

The Relationship Between Leg Explosive Power and Flexibility and Long Jump Ability in Squat Style

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ABSTRACT

This research aims to determine the relationship between leg explosive power and flexibility and long jump ability in squatting style at UPT-SPF students at SD Inpres Panaikang II/1. This research is a descriptive study with one dependent variable, namely squatting long jump ability. The sample in this study consisted of 50 students. The instruments in this study used a long jump test without a start for leg explosive power, a forward bending flexibility test for flexibility data, and a squatting long jump ability test for squatting long jump ability data. Data analysis obtained the following results: (1) There is a relationship between leg explosive power and squatting long jump ability with correction results ($r = -0.451$ ($P < 0.05$)). (2) There is a relationship between flexibility and squatting long jump ability with a corrected value ($r = -0.425$ ($P < 0.05$)). (3) There is a joint relationship between leg explosive power and flexibility and squatting long jump ability with a corrected value of ($R = 0.496$ ($P < 0.05$)) and F value = 7.652 ($P \text{ value} = 0.000 < 0.05$).

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- A. Conception and design of the study;
- B. Acquisition of data;
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INTRODUCTION

To stimulate children's physical growth and development, the government is taking the sports education route considering that the role of sport in physical growth and development is very large (Pramita et al., 2015). By exercising regularly, muscles will become strong and develop and make the body's organs function well.

Therefore, the sport needs to be further improved and popularized as a way of developing achievement which can also improve physical and spiritual health for every member of society (Meidhoni & Suropto, 2015). All of this needs to be given special attention, where sport has become a benchmark for the high and low levels of a nation's culture. So the pattern of development and development and coaching of sports in

Indonesia has certain goals and objectives, which are focused on the problem of improving sports performance.

To improve the long jump, physical education teachers must be able to develop mastery of basic techniques, in this case, the long jump (Erwizal & Yunitaningrum, 2015), especially in UPT-SPF students at SD INPRES Panaikang II/1 Makassar. Mastery of long jump techniques is still limited and there are still many weaknesses (Sobarna et al., 2017), including physical abilities that must be supported (Prasetyo, 2016). This causes students to be unable to display maximum achievements (Puspitasari, 2016).

As is the case with athletics in the long jump, the physical abilities that play a role and are needed are adequate physical elements to obtain long jump results (Ilmiah & Maslito, 2016). This is because without physical abilities it is difficult to develop long jump techniques well (Ali & Lumintuarso, 2017), and vice versa, with adequate physical abilities the implementation of long jump techniques will be performed perfectly (Wardani & Mahendra, 2017).

The long jump technique consists of four parts, namely the initial step which is taken at a distance from the board (support) (Riyanto et al., 2018). The fulcrum is a place to coordinate the rhythmic speed of steps (Basri et al., 2020), followed by body posture in the air to achieve maximum jumping distance by landing perfectly (Pardianto & Saputra, 2020). The implementation of the technique in the long jump is a unit that cannot be separated (Zainuri, 2020), because producing a long jump is greatly influenced by initial running speed, strength of the supporting leg, body balance when floating in the air and the body's flexibility ability. when landing (Widyanto et al., 2020).

In the implementation of the long jump, there are four series of movements starting from the start as an initial step which is carried out at a distance to the board (fulcrum) (Kurniawan et al., 2021), then continues with the body position in the air to achieve the maximum jump distance by landing perfectly (Suharto, 2021). The implementation of the four-movement techniques in the long jump is a unit of movement that cannot be separated because producing a long jump is greatly influenced by initial running speed, the strength of the supporting leg (Barutu, 2021), body balance when floating in the air and the body's flexibility. upon landing (Rawe & See, 2022).

Therefore, one of the efforts made to improve long jump ability is through physical exercise or training physical condition. The elements of physical ability in question which are the point of attention in this research are leg explosive power and flexibility.

The role of the physical element of leg explosive power, in this case, the jumper can make a strong jump if supported by good leg muscle explosive power. Two components cannot be separated in explosive leg power, namely strength and speed which can produce maximum power in a relatively short time. Therefore, a long jump requires strength and speed, especially when jumping, so that it is possible to produce a maximum jump.

The role of forefoot flexibility in performing a long jump, especially when carrying out support/repulsion, is when the body is in the air and when it is about to land, the body is moved forward quickly and then lands. Apart from that, it will also make it easier for

long jumpers to carry out movements that are difficult to do. Therefore, it can be said that a person's forward bending of the body also influences his ability to do the long jump.

One of the basic elements in developing long jump achievements among students at UPT-SPF SD INPRES Panaikang II/1 Makassar is uneven physical abilities and inadequate mastery of existing techniques, in addition to inadequate sports facilities and facilities, especially jumping tanks. Far. Therefore, for training to be more focused, you must first master the basic techniques in the long jump such as starting, focusing, flying and landing perfectly. Meanwhile, to support the long jump ability, optimal physical abilities such as leg explosive power and flexibility are needed. If these physical abilities are not optimal then the long jump results will not be optimal.

METHODS

In this research, there are four variables involved, namely the independent variable and the dependent variable. These four variables will be identified in the research as follows: the independent variable consists of leg explosive power and flexibility, while the dependent variable is long jump ability. When this research was carried out in March 2023, it was carried out outside PJOK learning hours. The location of this research was carried out at UPT-SPF SD INPRES PANAIKAN II/1 located at Jl. Urip Sumoharjo No. 272, ASWIP II, Pampang, Kec. Panaikang, Makassar City, South Sulawesi.

The population in this study were all male students of UPT-SPF SD INPRES Panaikang II/1 Makassar. Next, determine the number of students who will be used in the research. This was carried out by random sampling through lottery so that 50 students were obtained from UPT-SPF SD INPRES Panaikang II/1 Makassar.

Data collection techniques are a method used to collect data in a study. The data that will be collected in this research includes leg explosive power data, flexibility data, and squat long jump ability results data. After all research data was collected, namely leg explosive power data, flexibility data, and long jump ability data, to test the hypothesis proposed in this research, the data was compiled, processed, and analyzed statistically for correlation using computer facilities through the SPSS program.

RESULTS AND DISCUSSION

Descriptive data analysis is intended to obtain a general overview of the research data. A descriptive analysis was carried out on leg explosive power and flexibility with squatting long jump ability among UPT-SPF students at SD INPRES Panaikang II/1 Makassar. Descriptive analysis includes; total value, average, standard deviation, maximum, and minimum. It is hoped that these statistical values can provide a general idea of the state of data measuring leg explosive power and flexibility with squatting long jump ability in students at UPT-SPF SD INPRES Panaikang II/1 Makassar. The results of the descriptive analysis of each research variable can be seen in the following table.

Table 1.
Descriptive analysis results

Statistical Value	N	Mean	SD	Range	Min	Max
Leg Explosive Power	50	1,353	0,111	0,44	1,10	1,54
Flexibility	50	6,040	1,737	6	3	9
Long Jump Squat Style	50	3,338	0,308	1,30	2,65	3,95

The results of the analysis of the descriptive data above are just a general description of the data on leg explosive power and flexibility with long jump ability in the squat style of UPT-SPF students at SD INPRES Panaikang II/1 Makassar. The data above does not yet describe the relationship between the research variables. To prove whether there is a significant relationship between leg explosive power and flexibility and the ability to squat long jump in students at UPT-SPF SD INPRES Panaikang II/1 Makassar, further testing is needed using a data normality test.

Normality Test One of the assumptions that must be met so that parametric statistics can be used in research is that the data must follow a normal distribution. The concept of this normality test is almost the same as other normality tests, namely without being separated from the role of the standard score with its area which is linked to the sequence value of the data, so that this normality test can be used as an alternative for analyzing the distribution of research data whether it is normal or not. To determine the distribution of leg explosive power and flexibility with long jump squatting ability among students at UPT-SPF SD INPRES Panaikang II/1 Makassar, a data normality test was carried out using the Shapiro-Wilk test. The results of the data normality analysis can be seen in the following table.

Table 2.
Normality test results

	Statistics	Df	Significant
Leg Explosive Power	0,086	50	0,200
Flexibility	0,111	50	0,172
Long Jump Squat Style	0,100	50	0,200

To test this hypothesis, a correlation test was carried out between data on leg explosive power and flexibility and long jump ability with the squatting style of students at UPT-SPF SD INPRES Panaikang II/1 Makassar. using person correlation and multiple regression techniques.

The relationship between leg explosive power and squatting long jump ability.

To determine the magnitude of the relationship between leg explosive power and squatting long jump ability among students at UPT-SPF SD INPRES Panaikang II/1 Makassar, a person correlation analysis was carried out. A summary of the analysis results can be seen in the following table.

Table 3.
Results of analysis of leg explosive power with squatting long jump ability

Variable	r	P	Information
Leg Explosive Power	-0,451	0,001	Significant
Long Jump Squat Style			

Based on the table above, it can be seen that the results of the person correlation calculation, obtained a calculated correlation value, meaning that there is a significant relationship between leg explosive power and deep squat long jump ability, namely (r) = -0.451 ($P = 0.002 < \alpha 0.05$). Thus, if a student has good leg explosive power, this will also be followed by good squat long jump ability.

The relationship between flexibility and squatting long jump ability

To determine the magnitude of the relationship between flexibility and squatting long jump ability among students at UPT-SPF SD INPRES Panaikang II/1 Makassar, a person correlation analysis was carried out. A summary of the analysis results can be seen in the following table.

Table 4.
Results of flexibility analysis with squatting long jump ability

Variable	r	P	Information
Flexibility Long Jump Squat Style	-0425	0,002	Significant

Based on the table above, it can be seen that from the results of the person correlation calculation, the calculated correlation value is obtained, meaning that there is a significant relationship between flexibility and long jump ability in the squat style of students at UPT-SPF SD INPRES Panaikang II/1 Makassar, namely (r) = -0.425 ($P = 0.002 < \alpha 0.05$). Thus, if a student has good flexibility, it will also be followed by good squatting long jump ability.

The relationship between leg explosive power and flexibility and squatting long jump ability

To determine the magnitude of the joint relationship between leg explosive power and flexibility and squatting long jump ability in UPT-SPF students at SD INPRES Panaikang II/1 Makassar. multiple regression analysis was carried out. A summary of the analysis results can be seen in the following table.

Table 5.
Results of multiple regression analysis of leg explosive power and flexibility with squatting long jump ability

Variable	R	R ²	F	P _{Value}	Information
Leg Explosive Power Flexibility Long Jump Squat Style	0,496	0,246	7,652	0,001	Significant

Based on the table above, it can be seen that from the results of the multiple regression calculations, a calculated correlation value was obtained, meaning that there is a significant relationship between leg explosive power and flexibility and long jump ability in the squat style of students at UPT-SPF SD INPRES Panaikang II/1 Makassar, namely (R) = 0.496 ($P < \alpha 0.05$) with a coefficient of determination (R^2) = 0.246 or 24.6%, after carrying out a significance test using the F test, $F_{count} = 7.652$ ($P_{value} = 0.001 <$

$\alpha 0.05$). Thus, if a student has good leg explosive power and flexibility together, this will also be followed by better and maximum squat long jump ability.

There is a relationship between leg explosive power and squatting long jump ability

The results of data analysis obtained a calculated correlation value (r) = -0.451 ($P < \alpha 0.05$), so H_0 was rejected and H_1 was accepted, meaning there was a significant relationship between leg explosive power and squatting long jump ability in UPT-SPF students. SD INPRES Panaikang II/1 Makassar.

There is a relationship between flexibility and long-jump ability

The results of data analysis obtained a calculated correlation value (r) = -0.425 ($P < \alpha 0.05$), so H_0 was rejected and H_1 was accepted, thus meaning that there was a significant relationship between leg explosive power and flexibility with the long jump ability of squatting style in UPT-students. SPF SD INPRES Panaikang II/1 Makassar.

There is a mutual relationship between leg explosive power and flexibility and squatting long jump ability

The results of data analysis obtained a calculated correlation value (R) = 0.496 ($P < \alpha 0.05$), so H_0 was rejected and H_1 was accepted, thus meaning that there was a significant relationship between leg explosive power and flexibility with the ability to squat long jump in UPT-students. SPF SD INPRES Panaikang II/1 Makassar.

From the results of multiple regression data analysis, the calculated R -value (R_0) was obtained = 0.496, with F obtained = 7.652 ($P\text{value} = 0.000 < \alpha 0.05$). So H_0 is rejected and H_1 is accepted. This means that there is a significant relationship between leg explosive power and flexibility with the squatting long jump ability of UPT-SPF SD INPRES Panaikang II/1 Makassar students. The coefficient of determination (R^2) value obtained = 0.246. This means that, if a student has good leg power and flexibility, this will be followed by good squat long jump ability as well.

Discussion

This research aims to find out how much leg explosive power and flexibility are related to the squatting long jump ability of UPT-SPF students at SD INPRES Panaikang II/1 Makassar. Based on the hypothesis proposed in this research and from research data that has been carried out statistical tests between the variables of leg explosive power and flexibility and the ability to squat long jump in UPT-SPF SD INPRES Panaikang II/1 Makassar students as the dependent variable. The results of data analysis through statistics require a theoretical discussion that relies on the theories and framework of thought that underlie this research.

First hypothesis test results; There is a significant relationship between leg explosive power and squatting long jump ability in students at UPT-SPF SD INPRES Panaikang II/1 Makassar. Judging from the results of data analysis, it is obtained that $R = -0.451$ and a significant value of 0.001. If the results of this research are linked to the

underlying theory and framework of thought, then basically the results of this research support and strengthen existing theories and previous research results, then the leg explosive power variable supports the squatting long jump ability of UPT-SPF students. SD INPRES Panaikang II/1 Makassar.. A student who has good leg explosive power will have a positive impact when performing a squat long jump. Analysis of the ability of the explosive power of the legs is very visible when a student performs a squat-style long jump which can be done well and the results can be maximized when pushing to achieve the goal of the long jump, namely jumping as far as possible.

Second hypothesis test results; There is a significant relationship between flexibility and squatting long jump ability in students at UPT-SPF SD INPRES Panaikang II/1 Makassar. Judging from the results of data analysis, it is obtained that $R=-0.425$ and a significant value of 0.002. If the results of this research are linked to the theory and framework that underlies it, then basically the results of this research support and strengthen existing theories and previous research results, then The flexibility variable supports the long jump ability of the squat style in UPT-SPF SD INPRES students. Panaikang II/1 Makassar. A student who has good flexibility will have a positive impact when performing a squat long jump. Analysis of flexibility is very visible when a student when performing a long jump squat style maintains his position when landing while performing a squat style movement.

First hypothesis test results; There is a jointly significant relationship between the explosive power of the legs and flexibility with the long jump ability of the squat style among students at UPT-SPF SD INPRES Panaikang II/1 Makassar. Judging from the results of data analysis, it is obtained that $R=0.496$ and a significant value of 0.001. If the results of this research are linked to the theory and framework that underlies it, then basically the results of this research support and strengthen existing theories and previous research results, namely the variable relationship between leg explosive power and flexibility with long jump ability in squat style in UPT students. -SPF SD INPRES Panaikang II/1 Makassar. A student who has good leg power and flexibility will have a positive impact when performing a squat long jump. Analysis of the role of leg explosive power and flexibility, when used together, has a very positive impact, which will also be followed by good long jump ability.

CONCLUSION

Based on the results of data analysis and discussion, the results of this research can be concluded as follows:

1. There is a significant relationship between leg explosive power and squatting long jump ability in UPT-SPF SD INPRES Panaikang II/1 Makassar students, amounting to 45.1% with a significant value of 0.001
2. There is a significant relationship between flexibility and squatting long jump ability among students at UPT-SPF SD INPRES Panaikang II/1 Makassar, amounting to 42.5% with a significant value of 0.002.

3. There is a significant relationship between leg explosive power and flexibility with the ability to squat long jump in students at UPT-SPF SD INPRES Panaikang II/1 Makassar, amounting to 49.6% and the Fcount value is 7.652 with a significant value of 0.001. Meanwhile, the remaining 50.4% is influenced by other variables.

Based on the conclusions of this research, several suggestions are put forward as follows:

1. Sports Coach: The results of this research show that leg explosive power and balance provide a good relationship to squatting long jump ability, so these results provide input for coaching coaches, especially in training techniques and tactics as well as squatting long jump skills.
2. For trainers: It is recommended that there is a need to further improve physical skills and abilities to the maximum by providing good forms of physical training and basic techniques to achieve the desired results. Sports coaches and coaches, in particular, research results show that basic technical abilities and skills, especially long jump squatting, still need to be improved.
3. For students and athletes: be able to know how important it is to improve physical abilities because it can support achieving maximum results, in other words, training should not only be done at the time and place of training but also practice whenever there is an opportunity.
4. Researchers: It is hoped that they can continue this research with a wider scope, so that it can provide more complete information in terms of sports coaching, especially in long jump sports.

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