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Hubungan Panjang Tungkai Dan Kekuatan Otot Tungkai Terhadap Kecepatan Lari 100 Meter Mahasiswa FIKK UNM Makassar

Relationship Between Leg Length And Leg Muscle Strength Towards 100 Mter Running Speed Of FIKK UNM Makassar Students

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Abstract. This study aims to prove: 1) The relationship between vibration length and 100-meter running speed, 2) The relationship between cooling muscle strength and 100-meter running speed, 3) The relationship between freezing length and cooling muscle strength and 100-meter running speed. The research method used is a quantitative research method and this type of research is a correlational study involving 2 independent variables, namely cooling length and climate muscle strength, while the dependent variable is 100-meter running speed. The population in this study were FIKK UNM Makassar students, with a sample of 30 people taken by simple random sampling. The data analysis technique used is the correlation coefficient. The results of the study showed that: 1) There is a significant relationship between seizure length and 100-meter running speed with a value of $r = -0.590$ ($p < \alpha 0.05$). 2) There is a significant relationship between neck muscle strength and 100-meter running speed with a value of $r = -0.629$ ($p < \alpha 0.05$). 3) There is a significant relationship between the length of the cool-down and muscle spasm strength simultaneously on the 100 meter running speed of 79% with an R value = 0.790 ($p < \alpha 0.05$).

Keywords: leg length, leg muscle strength, 100 meter running speed

1 Introduction

The advancement of science and technology has an impact on many aspects of life, including sports. Science and technology concern information about the learning process obtained through observation of reason applied in the form of ideas or products. Finally, technology is the practice or applied science of theories derived from science, while science contains consistent theories or formulations.

Exercising is a systematic process in the form of all activities or efforts that can urgently improve, and foster the physical and spiritual potential of a person as an individual or member of society in the form of games, competitions or matches and intensive physical activities to get tours, victories and peak achievements in order to create a whole Indonesian human being of quality based on Pancasila.

One branch of physical education is athletics. Athletics can be said to be the parent of all sports. Athletics has 4 parts, namely walking, running, jumping, and throwing. Athletic training has a significant position in increasing or developing physical condition, and is the main basis for increasing or developing physical condition, and is the main basis for increasing maximum achievement for other sports. Not only that, athletics is also a popular sport and is tried throughout the country

100 m run is At a maximum speed of 100 meters, shift your weight forward with your right and left feet alternately. In the Big Indonesian Dictionary (KBBI), sprinting is a sports activity that is tried by running as fast as possible at a distance that is categorized as short, short distance running or sprinting is a fast running sport activity, at a distance of 100 m, 200 m and 400 m. 100 m run or commonly called short distance running is one of the running numbers in the athletics sport branch. Short distance running is also called sprinting, while the runner is called a sprinter. Short distance running is supported by great strength and speed, because short distance running has strong endurance energy from the start line to the finish line.

The role of physical skills in sports does not need to be debated anymore, for those who have great physical abilities will certainly have more opportunities to excel. To achieve optimal results when running 100 m, leg length and strong leg muscle strength are needed, but this cannot be separated from regular training, if you want to get optimal results.

Overlapping the physical condition factor, it has a significant role in supporting running speed, because people who have long legs with perfect harmony and body size will be superior in some things, both in terms of physical skills or in terms of reach compared to people who have short legs. So it is said that leg length is one aspect that can affect success when running 100 meters. Likewise with the physical element of leg muscle strength when running. Leg muscle strength is very much needed when running 100 meters.

Based on the results of the researcher's observations, it shows that the results of the 100-meter running speed of FIKK UNM students are lacking. Based on this description, the researcher is motivated to conduct research to master the extent to which: "The Relationship Between Leg Length and Leg Muscle Strength and 100-meter Running Speed of FIKK UNM Makassar Students".

2 Method

This research is a quantitative descriptive study that aims to see the relationship between physical factors and 100-meter running speed. The research method is defined as a study of the basic principles of investigation that often involve problems of logic, classification, and basic assumptions.

1. Research Place

This research will be conducted in the FIKK field, Makassar State University.

2. Research Variables

The research variables used in this study include:

a. Independent variables

- 1) Leg Length
- 2) Leg Muscle Strength

b. Dependent variables:

100-meter running speed

a) Population

Darmawan (2014:137) stated that one study certainly has limitations "in presenting sources of information or research subjects. In addition, research whose results can be generalized must have a balanced sampling process so that the conclusions can be generalized. from the study of all FIKK UNM Makassar students.

b) Sample

The sample is determined by the researcher based on considerations of the problem, objectives, hypotheses, methods, and research instruments, in addition to considerations of time, energy, and funding. As explained above, the sample consists of research subjects (respondents) who are the source of data selected from the results of the sampling technique (sampling technique) Deni (2014:138). The samples taken or used in this study were 30 male students of FIKK UNM Makassar.

After all the data is collected, the next step is to analyze the data. The conclusion in this study can be drawn by using statistical analysis with the help of the SPSS Version 25 computer program to determine whether there is a significant relationship between the independent variables and the dependent variables. The relationship between leg length and leg muscle strength to 100-meter running speed.

3 Result

The data from the leg length test, leg muscle strength and 100 meter running speed obtained in the study were analyzed using descriptive statistical techniques.

Table 1. Summary of results of descriptive analysis of data

Statistik	Leg Length (X1)	Leg Muscle Strength (X2)	100-meter running speed (Y)
N	30	30	30
Mean	92,03	42,67	13,5420
Median	93,00	42,00	13,4400
Mode	89	42	12,29
Std. Deviation	3,846	4,773	0,82328

Variance	14,792	22,782	0,678
Range	13	22	3,04
Minimum	85	35	12,29
Maximum	98	57	15,33
Sum	2761	1280	406,26

Data Normality Test

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 $KS-Z = 0.815$ ($P = 0.520 > 0.05$).

Correlation Analysis

After carrying out data normality tests on the hypothesis to be tested, the hypothesis is tested to prove its correctness.

Table 2. Results of the correlation test of leg length against 100-meter running speed

Correlation	N	r	P _{value}	Description
X ₁ . Y	30	-0,590	0,000	Significant

Based on the results of the correlation analysis test of leg length data on 100-meter running speed, the correlation value (r) = -0.590 was obtained with a probability level (0.000) smaller than α 0.05. So 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 concluded that there is a significant relationship between leg length and running speed.

Table 3. Results of correlation test of leg muscle explosive power and long jump ability

Correlation	N	r	P _{value}	Description
X ₂ . Y	30	-0,629	0,000	Significant

Based on the results of the correlation analysis test of leg muscle strength data on 100-meter running speed. The correlation value (r) = -0.629 is obtained with a probability level (0.000), smaller than α 0.05. So 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.

Table 4. Results of correlation test of leg length and leg muscle strength on 100 meter running speed

Correlation	N	R	R ²	P _{value}	Description
X ₁ .X ₂ . X ₃ . Y	30	0,790	0,624	0,000	Significant

Based on the results of multiple regression analysis of data between leg length and leg muscle strength on 100-meter running speed. The regression value (R) = 0.790 is obtained with a probability level (0.000) smaller than α 0.05 for the R² value (determinant coefficient) = 0.624. This means that 62.40% of 100-meter running speed with leg length and leg muscle strength. For the rest (100% - 62.40% = 37.60% is influenced by other factors. So H₀ is rejected and H₁ is accepted or the correlation coefficient is significant, or leg length and leg muscle strength are truly significantly related to 100-meter running speed. So it can be concluded that there is a significant relationship between leg length and leg muscle strength to 100-meter running speed.

4 Discussion

1. There is a relationship between leg length sprint speed and 100 meter sprint speed.

From the results of the first hypothesis test, the variables show a significant relationship between leg length (X₁) and 100-meter running speed (Y).

Based on the calculation, the correlation coefficient (r) = 0.590 was obtained which can be explained using the regression equation. $\hat{Y} = 25.169 + 0.162X_1$, so it can be proven that the 100-meter running speed technique really needs body part components such as leg length, where these components are very helpful in the running process. Because when running, leg length plays a very important role in determining the number of steps in one leg swing. The number of steps needed to cover one unit of distance will be smaller with long legs.

This is closely related to the theory put forward by Saiyed Muh. Fahri (2018:6) "Leg length is one of the body parts included in anthropometric measurements, namely one of the lower body parts or also known as power extremities consisting of the hips, thighs, calves and feet.

The length of the legs is intended as a support for the upper body and is one of the lower body parts that plays an important role in sports, legs as a part that plays an important role in running. An athlete who has a high body proportion and, followed by long legs, although not all of them are like that, the size of long legs does not always mean a long stride range, because of this agility and balance are still needed in knowing a person's stride range. Leg length plays a role as a physical component needed in running races as strength and speed and maximum contraction in sprinting. Thus, leg length includes measuring the lower body parts from the hips to the feet. "

The distance of the steps in a single leg swing is related to leg length. The number of steps required to cover a unit of distance will be smaller with longer legs. As a result, the faster the running speed, the further the legs can reach.

2. There is a relationship between leg muscle strength and 100 meter running speed.

From the results of the second hypothesis test, it shows that there is a significant relationship between leg muscle strength (X₂) and 100-meter running speed ability (Y). The correlation coefficient value (r) = 0.629 described by the regression equation is based on the calculation results $\hat{Y} = 18.174 + 0.109X_2$, so this finding proves that in running 100 meters, leg muscle strength is a supporting factor or supporting factor in the implementation of 100-meter running speed. Leg muscle strength that allows the development of muscle tension during maximum contraction. As a result, leg muscle strength is the same as its capacity to regulate and move weights while running.

This is in line with what is stated by According to Ismaryati, et al. (2018: 111) "strength is the power of muscle contraction achieved in one maximum effort. This maximum effort is carried out by muscles or a group of muscles to overcome resistance. Strength is a very important element in sports activities, because strength is the driving force, and prevents injury. In addition, strength plays an important role in other components of physical ability such as power, agility, speed. Thus, strength is the main factor in creating optimal performance."

So it can be proven that the speed of running 100 meters really needs leg muscle strength where this component is very helpful in the process of running speed. Because when an athlete runs, it requires good leg muscle strength in order to be faster and maximal when running.

This indicates that leg muscle strength contributes to individuals in performing various motor skills. This means that to be able to do activities well, it must be supported by good leg muscle strength, especially when running. Because someone who has strong leg muscle strength will support them to run 100 meters maximally.

3. There is a relationship between leg length and leg muscle strength and 100 meter running speed.

From the results of the third hypothesis test, it shows that there is a significant relationship between leg length (X₁) and leg muscle strength (X₂) on the ability to run 100 meters (Y). Based on the calculation results, the regression value R = 0.790 is obtained which is explained through the regression equation $\hat{Y} = 27.060 + 0.104X_1 + 0.092X_2$, for the R² value (determinant coefficient) = 0.624. This means that 62.4% of the 100-meter running speed, leg length and leg muscle strength. The rest (100% - 62.4% = 37.6%) is influenced by other factors. The calculated F is 22.377, these results further strengthen the results of the first and second hypothesis tests.

According to Sutanto (2016:21) "short distance running is often also called sprint, and the distance that must be covered usually varies, starting from 100 meters, 200 meters, or 400 meters in this sport the runner must run as fast as possible from the start to the finish line. The 100 meter run is one of the most common running races that someone can participate in, this running race is usually competed in high school, college, national and olympic levels" and regional levels. This number is often competed in official matches. Nur Ichsan Halim (2011:27) "muscle strength is a biomotor component required by all sports with different levels. This component can be improved by providing internal or external resistance to the muscles concerned."

Compared to someone with a low stride frequency, someone with high leg muscle strength and leg length will produce a higher stride frequency and a longer stride length when

running. This is very useful for producing maximum running speed because running speed is the result of a person's stride frequency and stride length. Given the importance of leg length and leg muscle strength, it is reasonable to believe that there is a relationship between both leg length and leg muscle strength simultaneously on 100-meter running speed.

So this proves that every student must have ideal body components including leg length and must have good leg muscle strength, so that students are able to move or do activities effectively and efficiently. Where we know that leg length and leg muscle strength are a combination of very important elements in performing several combinations of movements smoothly or smoothly without expending excessive energy.

5 Conclusion

Based on the results of data analysis and discussion, the research conclusions are stated as follows:

1. There is a significant relationship between leg length and 100-meter running speed in FIKK UNM students
2. There is a significant relationship between leg muscle strength and 100-meter running speed in FIKK UNM students
3. There is a significant relationship between leg length and leg muscle strength and 100-meter running speed in FIKK UNM students.

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