ASSESSMENT OF RELATION BETWEEN SOMATIC TRAITS AND SELECTED PHYSIOLOGICAL VARIABLES OF UNIVERSITY VOLLEYBALL PLAYERS

Sanjay Bhunia* & Dr. Lipsy John L**
* Nikhil Banga Sikshan Mahavidyalaya, Bishnupur, Bankura, West Bengal
** Department of Physical Education and Sports Science, Visva-Bharati University, Bolpur, Shantiniketan, West Bengal

Abstract:

Volleyball is one of many sports where the morphological makeup of the players affects their level of sports performance. The purpose of the study was to find out the relationship between somatic traits and physiological variables of university players. Total of 45 male (N=45) university volleyball players were selected as a subject from different university of West Bengal, age was ranges between 18-25 years. Coefficient of Correlation was calculated and level of significance was fixed at 0.05 level. After analysing the data, it was clearly observed that no significant relationship was observed between somatotype (endomorph, mesomorph and ectomorph) and physiological variables (pulse rate, BP-systolic and diastolic, respiratory rate and vital capacity), as because in all cases calculated r value is lesser than the table value or probability value is greater than 0.05 ($p<0.05$) calculated value of r. From the study's findings would helpful for future research on physiological state and its relationship to player selection based on body stature, talent identification in the game of volleyball, and the development of its training plan.

Key Words: Somatic Traits, Physiological Variable, Vital Capacity, Respiratory Rate, Blood Pressure, Endomorph, Mesomorph, Ectomorph

Introduction:

Around the world volleyball is played by millions of people it has earned a reputation as one of the most competitive sports in many nations. With 220 associated member nations, the FIVB (Federation of International Volleyball) is the largest sports association in the world. Volleyball is one of the sports where the morphological makeup of the players affects how well they perform. It was determined that volleyball players differ from the majority of other sportsmen in terms of morphological traits. In the world, volleyball is one of the most popular sports, and it played practically in every nation at varying levels of competition. Day by day the level of competition and performance also deemed as more fascinated in each country. For playing volleyball each player has requires high level of technical, tactical skills and suitable physical, physiological and anthropometric characteristics.

Sports performance is based in a complex and intricate diversity of variables which indicate directly including with physical, physiological, psychological, morphological and body stature (somatic traits) factors. Volleyball players must have great physical conditions especially related to somatic traits and physiological character. Studies on the physical and physiological characteristics of the human body to-date indicate that the morphological characteristics of athletes play vital role in success in a specific sport(Gaurav, Singh, & Singh, 2010).The somatic traits and physiological characteristics of an athlete is considered to be an important determinant of success sport, there would appear to be a tendency for individuals to gravitate towards the event to which they are anthropometrically best suited (Pradhan, 2018).

Somatotype measurements are applied based on external features of body structure and it is accepted as one of the indicators of physical body structure (Zorba, 2005). In the field of physical education and sports the most common method of determining somatotype quantity is Heath-Carter method (Koca, Ozder, & Akin, 2003).The somatic traits and physiological characteristics of an athlete is considered to be an important determinant of success in any top-level sport, there would appear to be a tendency for individuals to gravitate towards the event to which they are anthropometrically best suited. The somato typing and body composition characteristics are especially helpful in the field of physical education and sports in which the body could directly influence the biomechanics of movements and the performance's results of the athlete (Reilly, 1996). Smith and colleagues (1992) investigated physiological and performance differences between national level and university level volleyball players. So far relevant studies focused largely on the relationship between anthropometric qualities and team performance, and on the potential impact of anthropometric qualities on the efficacy of the game's skills have been largely examined (Giannopoulos, Vagenas, Noutsos, Barzouka, & Bergeles, 2017).

Volleyball players must have great physical conditions especially related to somatic traits and body composition. Studies on the physical characteristics of the human body to-date indicate that the morphological characteristics of athletes play vital role in success in a specific sport. Body height, being the most characteristic trait of volleyball players is significantly conditioned genetically (Abraham, 2014).To evaluate these physical characteristics, physiological characteristics the anthropometric measurements, parameters of the body composition such as the percent body fat (% fat) and lean body mass (LBM) and somatotypes components are often used. The recent researches show that there is a meaningful relationship between body shape and person's sport ability in a way the physical or bodily shape of strengthening runners is closer to ectomorph and the one of speed runners is close to mesomorph. The other groups like jumpers and mid-strengthening runners have a mix of ectomorph and mesomorph (Malousarisa, et al., 2008). In this context present study was to investigate the relationship between somatic traits and physiological variables of university volleyball players.

Statement of the Problem:

Purpose of the study was to find out the relationship between somatic traits and selected physiological variables of university level volleyball players.

Significance of the Study:

- To investigate the relationship with Endomorph and selected physiological variables of university volleyball players
- To find out the relationship between Mesomorph and selected physiological variables of university volleyball players
- To observe the relationship between Ectomorph and selected physiological variables of university volleyball players.

Methods and Materials:

Sample:

The present study was carried out on 45 male university volleyball players from four different universities of West Bengal, namely Visva Bharati, University of Burdwan, University of Kalyani and Jadavpur University. Their age ranging from 18 to 25 years (mean age: 21 years). Players from all three universities were participated in the East Zone Inter University Volleyball Tournaments (Men) in the year 2019-2020 and data were collected during their training camp of East Zone Inter-University Tournament. Out of 45 players, 12 players were selected from each university and only 9 players were selected from Jadavpur University. Prior to the administration of tests, a meeting was conducted with the subjects in the presence of researcher, coaches and other recorders. The requirements of the testing procedures were explained to them in detail so that there was no ambiguity in their minds regarding the assistant required of them.

Measurement of Somatic Traits:

The skinfold thickness measurements of all subjects were measured by Harpenden Skinfold Caliper to the nearest 0.1 mm. Girths were taken with a steel tape to the nearest 0.5 cm. Widths of body parts were measured by using a small Caliper. To assess the somatic traits (endomorphy, mesomorphy and ectomorphy) of positional differences among university level male volleyball players, the Heath and Carter (1990) (Carter & Heath, 1990) somatotype estimation equations were used.

Equation of Endomorphy character:

Endomorphy = 0.1451 (X) - 0.00068 (X) 2 + 0.0000014 (X) 3- 0.7182.

(Where, X = sum of supra-spinale, sub-scapular and triceps skinfold and corrected for stature by multiplying the sum ofskinfolds by 170.18/Body height in cm.)

Equation of Mesomorphy character:

Mesomorphy = (0.858 x Humerus Width) + (0.601 x Femur Width) + (0.188 x Corrected Arm Girth) + (0.161 x Corrected Calf Girth) - (Body Height x 0.131) + 4.5.

(Where, Corrected Arm Girth = Arm Girth - Biceps Skinfold, Corrected Calf Girth = Calf Girth-Calf Skinfold).

Equation of ectomorphy character:

Ectomorphy = (HWR x 0.732) - 28.58. (Where, HWR = (Body Height in cm) / (Weight in kg) 1/3).

Measurements of Physiological Variables:

Blood Pressure: Systolic and Diastolic Blood Pressure were assessed by using sphygmomanometer and stethoscope.

Pulse Rate: Pulse Rate was measured from palpate method.

Respiratory Rate: Respiratory Rate was assessed by observing the chest up and down of the subject in one minute.

Vital Capacity: Vital Capacity was measured by using dry spirometer (Base Line).

Analysis and Interpretation of Data:

A total of 45 volleyball players were selected as a subject from different university of West Bengal. Researcher selected physiological variables like Blood Pressure (Systolic and Diastolic), Pulse Rate, Respiratory Rate, Vital Capacity and Endomorph, Mesomorph and Ectomorph as Somatic Traits.To define the brief description of the study descriptive statistics was used and to determine the relationship of somatic traits with

International Journal of Engineering Research and Modern Education (IJERME)
Impact Factor: 7.018, ISSN (Online): 2455 - 4200
(www.rdmodernresearch.com) Volume 8, Issue 2, 2023

physiological variables Coefficient of Correlation was calculated and level of significance was fixed at 0.05 level.

Discussion & Findings:

Table 1: Elicit the relationship of somatic traits with physiological variables of university volleyball players

Somatic Traits		Pulse Rate	Blood Pressure Systolic	Blood Pressure Diastolic	Respiratory Rate	Vital Capacity
Endomorph	"r" value	0.141	0.061	0.232	-0.198	-0.264
	Probability	0.357	0.690	0.126	0.193	0.080
Mesomorph	"r" value	0.177	0.284	0.212	0.086	0.025
	Probability	0.244	0.059	0.162	0.574	0.870
Ectomorph	"r" value	0.012	-0.078	0.034	0.032	0.103
	Probability	0.939	0.612	0.824	0.835	0.502
N		45	45	45	45	45

From table no 1 it was clearly observed that no significant relationship was observed between somatic traits (endomorph, mesomorph and ectomorph) and physiological variables (pulse rate, BP-systolic and diastolic, respiratory rate and vital capacity), as because in all cases calculated r value is lesser than the table value or probability value is greater than 0.05.Cay et, al, (2016) defined six distinct somatotypes. Pulmonary function test (PFT) performedon different somatotypes in accordance with Kruskal-Wallis test revealed that FVC, FEV1, FEV1/FVC, PEF and FEF25-75 values are not affected by somatotype ($p > 0.05$) which may support the findings of this study to some extent. Alfredo and Silvia (2019) in their research findings in somatotype VO2 max depends on percentage of body fat and of muscle in the fat free mass which related to the relation with physiological condition of players.

Conclusion:

So far as the study it was conclude that, there is no significant relationship between somatic traits (endomorph, mesomorph and ectomorph) and selected physiological variables of university volleyball players.

Conflicts of Interest:

The author declares no conflict of interest for the study

References:

1. Abraham, B. (2014). Relationship Of Somatic Traits and Body Composition Among Volleyball Players and Controls. Golden Research Thoughts, 1-4.
2. Carter, J. E., & Heath, B. H. (1990). Somatotyping: Development and Applications. Cambridge: Cambridge University Press.
3. Clarke, H. H., Irving, R. N., & Health, B. H. (1961). Relation of Maturity, Structural and Strength Measures to the Somatotype of boys 9 through 15 years of age. Research Quaterly, 32:449.
4. Gaurav, V., Singh, M., & Singh, S. (2010). Anthropomeric characteristics, Somatotyping and Body Composiion of Volleyball and Basketball Players. Journal of Physical Education and Sports management, 28-32.
5. Giannopoulos, N., Vagenas, G., Noutsos, K., Barzouka, K., & Bergeles, N. (2017). Somatotype, Level of Competition, and Performance in Attack in Elite Male Volleyball. Journal of Human Kinetics, 131-140.
6. Koca, B., Ozder, A. G., & Akin, G. (2003). The Somatotypical Properties of the Footballers of Different Categories. J. Anthropol, 15.
7. Malousarisa, G., Bergelssan, Barzouka, Bayiosai, G, N., & Koskoloum. (2008). Somatotype, Size and Body Composition of Competitive Female Volleyball players. J Sci Med Sport, 377-344.
8. Morton, A. R. (1967). Comparison of Sheldons Trunk Index and Anthropometric Method of Somatotyping and their Relationship to the Maturity, Stracture and Motor Ability of 19-16 Years of Age. Dissertation Abstracts International, 25:16.
9. Pradhan, K. (2018). Somatic Trait and Body Composition Profiles of All India Inter University Fotball Players. Indian journal Of Research in Multi-Disciplinary Studies, 45-57.
10. Reilly, T. (1996). The Science of Training Soccer. London and Newyork: Poutledge Taylorand Feancis Group.
11. Zorba, E. (2005). Methods of Measurement for Body Structure and Coping with Obesity. Istanbul: Morpa Culture Publictio.
12. Araujo, A. O., & Rocha-Rodrigues, S. (2019). Association Between Somatotype Profile and Health-Related Physical Fitness in Special Police Unit. American College of Occupational and Environmental Medicine, 51-55.