. The comparative assessment of the somatotypes of the basketball, players showed that mesomorph of the basketball players appeared to have better than other somatotypes. The comparative assessment of the somatotypes of the volleyball, players showed that ectomorph of the volleyball players appeared to have better than other somatotypes. The comparative assessment of the somatotypes of the handball, players showed that mesomorph of the handball players appeared to have better than other somatotypes. The assessment of the performance of University level basketball, volleyball and handball players showed that majority of the basketball players performed averagely, volleyball players performed excellently and majority of handball players had performed good. The study is based on primary probe of Somatotypes characteristic of basketball, volleyball and handball players with Special reference to two districts e.g. Nagpur and Wardha districts of Vidarbha region of Maharashtra. Carter Somatotype Rating Form was used to assess the somatotypes characteristic of the basketball, volleyball and handball players and correlation between Somatotypes and sports

performance of basketball, volleyball and handball players.

KEYWORDS: *Somatotypes, characteristics, dimension, performance, players, measurement, training.*

OBJECTIVES OF THE STUDY

- To study the somatotypes characteristic of basketball, volleyball and handball players.
- To study the correlation between Somatotypes and sports performance of basketball, volleyball and handball players.

METHODOLOGY

- The study is based on primary probe, covering two districts e.g. Nagpur and Wardha districts of Vidarbha region of Maharashtra. A total of 300 (100 each players of basketball, Volleyball and handball games) players belonging to age group 18 to 25 years were selected for data collection. Carter Somatotype Rating Form was used to assess the somatotypes characteristic of the basketball, volleyball and handball players and correlation between Somatotypes and sports performance of basketball, volleyball and handball players. The following measurement components were used for the study:

- i) Height
- ii) Weight
- iii) Skinfolds
 - ❖ Triceps
 - ❖ Sub scapular
 - ❖ Surprailiac
 - ❖ Calf
- iv) Bone Width
 - ❖ Humerus
 - ❖ Femur
- v) Girths
 - ❖ Upper Arm
 - ❖ Calf

REVIEW OF LITERATURE

Viitasalo (1982) Fourteen Finnish and ten Russian elite male volleyball players were studied for their anthropometric dimensions, maximal isometric trunk extension and flexion, leg extension strength and vertical jumping height. In addition, the height of rise of the body centre of gravity h (C.G.), and the height of the hand and ball were analyzed from a video tape in spike and block jumps taken during actual competition. No significant differences were found, however, between the teams in the h (C.G.) during spiking. This finding seems to suggest that the Russians have better spike technique.

Tucker (1983) conducted a study to: (1) determine the effect of a four-month weight training program on college males' self-concepts; and (2) identify the types, in terms of extroversion, neuroticism, body cathexis, somatotype, and muscular strength, who benefit most. Training generally favourably affected self-concept.

Lora et al., (2008) The results show an endomesomorphic profile for male and female volleyball players agreeing with the predominant profile at these ages. However, after comparing these data with results obtained in other studies, we observed certain homogeneity in the male somatotype, invalidating the current trend of

using this parameter as criteria to select young sports talent. However, somatotype could be a factor to take into account with female athletes, since their profile is much more heterogeneous.

Koley et al., (2011) the purpose of this study was threefold: firstly, to evaluate the arm anthropometric profile of Indian inter-university basketball players; secondly, to search for the correlations among these arm anthropometric characteristics; and thirdly, to search for the association of handgrip with arm anthropometric characteristics in Indian inter-university basketball players. The results indicated statistically significant ($p \leq 0.05 - 0.01$) differences between the male basketball players and the controls in height, right handgrip strength, upper arm, forearm and total arm length, whereas no significant differences were found between the female basketball players and the controls. Highly significant ($p = 0.01$) sex differences were found in the basketball players in almost all the variables studied (except BMI and arm fat area). Significant positive correlations were noted among the arm anthropometric characteristics studied (except arm fat area and arm fat index), and with right and left handgrip strength.

Ajeesh & Pradeep (2013) The aim of the study was to find out the gender difference in Personality traits of Inter collegiate men and women Volleyball players with regard to Psychoticism, neuroticism, extraversion and Lie score. While analyzing the differences of Personality characteristic of men and women Volleyball players, gender differences on neuroticism was found between men and women Inter collegiate Volleyball players ($t = 4.69, P < .01$), where the men Volleyball players was found to have less score on neuroticism. So, far extraversion was concerned, significant gender difference was found to the men and women Inter-Collegiate Volleyball players ($t=2.77, P<.01$), men Volleyball players has lower extraversion. Hence, women Volleyball players were more extraverts.

Nikolaos et al., (2014) The aim of this study was to evaluate handball players' morphological characteristics and motor abilities according to their playing position. Materials & Methods: Participants were 46 handball players, aged from 18 to 21 years old from the national teams of Greece and former Yugoslavia republics. They were divided into four subgroups corresponding to playing positions. Their morphological characteristics of body height, body mass, hand extension, bioacromial distance and palm diameter were measured. Special tests of motor abilities were used for strength, speed and coordination. Kruskal-Wallis and Mann-Whitney U analyses were applied for the comparison of groups. Results: The results revealed few differences between all four playing positions in almost all measurements of morphological characteristics and motor abilities. There was homogeneity among players in different playing position with few exceptions.

Khan and Aziz (2015) With the aim to compare the sports competitive anxiety and sports achievement motivation between basketball players and all India intervarsity track runners. Forty six male subjects (23 basketball players and 23 all India intervarsity track runners) were recruited as subjects for the study. Their age ranged from 18 to 25 years. For the acquisition of psychological data of the participants of sports achievement motivation questionnaire developed by Kamlesh (1990) and for sports competitive anxiety questionnaire developed by Martin (1984) was used. The data of basketball players were acquired from the north zone intervarsity competition held at Bareilly, data of track runners were acquired from All India Intersvarsity Athletic meet held at Mangalore. The 't' test was used to analyze data. Results indicated that no significant difference was found between basketball players and all India intervarsity track runners in their sports competition anxiety and sports achievement motivation

Gaurav et al., (2015) The purposive sampling technique was used to select the subjects. All the subjects were assessed for height, weight, lengths, circumferences, diameters and skin fold thicknesses. An independent samples t-test revealed that inter-college volleyball players had significantly higher height ($p < 0.05$), arm length ($p < 0.05$), upper leg length ($p < 0.05$) and lower leg length ($p < 0.05$) as compared to inter-school level volleyball players. The inter-college level volleyball players were also found to have significantly greater elbow

diameter ($p < 0.05$), shoulder diameter ($p < 0.05$), hip diameter ($p < 0.05$), knee diameter ($p < 0.05$), calf circumference ($p < 0.05$), chest circumference ($p < 0.05$), upper arm circumference ($p < 0.05$) and fore arm circumference ($p < 0.05$). Inter-school volleyball players had significantly greater biceps ($p < 0.05$), triceps ($p < 0.05$), subscapular ($p < 0.05$) and suprailliac skinfold ($p < 0.05$) as compared to basketball players.

Markovic et al., (2015) the aim of the present study was to define a model of the physical performance of fourteen-year-old quality basketball and handball players. Forty-four boys took part in this study: 20 basketball players (average age 14.4 ± 0.31) and 24 handball players (average age 14.5 ± 0.41). In order to assess the morphological status of athletes we applied four, and for motor status assessment, 10 variables. Yo-Yo test was used to estimate athletes' functional status. By arithmetic means, we presented a model of the desirable physical performances of basketball and handball players. The t-test for independent samples was used to determine the significance of differences between the two groups of athletes. Basketball players had better results in all 15 tests, although the difference is statistically significant in 11 tests. The difference in quality was explained by a fact that basketball is three times popular among children compare to handball, and lack of sports halls in Bosnia and Herzegovina with proper size for a handball court.

Akdeniz (2015) The purpose of this study is to compare anthropometric characteristics and physical performance of girl volleyball players who are adolescent girls aged around 14 years old, and participated in national championships with different success levels. The subjects of the study consisted of 60 volunteering girl volleyball players. Anthropometric measures were used for anthropometric and somatotype characteristics. Hand strength test, leg and back strength test, flexibility, knee-bend sit-up, vertical jump test, 20-meter sprint test and bruce test for maximal oxygen consumption were used for measuring physical performance. As a result, the endomorphy values of the 2nd group's players were significantly higher ($p < 0.05$) than those of the 1st group's volleyball players. The new regression formula developed from this study is as follows: $\% \text{ fat} = 0.126(\text{thigh skf.}) + 0.626(\text{triceps skf.}) - 0.637(\text{biceps skf.}) + 0.955(\text{BMI}) - 13.144$ ($R = 0.836$ and $\text{SEE} = 1.33\%$). Successful girl volleyball players had a dominant somatotype profile, ectomorph structure, and lower ratio of body fat.

Nara (2017) The present study was an attempt to find out the difference in physical fitness level between basketball and football players. The sample for this study consisted of 150 subjects each belonging to Basketball and football from Haryana, who had represented their schools and colleges in various state level tournaments were selected as the subjects for the study. The Criterion measures from AAPHER Physical fitness test have been chosen for this study. Mean, Standard deviation and 't' Test were used to analyse the data Findings of the study revealed that: (i) Football players was found better in 50-yard dash than basketball players; (ii) Basketball players are much better in Standing Broad Jump than football players; (iii) there is no significant difference in Pull-Ups between Basketball and football players; (iv) Football players were found better in Shuttle-run than basketball players; (v) There is no significant difference in Sit-ups of Basketball and football players and (vi) Football players were found better in six hundred yard run than basketball players.

INTRODUCTION

The importance of sports and games is being increasingly recognised in India, from both the educational and social points of view. More and more funds are being allocated for encouraging sports in schools, colleges and universities; in fact, sports have become an essential part of the curricula. Time was when only a few students, who were fond of games like hockey, football, cricket or tennis, were allowed special facilities. But now regular programmes are drawn up in all educational institutions to persuade as many students as possible, regardless of special aptitudes, to participate in games, and not merely watch matches occasionally to cheer up their favourite teams or attend the prize distribution functions at the end of a sports season. The importance of

sports and games is being increasingly recognised in India, from both the educational and social points of view. More and more funds are being allocated for encouraging sports in schools, colleges and universities; in fact, sports have become an essential part of the curricula. Time was when only a few students, who were fond of games like hockey, football, cricket or tennis, were allowed special facilities. But now regular programmes are drawn up in all educational institutions to persuade as many students as possible, regardless of special aptitudes, to participate in games, and not merely watch matches occasionally to cheer up their favourite teams or attend the prize distribution functions at the end of a sports season. Success as a sports person comes from a combination of their ability and body build. The three components of body build are type, size and composition. A system, developed by W.H. Sheldon (c.1940) uses the terms ectomorph, endomorph, or mesomorph to describe the body build of an individual. Beashel and Taylor (1997) identify three extremes of body types. A predominantly ectomorphic individual is long, slender and thin, and therefore power and strength sports are perhaps not suitable as their slight build leaves them susceptible to injuries. While they can easily get lean and hard, their lack of musculature severely limits their chances in sports requiring mass. Ectomorphs dominate endurance sports and gymnastics. They can archive low levels of body fat which can be detrimental to health and for females in endurance sports it can result in a cessation of periods and iron deficiency. An endomorphic individual typically has short arms and legs and a large amount of mass on their frame. Their mass hampers their ability to compete in sports requiring high levels of agility or speed and perform sustained weight bearing aerobic activities such as running. Sports of pure strength, like power lifting, are perfect for an endomorph. They can gain weight easily and lose condition quickly if training stops. A mesomorphic individual excels in strength, agility, and speed. Their medium structure and height, along with their tendency to gain muscle and strength easily makes them a strong candidate for a top athlete in any sport. They can sustain low body fat levels and find it easy to lose and gain weight.

DISCUSSION AND CONCLUSION

The somatotype characteristics were measured with the help of Heath Carter Somatotype Rating Form. In accordance with internationally accepted standards following ten body measurements were taken (Martin and Saller, 1957; Tanner et al., 1969; Heath and Carter, 1967). Anthropometric Somatotyping was done incorporating the above ten anthropometric measurements using Heath and Carter's method (Carter, 1980; Heath and Carter, 1967). A somatotype was expressed in a three digit sequential numerals, representing endomorphy, mesomorphy and ectomorphy respectively. While analysing Comparative Assessment of somatotypes of the University level **basketball** players the table-1 indicate that ectomorph of the basketball players is 22%, while mesomorph is 66%. However, the endomorph of the basketball players is 2.7%. The comparative assessment of the somatotypes of the basketball, players showed that mesomorph of the basketball players appeared to have better than other somatotypes.

Table -1:
Comparative Assessment of somatotypes of the University level basketball players

Somatotyping – Basketball Players	Median Score	No. of players	Percentage
Ectomorphs	634	22	22
Mesomorphs	261	66	66
Endomorphs	357	12	12
Total		100	100

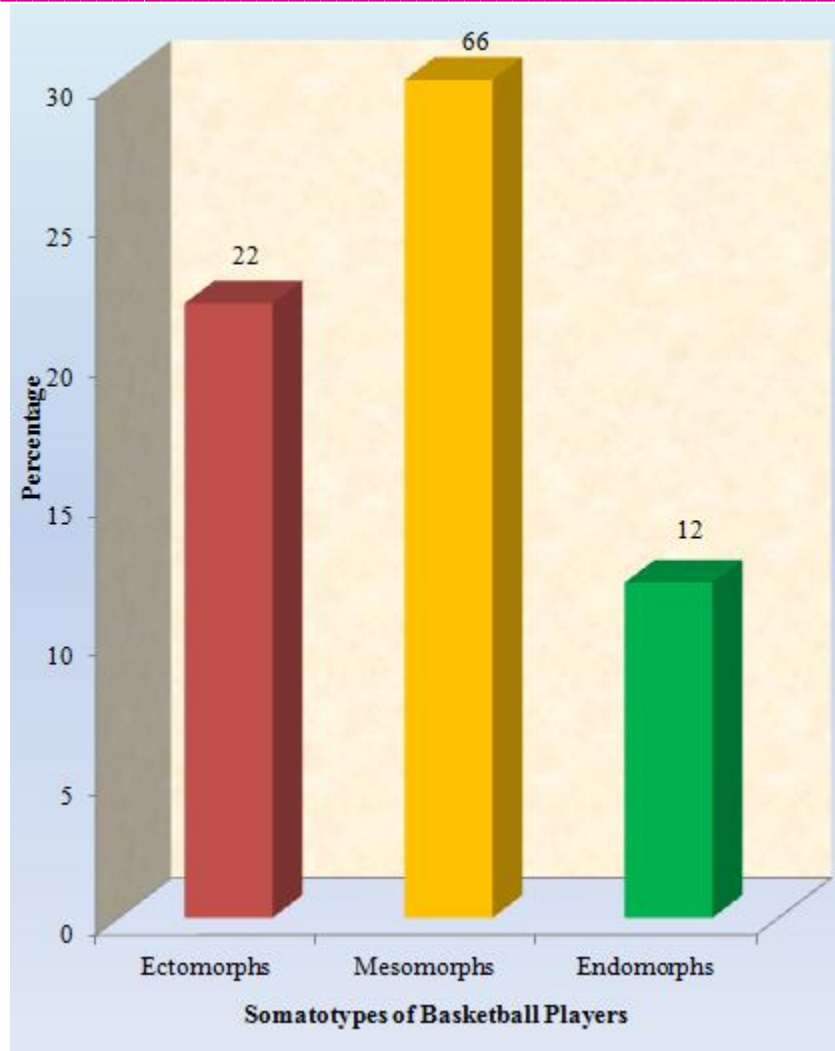


Fig -1: Comparative Assessment of somatotypes of the University level basketball players

Table -2:
Comparative Assessment of somatotypes of the University level volleyball players

Somatotyping – Volleyball Players	Median Score	No. of players	Percentage
Ectomorphs	643	59	59
Mesomorphs	362	32	32
Endomorphs	347	9	9
Total		100	100

Above **Table -2** presents results regarding the assessment of somatotype of the University level volleyball players. The results indicated that ectomorph of the volleyball players is 59%, while mesomorph is 32%. However, the endomorph of the volleyball players is 9%.

The comparative assessment of the somatotypes of the volleyball, players showed that ectomorph of the volleyball players appeared to have better than other somatotypes

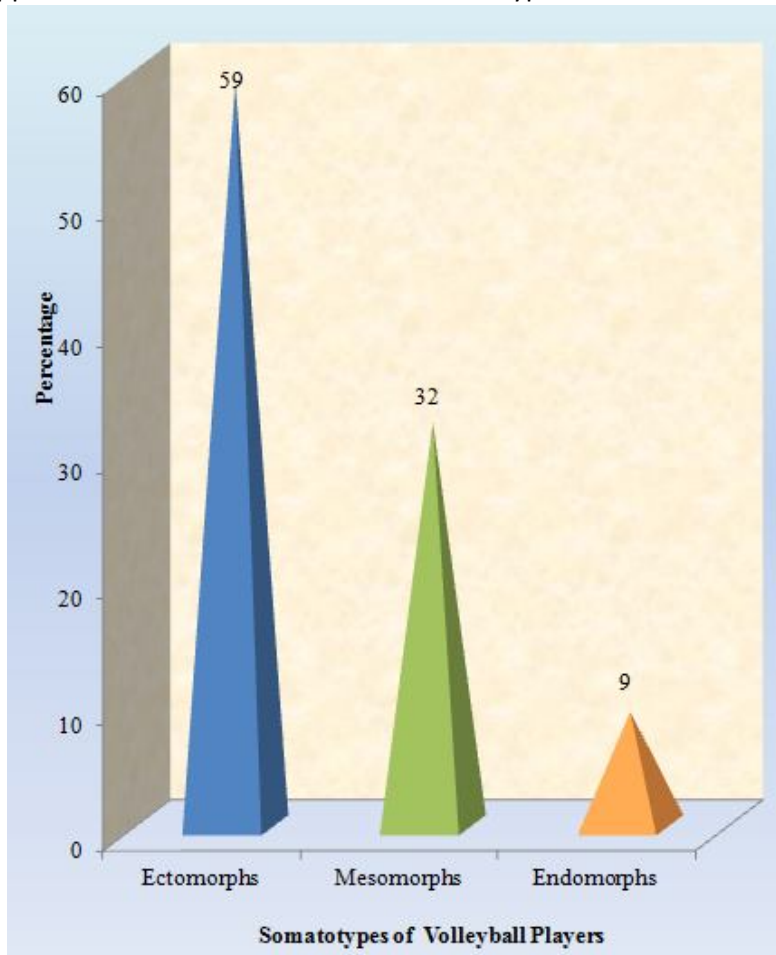


Fig -2: Comparative Assessment of somatotypes of the University level volleyball players

Table -3:
Comparative Assessment of somatotypes of the University level handball players

Somatotyping – Handball Players	Median Score	No. of players	Percentage
Ectomorphs	532	36	36
Mesomorphs	353	54	54
Endomorphs	327	10	10
Total		100	100

Above **Table -3** presents results regarding the assessment of somatotype of the University level handball players. The results indicated that ectomorph of the handball players is 36%, while mesomorph is 54%. However, the endomorph of the handball players is 10%.

The comparative assessment of the somatotypes of the handball, players showed that mesomorph of the handball players appeared to have better than other somatotypes

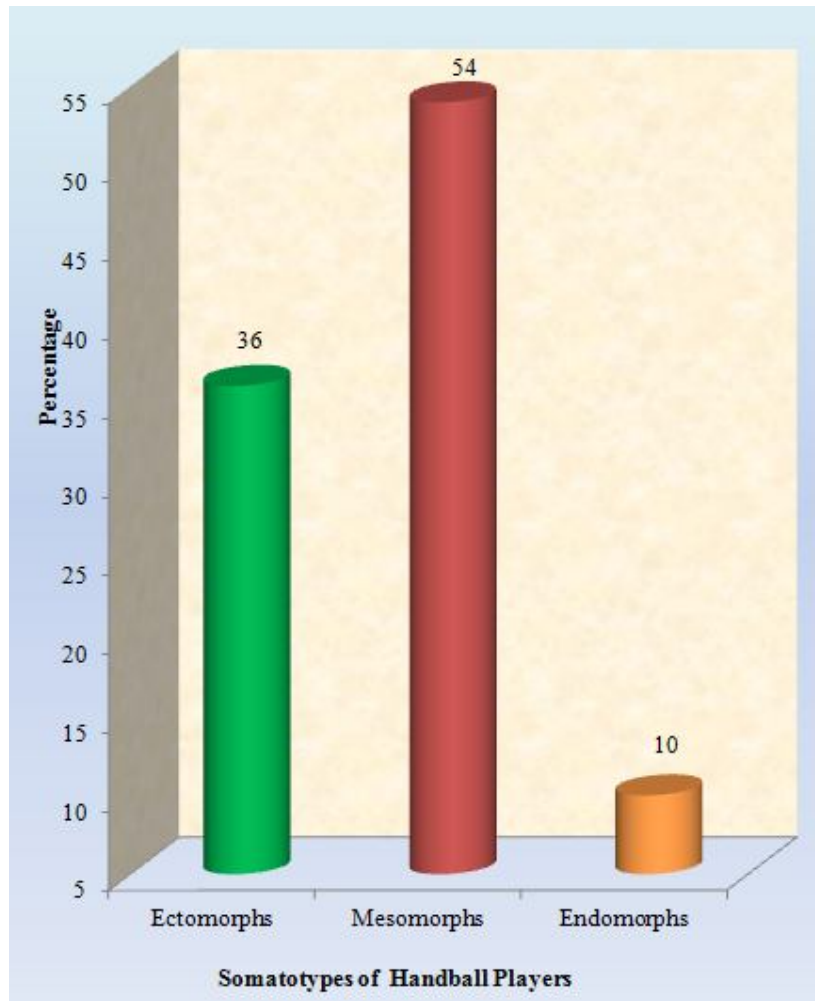


Fig -3: Comparative Assessment of somatotypes of the University level handball players

Table -4:
Performance of University level basketball, volleyball and handball players

Performance	Basketball		Volleyball		Handball	
	No.	Per.	No.	Per.	No.	Per.
Excellent	24	24	32	32	29	29
Good	20	20	30	30	42	42
Average	38	38	28	28	17	17
Below Average	18	18	10	10	12	12
Total	100	100	100	100	100	100

Above **Table -4:** presents results regarding the assessment of performance of the University level basketball, volleyball and handball players. The results indicated that of 24% basketball players, 32% volleyball and 29% handball players had an excellent performance. While 20% basketball players, 30% volleyball and 42% handball players performance was good. In addition to it, 38% basketball players, 28% volleyball and 17% handball players had an average performance however 18% basketball players, 10% volleyball and 12% handball players had a below average performance. The assessment of the performance of University level basketball, volleyball and handball players showed that majority of the basketball players performed averagely, volleyball players performed excellently and majority of handball players had performed good

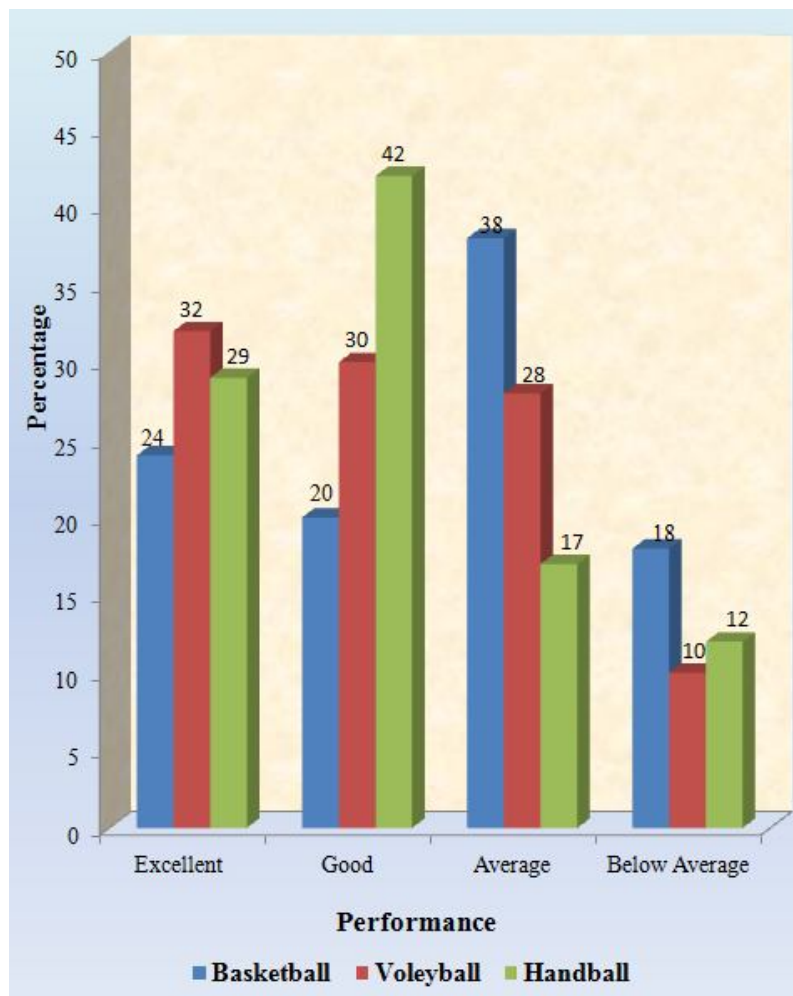


Fig -4: Comparative Assessment of somatotypes of the University level handball players

Relationships between personality factors, somatotypes and sports performance of the players

Table -5:
Relationships between personality factors and sports performance of Basketball players having different somatotypes

Personality factors	Sports performance of		
	Ectomorphs	Mesomorphs	Endomorphs
Sociability	0.685**	0.812**	0.321
Dominance	0.642**	0.756**	0.126
Extroversion	0.523*	0.648*	0.246
Conventionality	0.884**	0.596*	0.338
Self-Concept	0.612*	0.664*	0.264
Mental Toughness	0.416*	0.842**	0.423*
Emotional Stability	0.502*	0.409*	0.309

* : Significant at $p < 0.05$

** : Significant at $p < 0.01$

Above **Table-5** presents results pertaining to the relationship between personality factors and sports performance of basketball players having different somatotypes. The data shows that sports performance of Ectomorphic basketball players has strong positive relationship with the personality factors. However, notably, it is observed that Ectomorphs have strong positive relationship with Conventionality ($r^2=0.884$; $p < 0.01$), while mesomorphs have strong positive relationship with Mental Toughness ($r^2=0.842$; $p < 0.01$) and Endomorphs have positive relationship with Mental toughness ($r^2=0.423$; $p < 0.05$), but the strength of relationship was relatively weaker.

CONCLUSION

The comparative assessment of the somatotypes of the basketball, players showed that mesomorph of the basketball players appeared to have better than other somatotypes. The comparative assessment of the somatotypes of the volleyball, players showed that ectomorph of the volleyball players appeared to have better than other somatotypes. The comparative assessment of the somatotypes of the handball, players showed that mesomorph of the handball players appeared to have better than other somatotypes. The assessment of the performance of University level basketball, volleyball and handball players showed that majority of the basketball players performed averagely, volleyball players performed excellently and majority of handball players had performed good.

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