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THE RELATIONSHIP BETWEEN LEG LENGTH AND LEG MUSCLE STRENGTH ON 100 M RUNNING SPEED IN STUDENTS OF SMAN 11 BULUKUMBA

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Abstract
This study aims to determine; (1) Is there a relationship between leg length and 100 meter running speed in students of SMAN 11 Bulukumba; (2) Is there a relationship between leg muscle strength and 100 meter running speed in students of SMAN 11 Bulukumba; (3) Is there a relationship simultaneously between leg length and leg muscle strength and 100 meter running speed in students of SMAN 11 Bulukumba. The population in this study were all students of SMAN 11 Bulukumba. The sample used was 30 male students. In this study, the sampling method was by using a simple random sampling technique where samples were taken randomly. The data analysis techniques used in this study were descriptive analysis, correlation analysis, and regression analysis at a significance level of $\alpha = 0.05$ using the SPSS version 21 program. The results of the study showed that; (1) There is a significant relationship between leg length and 100 meter running speed in students of SMAN 11 Bulukumba, with a value of $r = 0.590$ ($\rho < \alpha = 0.05$); (2) There is a significant relationship between leg muscle strength and 100 meter running speed in students of SMAN 11 Bulukumba, with a value of $r = 0.629$ ($\rho < \alpha = 0.05$); (3) There is a significant relationship simultaneously between leg length and leg muscle strength and 100 meter running speed in students of SMAN 11 Bulukumba, with a value of the coefficient of determination (R2) = 0.624 or 62.4%.

Keywords: leg length, leg muscle strength and 100 meter run

INTRODUCTION

Learning is a deliberate and well-thought-out effort to create a learning environment and educational process where students can actively develop their religious and spiritual strengths, character, noble morals, intelligence, self-control, and other qualities needed by themselves and society. Learning can be interpreted as a conscious and systematic effort to achieve a better standard of living or progress. Simply put, learning is an educational process for students to understand, comprehend, and develop critical thinking skills.

Physical education is an educational process through physical activities designed to improve physical fitness, motor skills, knowledge and attitudes towards a healthy and active lifestyle, sportsmanship, and emotional intelligence.

Exercise is a series of orderly and planned physical movements to maintain movement (improve quality of life), and exercise is a periodic necessity of life. Exercise serves as a tool to maintain and protect health and can also stimulate physical and spiritual development and growth.

Exercising is a systematic process in the form of all activities or efforts that can encourage, improve, and develop the physical and spiritual potential of a person as an individual or member of society in the form of games, competitions or competitions and intensive physical activities to achieve recreation, victory and peak achievement in the context of creating a complete Indonesian human being of quality based on Pancasila.

One of the branches of physical education is athletics. Athletics can be considered the mother of all sports. Athletics has three components: running, jumping, and throwing. Athletics training plays a crucial role in the development of physical fitness and serves as the foundation for optimal performance in other sports. Furthermore, athletics is a popular sport practiced throughout the country.

In South Sulawesi, athletics, in particular, is a sport that can elevate our region to the national level. This is evident in the success of athletes in various athletic events, such as running competitions. Therefore, this success is a factor in maintaining existing achievements and striving for greater heights. These achievements certainly cannot be achieved without the support of interrelated factors. Such as quality infrastructure, good coaches, good organizational management, and government support. The 100m dash is a sprint that involves shifting your weight forward alternately with your right and left feet at maximum speed over 100 meters.

In the Big Indonesian Dictionary (KBBI), sprinting is a sporting activity that involves running as fast as possible over a short distance. Short-distance running, or sprinting, is a fast-paced sporting activity, involving distances of 100m, 200m, and 400m. The 100m dash, also known as short-distance running, is one of the running events in athletics. Short-distance running is also called sprinting, and runners are called sprinters. Short-distance running is supported by great strength and speed, as sprinters require strong endurance from the starting line to the finish line.

Based on observations, researchers showed that the 100-meter sprint speed of students at SMAN 11 Bulukumba was significantly lacking. Many students still failed during the 100-meter dash, for example, many were very slow to reach the finish line and frequently fell during the run. This was due to varying leg lengths and leg muscle strength, resulting in suboptimal and incomplete 100-meter runs.

Physical condition plays a significant role in supporting running speed. People with long legs that are in perfect balance with their height and body size tend to have an advantage in several areas, both in terms of physical skill and range, compared to those with short legs. Therefore, leg length is considered one factor that can influence success in the 100-meter dash. Similarly, leg muscle strength is crucial for running. Based on the description above, the researcher is motivated to conduct research to determine to what extent: "The Relationship Between Leg Length and Leg Muscle Strength and the 100 Meter Running Speed of Students at SMAN 11 Bulukumba".

METHODS

This type of research is correlational. Correlational research is the relationship between two or more variables as they exist without any treatment (Ma'ruf Abdullah, 2015:321). This research was conducted at SMAN 11 Bulukumba.

A population is a general area consisting of objects/subjects possessing certain qualities and characteristics that have been determined by the researcher to be studied and then conclusions drawn. Thus, a population is not simply the number of objects/subjects studied, but also encompasses all the characteristics/traits possessed by those objects (Sugiyono 2018; 117). Therefore, in this study, the population is all students at SMAN 11 Bulukumba.

According to Sugiyono (2018:118), a sample is a portion of the population and its characteristics. If the population is large and the researcher cannot study all members of the population, the sample is a portion of the population taken using a specific technique. The sample size is determined using random sampling. Because the population size in this study was too large, the researcher used simple random sampling by drawing lots. The sample used in this study was 25 students of SMAN 11 Bulukumba.

Research Method

Quantitative research can be defined as a research method based on the philosophy of positivism, used to study specific populations and samples. Sampling techniques are generally random, data collection uses research instruments, and data analysis is quantitative/statistical with the aim of testing predetermined hypotheses (Sugiyono, 2018:14).

1. Research Variables.

There are two variables involved in this research: the independent variable and the dependent variable (Ma'ruf Abdullah, 2015:192):

a) The independent variable (independent variable) is the variable that determines the direction or change of the dependent variable. Conversely, the independent variable is in a position that is not influenced by the dependent variable (the influencing variable).

1) Leg Length

2) Leg Muscle Strength

b) The dependent variable is the variable influenced by the independent variable (the influencing variable).

1) 100 Meter Running Speed

RESULT AND DISCUSSION

Based on the results of statistical analysis based on survey research conducted at SMAN 11 Bulukumba, the following results for leg length, leg muscle strength and running speed are presented in table 1 below:

Statistical Values	Variable		
	leg length (X_1)	leg muscle strength ($X_{2)}$	running speed (Y)
Number of Samples	30	30	30
Maximum Value	98	57	15,33
Minimum Value	85	35	12,29
Range	13	22	3,04
Mean	92,03	42,67	13,5420
Median	93,00	42,00	13,4400
Standard Deviation (s)	3,846	4,773	0,82328
Variance (S^2)	14,792	22,782	0,678

1. Data Normality Test

The results of the data normality test for each variable can be formulated as follows:

1. The leg length variable (X1) in the table above shows that the data is in a normal distribution, because (P) is greater than 0.05 (significant level), namely KS-Z = 0.726 (P = 0.668 > 0.05).
2. The leg muscle strength variable (X2) in the table above shows that the data is in a normal distribution, because (P) is greater than 0.05 (significant level), namely KS-Z = 0.598 (P = 0.867 > 0.05).
3. The 100-meter running speed variable (Y) in the table above shows that the data is in a normal distribution, because (P) is greater than 0.05 (significant level), namely KS-Z = 0.815 (P = 0.520 > 0.05).

3. Hypothesis Testing

a. The Contribution of Leg Length and Running Speed of Students at SMAN 11 Bulukumba.

The first hypothesis tested in this study was "there is a relationship between leg length and running speed of students at SMAN 11 Bulukumba." Based on the results of a survey conducted on students at SMAN 11 Bulukumba, the correlation analysis data related to leg length and running speed of students at SMAN 11 Bulukumba are presented in the following table.

Table 2. The first hypothesis is the relationship between leg length and running speed.

correlation	N	r	P_{value}	Significant
X_1.Y	30	-0,590	0,000	Description

Based on the results of the correlation analysis test of leg length data on 100-meter running speed. The correlation value (r) = -0.590 is obtained with a probability level (0.001) less than α 0.05. Therefore, H0 is rejected and H1 is accepted or the correlation coefficient is significant, or leg length is significantly related to 100-meter running speed. So it can be shown that leg length and 100-meter running speed have a substantial relationship.

b. The Relationship between Leg Muscle Strength and Running Speed of Students at SMAN 11 Bulukumba.

The second hypothesis tested in this study was "there is a relationship between Leg Muscle Strength and Running Speed of Students at SMAN 11 Bulukumba." Based on the results of a survey conducted on SMAN 11 Bulukumba students, the correlation analysis data related to Leg Muscle Strength and Running Speed are presented in the following table:

Table 3. The second hypothesis is the relationship between Leg Muscle Strength and Running Speed.

correlation	N	r	P_{value}	Significant
X_2.Y	30	-0,629	0,000	Description

Based on the results of the correlation analysis of leg muscle strength against 100-meter running speed. The correlation value (r) = -0.629 with a probability level (0.000) less than α 0.05. Therefore, H0 is rejected and H1 is accepted or the correlation coefficient is significant, or leg muscle strength is significantly related to 100-meter running speed. So it can be concluded that there is a significant relationship between leg muscle strength and 100-meter running speed.

C. Hubungan antara panjang pendinginan dan kekuatan otot pendinginan terhadap kecepatan lari siswa SMAN 11 Bulukumba.

Hipotesis keempat yang diuji dalam penelitian ini adalah hubungan antara panjang pendinginan dan kekuatan otot pendinginan terhadap kecepatan lari siswa SMAN 11 Bulukumba. Berdasarkan hasil survei yang dilakukan di SMAN 11 Bulukumba, data hasil analisis korelasi berganda terkait performa kecepatan lari disajikan dalam tabel berikut:

Tabel 4. Hipotesis Tiga: Terdapat hubungan antara kanjang pendinginan dan kekuatan otot pendinginan terhadap kecepatan lari siswa SMAN 11 Bulukumba.

correlation	N	R	R^2	P_{value}	Significant
$X_1.X_2$. Y	30	0,790	0,624	0,000	Description

Berdasarkan hasil pengujian analisis regresi data antara panjang pendinginan dan kekuatan otot pendinginan terhadap kecepatan lari 100 meter. Maka diperoleh nilai regresi R = 0,790 dengan tingkat probabilitas (0,000) lebih kecil dari α 0,05, untuk nilai R2 (koefisien determinan) = 0,624. Hal ini berarti 62,4% kecepatan lari 100 meter, panjang pendinginan dan kekuatan otot pendinginan. Untuk sisa (100% - 62,4% = 37,6% dipengaruhi oleh faktor lain. Didapat F hitung adalah 22,377 dengan tingkat signifikan

(0,000) oleh karena probabilitas (0,000) jauh kurang dari 0,005, sehingga model regresi dapat dipakai untuk kecepatan lari 100 meter. Maka H0 ditolak dan H1 diterima atau korelasi signifikan, atau panjang ikatan dan kekuatan otot benar-benar berhubungan secara signifikan terhadap kecepatan lari 100 meter. Sehingga dapat disimpulkan bahwa ada hubungan yang signifikan antara panjang pendinginan dan kekuatan otot-otot terhadap kecepatan lari 100 meter.

CONCLUSSION

Assin Based on the data Analysis and Discussion, the Results of This Study can be Concluded as Follows :

1. There is a significant relationship between leg length and 100-meter sprint speed in students at SMAN 11 Bulukumba.
2. There is a significant relationship between leg muscle strength and 100-meter sprint speed in students at SMAN 11 Bulukumba.
3. There is a significant relationship between leg length and leg muscle strength and 100-meter sprint speed in students at SMAN 13 Takalar.

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