

The Relationship between Body Shape and 60 Meter Running Speed

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Abstract—This descriptive study aims to investigate the association between body shape and 60-meter running speed. The population of the research was all students of SMA Negeri 2 in Jeneponto regency with the samples of 40 male students chosen randomly. Data were analyzed using percentage, correlation, and regression analysis technique. The results of the study show that 1) the average body shape of the students is mesomorphy; 2) the running speed of the students is categorized into moderate level, and 3) there is a significant relationship between body structure and 60 running speed of the students with the ρ value 0.618 ($P < 0.05$ with the R Squared value 0.382 and the F value 23.53 ($P < 0.05$).

Keywords—body shape, running speed, sport

I. INTRODUCTION

Sport is a physical activity that influences the development of a person's personality. Besides, sports are efforts to encourage, to develop and to foster physical and spiritual strength. Considering the importance of sports activities, the government included sports activities in schools starting from kindergarten to tertiary education and in government regulations. Moreover, the body structure is a decisive physical aspect of fostering sports abilities. Body structure becomes one of the factors influencing the achievement of an athlete. However, a person's body structure is usually associated with other physical abilities as suggested by Pasau that people who have high and large physical abilities and averagely have strength, speed, the endurance of the heart lungs, muscle, and others are better than short-bodied postures [1]. Sajoto explained that high posture high posture is better in motion when compared to the short-bodied postures [2]. This affects the body's movement when doing sports. Based on this explanation, it can be said that physical aspects that determine athletes' achievement in sports.

The advancement of science and technology has given a really big influence on human lifestyle. Similarly, sports science cannot be separated and ignored in the efforts to improve sports achievement, especially in athletics where every human has abilities in terms of postures to be developed. Furthermore, the development of science, especially the sports science, can be proven by the record-breaking achievements from various sports; whether it is running, jumping, and throwing at the regional and national levels, as well as international scale. When compared with other countries in terms of achievements in athletic sports, our country is far behind. This is considered a challenge for sports coaches in Indonesia.

Therefore, all methods of teaching and training or fostering sports must be investigated as carefully as possible, especially the body structure of a person who is expected to achieve marvelous results and to be scientifically accountable, not based on the prediction. In the world of sports, especially athletics, South Sulawesi athletes rarely perform in athletic sports. As a result, all of these are problems that must be solved together through a more thorough and detailed study. Thus, the benefits of sports are increasingly important in everyday life in terms of education, psychological, physiological, and social relations. Regarding this fact, the most basic thing to be developed is to improve physical health, especially the body structure to achieve objectives in athletic sports in accordance with the planned program.

The description above leads to a finding that in an atmosphere of increasingly advanced sports activities, every sports coach must participate in thinking about, striving for and carrying out every effort for the success of the sport. After discussing the influential elements in the athletic sports in general, two elements, namely the body structure and the ability to run 60 meters, are further discussed as the problems in this study. Body structure or anthropometrics is a technique used to find out the size of body parts. The measurement resulting from anthropometrics can provide an overview or estimate the shape, size, and composition of the body, either in a normal condition or not.

As for the problems that arise in the body structure of students of SMAN 2 Jeneponto Regency, according to the researcher's observations, these school students carry out routine physical activities, namely walking to school and helping parents or families working in the fields or in the garden (manual laborers) after returning from school. It is most likely that the structure of the body affects the athletic ability to run 60 meters. Therefore, the researcher was interested in investigating the association between body structure and the athletic ability to run 60 meters in a study entitled *The Relationship between Body Structure and 60 Meter Running Speed of the Students in SMAN 2 Jeneponto Regency*.

II. RESEARCH METHODS

The current study was correlational descriptive research, which the data were obtained from the results of tests and measurements described in percentages and classifications of the conditions or abilities of the study samples and the correlational relationship between independent and dependent variables. Moreover, the independent variable was the body structure (X) comprised of height, chest

circumference, weight, arm length, and leg length. Meanwhile, the dependent variable was the 60-meter running speed (Y). The number of samples involved in this study was 40 students selected using random sampling technique. Data were analyzed using both descriptive and inferential statistical methods for the purpose of testing the research hypotheses. Descriptive analysis was conducted to obtain the general picture of data that included average, standard deviation, minimum and maximum values, while inferential analysis was performed to test the hypotheses of the research using correlational and regression tests.

III. FINDINGS AND DISCUSSION

A. Data Analysis Presentation

The results of tests and the measurements of body structure and 60-meter running speed of SMAN 2 Jeneponto students consisted of eight test items, the four items for body structure which was comprised of height, chest circumference, arm length, and leg length and 60-meter running speed. Data on body structure and 60 meters running speed were the total value obtained from each test item so that the obtained raw data needed to be changed into T-score data because the four test items of the body structure and 60-meter running speed had different units of measurement. Therefore, the data of the current research consisted of the original data and T-score data. Descriptive analysis was performed on the original data and T-score data, while the normality analysis was conducted on T-score data. At the beginning stage of data analysis, the researcher presented the general description of the body structure and the students' 60-meter running speed.

The general description of the statistics consists of the total number of values, average, standard deviation, variance, and range, as well as maximum and minimum data. To explain all the general description of the research data, descriptive statistical analysis was carried out and explained in detail as follows.

B. Descriptive Analysis

Data of the body structure include height, weight, chest circumference, arm length, leg length, sitting height, and thigh circumference. Meanwhile, data of the 60-meter running speed include 60-meter sprint run. All the data obtained from tests and measurements were categorized into two: body structure data and 60-meter running speed data.

- Data of the body structure of the students of SMAN 2 Jeneponto reveal the total value = 8200.00, the average value = 205.00, the standard deviation = 28.19, the range = 128.00, the minimum data = 156.00, the maximum = 284.00.
- Data of the 60-meter running speed of the students of SMAN 2 Jeneponto reveal the total value = 1995.00, the average value = 49.87, the standard deviation = 9.99, the minimum data = 31.00, and the maximum data = 72.00, and the range 41.00.

TABLE I. THE RESULTS OF NORMALITY TEST OF BODY STRUCTURE AND 60 METER RUNNING SPEED DATA

Statistics Value	Body Structure	60 Meter Running Speed
N	40	40
Absolute	0.104	0.146
Positive	0.104	0.146
Negative	-0.068	-0.114
Kolmogorov-smirnov Z	0.539	0.758
Asymp. Sig	0.933	0.614

Table 1 above shows the results of the normality test using the Kolmogorov Smirnov test explained as follows:

- Based on data of the body structure, the Kolmogorov-Smirnov value (K-S Z) .0539 ($P > 0.05$) was obtained. It can be said that the body structure of the students of SMAN 2 Jeneponto follows a normal distribution.
- Based on data of 60-meter running speed data, the Kolmogorov Smirnov value (K-S Z) 0.758 ($P > 0.05$) was obtained. It can be said that the 60-meter running speed of the students of SMAN 2 Jeneponto follows a normal distribution.

For the purpose of testing the hypothesis, the correlational test was conducted on the body structure and the running speed of the students using the Pearson correlation technique. The results of the data analysis show that:

- The result shows that students' body structure, it can be found that 7 people (17.5%) belong to the **endomorph** category; 18 people (45%) belong to the **mesomorph** category, and 15 people (37.5%) belong to the **ectomorph** category. Thus, it can be said that on average the body structure of the students of SMAN 2 has the mesomorph form.
- Based on the analysis of the students' 60 meters running speed, it can be found that 3 people (7.5%) belong to the fair category; 13 people (32.5%) belong to the average category; 16 people (40%) belong to the poor category; and 8 people (20%) belong to the very poor category. Thus, it can be concluded that the average 60 meter running speed of the students of SMAN 2 Jeneponto is below average.
- The relationship between the body structure and the students' 60-meter running speed students shows r value = 0.618. This indicates that there is a significant relationship between the two variables.

The results of hypothesis testing in the current research show that on average the students' body shapes belong to a mesomorph category that is not too tall and not too short, but agile and strong, allowing them to run quickly when trained properly with the right procedures. Furthermore, the results of testing the second hypothesis show that on average the 60 running speed of the students belongs to the below average category. The results of the study also show that there is a significant association between the body structure and the 60-meter running speed of the students.

Based on the observations by the researcher, the environment also has an important role, besides genetic which is the main factor. The body structure is influenced by several external and internal factors, including nutrition,

economic status, daily activities, lifestyle, parental education and the role of schools in their effort to increasing sports activities to improve physical conditions that greatly affect the body structure of their students. People's lifestyle of each region and the environment that requires them to move more affect the structure of one's body. In the current study, based on the researcher's observations on the condition of the students of SMAN 2 Jeneponto, the majority of the students come from the low middle-class. As a result, they use more physical activities in their daily activities to help parents. For example, many of them go to schools by bicycles and on foot, and ride motorbikes or cars that are all not programmed, but it happens by chance. These activities cause the body unable to develop faster when compared to people who have active programmed activities.

This phenomenon also supports the development of a person's body structure in addition to the nutrition needed by the body. Geographically, SMAN 2 Jeneponto is located on a plateau. Besides, sports facilities of SMAN 2 Jeneponto are quite adequate. However, the nutritional problems commonly consumed by students are not controlled or do not meet the nutritional standards because most of them come from low middle-class family. Consequently, it is rather difficult for them to meet nutritional needs. The students' body structure averagely belongs to the moderate

category. The development of the body structure of the students in the region only relies on daily activities. According to the literature review and the researcher's observations, the 60-meter running speed of a person is affected by external and internal factors which have been explained before.

IV. CONCLUSION

Based on the results of the analysis, it can be concluded that:

- The body structure of the students of SMAN 2 Jeneponto has averagely **mesomorphy** shape.
- The running speed of the students of SMAN 2 Jeneponto averagely belongs to the below average category.

There is a significant association between body structure, including height, weight, chest circumference, leg length, arm length, sitting height, and thigh circumference, and the 60-meter running speed of the students of SMAN 2 Jeneponto.

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