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Association with selected performance variables influence over speed, and cardio respiratory endurance in athletics

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Abstract

To select athletes of different body types the investigator gathered 60 athletes from different areas, from different colleges of Andhra Pradesh. The body type was determined based on anthropometric measurements consists of objective measurements of structure such as Weight, Height. Chest measurement, Shoulder leg and hand length, girth, thigh and calf muscles measurements and fat content. These men athletes were divided into three groups of twenty each Endomorph, twenty mesomorph, and twenty Ectomorph on the basis of morphological characteristics put forward by Sheldon and others taking into consideration of height, weight, fat content of the individual and also by subjective judgment. The endarorphs are characterised by soft, roundness with prominence of the digestive viscera. No muscle definition, smooth skin, large head, short neck, prominent abdomen and thorax. The mesonorphs are characterised by predominance of muscles and bones, thick coarse skin, hair, broad shoulders etcetera. And the ectonorphs are characterised by long slender limbs, neck and trunk, prominent ribs and small abdomen. After classification of the athletes based on their body types, performance variables selected for this study were administered among all the athletes selected through standard tests for this purpose. To find out the association between specific body types and their performance variables, Pearson Coefficient Correlation was computed and association between body type and performance variables were found out. In all cases 0.05 level was fixed to test the hypothesis of this study.

Keywords: anthropometric measurements

Introduction

The association of certain body builds with personality and behavioral patterns, health problems and physical performance has long been recognized. Most of us have rather stereotyped notions of what the typical fat person is like, the skinny person, and the person who is “all muscle”. This concept that a man behaves as he does because of what he represents the foundation of somatotyping.

A number of studies have proved that body build is basic as frame work of reference to intercept health, types of physical fitness, Performance and personality characteristics of athletes.

Need of the Study

Athlete’s performance variable including sprinting is a demanding physical activity which involves high-speed running over short distances. It can help improve speed, flexibility and cardio respiratory conditioning. Flexibility and cardio respiratory conditioning are two of the most important fitness requirements for athletes. It is very important to properly warm-up and stretch before athletic action.

An athlete must have very fast reaction time, a high percentage of white, fast-twitching muscle fibre, enormous explosive muscle power in his legs and arms to accelerate from zero to 43 km/h in less than eight seconds, huge muscle power to a shift 70 kg per second, extremely strong core muscles for good balance and posture, and a very good sense of rhythm The researcher is interested to find out association between different types of body on selected performance variables of athletes. For this purpose, the investigator selected body types of athletes, such as, Endomorph, Mesomorphy abd Ectomorphy and performance variables, speed, and cardio respiratory endurance.

Objectives of the Study

The objectives of this study were as follows:

a. To select collegiate level athletes of runners, jumpers and throwers and classify them according to the body type they possess namely, Endomorph, Mesomorphy abd Ectomorphy.
b. To measure the performance variables of athletes, namely, speed, and cardio respiratory endurance.
c. To find out the differences if any existed among athletes of different body types on selected performance variables.
d. To find out the association between different type of body with selected performance variables of athletes.

Statement of the Problem

The study relates to whether the different body types have any significant association with selected performance variables influence over speed, and cardio respiratory endurance in athletics.

Hypothesis

It was hypothesized that there would be no significant association between mesomorph body type athletes whose height was less than 165 cms with selected performance variables speed, and cardiovascular endurance.

- It was hypothesized that there would be no significant

association between ectomorph body type athletes whose height was less than 165 cms with selected performance variables speed, and cardiovascular endurance.

- It was hypothesized that there would be no significant association between endomorph body type athletes whose height was less than 165 cms with selected performance variables speed, and cardiovascular endurance.
- It was hypothesized that there would be no significant association between mesomorph body type athletes whose height was more than 165 cms with selected performance variables speed, and cardiovascular endurance.
- It was hypothesized that there would be no significant association between ectomorph body type athletes whose height was more than 165 cms with selected performance variables speed, and cardiovascular endurance.
- It was hypothesized that there would be no significant association between endomorph body type athletes whose height was more than 165 cms with selected performance variables speed, and cardiovascular endurance.

Significance of this Study

It gives enough scope for the coaches to find out which of the body types namely, endomorph, mesomorph and ectomorph have greater influence on selected performance variables speed and cardiorespiratory endurance in relation to athletic performance.

- The study will help to classify athletes according to their body types.
- The study would further helpful to find out the differences if any existed between different body types on performance variables speed, and cardiorespiratory endurance.
- This helps the physical education personnel and coaches to give a clear guideline to select athletes for different athletic events according to their body types.

Delimitations

The study is confined to 90 among which 45 were less than 165 cms height consisting of 15 mesomorph, 15 ectomorph and 15 endomorph and 45 were more than 165 cms height consisting of 15 mesomorph, 15 ectomorph and 15 endomorph and 45 inter collegiate level athletes from different disciplines of different colleges in Andhra Pradesh.

- The athletes of different body types were in the age group from 18 to 24.
- For this study athletic performance variables speed, and cardiorespiratory endurance were selected.
- John Quinn (2017)'s classification of body types, namely, endomorph, mesomorph and ectomorph for athletes' height less than 165 cms and athletes height of more than 165 cms, have been used to determine different body types of the subjects.

Limitations: The Investigation is Limited in The Following Respects.

The different body types namely endomorph, ectomorph and mesomorph is done only by subjective judgement depending on the morphological characteristics such as height, weight and fat content of the individual.

Methodology

Selection of Subjects

The sample taken for the present study were 90 male athletes from different colleges of Andhra Pradesh consisting of thirty of endomorph body type, further 15 of athletes of less than 165 cm and 15 of athletes of more than 165 cms thirty of ectomorph athletes consisting of 15 athletes of less than 165 cm and 15 of more than 165 cm and thirty mesomorph consisting of 15 of less than 165 cm and 15 of more than 165 cms The average age of the subjects ranged from 18 -24 years.

Selection of Variables

The purpose of the study was to find out the association of different body types on selected performance variables of athletes. For this purpose, the investigator based on Experience gained through review of related literature and with the guidance of the experts and guide the following variables were selected.

Body Types

1. 30 athletes of endomorph body type consisting of 15 less than 165 and 15 more than 165 cms
2. 30 Athletes of mesomorph body type consisting of 15 less than 165 and 15 more than 165 cms
3. 30 Athletes of ectomorph body type consisting of 15 less than 165 and 15 more than 165 cms

Performance Variables

1. Speed
2. Cardiorespiratory Endurance

Research Design

To select athletes of different body types the investigator gathered 60 athletes from different areas, from different colleges of Andhra Pradesh. The body type was determined based on anthropometric measurements consists of objective measurements of structure such as Weight, Height. Chest measurement, Shoulder leg and hand length, girth, thigh and calf muscles measurements and fat content. These men athletes were divided into three groups of twenty each Endomorph, twenty mesomorph, and twenty Ectomorph on the basis of morphological characteristics put forward by Sheldon and others taking into consideration of height, weight, fat content of the individual and also by subjective judgment. The end arorphs are characterised by soft, roundness with prominence of the digestive viscera. No muscle definition, smooth skin, large head, short neck, prominent abdomen and thorax. The mesonorphs are characterised by predominance of muscles and bones, thick coarse skin, hair, broad shoulders etcetera. And the ectonorphs are characterised by long slender limbs, neck and trunk, prominent ribs and small abdomen. After classification of the athletes based on their body types, performance variables selected for this study were administered among all the athletes selected through standard tests for this purpose. To find out the association between specific body types and their performance variables, Pearson Coefficient Correlation was computed and association between body type and performance

variables were found out. In all cases 0.05 level was fixed to test the hypothesis of this study.

Selection of Performance Variables

The performance variables and the tests selected were presented in Table I.

Table 1: Showing the Performance variables selected, Tests and Units of Measure

S.No	Variables	Tests	Units of Measure
1	Speed	50 M Sprint	Seconds
2	Cardiorespiratory Endurance	12 Min Run/Walk	Meters

Statistical Analysis

It was suggested to statistically analysed by one way ANOVA to find out whether there was any significant difference among different body types of athletes on performance variables, speed, agility, explosive leg power, reaction time, muscular endurance and cardiovascular endurance To compare the association between different body types and the performance of athletes Pearson Correlation Coefficient was calculated.

Results and Discussions

Association of different body types of athletes with height less than 165 CMS.

Association of Different Body Types with Performance Variable Speed

The results presented in Table III shows the descriptive statistics of different body types, namely, mesomorph, ectomocrph and entomorph of athletes with height less than 164 cms on performance variable Speed.

Table 2: Descriptive Statistics on Performance Variable Speed of Different Body Types of Athletes with Height Less Than 165 Cms

S.No	Body Type	N	Mean	Standard Deviation	Minimum	Maximum
1	Mesomorph	15	7.04	0.22	6.78	7.38
2	Ectomorph	15	6.92	0.16	6.69	7.22
3	Endomorph	15	7.16	0.20	6.87	7.37

The descriptive statistics presented in Table III shows that the performance variable Speed mean for mesomorph body type was 7.04 seconds with standard deviation $\pm$ 0.22 and the minimum 6.78and maximum of 7.38; ectomorph body type mean was 6.92 seconds with seconds with standard deviation $\pm$ 0.16 and the minimum 6.69and maximum of 7.22; and endomorph body type mean was 7.16 seconds with seconds with standard deviation $\pm$ 0.20 and the minimum 6.87 and maximum of 7.37.

The obtained mean scores on performance variable Speed among mesomorph, ectomorph and endomorph body type athletes was presented through bar diagram in Figure I for better understanding of the results presented in Table Speed.

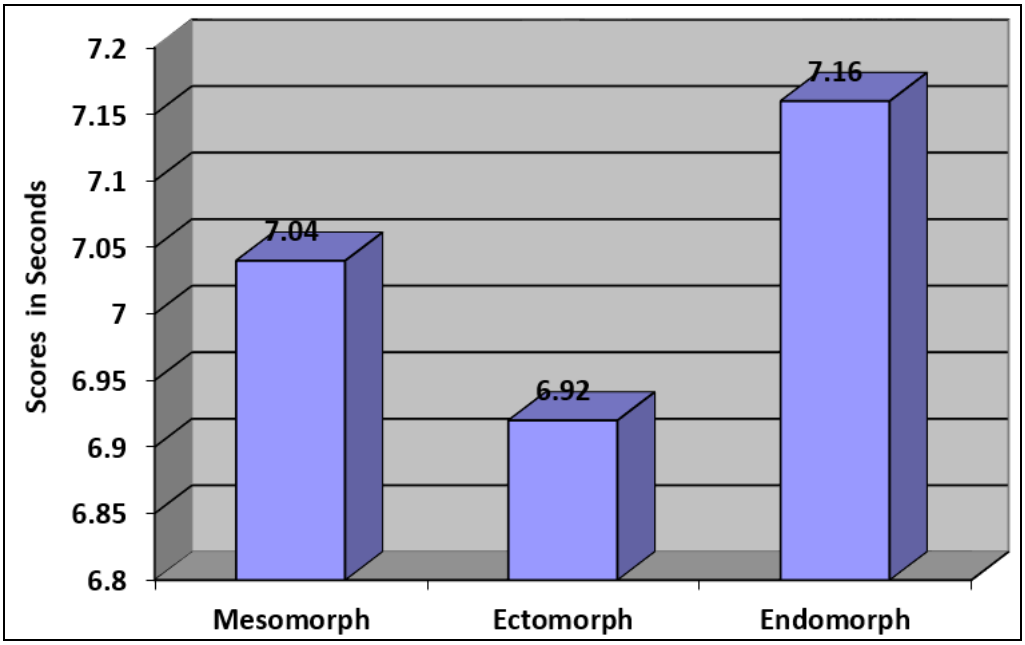

Fig 1: Bar Diagram Showing the Means of Performance Variable Speed among Different Body Types

The association of different body types of athletes on performance variable Speed was examined through statistical analysis Pearson Correlation Coefficient. The body types of athletes were classified among athletes of less than 165 cms and their wrist measurements. The results presented in Table IV shows the results on performance variable Speed.

Table 3: Association between different body types on performance variable speed among athletes with height less than 165 cms.

S.No	Body Type	N	Wrist Measurement Mean	Performance Variable Mean	Obtained 'r'
1	Mesomorph	15	16.57	7.04	-0.557*
2	Ecotomorph	15	15.31	6.92	0.375
4	Entomorph	15	17.89	7.16	0.217

Significant at 0.05 level

The results presented in Table IV proved that there was significant association between mesomorph body type athletes with less than 165 cms with performance variable Speed as the obtained 'r' value of -0.557was greater than the required 'r' value of 0.49 to be significant at 0.05.

The association between ectomorph athletes with less than 165 cms with performance variable Speed 0.375 and entomorph athletes 0.217 weres not significant as the obtained 'r' value was less than the required 'r' value to be significant.

The bar diagram presented in Figure II shows that the comparison obtained 'r' values between different body types with performance variable Speed.

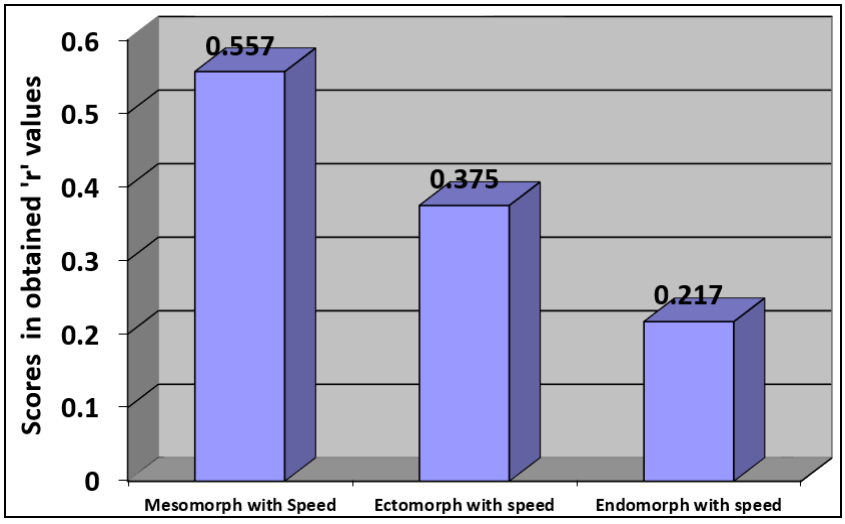

Fig 2: bar diagram showing obtained 'r' value on association between different body types with performance variable speed

Association of Different Body Types with performance Variable Cardiorespiratory endurance : The results presented in Table V shows the descriptive statistics of different body types, namely, mesomorph, ectomocrph and entomorph of athletes with height less than 164 cms on performance variable Cardiorespiratory endurance.

Table 4: descriptive statistics on performance variable cardiorespiratory endurance of different body Types of athletes with height less than 165 cms

S.No	Body Type	N	Mean	Standard Deviation	Minimum	Maximum
1	Mesomorph	15	2396.67	203.19	2120	2740
2	Ectomorph	15	2293.67	272.36	1720	2800
3	Endomorph	15	2385.33	162.42	2200	2765

The descriptive statistics presented in Table V shows that the performance variable Cardiorespiratory endurance mean for mesomorph body type was 2396.67 seconds with standard deviation $\pm$ 203.19 and the minimum 2120and maximum of 2740; ectomorph body type mean was 2293.67 seconds with seconds with standard deviation $\pm$ 272.36 and the minimum 1720and maximum of 2800; and endomorph body type mean was 2385.33 seconds with seconds with standard deviation $\pm$ 162.42 and the minimum 2200 and maximum of 2765.

The obtained mean scores on performance variable Cardiorespiratory endurance among mesomorph, ectomorph and endomorph body type athletes was presented through bar diagram in Figure III for better understanding of the results presented in Table Cardiorespiratory endurance.

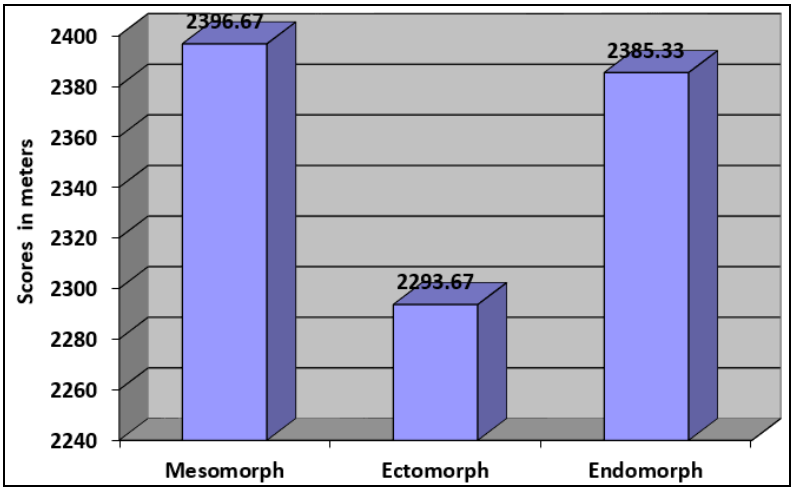

Fig 3: Bar diagram showing the means of performance variable cardiorespiratory endurance among different body types

The association of different body types of athletes on performance variable Cardiorespiratory endurance was examined through statistical analysis Pearson Correlation Coefficient. The body types of athletes were classified

among athletes of less than 165 cms and their wrist measurements. The results presented in Table VII shows the results on performance variable Cardiorespiratory endurance.

Table 5: association between different body type on performance variable cardiorespiratory endurance among athletes with height less than 165 cms.

S.No	Body Type	N	Wrist Measurement Mean	Performance Variable Mean	Obtained 'r'
1	Mesomorph	15	16.57	2396.67	0.069
2	Ecotomorph	15	15.31	2293.67	0.436
4	Entomorph	15	17.89	2385.33	-0.342

Not Significant

The results presented in Table VII proved that there were insignificant association between mesomorph, ectomorph and endomorph body type athletes with less than 165 cms with performance variable Cardiorespiratory endurance as the obtained 'r' value of 0.069, 0.436 and -/342 were lessern than the required 'r' value of 0.21 to be significant at 0.05. The bar diagram presented in Figure IV shows that the comparison obtained 'r' values between different body types with performance variable Cardiorespiratory endurance.

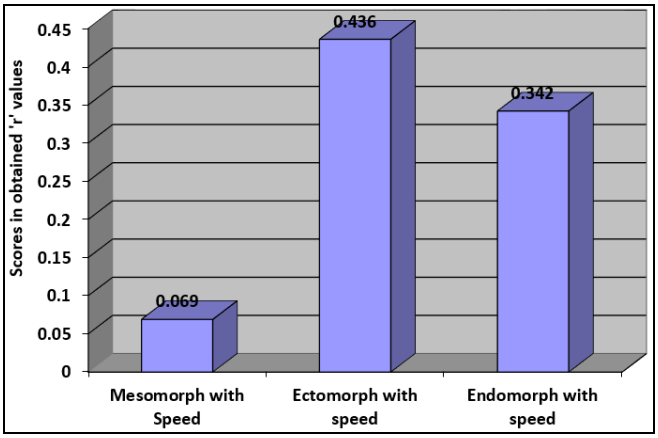

Fig 4: Bar Diagram Showing Obtained 'R' Value on Association between Different Body Types with Performance Variable Cardiorespiratory Endurance

Association of Different Body Types of Athletes with Height more than 165 CMS.

Association of Different Body Types with performance Variable Speed

The results presented in Table VIII shows the descriptive statistics of different body types, namely, mesomorph, ectomocrph and entomorph of athletes with height less than 164 cms on performance variable Speed.

Table 6: Descriptive statistics on performance variable speed of different body types of athletes with height more than 165 cms

S.No	Body Type	N	Mean	Standard Deviation	Minimum	Maximum
1	Mesomorph	15	7.09	0.17	6.89	7.39
2	Ectomorph	15	7.01	0.21	6.54	7.31
3	Endomorph	15	7.09	0.18	6.82	7.42

The descriptive statistics presented in Table XVII shows that the performance variable Speed mean for mesomorph body type was 7.09 seconds with standard deviation $\pm$ 0.17 and the minimum 6.89and maximum of 7.39; ectomorph body type mean was 7.01 seconds with seconds with standard deviation $\pm$ 0.21 and the minimum 6.54and maximum of 7.31; and endomorph body type mean was 7.09 seconds with seconds with standard deviation $\pm$ 0.18 and the minimum 6.82 and maximum of 7.42.

The obtained mean scores on performance variable Speed among mesomorph, ectomorph and endomorph body type athletes was presented through bar diagram in Figure V for better understanding of the results presented in Table Speed.

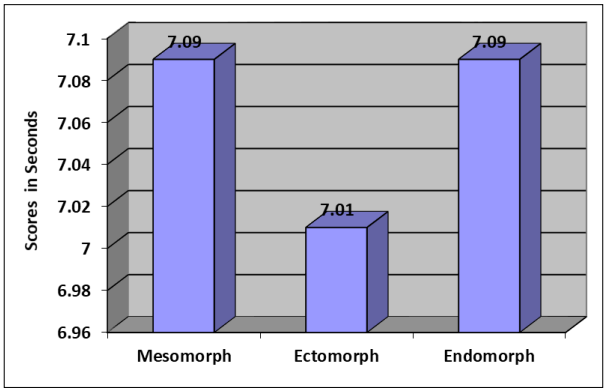

Fig 5: bar diagram showing the means of performance variable speed among different body types

The association of different body types of athletes on performance variable Speed was examined through statistical analysis Pearson Correlation Coefficient. The body types of athletes were classified among athletes of more than 165 cms and their wrist measurements. The results presented in Table IX shows the results on performance variable Speed.

Table 7: Association between different Body types on performance variable speed among athletes with height more Than 165 cms.

S.No	Body Type	N	Wrist Measurement Mean	Performance Variable Mean	Obtained 'r'
1	Mesomorph	15	16.57	7.09	0.050
2	Ecotomorph	15	15.31	7.01	0.555*
4	Entomorph	15	17.89	7.09	0.279

Significant at 0.05 level

The results presented in Table IX proved that there was significant association between ectomorph body type athletes with more than 165 cms with performance variable Speed as the obtained 'r' value of 0.555 was greater than the required 'r' value of 0.21 to be significant at 0.05.

The association between mesomorph and ectomorph athletes with more than 165 cms with Perfomance variable Speed 0.0.50 and 0.279 were not significant as the obtained 'r' value was less than the required 'r' value to be significant.

The bar diagram presented in Figure VI shows that the comparison obtained 'r' values between different body types with performance variable Speed.

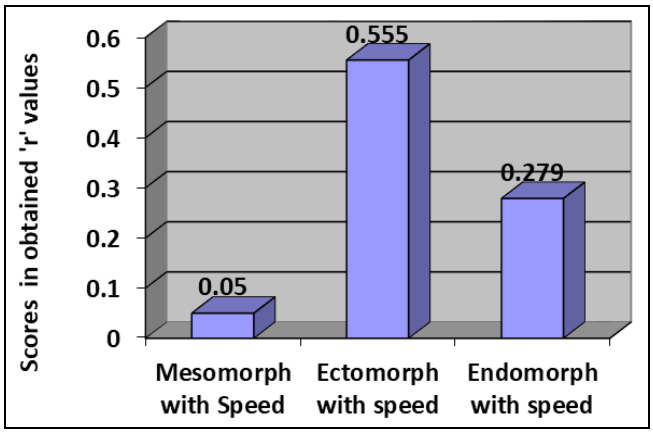

Fig 6: bar diagram showing obtained 'r' value on association between different body types with performance variable speed

Association of Different Body Types with performance Variable Cardiorespiratory endurance

The results presented in Table X shows the descriptive statistics of different body types, namely, mesomorph, ectomocrph and entomorph of athletes with height less than 164 cms on performance variable Cardiorespiratory endurance.

Conclusions

Within the limitation and delimitation of the study, the following conclusions were drawn in this study.

1. It was concluded that among athletes of height less than 165 cms, proved that performance variables, speed, were significantly associated with mesomorph body type athletes and there was insignificant association between mesomorph body type athletes of height less than 165 cms on performance variables, cardiovascular endurance.
2. It was concluded that there was significant association between ectomorph body type athletes whose height was less than 165 cms with performance variable, while there were insignificant relationship with other performance variables, such as, speed, and cardiovascular endurance.
3. It was concluded that insignificant association between endomorph body type athletes with height of less than 165 cms with performance variables speed, and cardiovascular endurance as the obtained 'r' values were lesser than the Required 'T' value to be significant at 0.05 level.
4. It was concluded that among athletes of height more than 165 cms, proved that performance variables, were significantly associated with mesomorph body type athletes and there was insignificant association between mesomorph body type athletes of height more than 165 cms on performance variables, speed and cardiovascular endurance.
5. It was concluded that insignificant association between endomorph body type athletes with height of more than 165 cms with performance variables speed and cardiovascular endurance as the obtained 'r' values were lesser than the required 'T' value to be significant at 0.05 level.

Recommendations

The findings of this study proved that there were significant association between mesomorph athletes and selected performance variables, than ectomorph and endomorph athletes. In view of the findings of this study, the following recommendations are made.

1. While selecting athletes for particular discipline in athletics, the findings of this study may be considered that athletes with such body types can be selected and trained for optimum level of achievements.
2. The athletes may try to gain suitable body types that suits to specific athletic events as found in this study.
3. In view of the findings of this study, weight management education may be imparted to the athletes so that they could attain the desirable level of body types suited to their athletic events.

References

1. Arlott J. Oxford Companion to Sports and Games, London, 1975.
2. Bompa T. Periodization Training for Sports. Human Kinetics: Champaign, IL, 1999.
3. Carl E Klaps, Daniel D Amebin. Modern Principles of Athletic training, (Saint Louis: The C.V. Mosby Company, 1969), 1969, 64.
4. Carlton R Mayer. Measurement in Evaluation (New York: Ronald Press Company, 1974), 1974, 3-5.
5. Charles A Bucher. Foundations of Physical Education, (Seventh Edition, C.V.Mosby Company Saint Louis, 1971,), 1971, 241-242.
6. Charles Harold Mc Clay, Norman Dorothy Yough, Tests and Measurements in Health and Physical Education (3rd ed) (New York: Appleton Century Crafts, Inc.), 1966.

7. Clayne R Jenson, A Garth Fisher, Scientific Basis of Athletic Conditioning, (Philadelphia: Lea and Febiger, 1979), 1979, 214.