



## **The Correlation Between Balance And Lower Limb Power With The Speed Of Naeryo Chagi Kick In Taekwondo**

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### **Abstract**

This study aims to determine the relationship between balance and leg muscle power to Naeryo Chagi's kick speed in Taekwondo Club Nawesena athletes in Bandar Lampung City. The research method used a correlational approach with a sample of 30 athletes. The instruments used included a balance test with a standing stroke test, leg muscle power with a vertical jump, and Naeryo Chagi's kick speed with a stopwatch for 15 seconds. The results showed that there was a significant relationship between balance and Naeryo Chagi's kick speed ( $r_{count} = 0.441 > r_{table} = 0.374$ ) and between leg muscle power and Naeryo Chagi's kick speed ( $r_{count} = 0.525 > r_{table} = 0.374$ ). Simultaneously, balance and leg muscle power were also significantly related to Naeryo Chagi's kick speed ( $r_{count} = 0.687 > r_{table} = 0.374$ ) with a contribution of 47.19%.

**Keywords:** Balance, Leg Muscle Power, Kick Speed, Naeryo Chagi, Taekwondo

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## **INTRODUCTION**

Sport is a form of planned and structured human physical activity, involving repeated body movements to achieve good physical and mental results. People who engage in sports require a supportive physical condition so that the activity can run smoothly and achieve the desired results. Sport is a body movement that has an effect on the body as a whole and helps stimulate muscles and other body parts (Prima, 2024). One type of competitive sport that is very diverse is taekwondo, a martial art that has become very popular in Indonesia and has developed over the years. Taekwondo is a martial art originating from South Korea that has developed in Indonesia and has even spread throughout the world. As a result, taekwondo is increasingly popular among the public, including the younger generation.

In the sport of taekwondo, there are various kicking techniques. One of the kicking techniques often used in taekwondo is naeryo chagi. This technique is a choice, this kick targets the head and if this kick is done well, it is not difficult to score. Kick by lifting the leg as high as possible through the outside, inside, or directly upwards (front), towards the target.

Where the targets are the head, shoulder blades and head (Suryadi, 2003). Meanwhile, according to Sryana et al. (2004) Naeryo Chagi is a hoe kick, a kick with a straight leg (knees are not bent) targeting the head/shoulders. To achieve the goal of the Naeryo Chagi kick, namely kick speed, the leg muscle power factor plays a big role so that the legs will be able to move quickly because there is strong muscle power to perform muscle contractions quickly. Many athletes kick Naeryo Chagi strongly but not quickly and often when kicking their body position leans backwards or to the side which can cause them to fall due to lack of balance and also to avoid injury (Kamisopa, 2017). The Naeryo Chagi kick requires balance training aimed at enhancing muscle tone and plays a significant role in shaping posture and movement. Balance training also plays a significant role in growth, agility, and performance (Tisnowati & Moekarto, 2005). The principle of training is part of the training used to improve performance (Dinata, 2005).

Based on the results of observations conducted by researchers at the Nawasena Taekwondo Club in Lampung, problems with balance and power were found when performing the Naeryo Chagi kick. The taekwondo athletes appeared to have difficulty maintaining balance and lacked sufficient power when performing the Naeryo Chagi kick. This resulted in less than optimal kick speed. Motivated by the problems found during the observations, researchers saw that there were problems at the Nawasena Taekwondo Club in Lampung, namely a lack of balance, power, and speed in performing the Naeryo Chagi kick. There is a saying that athletes will compete according to what they are trained to do (Dinata, 2003).

With power, you can also perform as many kicks as possible without expending a lot of energy and accompanied by the correct technique. In addition to balance and power, speed is also one of the abilities needed in the sport of taekwondo. Thus, good speed will enable athletes to perform kicks, especially Naeryo Chagi, optimally. The problem that has existed so far is that in Naeryo Chagi kicks, there is a lack of kick speed in matches. And the kicks that are performed are not optimal due to lack of power so that they only touch the body protector. Based on the description above, the author is interested in conducting research on "The Relationship Between Balance and Leg Muscle Power to the Speed of Naeryo Chagi Kicks in Taekwondo."

## **METHOD**

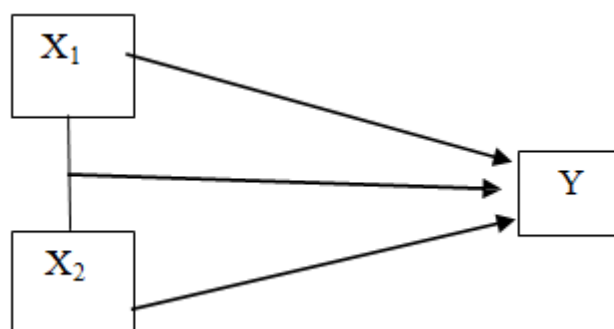
A method is a systematic way used to achieve a goal so that a method is achieved that functions as a tool to achieve the goal (Dinata, 2018). The research method used is

quantitative with correlation studies, namely a study that collects data obtained from the results of recording and measurements consisting of balance, leg muscle strength, and the speed of the Naeryo Chagi kick. The research method is basically a scientific way to obtain data with a specific purpose and use (Sugiyono, 2022).

The population to be used for this study is the Nawasena Taekwondo Club in Bandar Lampung, which consists of 30 athletes. The population of the NAWASENA Taekwondo Club in Bandar Lampung is 30 athletes. The sampling technique in this study is random sampling, which is a technique or method of taking samples from members of the population that is carried out randomly without considering the strata within the population. Simple random sampling is used because each member of the population has an equal opportunity to be selected, so the sample results are more representative and reliable. This method is also easy to understand and apply, especially for relatively homogeneous or small populations. (Sugiyono, 2020).

This research was conducted at a taekwondo dojang in Bandar Lampung, specifically at the Nawasena Dojang Club on Jl. Lieutenant Colonel H Jl. Endro Suratmin, Sukarame, Sukarame District, Bandar Lampung City. The research was conducted for one day on May 1, 2025. This study used independent variables as causal factors. The independent variables in this study were balance ( $X_1$ ) and leg muscle power ( $X_2$ ). Then, the dependent variable was used as a consequence or effect factor. The dependent variable in this study was Naeryo Chagi's kicking speed ( $Y$ ).

The resulting correlation coefficient indicates the level/degree of relationship between balance and leg muscle power with Naeryo Chagi's kicking speed in taekwondo. The research design diagram used is as follows:



**Figure 1.** Research Design

Description:

$X_1$ : Balance

$X_2$ : Leg muscle power

$Y$ : Naeryo Chagi kick speed

The data obtained in this study are the results of measurements, namely a balance test with balance ability units of minutes, a leg muscle test with a vertical jump unit of kg, and a Naeryo Chagi kick speed test with a test speed instrument unit of seconds, which are then processed in Microsoft Excel. The instruments in this study were balance test measurements using the Standing Stroke Test, leg muscle power test measurements using the Vertical Jump, and Measurement of Naeryo Chagi's kick speed using Performance Assessment.

The data analysis method used to process the data obtained from the balance test results (X1), leg muscle power (X2), and Naeryo Chagi's kicking speed (Y) was correlational analysis. This data analysis technique was directed at testing the proposed hypothesis and answering the problem formulation.

If the calculated L statistic value < L table at the 5% significance level, then the null hypothesis (H<sub>0</sub>: the data is normally distributed) is not rejected, meaning the data can be assumed to come from a normally distributed population.

$$F_{reg} = \frac{RK_{res}}{RK_{reg}}$$

Description:

F: The value of the f-number of the regression line

F<sub>k reg</sub>: The square value of the regression line

F<sub>k res</sub>: The square value of the residual line

F value is then compared with the table value. At a significance level of 5%, the regression is said to be linear if the observed F value is smaller than the table F value.

To test the hypothesis between X1 and Y, statistics were used through person-product-moment correlation with the following formula:

$$r_{x_1y} = \frac{n\sum x_1y - (\sum x_1)(\sum y)}{\sqrt{[n\sum x_1^2 - (\sum x_1)^2][n\sum y^2 - (\sum y)^2]}}$$

Description:

$r_{x_1y}$  = Correlation coefficient n = Number of samples

X<sub>1</sub> = Variable score

X<sub>1</sub>Y = Variable score Y

$\sum X_1$  = Total score of variable  $X_1$

$\sum Y$  = Total score of variable  $Y$

$\sum X_1^2$  = Total score of variable  $X_1^2$

$\sum Y^2$  = Total score of variable  $Y^2$

To test the hypothesis between  $X_2$  and  $Y$ , statistics are used through person product moment correlation with the following formula:

$$r_{x_2y} = \frac{n\sum x_2y - (\sum x_2)(\sum y)}{\sqrt{[n\sum x_2^2 - (\sum x_2)^2][n\sum y^2 - (\sum y)^2]}}$$

Description:

$r_{x_1y}$  = Correlation coefficient  $n$  = Number of samples

$X_1$  = Variable score

$X_1Y$  = Variable score  $Y$

$\sum X_1$  = Total score of variable  $X_1$

$\sum Y$  = Total score of variable  $Y$

$\sum X_1^2$  = Total score of variable  $X_1^2$

$\sum Y^2$  = Total score of variable  $Y^2$

According to Riduwan (2005:144), to test the hypothesis between  $X_1$  and  $X_2$  to  $Y$ , the  $F$  statistic is used through a multiple correlation model between  $X_1$  and  $X_2$  to  $Y$  with the formula:

$$R_{y.x_1x_2} = \sqrt{\frac{r_{yx_1}^2 + r_{yx_2}^2 - 2r_{yx_1}r_{yx_2}r_{x_1x_2}}{1 - r_{x_1x_2}^2}}$$

Description:

$R_{XXY}$  = Multiple correlation coefficient between variables  $X_1$  and  $X_2$

$1\ 2$  = together with variable  $Y$

$r_{X1Y}$  = Correlation coefficient of  $X_1$  with  $Y$

$r_{X2Y}$  = Correlation coefficient of  $X_2$  with  $Y$

$r_{X1X2}$  = Correlation coefficient of  $X_1$  with  $X_2$

$r_{X1Y}^2$  = Squared correlation coefficient of  $X_1$  with  $Y$

$r_{X2Y}^2$  = Squared correlation coefficient of  $X_2$  with  $Y$

$r_{X1X2}^2$  = Squared correlation coefficient of X1 with X2

The presence or absence of a positive relationship between variables, and the strength of the relationship is indicated by the value of the correlation coefficient. If the correlation coefficient is 0, then there is no linear relationship between the two variables. To interpret the strength of the relationship between variables X and Y, the following table can be used as a guideline:

**Table 1.** Guidelines for Providing Correlation Coefficients

Coefficient Interval	Relationship Level
0,00-0,199	Very Low
0,20-0,399	Low
0,40-0,599	Moderate
0,60-0,799	Strong
0,80-1,000	Very Strong

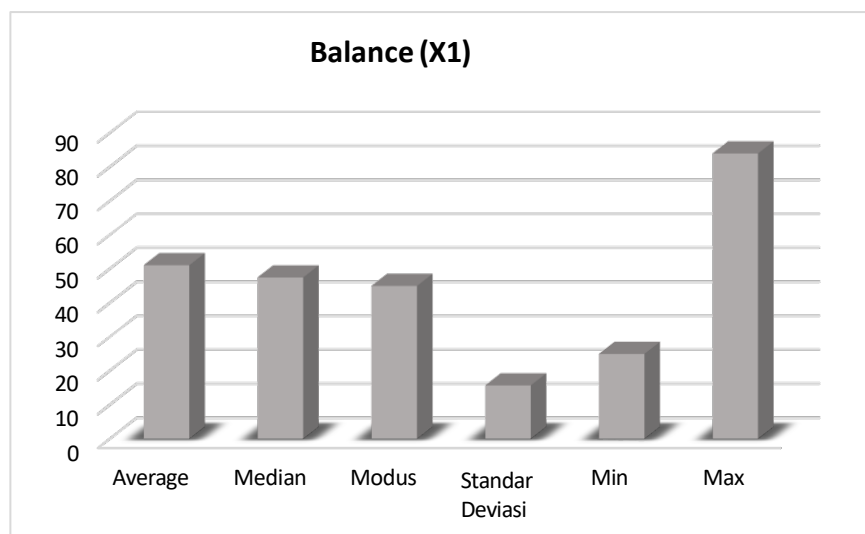
## RESULTS AND DISCUSSION

### Result

The data obtained from each variable were then grouped and analyzed statistically, as shown in the appendix. A summary of the overall data description is presented in the following table:

**Table 2.** Balance, Leg Muscle Power, and Kicking Speed of Naeryo Chagi

No	Result	Variable		
		Balance (X1)	Leg Muscle Power (X2)	Kicking Speed of Naeryo Chagi (Y)
1	Mean	51,1	46,167	24,4
2	Median	47,5	45	24,5
3	Mode	45	43	26
4	Standard Deviation	15,729	6,395	4,431
5	Minimum	25	36	20
6	Maximum	84	62	28



**Figure 2.** Balance bar chart

The results of the research and measurements on the balance variable show that the average balance score was 51.1, with 15 athletes below the average score, 15 athletes above the average score, a median of 47.5, a mode of 45, a standard deviation of 15.729, a minimum score of 25, and a maximum score of 84.

**Table 6.** Equilibrium Frequency Distribution

No	Category	Frequency(f)	Percentage (%)
		L	L
1	Very good	12	40%
2	Good	14	47%
3	Average	4	13%
4	Poor	0	0%
5	Very poor	0	0%
<b>Total</b>		<b>30</b>	<b>100%</b>

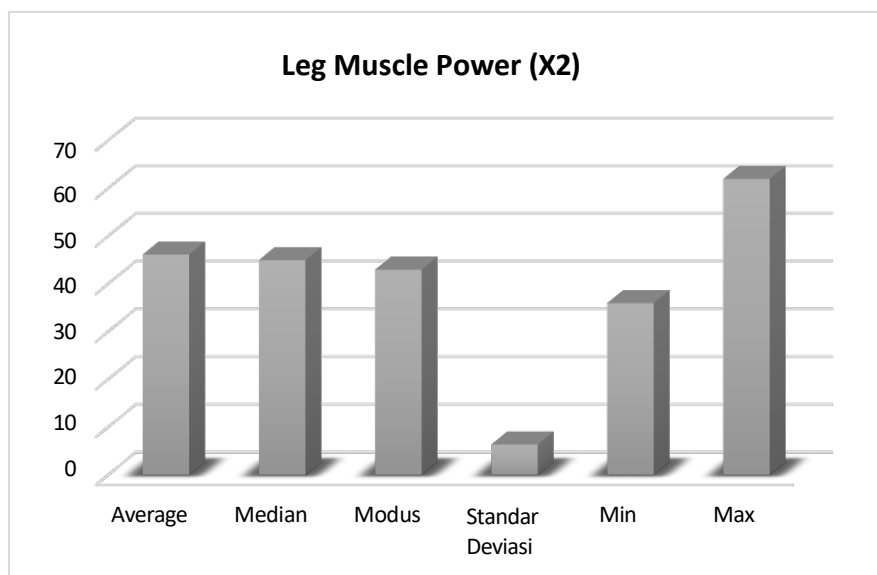


Figure 3. Bar Chart of Leg Muscle Power

The results of the research and measurements on the leg muscle power variable show that the average leg muscle power was 46.1, the median was 45, the mode was 43, the standard deviation was 6.395, the minimum value was 36, and the maximum value was 62.

Table 7. Frequency Distribution of Leg Muscle Power

No	Category	Frequency(f)	Percentage (%)
		L	L
1	Very good	2	7%
2	Good	5	17%
3	Average	19	63%
4	Poor	4	13%
5	Very poor	0	0%
<b>Total</b>		<b>30</b>	<b>100%</b>

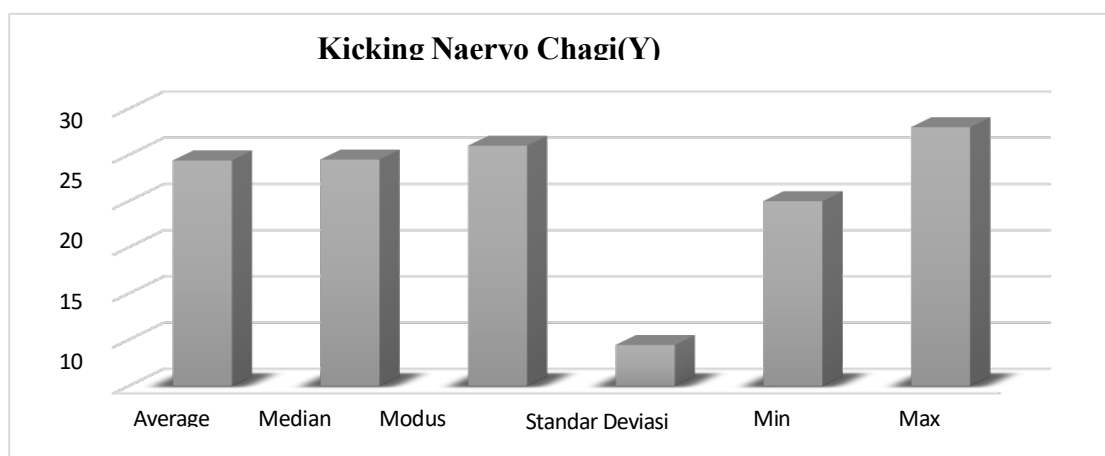


Figure 4. Bar Chart of Leg Muscle Power

The results of research and measurements on Naeryo Chagi's kick speed variable show that the average speed is 24.4, the median is 24.5, the mode is 26, the standard deviation is 4.431, the minimum value is 20, and the maximum value is 28.

**Table 8.** Frequency Distribution of Naeryo Chagi's Kick Speed

No	Category	Frequency(f)	Percentage (%)
		L	L
1	Very good	15	50%
2	Good	15	50%
3	Average	0	0%
4	Poor	0	0%
5	Very poor	0	0%
<b>Total</b>		<b>30</b>	<b>100%</b>

**Table 9.** Normality Test

No	Variable	L <sub>value</sub>	L <sub>table (0,05)</sub>	Conclusion
1	Balance (X1)	0,154	0,161	Normal
2	Leg Muscle Power (X2)	0,155	0,161	Normal
3	Naeryo Chagi Kick (Y)	0,08	0,161	Normal

Based on the results of the normality test in the table above, the balance variable data shows a calculated L value of  $0.154 < L_{table} = 0.161$ , the leg muscle power variable data shows a calculated L value of  $0.155 < L_{table} = 0.161$ , and the kick variable data for Naeryo Chagi shows a calculated L value of  $0.08 < L_{table} = 0.161$ . Therefore, it can be concluded that all data variables are normally distributed.

**Table 10.** Linearity Test

No	Variable	F <sub>value</sub>	F <sub>table</sub>	Conclusion
1	Balance – Naeryo Chagi Kick	0,921	5,77	Linier
2	Leg Muscle Power – Naeryo Chagi Kick	4,897	5,77	Linier

Based on the results of the linearity test in the table above, the data for Naeryo Chagi's balance and kick variables show a calculated F value of  $0.921 < F_{table} = 5.77$ , and the data for Naeryo Chagi's leg muscle power and kick variables show a calculated F value of  $4.897 < F_{table} = 5.77$ . Therefore, it can be concluded that there is a linear relationship between the two variables in all data.

Table 11. Correlation between Balance (X1) and Naeryo Chagi's Kicking Results (Y)

Correlation	r <sub>Value</sub>	r <sub>table</sub>	Criteria	Description
X1 - Y	0,441	0,374	Currently	Significant

The significance of the correlation coefficient was tested by comparing  $r_{x1.y} = 0.441$  with  $r(0.05)(28) = 0.374$ . Since the correlation coefficient between  $r_{x1.y} = 0.441 > r(0.05)(28) = 0.374$ , the correlation coefficient is significant. Therefore, the hypothesis "There is a relationship between balance and Naeryo Chagi kicking results in Taekwondo Club Nawasena Lampung athletes" is accepted.

**Table 12.** Correlation between Leg Muscle Power (X2) and Naeryo Chagi Kicking Results (Y)

Correlation	r <sub>Value</sub>	r <sub>table</sub>	Criteria	Description
X2 - Y	0,525	0,374	Currently	Significant

The significance of the correlation coefficient was tested by comparing  $r_{x1.y} = 0.525$  with  $r(0.05)(28) = 0.374$ . Since the correlation coefficient between  $r_{x1.y} = 0.525 > r(0.05)(28) = 0.374$ , the correlation coefficient is significant. Therefore, the hypothesis "There is a relationship between leg muscle power and the results of Naeryo Chagi kicks in Taekwondo Club Nawasena Lampung athletes" is accepted.

**Table 13.** Correlation of Balance (X1) and Leg Muscle Power (X2) with the Results of Naeryo Chagi Kicks (Y)

Correlation	r <sub>Value</sub>	r <sub>table</sub>	F <sub>Value</sub>	F <sub>table</sub> (0,05,2;27)	Description
X1 and X2 - Y	0,687	0,374	12,066	3,354	Significant

Because the calculated F value = 12.066 > F table = 3.354, Ho is rejected, meaning simultaneously/together "There is a significant relationship between balance and leg muscle power and the results of the Naeryo Chagi kick in the Taekwondo Club Nawasena Lampung athletes.

## **Discussion**

The results of the correlation analysis showed that there was a significant relationship between balance and the speed of the Naeryo Chagi kick in the Taekwondo Club Nawasena Lampung athletes, with a calculated  $r$  value of 0.441 which was greater than the  $r$  table of 0.374. This finding illustrates that the better the balance ability of the athlete, the greater the opportunity to produce a fast and stable kick. Physiologically, balance is the ability of the neuromuscular system to maintain the body's position correctly when still (static balance) and when moving (dynamic balance) (Suharjana, 2013). In the Naeryo Chagi kick, balance plays an important role when one leg functions as a support, while the other leg moves to swing the kick. Poor balance can cause the body to lose stability so that the direction and speed of the kick are less than optimal.

The correlation analysis showed a calculated  $r$  value of  $0.525 > r$  table 0.374, indicating a significant relationship between leg muscle power and Naeryo Chagi's kick speed. This finding indicates that the higher an athlete's leg muscle explosiveness, the greater their ability to execute a high-speed kick. Leg muscle power is the muscle's ability to exert maximum force in a short period of time (Harsono in Ariansyah et al., 2017). In the Naeryo Chagi movement, leg muscle power is required from the initial phase of lifting the leg, through the swing phase, and the impact phase on the target. High explosive power allows the leg to move quickly while applying strong pressure on the target. This finding aligns with the theory of Pratomo and Gumantan (in Rahmalia, 2021), which emphasizes that leg muscle explosive power is the result of the synergy of muscle strength and speed, enabling athletes to perform explosive movements. Exercises such as squat jumps, plyometrics, and vertical jumps have been shown to improve this ability.

The results of the simultaneous analysis showed a calculated  $r$  value of  $0.687 > r$  table 0.374 with a contribution of 47.19%. This means that almost half of the variation in Naeryo Chagi's kick speed in Taekwondo Club Nawasena Lampung athletes can be explained by a combination of balance and leg muscle power factors. These two independent variables complement each other. Balance provides body stability so that movements can be executed precisely, while leg muscle power provides explosive power to accelerate the leg movement towards the target. Without good balance, leg muscle power cannot be channeled effectively. Conversely, without adequate power, good balance will not produce optimal kick speed.

## CONCLUSION

Based on the research results and discussion, this study can conclude that: There is a relationship between balance and the results of Naeryo Chagi's kicks. There is a relationship between leg muscle power and Naeryo Chagi's kicks. There is a relationship between balance and leg muscle power and the speed of Naeryo Chagi's kicks.

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