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Relationship between Leg Length and Foot Frequency with 50-Meter Running Speed

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A. Conception and design of the study; **B.** Acquisition of data; **C.** Analysis and interpretation of data; **D.** Manuscript preparation; **E.** Obtaining funding

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ABSTRACT

This study aims to determine the relationship between leg length and foot frequency with a running speed of 50 meters. This research is a type of descriptive research. The population of this study is all students of SMP Negeri 8 Makassar with a research sample of 60 male students selected by random sampling. The data analysis technique used is a correlation and regression analysis technique using the SPSS Version 20.00 system at a significant level of 95% or α 0.05. Based on the results of data analysis, this study concludes that: There is a significant relationship between leg length and running speed of 50 meters, it is proven that the value of ro = 0.866 ($P < \alpha$ 0.05); There was a significant relationship between the frequency of footsteps and the running speed of 50 meters, it was proven that the value of ro = 0.870 ($P < \alpha$ 0.05); There was a relationship between leg length and footstep frequency with a running speed of 50 meters, proving a Ro value = 0.883 ($P < \alpha$ 0.05).

Keywords : Leg Length; Step Frequency; Running Speed; 50 meters; Athletics.

INTRODUCTION

Physical education taught in schools has a great influence on the development, speed, attitude and behaviour of students (Sahabuddin et al., 2020). Therefore, the physical education taught can awaken and direct the potential in students and later be healthy and quality (Sahabuddin, Hakim, et al., 2022). Increasing the role of sports, and physical education lessons need to be carried out (Sahabuddin, Sudirman, et al., 2022). Of the many physical education materials, there is an athletic branch which is referred to as the parent of all sports (Bismar & Sahabuddin, 2019). Athletics is a physical activity or physical exercise that contains natural/natural movements such as: walking, running, jumping and throwing. Of the four numbers in athletics, the running number is focused on finding the optimal solution to be able to achieve maximum achievement, so that there is no between hope and reality. In terms of the nursery that exists today, especially in the municipality of Makassar, it is very essential because it has been provided with facilities to handle education. This means that every novice athlete is accommodated in a school and supported by adequate

facilities. This means that the government's attention to the world of sports, especially in athletics, is very special compared to other sports.

In the 100-meter sprint, for example, there are very few athletes able to achieve peak achievement (Kusuma, 2019) due to the existence of inhibiting factors (Hermansah, 2016). The inhibiting factor is that his physical ability and posture are still lacking (Ariyantinin et al., 2016). The important thing that must be considered is that when doing sports activities, it must be supported by the body's abilities (Rusli, 2017) to make adjustments or adaptations to the physical burdens that must be overcome (Kardiyono, 2017), in this case, to do exercises. Looking at the sprint running movement (Leyva et al., 2017), of course, it is inseparable from the ability of the legs that must be fast (Giyatno, 2017). In the sprint number run with a distance of 50 meters, of course, maximum speed is needed to reach the finish line (Satun, 2018). But on the other hand, speed will not be formed without the role of leg length (Nuryadi & Firmansyah, 2018), because the strength of the legs that sprint runners have will help to develop the expected speed (Hidayat, 2019) Besides that, the element of step frequency will be very helpful in achieving running movements (Rahadian, 2018). Because for runners who have a small step frequency, they certainly have a speed that is not optimal (Dwi et al., 2018). So the running speed you have will not be optimal (Evitamala et al., 2019) compared to runners who have a fast and long stride frequency with a high posture (Kurnia, 2018).

In one of the schools in the city of Makassar, namely SMP Negeri 8 Makassar, the development of athletics, especially in the sprint number, did not show the expected results. In connection with the problem to be studied, namely the 50-meter run, there has been a lot of research on various factors to support the achievement of the number. Therefore, with many factors or efforts made, it does not mean that efforts to achieve other factors are an obstacle, but are used as a handle for better achievement improvement.

METHODS

The method used in this study is descriptive. The population of this study is all students of SMP Negeri 8 Makassar. However, the population is limited to male students only so that they have the same traits in terms of gender. The sample taken or used in this study amounted to 60 people from male students of SMP Negeri 8 Makassar with a random random sampling technique on objects. The collected data needs to be analyzed statistically, descriptively, as well as incorrectly to test research hypotheses. The description used in this research is as follows: descriptive data analysis is intended to get an overview of the data which includes averages, and standard deviations. And inphenial analysis is used to test research hypotheses using correlation and regression tests. So the overall statistical data analysis used in general uses computer analysis in the SPSS version 11.00 program with a significant level of 95% or α = 0.05.

RESULTS AND DISCUSSION

Result

Descriptive data

The descriptive analysis of the research data consisting of the measurement of leg length, foot frequency test, and 50-meter running speed in SMP Negeri 8 Makassar students can be described as follows:

a. For leg length data, from 60 samples, a total value of 2999.00 was obtained. The average result was 49.9833 and the standard deviation of 10.03129 from the lowest (minimum) data obtained = 33.00 and the highest (maximum) 72.00 with a range value of 39.00.
b. For footstep frequency data, from 60 samples, a total value of 3002.00 was obtained. The average result was 50.0333 and the standard deviation was 9.32823 from the lowest (minimum) data obtained = 34.00 and the highest (maximum) was 68.00 with a range value of 34.00.
c. For the data on the running speed of 50 meters, from 60 samples, a total value of 3001.00 was obtained. The average result was 50.0167 and the standard deviation of 9.99744 from the lowest (minimum) data obtained = 31.00 and the highest (maximum) was 69.00 with a range value of 38.00.

Requirements testing analysis

Research data to be analyzed statistically must meet the requirements for analysis. For this reason, after the data on leg length, foot frequency and running speed of 50 meters in this study were collected, before statistical analysis was carried out for hypothesis testing, a requirement test was first carried out, namely normality with the Kolmogorov-Simirnov Test test at a significant level of 95% or α = 0.05. The results of the Kolmogorov-Smirnov Test can be described as follows:

a. In the normality test of leg length data, the value of K-Sz = 0.769 was obtained with a probability level = 0.595 greater than α 0.05 or at a significant level of 95%. Thus, the leg length data obtained is normally distributed.
b. In the normality test of the footstep frequency data, the value of K-Sz = 0.817 with the probability level = 0.517 is greater than the value α = 0.05 or at a significant level of 95%. Thus, the footstep frequency data obtained is normally distributed.
c. In the normality test of the 50-meter running speed data, the value of K-Sz = 0.584 was obtained with a probability level = 0.884 greater than α 0.05 or at a significant level of 95%. Thus, the 50-meter running speed data obtained is normally distributed.

Correlation analysis

Correlation analysis was carried out to determine the relationship between each independent variable and the bound variable. The correlation analysis used was a single correlation analysis (R) and a double correlation of two predictors (R) at a significant level of 95%. The results of the correlation analysis in full can be described as follows:

There is a relationship between the length of the legs and the running speed of 50 meters of SMP Negeri 8 Makassar students.

Based on the results of the test analysis of the correlation of leg length data with a running speed of 50 meters. A correlation value (r0) = 0.866 with a probability level (P) of 0.000 < α 0.05, for the coefficient value of determination = 0.750. This means that 75% of the 50-meter running speed is explained by the length of the legs in SMP Negeri 8 Makassar students. While the rest (100% - 75% = 25%) is explained by other causes. It was concluded that Ho was rejected and H1 was accepted. Thus, there is a significant relationship between the length of the legs and the 50-meter running speed of SMP Negeri 8 Makassar students.

There is a relationship between the frequency of footsteps and the running speed of 50 meters of SMP Negeri 8 Makassar students.

Based on the results of the test analysis of the correlation of footstep frequency data with a running speed of 50 meters. The correlation value (r0) = 0.870 with a probability level (P) 0.000 < α 0.05, for the determination coefficient value = 0.757. This means that 75.7% of the 50-meter running speed is explained by the frequency of footsteps in SMP Negeri 8 Makassar students. While the rest (100% - 75.7% = 24.3%) is explained by other causes. It was concluded that Ho was rejected and H1 was accepted. Thus there is a significant relationship between the frequency of footsteps and the 50-meter running speed of SMP Negeri 8 Makassar students.

There is a relationship between the length of the legs and the frequency of footsteps with the running speed of 50 meters of SMP Negeri 8 Makassar students.

Based on the results of the regression analysis of leg length and foot frequency data with a running speed of 50 meters. The regression value (R0) = 0.883 with probability level (P) = 0.000 < < α 0.05, for the value of R Square (coefficient determination) = 0.780. This means that 78% of the 50-meter running speed is explained by the length of the legs and the frequency of footsteps in the students of SMP Negeri 8 Makassar. While the rest (100% - 78% = 22%) is explained by other causes. From the ANOVA test or F test, the F calculation was 100.971 with a significance level of 0.000. Since the probability (0.000) is much smaller than 0.05, the regression model can be used to predict a 50-meter running speed (applicable to the population in which the sample is taken). So Ho was rejected and H1 was accepted or coefficient regression was significant, or leg length and footstep frequency had a significant effect on the 50-meter running speed. Thus, there is a significant relationship between the length of the legs and the frequency of footsteps with the running speed of 50 meters of SMP Negeri 8 Makassar students.

Discussion

The first hypothesis; there is a significant relationship between the length of the legs and the running speed of 50 meters of SMP Negeri 8 Makassar students. It is evident from the results of the analysis that the observation correlation value is greater than the value α = 0.05. This proves that the running speed of 50 meters is greatly influenced by the length of the legs. However, from the results obtained students at SMP Negeri 8 Makassar are only able to have a leg length of 54.9% in reaching a running speed of 50 meters. This means that the length of the legs he has is classified as moderate in supporting the maximum speed in the sprint running number. A sprint or short-distance runner must have a leg length. Leg length is indispensable for every athlete. Therefore, every sprint runner needs a high body structure element, especially the length of the legs as a driving force to achieve maximum speed.

The second hypothesis; there is a significant relationship between the frequency of footsteps and the 50-meter running speed of SMP Negeri 8 Makassar students. It is evident from the results of the analysis that the observation correlation value is greater than the value α = 0.05. This proves that the frequency of footsteps is very supportive in doing a 50-meter running speed. However, students of SMP Negeri 8 Makassar only have a footstep frequency of 18.3% to support a running speed of 50 meters. The frequency of footsteps is one of the factors that support the achievement of maximum speed. The frequency of

footsteps does not mean that it is ignored or noticed, but the distance travelled is a sprint or short distance.

The third hypothesis; there is a significant relationship between leg length and footstep frequency with the 50-meter running speed of SMP Negeri 8 Makassar students. It is evident from the results of the analysis that the observation regression value is greater than the value α = 0.05. This proves that these two factors, namely leg length and foot frequency are interrelated in achieving and increasing the high jump result in high jump. However, students of SMP Negeri 8 Makassar have a footstep frequency of 80% to support the achievement of 50-meter running speed results. It has been stated that leg length is very necessary for a sprinter runner. With the length of the legs, it will be able to do a long range compared to runners who have short legs. On the other hand, the maximum frequency of steps will have an effective and efficient impact in doing sprint running speed such as at a distance of 50 meters.

CONCLUSION

Based on data analysis with statistical calculations and the results of hypothesis testing as well as from the discussion, the results of this study are concluded as follows:

1. There was a significant relationship between the length of the legs and the 50-meter running speed of SMP Negeri 8 Makassar students.
2. There was a significant relationship between the frequency of footsteps and the 50-meter running speed of SMP Negeri 8 Makassar students.
3. There was a significant relationship between the length of the legs and the frequency of footsteps with the running speed of 50 meters of SMP Negeri 8 Makassar students.

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