



## The Correlation Between Leg Muscle Explosive Power and Long Jump Performance Using the Hang Style in Fifth-Grade Male Students at Dendeng Public Elementary School, Kupang Regency

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Correlation, Conference, Explosive Coefficient, Long Jump, Muscle, Power, Long

### Abstract

This study aims to determine the correlation between leg muscle explosive power and long jump performance using the hang style among fifth grade students of SDN Dendeng. The research employed a correlational method with a quantitative approach. The sample consisted of fifth grade students selected through purposive sampling. The instrument used to measure leg muscle explosive power was the vertical jump test, while long jump performance was measured by the students' best jump results. Data were analyzed using the Product Moment correlation test. The results of the study indicate that there is a significant relationship between leg muscle explosive power and long jump performance in the hang style. The correlation coefficient obtained falls into the strong category, meaning that the better the students' leg muscle explosive power, the higher their long jump performance. Thus, it can be concluded that leg muscle explosive power plays an important role in supporting students' achievement in long jump using the hang style.



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### INTRODUCTION

Physical education, sports, and health are an integral part of education as a whole (Sientop & Van der Mars, 2022). They aim to develop aspects of physical fitness, motor skills, critical thinking skills, social skills, reasoning abilities, and healthy lifestyle behaviors. The introduction to a clean environment through physical education, sports, and health activities is systematically planned in order to achieve national education goals (Jerver, 2009; Rahmat, 2015; Sientop & Van der Mars, 2022).

Physical education, sports, and health play a very important role by providing students with opportunities to be directly involved in various learning experiences through systematically conducted physical activities (Mardela, 2019; Meriyanto, Nurrochmah, & Heynoek, 2016; Muchlisa,

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2017). These learning experiences are directed toward fostering physical growth and better psychological development, while also shaping a healthy and fit lifestyle throughout life.

One of the materials taught in Physical Education, Sports, and Health for Grade V students at Dendeng Public Elementary School, Kupang Regency, is athletics, specifically the long jump event. The long jump requires strong leg muscle explosive power. The hang style (walking in the air style) in the long jump has unique characteristics that demand explosive leg muscle power to produce a strong take-off and achieve optimal flight in the air. A powerful take-off is influenced by several factors, namely the support phase, body posture in the air, and landing.

This study aims to determine the ability of Grade V male students at Dendeng Public Elementary School to perform the hang style long jump with precision and accuracy in order to produce their best jump performance.

## **METHOD**

This study employed a descriptive quantitative research method by collecting, processing, analyzing, and presenting data based on numerical data objectively in order to explore and reveal the correlation between lower limb explosive power and long jump performance using the hang style (Mulyadi, 2011).

The description of the ability of fifth-grade male students at SDN Dendeng in performing the hang-style long jump was measured based on the jumping distance achieved. The data collection technique used in this study was observation through testing the students' lower limb explosive power in relation to their long jump performance (Abdillah, 2024). The jump results were analyzed using the Product Moment correlation formula (Sugiyono, 2024).

## **RESULT AND DISCUSSION**

The results of observations on the long jump achievements of male students in grade V of SDN Dendeng are as follows:

**Table 1.** Results of the Leg Muscle Explosive Power Test for the Long Jump

No	Student Name	Without Achievement	Achievement	Difference (X)	Lompat Jauh
1	AR	155	183	28	264
2	GR	165	194	29	225
3	RM	150	188	38	300
4	MR	168	200	32	217
5	SF	168	213	45	298
6	RN	174	215	41	276
7	DR	145	173	28	275
8	OC	166	198	32	263
9	DS	170	199	29	212
10	MK	176	206	30	224
11	TD	173	211	38	255
12	LE	164	198	34	254
13	MN	160	187	27	165
14	AF	168	195	27	218

15	DL	158	192	34	207
16	NF	162	204	42	218

Based on the above data, a descriptive statistical analysis was conducted to determine the results of the vertical jump and long jump measurements. The results of the descriptive statistical analysis of the long jump results are as follows:

**Table 2.** Descriptive Analysis

Statistics	Vertical Jump	Long jump
N	16	16
Mean	32.88	241.94
Std. Deviation	6.58	36.90
Minimum	20	165
Maximum	45	300

Based on the results of the descriptive statistical analysis, the students' Vertical Jump scores had a mean of 32.88 cm with a standard deviation of 6.58, a minimum value of 20 cm, and a maximum value of 45 cm. Meanwhile, the Long Jump results showed a mean of 241.94 cm with a standard deviation of 36.90, a minimum value of 165 cm, and a maximum value of 300 cm.

This indicates that there is a fairly clear variation in the students' Vertical Jump ability and Long Jump distance, allowing the analysis to proceed with a normality test. The data normality test was conducted using the Shapiro-Wilk test to determine whether the data distribution was normal. The results of the normality test are presented in the following table:

**Table 3.** Normality Test

	Tests of Normality					
	Kolmogorov-Smirnov <sup>a</sup>			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	Df	Sig.
Vertical Jump	.124	16	.200*	.968	16	.813
Long jump	.177	16	.195	.948	16	.463

Based on the table above, the significance value for the Vertical Jump variable is 0.813 and for the Long Jump variable is 0.463. Both values are greater than the significance level of  $\alpha = 0.05$ .

These results indicate that the data for both variables are normally distributed, and therefore the analysis can proceed with the Pearson Product Moment correlation test, with the results as follows:

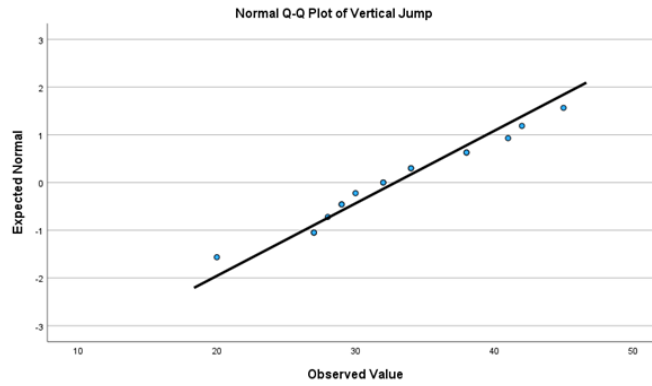


Figure 1. QQ Plot Vertical Jump

The Q-Q Plot shows that the Vertical Jump data points are located close to the diagonal line, indicating that the distribution pattern follows a normal distribution. Therefore, the visual Q-Q Plot strengthens the results of the Shapiro-Wilk test, confirming that the Vertical Jump data are normally distributed.

Furthermore, the results for the Long Jump are illustrated in the following figure:

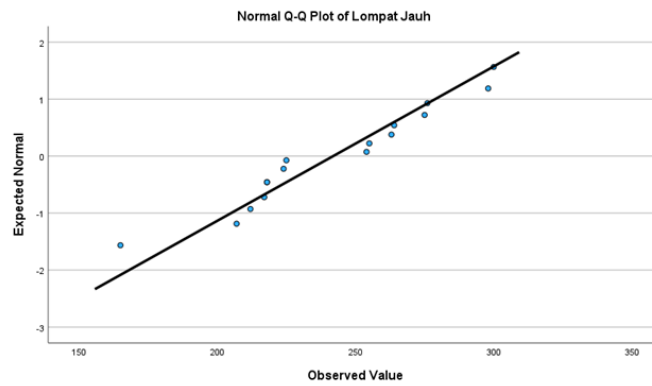


Figure 2. Q-Q Plot of the Long Jump

The Long Jump Q-Q Plot shows that most of the data points follow the diagonal line, with only very slight deviations. This indicates that the data distribution is approximately normal.

Thus, the visual Q-Q Plot supports the results of the Shapiro-Wilk test, which indicate that the Long Jump data are normally distributed.

The results of the Pearson Product Moment correlation test are presented as follows:

<b>Correlations</b>			
		Vertical Jump	Lompat Jauh
Vertical Jump	Pearson Correlation	1	.377
	Sig. (2-tailed)		.150
	N	16	16
Lompat Jauh	Pearson Correlation	.377	1
	Sig. (2-tailed)	.150	
	N	16	16

Figure 3. Results of the Pearson Product Moment Correlation Test

The results of the Pearson correlation analysis show that the correlation coefficient between vertical jump and long jump is  $r = 0.377$ , with a significance value of  $p = 0.150$ . Since the p-value is greater than 0.05, this indicates that the relationship between the two variables is not statistically significant.

Although the relationship has a positive direction and falls into the low correlation category, statistically it cannot be proven that lower limb explosive power (vertical jump) is related to long jump performance among fifth-grade students at SD Negeri Dendeng.

## **Discussion**

The results of the descriptive statistical analysis show that the students' vertical jump scores ranged from 20 to 45 cm, with an average of approximately 32 cm. The long jump results ranged from 165 to 300 cm, with an average of approximately 242 cm. These data indicate that the students' physical abilities varied considerably, both in terms of lower limb explosive power and the resulting jump distance.

The results of the normality test using Shapiro–Wilk (Mulyadi, 2011) showed that both variables had significance values above 0.05, namely 0.813 for vertical jump and 0.463 for long jump. Therefore, both sets of data were declared normally distributed. The Q–Q plot graphs also supported these findings, as the data points tended to follow the diagonal line, indicating no meaningful deviation from normality. The linearity test also showed a linear relationship between the two variables. This was evident from the test results indicating that the deviation from linearity was not significant, meaning that the relationship between lower limb explosive power and long jump performance can be considered linear.

The results of the Pearson Product Moment correlation test (Sugiyono, 2024) produced a correlation coefficient of 0.377 with a significance value of 0.150. This correlation coefficient indicates that the relationship between vertical jump and long jump is positive but falls within the low category. It can be concluded that students with better lower limb explosive power tend to achieve longer jump distances; however, the strength of the relationship is not substantial. The significance value greater than 0.05 indicates that the relationship is not statistically significant. Thus, this study did not find strong evidence that lower limb explosive power directly determines long jump performance among students.

## **CONCLUSION**

The vertical jump ability of fifth-grade students at SDN Dendeng falls within the moderate category, with an average score of approximately 32 cm. Meanwhile, long jump performance shows a fairly wide variation, with an average of approximately 242 cm and a high level of variability.

The results of the Pearson Product Moment correlation test show a correlation coefficient of  $r = 0.377$  with a significance value of  $p = 0.150$ . This value indicates that the relationship between lower limb explosive power and long jump performance is positive but weak, and not statistically significant.

The correlation coefficient demonstrates that there is no significant relationship between lower limb explosive power and hang-style long jump performance among fifth-grade students at SDN Dendeng.

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