

THE AFFILIATION BETWEEN ATHLETE'S PHYSIOLOGICAL AND ANTHROPOMETRICAL PARAMETERS AND ITS ROLE IN PERFORMANCE OF MALE BADMINTON COMPETITORS

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ABSTRACT

The crucial apprehension of high level of performance in sports is the final performance whether it is during training or sports competition. The ultimate result relies on intricacy of factors. Level of performance can be improved if the physical educationist and coaches more inclusively understand the anatomy and working of skeletal muscles. It can be examined by reviewing the size; shape and form of athlete's body and for this rationale, a series of preferred anthropometric dimensions and physiological parameters of athletes are measured. The affiliation among any two parameters can play a helpful role in performance. Several aspects are responsible for the performance of badminton players. Basic skills of badminton such as various types of serves, loops and lobs, smashing and blocking, involves a particular type of physique having specific proportions with specified provisional capabilities, observed in physiological variables for instance vital capacities, heart rate, blood pressure and breathing frequency at rest.

The aim of this study is to evaluate the measurements and proportions of the human body (anthropometry) and physiological diversities in various degrees performance among male badminton players belonging to District Hyderabad Sindh. Every now and then Physical Educators and trainers are involved with team assortment plus the coaching and scientific training of athletes for competitions. Their job requires a relevant understanding of the sport concerned and in addition to the techniques and strategy concerning that game and an insight of the anthropometrical and physiological differences which materialize the basis of good techniques and tactics. The study will be of significance in tendering awareness in the domain of Badminton.

For present study National and all Pakistan Intervarsity level players were considered as High level competitors while District, Region and Collegiate level Players were considered as Low level competitors A total of 20 subjects (10 from each category that is high & low level Badminton competitors) were selected randomly.

Anthropometrical measures, body Indices and physiological considerations such as blood pressure, vital capacity, heart rate and resting breathing frequency were measured to evaluate the study variables.

Present research observed that top level badminton competitors were greater than bottom level badminton competitors in mass, forearm, leg and foot length, biceps and calf muscle girth, vital capacity and mesomorphy whereas bottom level badminton competitors were bigger in lengthwise measurement of hand, shoulder girth, hip girth, biceps skin fold, heart rate, diastolic and systolic blood pressure, breathing frequency at rest, sitting height - height index, thigh, lower and upper leg length indices, upper and lower arm length indices, hip width - stature, shoulder width - stature and hand length-wrist width indices, whereas in rest of the variables, the differences were insignificant.

Introduction:

The body physique varies in a numerous ways which can be explored by reviewing the mesomorphological study of an individual, (Atkin, 1991). A faction of chosen anthropometric dimensions and physiological considerations are evaluated for intended rationale, (Eston and Reily 1996). The associations are made to recognize the body physique idiosyncrasies of a populace. This mesomorphological study of an athlete provides potential estimation of fat distribution and muscle and bone development. It is more significant among athletes and sportsmen where the physical fitness has a fundamental role to play in the competitive sports, (Charles 1983).

Physical Education teachers and coaches are concerned at times with team selections as

well as the training and preparation of the player for competitions. Their job as such demands a pertinent knowledge of the game concerned as well as the techniques and tactics in relation to that game along with an understanding of the anthropometrical and physiological variables, which form the basis of good techniques and tactics, (Astrand and Rodahl 1986).

The knowledge of anthropometrical measures grants an opportunity to assess whether sports competitors interested in specific sports differs with respect to their relationship with certain well defined parameters (Connors and Morgan 1991). The Body form and figure have been judged in terms of indices. Regression links in several preferred dimensions are demonstrated to identify the extent of relationship of different parts of

body. Association among any two constraints possibly will have a helpful role in performance, such as, proportionately larger upper limb length play a positive role in discus throwers (Dyson, 1963).

Thus it demonstrates that anthropometrical measures of athletes have a noteworthy role in the performance of sportsmen (Atkin, 1991). Badminton player's performance depends on various aspects for instance basic expertise of badminton like various types of service such as high and low service, drive and flick service, lobs, loops, smash and block, needs a particular sort of body form and figure having identifiable proportions with specific provisional capacity. (Len Wright, 1972 and Davis, 1984), which can be spotted in physiological measures such as vital capacity, heart rate, blood pressure and resting breathing frequency, (Davis, Pat 1984). The aim of study is to evaluate the anthropometrical and physiological variations among top and bottom level male Badminton competitors of Sindh.

Every now and then Physical Educators and trainers are involved with team assortment plus the coaching and scientific training of athletes for competitions (Barry and Jack 1928). Their job requires a relevant understanding of the sport concerned and in addition to the techniques and strategy concerning that game and an insight of the anthropometrical and physiological differences which materialize the basis of good techniques and tactics, (Bryant and Cratty 1968) The study will be of significance in tendering awareness in the domain of Badminton and it will assist in imparting the physical educationists and coaches of the physical fitness and physiological inconsistencies and moreover it will be valuable for selection of players for badminton and help out in organizing scientific based training programs, (Carter, 1990) It also offer criteria for catch them early and coach them early idea of promising badminton players.

Modern sport cannot develop further without direct scientific assistance provided by

various scientific disciplines. Structural assessment is one form of help that anthropometry can offer. Structural assessment aims to identify individual traits on relation to their segmental length, breath proportion, body composition and other relevant physiological traits, (Groppel and Roetert, 1992). Structural assessment has been used now in the selection of athletes and also serves as a tool to spot inherited gifted individual with potential physical requirements of the game. In recent year's scientist have become increasingly interested in assessing the structure of athletes. There has been a general promise that athlete's possess unique and definable personality characteristic. Various scientists had gained increasing amount of accurate evidence to relate general athletic ability with dimensions of structure. (Kreighbavm and Ktharine 1985). "In sports where body weight has to be lifted repeatedly against gravity, such as in badminton, extra mass in the form of fat would be disadvantageous. Height does not seem to be a determinant of success in badminton as most adult

players are taller than the top of the badminton net which is 1.52 to 1.55 meters from the floor, (Reilly et al., 1990). The physical requirements of racquet sports demand efficiency in a number of fitness components. To be able to execute advance strokes or compete effectively against progressively stronger opponents, a player would need to develop higher levels of the basic physical qualities, such as strength, power, muscular endurance, flexibility, coordination and agility, (Katch, et al., 2006).

METHODOLOGY

Sample of study:

For present study National and all Pakistan Intervarsity level players are regarded as top level competitors while District, Region and Collegiate level Players are considered as bottom level badminton competitors. Considering the objectives of the research a total of 20 subjects were selected randomly for study purpose (10 subjects from each category that is top and bottom level Badminton competitors) from District Hyderabad of Sindh province.

Tools for data collection:

Surveys were conducted and badminton players of the two categories were approached through coaches and managers of participating teams to analyze anthropometrical and physiological considerations which are as under.

1. Stature
 2. Sitting height
 3. Weight
 4. Lower arm length
 5. Upper arm length
 6. Hand length
 7. Total arm length
 8. Upper leg length
 9. Lower leg length
 10. Humerus bi - epicondylar
 11. Femur bi - epicondylar
 12. Wrist width
 13. Biceps muscle girth
 14. Thigh muscle girth
 15. Calf muscle girth
 16. Shoulder width
 17. Hip width
 18. Biceps skin fold
 19. Triceps skin fold
 20. Supra - iliac skin fold
 21. Sub - scapular skin fold
 22. Calf skin fold
 23. Foot length
- (Somatotype (Heath and Carter 1990))

Body Indices

1. Sitting height - stature index
2. Ponderal index
3. Upper arm length - lower arm length index
4. Hip width - stature index
5. Thigh length-lower leg length
6. Shoulder width-stature index
7. Hand length - wrist width index
8. Arm length-leg length index

(Body Composition (Durnin and Womerslev 1974))

Physiological Variables

1. Blood Pressure
2. Vital capacity
3. Heart rate
4. Resting breathing frequency

The data collected from the study was analyzed by using SPSS version 15. Descriptive statistics like measurement of central tendency and measurement of dispersion (such as percentage, mean, and standard deviation) was utilized to describe the data. Z - test at significance value 0.05 was applied to obtain the significant difference between the listed delimited variables of top and bottom level badminton competitors. The significance value at 0.05 was considered as an independent variable.

RESULTS:

Table 1
Anthropometrical considerations of top and bottom
Level Badminton Competitors

Anthropometrical Variables	High Performance Badminton Players		Low Performance Badminton Players		Obtained Value Z - Test
	Mean	Standard Deviation	Mean	Standard Deviation	
Weight	64.87	7.07	61.89	6.92	2.13
Stature	173.10	5.94	171.68	5.21	1.27
Sitting Height	88.79	3.13	89.85	3.61	1.57
Upper Arm Length	34.68	1.81	34.46	1.84	0.59
Lower Arm Length	27.99	1.35	27.20	1.32	2.95
Hand Length	18.77	0.65	19.19	0.90	2.66
Total Arm Length	72.46	3.20	71.96	3.78	0.71
Upper Leg Length	49.82	2.83	49.13	2.64	1.26
Lower Leg Length	45.16	3.24	42.12	2.86	4.97
Foot Length	26.03	1.17	25.46	1.24	2.37
Shoulder Width	41.88	2.31	43.70	2.16	4.07
Hip Width	27.14	1.70	29.16	1.52	6.28
Humerus Bi - Epicondylar	6.61	0.42	6.60	0.44	0.14
Femur Bi - Epicondylar	8.59	0.38	8.66	0.53	0.75
Wrist Width	5.48	0.22	5.40	0.39	1.24
Biceps Muscles Girth	29.68	2.40	27.80	2.56	3.79
Calf Muscle Girth	34.88	1.93	33.30	2.38	3.65
Thigh Muscle Girth	49.55	3.44	49.81	4.04	0.34
Biceps Skin Fold	3.42	1.01	4.03	1.77	2.14
Tricep Skin Fold	7.44	2.53	8.36	3.62	1.47
Supra - Iliac Skin Fold	8.33	4.88	9.13	4.32	0.88
Sub - Scapular Skin Fold	9.50	2.66	9.56	3.14	0.10
Calf Skin Fold	8.83	3.47	8.68	3.57	0.22

Table 2
Physiological parameters of top and bottom
Level Badminton Competitors

Physiological Variables	High Performance Badminton Players		Low Performance Badminton Players		Obtained Value Z - Test
	Mean	Standard Deviation	Mean	Standard Deviation	
Heart Rate	67.38	10.58	72.56	10.18	2.49
Blood Pressure Systolic	108.10	11.06	118.02	10.46	4.61
Blood Pressure Diastolic	72.82	10.94	79.46	9.25	3.28
Vital Capacity	6120	530.88	5798	622.20	2.78
Resting Breathing Frequency	19.44	3.70	23.60	5.43	4.48
Body Composition	12.20	3.72	12.85	3.79	0.87

Table 3
Body Indices of top and bottom level badminton competitors

Body Indices	High Performance Badminton Players		Low Performance Badminton Players		Obtained Value Z - Test
	Mean	Standard Deviation	Mean	Standard Deviation	
Sitting Height - Stature Index	51.31	1.38	52.34	1.46	3.62
Ponderal Index	43.16	1.33	43.50	1.61	1.14
Thigh Length - Lower Leg Length Index	110.69	7.66	117.02	7.88	4.08
Upper Arm - Lower Arm Length Index	124.02	5.82	126.83	6.33	2.31
Hip Width - Stature Index	15.68	0.91	17.00	0.88	7.35
Shoulder Width - Stature Index	24.21	1.37	25.46	1.12	4.98
Hand Length - Wrist Width Index	343.30	17.44	357.24	29.76	2.86
Arm Length - Leg Length Index	81.94	3.97	82.49	12.43	0.03

DISCUSSION:

Various studies having precise relevance with present study are mentioned below:

Hector (1994) examined the physiological factors of selected college level male players of badminton and observed significant differences in intensity percentage, distance covered, playing time and number of shots played between the high and low level groups which is also relevant with our study.

(Khayankeashi 1998) carried out correlation research on male athletes between hip width, leg strength, and BMI to the overall movement response duration and discover that obtained association was low and not significant apart from leg length

(Joseph 1983) examine the affiliation of power ability, flexibility and dimensions of body parts to volleyball performance capacity of thirty volleyball competitors and observe that strength was the major reliable lone variable in calculating playing capacity while Flexibility and agility showed insignificant

relationship to playing ability. Leg and arm length and also were consistent.

(Astrand and Rodahl 1986) carried out a study to investigate the association of body indices and abdominal power, to standing broad jump of male students of college level and observed that there was a significant link between above mentioned variables.

CONCLUSION:

Our study concluded that top level badminton competitors were greater in mass, arm, leg and foot length, biceps muscle and calf muscle girth, vital capacity, mesomorphy than bottom level badminton competitors whereas bottom level badminton competitors were greater in hand length, shoulder and hip width, biceps skin fold, heart rate, systolic and diastolic blood pressure, resting breathing frequency, sitting height - stature index, thigh length - lower leg length index, upper arm - lower arm length index, hip width - stature index, shoulder width - statue index and hand length-wrist width index.

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