



The Relationship between Leg Muscle Strength and Back Muscle Flexibility on Shooting Results of Futsal Athletes

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Abstract

This study aims to determine the relationship between leg muscle strength and back muscle flexibility to *shooting* Academy Futsal Athletes in 2022. This research was carried out in the Futsal Academy Bangsal 13 Fc field. The population in this study were all athletes of the soccer school ward 13 as many as 30 people. Sampling was carried out using *purposive random sampling*, with 10 people being the sample. Data analysis techniques used to test the hypothesis are normality test, linearity test, and correlation test. From the results of the first hypothesis correlation test, a significance value of $0.043 < 0.05$ was obtained, so there was a significant relationship between leg muscle strength and the results of *shooting the ball*. The results of the second hypothesis test have a significance value of $0.032 < 0.05$, so there is a significant relationship between Back Muscle Flexibility and the results of *shooting the ball*. Based on the multiple correlation test in the summary model table, it is known that the magnitude of the relationship between Leg Muscle Strength and Back Muscle Flexibility (simultaneously) on the ball shooting results calculated by the correlation coefficient is 0.488, this indicates a moderate effect. Meanwhile, the simultaneous contribution or contribution of the Leg Muscle Strength with *Back Muscle Flexibility* is 23.8%, while 76.2% is determined by other variables.

Keywords: *Leg muscle strength, Back muscle flexibility, Shooting results*

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INTRODUCTION

Shooting has an important meaning in the game of futsal, in every football match, long-distance kicks are very often carried out by every player, because apart from being used to score goals, they can also be used to provide long passes to teammates or sweeps. in their own defense area (clearent) when attacked by an opponent (Mistahul Ulum, I. K. B. Asra, 2022), (Amir Supriadi, 2022) . Judging from the futsal game, kicking the ball is the basic technique of playing futsal that is most often done in the game. Through this kick will be established cooperation

between one Player with other players in one team. In addition, some of the goals occurred through precise and accurate kicks (Tarigan & Winata, 2020). Besides that, do not forget that systematic and sustainable training plays a very important role in producing good physical abilities to support the technique in futsal.

To produce a maximum kick or shooting, in addition to requiring good technical mastery, physical ability also plays a role because far kick results are obtained from good technical mastery as well as good physical condition (Chloé Nurik, 2017). A player must have good leg muscle strength aimed at the strength of the shooting results carried out by the athlete or where the ball wants to be placed besides the back muscle flexibility factor also acts as a connecting factor between these factors because with the flexibility of the back muscles With a good level of flexibility, the flexibility of the back helps support shooting so that the ball will be difficult to reach by the goalkeeper, an athlete's ability to shoot is also influenced by the flexibility of his waist muscles. Flexibility is a person's effectiveness in adjusting himself to carry out all body activities with the widest possible stretching, especially the muscles and ligaments around the back (Fadilah & Wibowo, 2018). This will be very easily marked by the level of flexibility of the whole body, especially the muscles, ligaments. The higher the flexibility of the back, the angle of motion in taking the angle of the back for a whip is also greater so that the power generated also becomes greater (Pujarina & Kumala, 2019). The elements mentioned above are the physical qualities that determine to achieve results in sports.

A trainer must be able to know which parts need to be trained so that the muscles to be used can be strong and this is of course in accordance with the sport to be performed (Abdurrahman Yusuf Anjani Pjt, 2022), . And to increase endurance and muscle strength, training movements are needed that make a player strong and master skills. In addition, the practice should be gradual at first but gradually become special.

In sports activities, power is a very important biomotor component because power will determine how hard people can kick. Power is one element of the physical condition needed for almost all sports, including futsal, power is a combination of several physical elements, namely the element of strength and the element of speed, meaning that the ability of muscle power can be seen from the results of work done using strength and speed, power is the product of strength and speed. Power is the ability of muscles to exert maximum force in a very short time (Effendi, 2018).

The researcher assumes that the strength of the leg muscles and the flexibility of the back muscles of the players are closely related to the shooting results made by the players so that this is a factor that is closely related to a person's ability to perform one of the techniques in the game of futsal. That the factor of leg muscle strength and back muscle flexibility is very influential on the shooting results.

Based on the observations that the researchers saw during futsal training carried out by the Bangsal 13 Fc futsal athletes, it appears that there are several very important elements in carrying out basic shooting techniques including leg muscle strength and back muscle flexibility. These two factors are two things that cannot be separated in their application when shooting, besides that these factors are also key factors for success in shooting when the leg muscle strength is good, then in shooting the direction of the ball will be very good and the flexibility factor of the back muscles, the angle the motion in taking the back angle for a whip is also getting bigger so that the power generated is also getting bigger and can support a person's ability to shoot properly and correctly.

Based on the description above, it can be concluded that between the strength of the leg muscles and the flexibility of the back muscles on the shooting results in futsal, it can be concluded that there is a relationship from one variable to another. Thus, from the above variables, it is expected that a futsal player can have futsal shooting results

METHOD

This research is a correlational study. Correlational research is research conducted to determine whether there is a relationship between two or several variables (Fadilah & Wibowo, 2018). The method used is a kick performance test towards the goal, data collection techniques using measurement tests. This study aims to determine whether there is a relationship between leg length and leg muscle strength with the accuracy of kicks towards the goal.

This research was carried out in the Futsal Academy Bangsal 13 Fc field. The population in this study were all athletes of the soccer school ward 13 as many as 30 people. Sampling was carried out using purposive random sampling, with 10 people being the sample. Data analysis techniques used to test the hypothesis are normality test, linearity test, and correlation test.

To determine whether there is a relationship using the Pearson product moment correlation method with the symbol r . The research design is as follows:

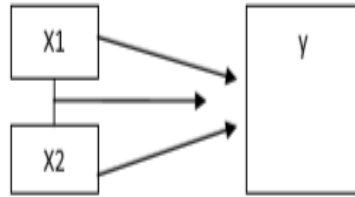


Figure 1. Research Design Variables X and Y

RESULTS AND DISCUSSION

Result

The results of the descriptive statistical analysis for the Leg Muscle Strength variable obtained the Mean = 59.995, Range = 21.2, Sum = 599.55, Minimum = 50.8, Maximum = 72, and Standard Deviation = 7.30.

Table 1. Description of the results of leg muscle strength

Interval	Category	Frequency	Percentage (%)
>70,9	Very High	1	10%
63,6 – 70,9	High	2	20%
56,3 – 63,6	Medium	3	30%
49,0 – 56,3	Low	4	40%
< 49,0	Very Low		
Amount		10	100%

Description of the Research Results of Back Muscle Flexibility

The results of descriptive statistical analysis for the Back Muscle Flexibility variable obtained the Mean = 6.40, Range = 3, Sum = 64, Minimum = 5, Maximum = 8, and Standard Deviation = 1.075.

Table 2. Description of the results of back muscle flexibility

Interval	Category	Frequency	Percentage (%)
>8,0 cm	Very High	2	20%
7,0 - 7,9 cm	High	2	20%
6,0 – 6,9 cm	Medium	4	40%
4,9 – 5,9 cm	Low	2	20%
< 4,8 cm	Very Low		
Amount		10	100%

Description of Shooting Futsal Research Results

The results of descriptive statistical analysis for the Shooting variable obtained the Mean = 3.30, Range = 2, Sum = 33, Minimum = 2, Maximum = 4, and Standard Deviation = 0.823.

Table 3. Description of Futsal Shooting Results

Score	Categori	Frequency	Percentage (%)
4	Very High	5	50%
3	High	3	30%
2	Medium	2	20%
1	Low		
0	Very Low		
Amount		10	100%

Test Data Requirements

a. Normality test

The calculation of the data normality test is intended to determine whether the variables in the study have a distribution of the data used from a normal distribution or not. In this study, to test the normality of the data, the technique using SPSS Statistics 20 with the Kolmogorov-Smirnov formula was used.

Table 4. Normality Test

	correlation	Sig	Infromation
X ₁	With Y	0,090	Distribution Normal
X ₂	With Y	0,200	Distribution Normal

Based on the results of the normality test, it can be seen that the data from all variables have a p value (Sig.) > 0.05, then all variables are normally distributed and the analysis can be continued.

a. Linearity Test

The linearity test is used to determine whether the relationship between the independent variable and the dependent variable is linear (the graph of the relationship forms a straight line). Linearity testing can be done using the help of SPSS Statistics 20.

Table 5. Linearity Test

correlation	Sig	Information
X ₁ with Y	0,191	Linier
X ₂ with Y	0,555	Linier

Based on the results of the linearity test, it can be strengthened by the value of p (Sig.) > 0.05 so that all variables X₁, X₂, have a linear relationship with Y. Thus, all prerequisite analyzes are met and can be continued.

Hypothesis testing

a. First Hypothesis Test

H₀: Leg muscle strength has no significant relationship with ball shooting results.

H_a: Leg muscle strength has a significant relationship with ball shooting results.

Table 6. First Hypothesis Test

correlation	r_{xy}	Sig	Information
X ₁ with Y	0,597	0,043	Sig

Based on the probability or significance value from the table above, it is known that the relationship between coordination (X₁) and the results of shooting the ball (Y) has a significance value of 0.043 < 0.05 and an r_{xy} value of 0.597, so H₀ is rejected and H_a is accepted so that there is a significant relationship between leg muscle strength. (X₁) with the result of shooting the ball (Y).

Second Hypothesis Test

H₀: Back Muscle Flexibility has no significant relationship with ball shooting results.

H_a: Back Muscle Flexibility has a significant relationship with ball shooting results.

Table 7. Second Hypothesis Test

Correlation	r_{xy}	Sig	Information
X ₂ with Y	0,112	0,0	Sig

Based on the probability or significance value from the table above, it is known that there is a relationship between Back Muscle Flexibility (X2) and the results of shooting the ball (Y), a significance value of $0.005 < 0.05$ and an r_{xy} value of 0.626, then H_0 is rejected and H_a is accepted so that there is a significant relationship between flexibility. Back Muscles (X2) with the result of shooting the ball (Y).

Hypothesis Testing Analysis with Multiple Correlation

H_0 : Leg muscle strength and back flexibility together have an insignificant relationship with the results of shooting the Bangsal 13 fc ball.

H_a : Leg muscle strength and back flexibility together have a significant relationship with the results of shooting the Bangsal 13 fc ball.

Table 8. Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,488 ^a	,238	,020	,815

Based on the model summary table, it is known that the magnitude of the relationship between Leg Muscle Strength and Back Muscle Flexibility (simultaneously) on shooting results calculated by the correlation coefficient is 0.488, this indicates a moderate effect. Meanwhile, the simultaneous contribution or contribution of the Leg Muscle Strength with Back Muscle Flexibility is 23.8%, while 76.2% is determined by other variables.

Discussion

The Relationship Between The Strength Of The Limb Muscles And The Results Of Shooting The Balls Of Ward 13 Fc . Academy Players

The results of the research that have been carried out show that there is a significant relationship between leg muscle strength and the results of shooting the ball, this result is shown based on the Pearson correlation test with an r_{xy} value of 0.597 and a significance value of $0.043 < 0.05$ then H_0 is rejected and H_a is accepted so that there is a significant relationship between Strength leg muscles (X1) with the result of shooting the ball (Y). Based on this statement and complemented by the results of research that has been done, it shows that students who have good coordination can shoot the ball well and smoothly, but on the contrary, leg muscle strength. Bad feet also affect the results of shooting the ball to be not smooth. Thus the results of this study also show that it is important for each student to have and improve leg muscle strength to improve the results of shooting the Bangsal 13 fc ball.

The Relationship Between Back Muscle Flexibility With Shooting Results Of Ward 13 Futsal Academy Athletes

The results of the research that have been carried out show that there is a significant relationship between Back Muscle Flexibility (X2) and the results of shooting the ball (Y) with an r_{xy} value of 0.597 and a significance value of $0.032 < 0.05$, so H_0 is rejected and H_a is accepted so that there is a significant relationship between Back Muscle Flexibility (X2) with the result of shooting the ball (Y). Based on this statement and complemented by the results of research that has been carried out, it shows that students who have good back muscle flexibility can shoot the ball well and smoothly but on the other hand, poor back muscle flexibility also affects the results of shooting the ball to be not smooth and lack of flexibility Back muscles will have an impact on the speed of shooting the ball. Thus the results of this study also show that flexibility of the back muscles is important to be owned and improved by every athlete to improve shooting results for futsal athletes in Bangsal 13 fc.

The Relationship Between Limb Muscle Strength and Back Muscle Flexibility on Shooting Results of Ward 13 Futsal Academy Athletes

Based on the multiple correlation test in the summary model table, it is known that the magnitude of the relationship between Leg Muscle Strength and Back Muscle Flexibility (simultaneously) on the ball shooting results calculated by the correlation coefficient is 0.488, this indicates a moderate effect. Meanwhile, the simultaneous contribution or contribution of the Leg Muscle Strength with Back Muscle Flexibility is 23.8%, while 76.2% is determined by other variables. for example field conditions, exercise intensity, speed, flexibility, endurance, balance.

CONCLUSION

Based on data analysis and discussion in the previous chapter, the following conclusions can be drawn: There is a significant relationship between leg muscle strength and the results of shooting balls for Bangsal 13 fc students. It is known that based on the magnitude of the r_{xy} value of 0.597 and a significance value of $0.043 < 0.05$, H_0 is rejected and H_a is accepted. There is a significant relationship between Back Muscle Flexibility and the results of shooting balls for Ward 13 fc students. It is known that based on the magnitude of the r_{xy} value of 0.597 and the significance value of $0.032 < 0.05$, then H_0 is rejected and H_a is accepted. There is a significant relationship between leg muscle strength and back muscle flexibility with the results of shooting the Bangsal 13 fc ball. It is known that based on the magnitude of the correlation value of 0.488, this indicates a moderate effect. Meanwhile, the simultaneous contribution or contribution of the

Leg Muscle Strength with Back Muscle Flexibility is 23.8%, while 76.2% is determined by other variables.

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