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THE RELATIONSHIP OF BACK FITNESS, MUSCLE STRENGTH ARM AND HAND STRIP ON THE SPEED OF THE O GOSHI TECHNIQUE IN JUDO ATHLETES IN BANDAR LAMPUNG

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ABSTRACT
This study aims to determine how the relationship between back flexibility, arm muscle strength and grip to the speed of o goshi technique strikes on judo athletes in judo bandar lampung. Data retrieval using method descriptive correlational. The sample is 30 people with data collection technique Total Sampling. The data analysis technique uses Normality Test, Homogeneity Test, Linearity Test and Correlation Product Moment. The results showed that (1) the flexibility of the back muscles gave a relationship to the throw speed of the technique O Goshi by 31.3%, (2) the strength of the arm muscles give a relationship to the throw speed of the technique O Goshi by 48.5%, and (3) Grip hand give a relationship to the speed of dings technique O Goshi by 37.0%. While back muscle flexibility, arm muscle strength, and hand grip give a relationship of 64.6% to the slam speed of the technique O Goshi. From the results of this study, it can be concluded that back flexibility, arm muscle strength and hand grip contribute to the kicking speed of the technique O Goshi, and the biggest contribution to the kicking speed of the technique O Goshi is the arm muscle strength of 48.5%.

KEYWORDS: *Speed, Muscle Strength, Flexibility, Technique O Goshi.*

INTRODUCTION
The definition of judo is a branch of martial arts that originates from Japan and has become a popular sport today, Kadir (2013). Judo is a competitive sport that relies on good back flexibility and arm muscle strength to throw. The development of Judo sport development in Indonesia is very rapid, which can be seen from the many regional and national level championships held in Indonesia. As well as many clubs Judo in colleges and schools.

There are several throwing techniques in judo that judo players must learn, judo throwing techniques, namely:

1. Te-Waza (hand throwing or slamming technique).
2. Koshi-Waza (throwing or slamming technique with the pelvis).
3. Ashi-Waza (throwing or slamming technique with the feet).
4. Sutemi-Waza (throwing or slamming technique by dropping yourself).
5. Yoko-Sutemi-Waza (throwing or slamming technique by throwing yourself to the side).

The O Goshi throwing technique is a throwing technique with the whole hip (large Hip Throw). Researchers will specialize in research on the relationship between back flexibility, arm muscle strength and hand grip on throwing speed in the O Goshi technique in Bandar Lampung Judo Athletes aged 16-20 years. Based on observations, researchers saw that several judo athletes from Bandar Lampung when competing were athletes who used the O Goshi throwing technique. Researchers looking during randori found a judo player throwing a kick using the O Goshi technique and producing an ippon. Therefore, researchers tried to examine what physical factors support the success of this technique so as to produce a perfect kick.

METHODOLOGY
In this research, researchers used descriptive correlational research methods. This method was used because this research is related to information parables that describe existing symptoms. Especially regarding the relationship between back flexibility, arm muscle strength and hand grip strength on the speed of the O Goshi kick in Bandar Lampung judo athletes aged 16-20 years. Correlation research is research to determine the relationship and level of relationship between two or more variables without any attempt to influence these variables so that there is no variable manipulation, Frankel and Wallen (2008). The existence of relationships and levels of these variables is important because by knowing the level of relationships that exist, researchers will be able to develop them in accordance with the research objectives.

Population is an area consisting of objects that have certain quantitiesand characteristics determined by researchers to be studied and the possibility of drawing conclusions. The population in this study was 30 Bandar Lampung Judo athletes (Sugiyono et al., 1992). The sample is a part or representative of the population studied, Arikunto et al. 2010). To determine the sample size if the subjects are less than 100 is better to take all. Furthermore, if the number of subjects is large, between 10

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– 15% or 20 – 25% or more can be taken. In this research, the sampling method is by total sampling, namely including all individuals or members of the population as samples, (Arikunto et al., 2010). The sample in this study was 30 Bandar Lampung judoka using a total sampling technique.

A research variable is an attribute or trait or value of a person, object or activity that has certain variations determined by the researcher to be studied and then conclusions drawn, (Sugiyono et al., 2017).
In this research the variables consist of:
Independent Variable
An independent variable is a variable whose value does not depend on other variables. In this study, there are two independent variables, namely:
1. Back Flexibility (X1)
2. Arm Muscle Strength (X2)
3. Hand Grip Strength (X3)

Dependent Variable
The dependent variable is a variable whose value depends on other variables, in this study the dependent variable is the O Goshi Technique's Throwing Speed (Y).

Normality test
The step before testing the hypothesis is to first test the requirements. Data analysis using the normality test, namely using the Liliefors test, (Sudjana et al.,2005). The purpose of the normality test is to find out whether the distribution is normal or not.

Homogeneity test
In addition to testing the distribution of values to be analyzed, it is necessary to test homogeneity to be sure that the groups that form the sample come from a homogeneous population. Homogeneity was sought using the F test.

Linearity test
The linear test is a test used to find out whether the independent variable and the dependent variable are linear or not. This test can be used as a requirement in correlation or linear regression analysis. The linearity test is intended to test whether the data being analyzed is linear or not, (Sudjana et al., 2003).
Product moment correlation
To find the relationship between each predictor and the dependent variable in testing the hypothesis between X1,X2,X3 and Y, statistics are used through product moment correlation, (Arikunto et al., 2010).

RESULTS AND DISCUSSION

Research objectives can be achieved by collecting data from each research variable. The data collected in this study consisted of three independent variables, namely: back flexibility, arm muscle strength, and hand grip strength as well as one dependent variable, namely the kicking speed of the O Goshi technique. The summary of the overall data description is presented in table form as follows:

Table 1. Description of data from measurements of back flexibility, arm muscle strength, hand grip strength and kicking speed in the O Goshi technique

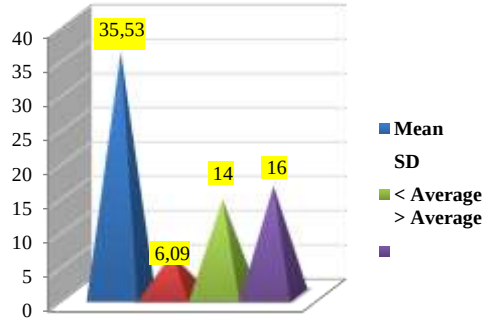
Variable				
Result	**Flexibility Back**	**Strength Arm**	**Strength Grip**	**Slam**
Average	35,43	28,90	34,03	1,36
SD	6,09	8,67	6,65	0,08
< Average F	14	17	16	15
%	46,67%	56,67%	53,33%	50%
> Average F	16	13	14	15
%	53%	43,33%	46,67%	50%

The following is a partial explanation of the research results of each variable including the average, standard deviation, number of students who are below the class average and the number of students who are above the class average:

Back flexibility of bandar lampung judo athletes

The results of research and measurements on back flexibility variables in Bandar Lampung Judo athletes show that the average flexibility class is 35.53. The standard deviation of flexibility is 6.09 athletes who are below the class average by 14 (46.67%) and athletes who are above the class average by 16 (53.33%). So that can be depicted through a bar chart as follows:

Fig 1. Bar diagram of back flexibility of Bandar judo athletes Lampung



Arm muscle strength of bandar lampung judo athletes

The results of research and measurements on arm muscle strength variables in Bandar Lampung Judo athletes show that the average strength class is 28.90. The standard deviation of strength is 8.67 athletes who are below the class average as many as 17 (56.67%) and athletes who are above the class average as many as 13 (43.33%). So it can be depicted through a bar chart as follows:

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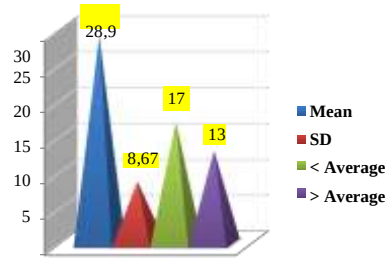
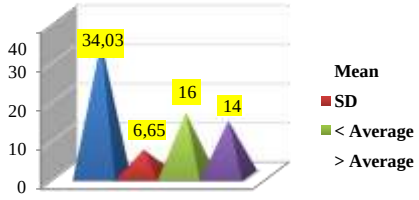
Fig 2. Bar diagram of arm muscle strength of judo athletes Bandar Lampung



Grip strength of bandar lampung judo athletes

The results of research and measurements on hand grip strength variables in Bandar Lampung Judo athletes show that the average hand grip strength class is 34.03. The standard deviation of hand grip strength is 6.65 for athletes who are below the class average of 16 (53.33%) and athletes who are above the class average is 14 (46.67%). So it can be described via a bar chart as follows:

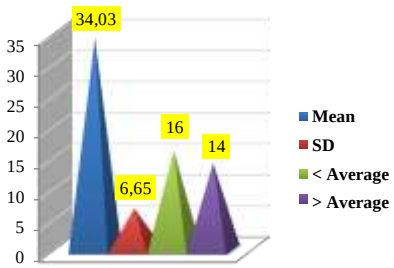
Fig 3. Bandar judo athlete's hand grip strength bar diagram Bandar Lampung



Speed of throwing technique of o goshi judo athlete bandar lampung

The results of research and measurements on the variable speed of the o goshi technique in Judo athletes in Bandar Lampung show that the average class speed of the o goshi technique is 1.36. The standard deviation of the slamming speed of the o goshi technique is 0.08 for athletes who are below the class average by 15 (50%) and athletes who are above the class average by 15 (50%). So that it can depicted through a bar chart as follows:

Fig 4. Bar diagram of the throwing speed of the o goshi technique of judo athletes in Bandar Lampung



Data analysis is used to answer the proposed hypothesis. Before data analysis is carried out, it is necessary to test the prerequisites for analysis, namely normality, homogeneity and linearity tests. The results of the prerequisite tests and hypothesis tests can be seen as follows:

Normality test

To test the normality of the data, use a normality test known as the Lilliefors test, (Sudjana et al., 2002). If L count < L table it means the data is normally distributed and otherwise the data is not normally distributed (Sudjana et al., 2002). The results of the normality test are as follows:

No	Variable	L Count	L Table	Conclusion
1	Flexibility Back	0,118	0,220	Normal
2	Muscle Arm	0,108	0,195	Normal
3	Strength Hand Grip	0,077	0,206	Normal
4	Speed slam O Goshi	0,146	0,195	Normal

Homogeneity test

The homogeneity test is carried out to obtain information whether the two sample groups have homogeneous variances or not. The results of homogeneity calculations are presented in the following table:

Table 3. Homogeneity test

No	Data	F Count	F table	Conclusion
1	Back flexibility - Slam Speed	1,000	1,861	Homogen
2	Arm muscle strength - Slam Speed	1,000	1,861	Homogen
3	Hand grip strength - Slam Speed	1,000	1,861	Homogen

To find out which variables have the same variance, the test carried out is by comparing the largest variance and the smallest variance from each group so that the calculated F value is obtained using the test criteria if the calculated F value is < F table.

So both data are homogeneous or come from the same variance. It turns out that the test results show that F count < F table, so the two variances are homogeneous.

Linearity test

The linearity test is a test to determine whether the form of relationship between the independent variable and the dependent variable is linear. To test the linearity of the regression line with the F test and based on the calculations, the following results are obtained:

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Table 4. Linearity Test

No	Variabel	F Count	F table	Conclusion
1	Back flexibility - Slam Speed	1,003	2,482	Linier
2	Arm muscle strength - Slam Speed	0,686	2,685	Linier
3	Hand grip strength -Slam Speed	1,342	2,533	Linier

Data Analysis

Relationship of back flexibility to kicking speed in the o goshi technique

Based on the data analysis obtained, the correlation value (R) is 0.560 (there is a positive/moderate relationship between back flexibility and the speed of the o goshi technique) and the percentage influence of the independent variable on the dependent variable is explained, which is called the coefficient of determination which is the result of squaring R. From the data analysis, a coefficient of determination (R^2) was obtained 0.313, which means that the relationship between the independent variable (back flexibility) and the bond variable (o goshi technique slamming speed) is 31.3%, while the rest is influenced by other variables.

Relationship between arm muscle strength and throwing speed o goshi technique Based on data analysis, the correlation/relationship value (R) was obtained, namely 0.697 (there is a positive/strong relationship between arm muscle strength and the speed of the o goshi technique) and the percentage influence of the independent variable on the dependent variable is explained, which is called the coefficient of determination which is the result. from squaring R. From the data analysis, a coefficient of determination (R^2) was obtained of 0.485, which means that the relationship between the independent variable (arm muscle strength) and the dependent variable (o goshi technique slamming speed) is equal to 48.5%, while the rest is influenced by other variables.

Relationship between hand grip strength and speed o goshi technique slam Based on data analysis, the correlation/relationship value (R) was obtained, namely 0.608 (there is a positive/strong relationship between hand grip strength and the slamming speed of the o goshi technique). The percentage of influence of the independent variable on the dependent variable is called the coefficient of determination which is the result of squaring R. From the analysis of this data, a coefficient of determination (R^2) of 0.370 is obtained, which means that the relationship between the independent variable (hand grip strength) and the dependent variable (technical slam speed o goshi) is as big as 37.0%, while the rest is influenced by other variables.

The relationship between back flexibility, arm muscle strength and hand grip strength with kicking speed in the o goshi technique. Based on data analysis, it was obtained that the correlation/relationship value (R) was 0.804 (there is a positive/very strong relationship between back flexibility, arm muscle strength and hand grip strength and the speed of the o goshi technique) and explained the percentage influence of the independent variable on the variable. The dependent variable is called the coefficient of determination which is the result of squaring R. From the data analysis, a coefficient of determination (R^2) of 0.646 is obtained which means that the influence/contribution of the independent variables (back flexibility, arm muscle strength and hand grip strength) on the dependent variable (speed o goshi technique slam) is 64.6%, while the rest is influenced by other variables.

Flexibility is a very important and necessary element in all sports. Because flexibility supports the quality of allowing a joint segment to move as much as possible according to the possibility of movement (the width of the joint) thus allowing a muscle or group of muscles to contract in a position of maximum shortening and lengthening. Flexibility is very much needed in performing good judo kicks because almost all judo throwing techniques are based on the biomotor component of flexibility (Kadir et al., 2013).

From the results of the data analysis that has been carried out, it can be concluded that there is a significant relationship between back flexibility and the speed of the O Goshi technique in Bandar Lampung Judo athletes. Flexibility is very important in Judo, especially in performing the O Goshi throwing technique skill when the athlete pulls the opponent's hand and sweeps the opponent's leg, then good back flexibility will smooth out the O Goshi throwing movement. From the results of testing the second hypothesis, it was found that arm muscle strength had a significant relationship with the throwing speed of the O Goshi technique in Bandar Lampung Judo athletes. This finding means that the better the arm muscle strength, the better the throwing speed of the O Goshi technique in Judo athletes, conversely, the less arm muscle strength, the less optimal the throwing ability will be.

O Goshi's good throwing skills will be even better if they are supported by other physical factors possessed by the athlete or judoka. The physical factor is arm muscle strength. With good arm muscle strength, the athlete's strength to pull, push or lift during a slam will become easier.

In Judo, arm muscle strength plays an important role in the application of Judo techniques, especially the O Goshi kick. So good arm muscle strength can make judo athletes feel confident in being able to produce maximum kicks and be able to knock down opponents. The results of research conducted on hand grip strength variables show that there is a significant relationship to the speed of the O Goshi technique in Judo athletes in Bandar Lampung. Strength is defined as a component of a person's physical condition, the ability to use muscles to accept loads while working, then grip is the grip of the hand to hold.

Hand grip strength in this study is the effort of the hand muscles to provide strength when holding the opponent's judogi. In a match, each judo player has different grip characteristics. Commonly used grip techniques are two-handed grip and one-

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handed grip. This grip technique is an indication of the type of judo player himself, namely the attack, defense and counterattack type. The grip is one of the stages in performing a judo technique. In other words, the grip influences the next movement.

Meanwhile, the combination of the independent variables of back flexibility, arm muscle strength, and hand grip above shows that there is a significant relationship to the speed of the O Goshi kick in Bandar Lampung judo athletes at 52.2%.

CONCLUSION

Based on data analysis and the previous discussion, the following conclusions can be drawn: there is a significant relationship between back flexibility and throwing speed in the o goshi technique in bandar lampung judo athletes, there is a significant relationship between arm muscle strength and throwing speed in the o goshi technique in bandar lampung judo athletes. There is a significant relationship between hand grip strength and throwing speed in the o goshi technique in bandar lampung judo athletes, there is a significant relationship between back flexibility, arm muscle strength, and big hand grip strength on the throwing speed of the o goshi technique in bandar lampung judo athletes, arm muscle strength has a greater relationship to the speed of the o goshi technique in judo athletes in bandar lampung.

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