International Journal Of Humanities Education And Social Sciences ***(IJHESS)*** *E-ISSN:* **2808-1765**
Volume 4, Number 1, August 2024, *Page. 499 – 507*
Email : editorijhess@gmail.com

The Relationship Of Explosive Leg Muscle Power And Leg Length With Long Jump Results In Students Private Class Viii[1] SMP Negeri 6 Siak Hulu

Ardison[1)], Ahmad Rahmadani[2)]
[1,2)] Universitas Islam Riau

*Corresponding Author
Email: ahmadrahmadani@edu.uir.ac.id; Ardison799@gmail.com

Abstract
The aim of this research is to determine the relationship between leg muscle explosive power and leg length with long jump results in students son of class VIII1 of SMP Negeri 6 Siak Hulu. This type of research is multiple correlation. The population and sample in this study were 17 male students in class VIII1 of SMP Negeri 6 Siak Hulu. The research instruments used were the standing broadjump test, leg length test and long jump test. The data analysis technique used is the multiple correlation value test. Based on the results of the research that has been carried out, it can be concluded that; 1) There is a relationship between explosive power of leg muscles and long jump results in students son of class VIII1 of SMP Negeri 6 Siak Hulu with a calculated r greater than r table (0.571 > 0.482), 2) There is a relationship leg length with long jump results in students son of class VIII1 of SMP Negeri 6 Siak Hulu with a calculated r greater than r table (0.648 > 0.482), 3) There is a relationship between explosive power of leg muscles and leg length with long jump results in students son of class VIII1 of SMP Negeri 6 Siak Hulu with a calculated r greater than r table (0.755 > 0.482).

Keywords : Explosive Power Of Leg Muscles, Length Of Legs From Long Jump Results.

INTRODUCTION

Sports is improving the quality of life of Indonesian people physically, spiritually and socially in creating an advanced society. Because education related to sports is a vital means for the formation of students. As stated in Law no. 3 of 2005 article 25 concerning the National Sports System states that in order to develop sports achievements in educational institutions, in each educational pathway, sports activity units, sports classes, coaching and training centers, sports schools can be formed, as well as holding tiered and continuous sports competitions.

One way to start coaching and developing sports is to introduce the sport itself to students. Physical and health education in schools aims to help students increase and improve their level of health and physical fitness through understanding development, positive attitudes and basic movement skills as well as various physical activities. One part of the implementation of physical education teaching and learning activities in junior high schools is providing athletic lessons, Athletics has several sports in each number. One of the sports that is part of athletics is the long jump. Long jump is an athletic event that requires the skill of jumping forward as far as possible in one jump. There are three styles in the long jump, namely the squatting style long jump (orthodox style), the hanging style long jump (schepper styl), the long jump walking in the air (walking in the air). Everything is intended to achieve the maximum jump or as far as possible.

In this long jump event there are several stages. Like the start which requires speed, the support which requires strength and the jump which requires power or explosive power in order to push the body to fly forward. The expected target of the long jump requires various good explosive power exercises. Explosive power is the strength of muscle work to direct maximum strength in a very fast time. In the long jump event, a start is very necessary when leaning and a perpendicular jump is needed when landing after a support. Good explosive power plays an important role in efforts to get the body into the air and when floating in the air, so that with the

explosive power ability possessed, an athlete is able to land as precisely as possible. Apart from that, height also plays a role, jumpers who have long legs will find it easier to create a longer jump range.

(Syaifuddin, 2011) explains that explosive power is a translation of the words explosive power or power (English) and schnelkraft (German). Based on the German sports knowledge dictionary, schnelkraft = power which means the ability to achieve the highest possible strength in a short time. In the same book (Syaifuddin, 2011) it is also explained that explosive power is the product of two abilities, namely strength and speed to exert maximum force in a short time. From the quote above, it can be explained that explosive power is the ability to achieve maximum power in a short time. This ability is the result of muscle contraction to produce shock energy. This ability to contract requires training so that the muscles get used to receiving stimuli quickly and with fast reaction speeds.

Explosive power of leg muscles leg muscles is a very important component in sports. There are many sports that require explosive power in the leg muscles to carry them out. The long jump requires leg muscle power in the running phase as well as jumping the feet on the push board. Therefore, sprint training and also improving the physical condition of leg muscle power are needed. According to (Makorohim et al., 2022) the most dominant increase in plyometric training is lower extremity explosive strength, namely leg power and sprint speed. Running also has benefits for our bodies. One of them is that it can increase metabolism in the body and can help the weight loss process (Dupri, 2016) Explosive muscle power is a person's ability to use the maximum force exerted in the shortest possible time. Explosive power can occur if the physical conditions of the elements of strength and speed work simultaneously. So if you only have strength without being accompanied by speed then explosive power will not be achieved properly.

From another source (Mulyono, 2010) explains that power is "strength/ power is the ability to exert maximum force in a minimum period of time." From the definitions above, an opinion can be drawn that explosive power of leg muscles is the ability of leg muscles to produce energy. maximum in a short time. In everyday life, explosive power in leg muscles can be seen in running or jumping movements. The legs as an active means of movement in this sport must be in prime condition so that the physical condition associated with the legs in the long jump sport can provide maximum contribution. The leg is the part of the body from the groin to the soles of the feet. The legs will support the body when standing or moving. With strong leg muscles, a person can run faster or jump higher or further.

(Haryanto & Fataha, 2021) Leg length is the vertical distance from the sole of the foot to the groin which is measured by standing upright. A person who has long legs will logically have an advantage in running and jumping. Because in running you will have a wider range and also in jumping you will have a wider range too. Leg length as one of the lower limbs has an important role in physical sports performance. As a lower limb, leg length functions as a support for the movement of the upper limbs, as well as determining movement in walking, running and jumping.

(Iswandi & Purnomo, 2013) usually, a reliable long jumper is also a strong short distance runner, because the forging of both sports is almost the same, namely strong legs and abdominal muscles, short distance running speed, and foot strike. "A long jumper must have a supportive body posture, namely have long legs and must also master the long jump technique well in order to support the results of the jump. However, having a supportive posture and good technical mastery is not enough to be a reliable long jumper, but you must have the elements of good physical fitness.

From the results of observations made by researchers on class VIII1 students at SMP Negeri 6 Siak Hulu, researchers found several problems such as: some students had not mastered

good long jump techniques. The slow running speed of students when taking stances before jumping. This lack of balance when landing can be seen when landing, many students fall backwards, thereby reducing the distance of the jump. The lack of height of the student's jump indicates that the explosive power of the student's leg muscles is still weak. Judging from an anthropometric perspective , students' heights are also uneven, this might influence students' long jump results. Based on the results of observations that the author encountered in the field, the author felt interested in conducting research by setting the title "The relationship between explosive power of leg muscles and leg length with long jump results in male students in class VIII1 of SMP Negeri 6 Siak Hulu".

RESEARCH METHODS

The type of research used in this research is multiple correlation. The population in this study was male students in class VIII1 of SMP Negeri 6 Siak Hulu, totaling 17 students. The sampling technique in this research used *total sampling*. The number of samples in this research is 17 students. The research instrument used was a test leg *power* / *explosive* leg muscle power (*standing broad jump*), leg length test and long jump test. The data analysis used is calculating the multiple correlation value between variable X1, variable X2 and variable Y.

RESULT AND DISCUSSION

1. Data on *Explosive Power* of Leg Muscles for Boys in Class VIII1 of SMP Negeri 6 Siak Hulu

Based on the results of research that has been carried out regarding the relationship between leg muscle *explosive power* and long jump results for male students in class VIII1 of SMP Negeri 6 Siak Hulu, it is known that the results of measuring leg muscle *explosive power* male students in class VIII1 of SMP Negeri 6 Siak Hulu using the standing broadjump test obtained the highest score of 173 centimeters and the lowest was 125 centimeters. The sample consisted of 17 people.

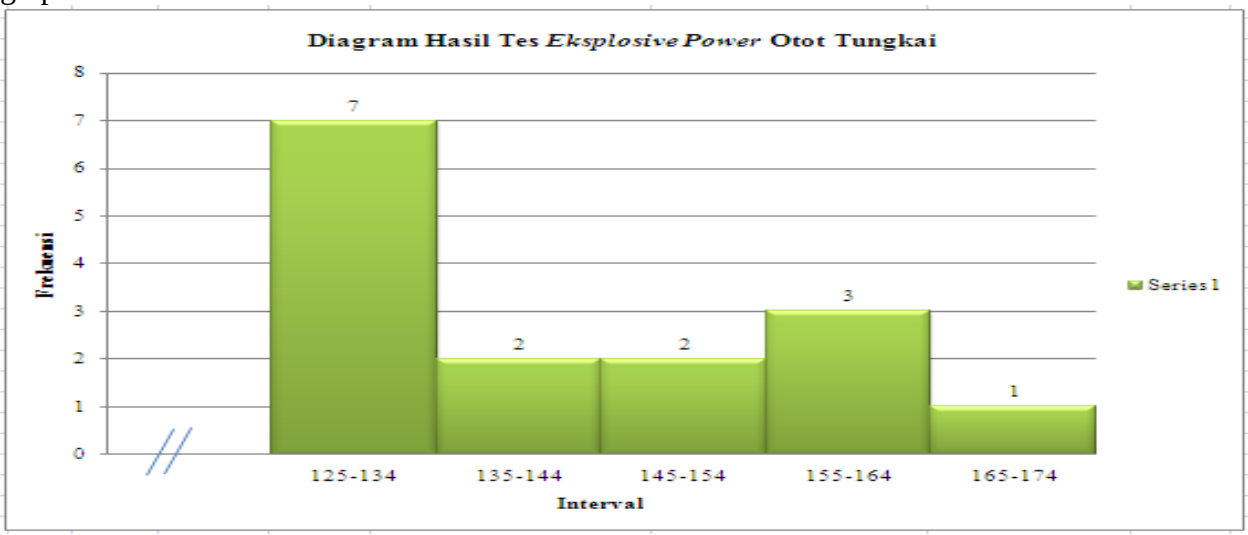
Leg muscle explosive power test results using the *standing brodjump test*, it was distributed with a total of 5 class intervals and a class interval length of 10, where in the first class with a class interval range of 125-134 there was an absolute frequency of 7 people with a relative frequency of 41.18%, in the second class with a range interval class 135-144 there is an absolute frequency of 2 people with a relative frequency of 11.76%, in the third class with an interval class range of 145-154 there is an absolute frequency of 2 people with a relative frequency of 11.76%, in the fourth class with an interval class range of 155- 164 there is an absolute frequency of 3 people with a relative frequency of 17.65%, in the fifth class with a class interval range of 165-174 there is an absolute frequency of 1 person with a relative frequency of 5.88%. For more details, see the table below:

Table 1. Frequency Distribution of Leg Muscle *Explosive Power Data* for Male Students in Class VIII1 of SMP Negeri 6 Siak Hulu

No	Intervals			Absolute Frequency	Relative Frequency
1	125	-	134	7	41.18%
2	135	-	144	2	11.76%
3	145	-	154	2	11.76%
4	155	-	164	3	17.65%

5	165	-	174	1	5.88%
Amount				**15**	**88.24%**

The data contained in the table is also depicted in the form of the following histogram graph:



Graph 1. Frequency Distribution Histogram of *Explosive Power Data* of Leg Muscles for Boys in Class VIII1 of SMP Negeri 6 Siak Hulu

2. Data on Leg Length of Male Students in Class VIII1 of SMP Negeri 6 Siak Hulu

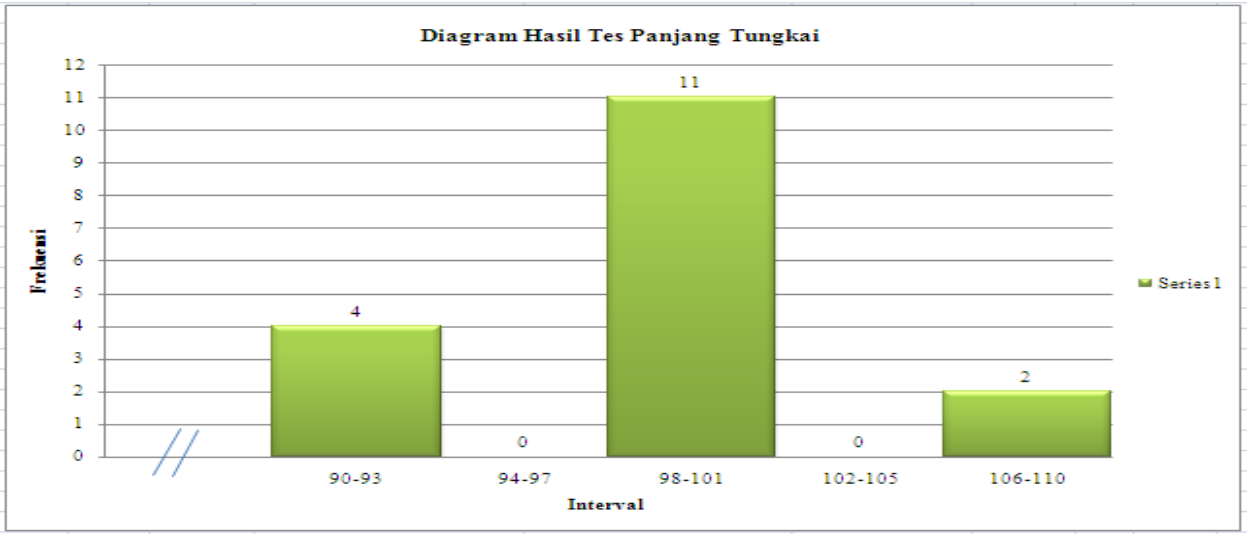
Based on the results of the leg length measurement test for male students in class VIII1 at SMP Negeri 6 Siak Hulu using leg length measurements, the highest value was 110 centimeters and the lowest was 90 centimeters. The mean (average) was 98.82 with a *standard deviation* of 6 seconds and the median or middle value. equal to 100, mode 100 from a sample of 17 people.

The results of the leg length measurements were distributed in values with a total of 5 class intervals and a class interval length of 4, where in the first class with an interval class range of 90-93 there was an absolute frequency of 4 people with a relative frequency of 23.53%, in the second class with a range there are no interval classes 94-97, in the third class with an interval class range of 98-101 there is an absolute frequency of 11 people with a relative frequency of 64.71%, in the fourth class with an interval class range of 102-105 there are none, in the fifth class with a class range interval 106-110 there is an absolute frequency of 2 people with a relative frequency of 11.76%. For more details, see the table below:

Table 2. Frequency Distribution of Leg Length Data for Male Students in Class VIII1 of SMP Negeri 6 Siak Hulu

No	Intervals			Absolute Frequency	Relative Frequency
1	90	-	93	4	23.53%
2	94	-	97	0	0.00%
3	98	-	101	11	64.71%
4	102	-	105	0	0.00%
5	106	-	110	2	11.76%
Amount				**17**	**100%**

The data contained in the table is also depicted in the form of the following histogram graph:



Graph 2. Frequency Distribution Histogram of Leg Length Data for Boys in Class VIII1 of SMP Negeri 6 Siak Hulu

3. Data on long jump test results for male students in Class VIII1 of SMP Negeri 6 Siak Hulu

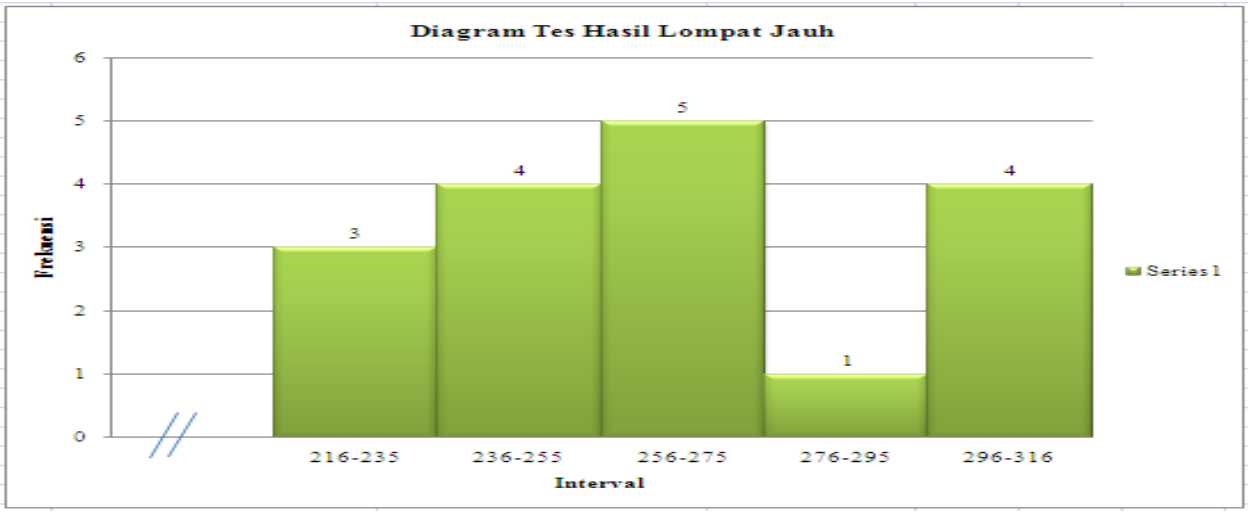
Outcome measurement results long jump for male students in class VIII1 of SMP Negeri 6 Siak Hulu using the long jump test, the highest score was 316 centimeters and the lowest was 216 centimeters. The mean (average) was 266.41 centimeters with a *standard deviation* of 31.78 centimeters and the median or middle value was 271 centimeters. from a sample of 17 people.

The results of the long jump test were distributed in value with a total of 5 class intervals and a class interval length of 20 centimeters, where in the first class with an interval class range of 216-235 there was an absolute frequency of 3 people with a relative frequency of 17.65%, in the second class with in the interval class range of 236-255 there is an absolute frequency of 4 people with a relative frequency of 23.53%, in the third class with an interval class range of 256-275 there is an absolute frequency of 5 people with a relative frequency of 29.41%, in the fourth class with an interval class range of 276 -295 there is an absolute frequency of 1 person with a relative frequency of 5.88%, in the fifth class with a class interval range of 296-316 there is an absolute frequency of 4 people with a relative frequency of 23.53%. For more details, see the table below:

Table 3. Frequency Distribution of Long Jump Results for Extracurricular Students at SMP Negeri 6 Siak Hulu

No	Intervals			Absolute Frequency	Relative Frequency
1	216	-	235	3	17.65%
2	236	-	255	4	23.53%
3	256	-	275	5	29.41%
4	276	-	295	1	5.88%
5	296	-	316	4	23.53%
Amount				**17**	**100%**

The data contained in the table is also depicted in the form of the following histogram graph:



Graph 3. Frequency Distribution Histogram of Long Jump Results for Extracurricular Students at SMP Negeri 6 Siak Hulu

Data analysis

1. Contribution of *Explosive Power* of Leg Muscles to the Long Jump Results of Class VIII1 Boys at SMP Negeri 6 Siak Hulu

From the results of the calculation of standing broadjump data and long jump data, it is known that the correlation value of leg muscle explosive power on the long jump results for male students in class VIII1 of SMP Negeri 6 Siak Hulu is 0.571, namely in the sufficient category This correlation value indicates that a person's leg muscle explosive power has a sufficient relationship with the results of the long jump achieved The correlation value shows that the correlation value achieved is greater than the table r value = 0.482, so the hypothesis proposed can be accepted, namely that there is a relationship between muscle explosive power. legs with long jump results for male students in class VIII1 of SMP Negeri 6 Siak Hulu

The correlation value with the sufficient category level shows that the explosive power of the leg muscles is related when a student performs a long jump, a male student in class VIII1 of SMP Negeri 6 Siak Hulu. This occurs when the support leg makes a strong push on the push board so that the body gets a lifting thrust. body forward, resulting in a jump as far as the thrust originating from the explosive power of the leg muscles.

2. The Contribution of Leg Length to the Long Jump Results of Class VIII1 Boys at SMP Negeri 6 Siak Hulu

From the results of calculating the leg length test data with the long jump test results, it is known that the correlation value of leg length with the long jump results for male students in class VIII1 of SMP Negeri 6 Siak Hulu is 0.648, namely in the strong category. This correlation value indicates that a person's leg length has a strong relationship to the long jump results, the resulting correlation value is greater than the r table value = 0.482, so the proposed hypothesis can be accepted, namely that there is a relationship between leg length and the long jump results for male students in class VIII1 SMP Negeri 6 Siak Hulu.

This correlation value indicates that the length of the legs is related to the results of the jump so that when supporting and flying in a direction as far as possible, utilize the length of the legs so that students can land as far as possible in the sandbox.

3. Contribution of *Explosive Power* of Leg Muscles and Leg Length With Long Jump Results for Class VIII1 Boys of SMP Negeri 6 Siak Hulu

From the calculation results of the leg muscle explosive power test data and leg length Based on the results of the long jump test, it is known that the correlation value of explosive power of leg muscles and leg length with the long jump results of male students in class VIII1 of SMP Negeri 6 Siak Hulu is 0.755, namely in the strong category. This correlation value indicates that the explosive power of the leg muscles and leg length someone gives a strong relationship to the results of the long jump, the resulting correlation value is greater than the table r value = 0.482, so the proposed hypothesis can be accepted, namely that there is a relationship between explosive power of leg muscles and leg length. with the results of the long jump for male students in class VIII1 of SMP Negeri 6 Siak Hulu.

This correlation value indicates that leg muscle explosive power and leg length coincide has a relationship with the results of the long jump performed by students, the relationship value of explosive power of leg muscles and leg length on the long jump ability of male students in class VIII1 of SMP Negeri 6 Siak Hulu shows that the better the explosive power of the leg muscles and the students have long legs, the maximum long jump will be produced.

Discussion

This research shows that the elements of explosive power in leg muscles and leg length provides a significant relationship to students' long jump results, power is useful in producing high thrust when jumping, so that maximum results from the long jump will depend on the high or low thrust produced by the explosive power of the leg muscles. The length of the legs of a student who wants to do a long jump is a blessing for the student to be able to land as far forward as possible, by utilizing the attitude when floating in the air, the longer the student's legs, the further the jump will be, therefore, Every student who wants his jumps to be far and maximum must first maximize the use of his legs which are aligned with good landing techniques.

In sports, long jump ability requires explosive power in leg muscles and leg length which is good so that it can maximize the results of students' long jump abilities. In the long jump ability, almost all leg muscles work. Leg muscle explosive power and leg length together have a significant relationship to long jump results. Based on this explanation, it can be concluded that when doing a long jump, in order for the long jump results to be maximized, supporting elements such as physical elements such as explosive power of the leg muscles, speed, coordination of movements and balance and maximized by the presence of leg length, the student's long jump results will be to be maximum.

The results of this research are relevant to research conducted by (Febrionaldi, 2017) that the research results are as follows: 1) The results obtained from speed have a significant relationship to long jump ability, this is indicated by the results obtained, namely Ftab = 0.3264, percentage the relationship level is 4.59% moderate, 2) The results obtained from *the explosive power* of the leg muscles have a significant relationship to long jump ability, this is indicated by the results obtained, namely Ftab = .0.5596, the percentage level of relationship is 1.28% Low. 3) There is a significant relationship between speed and *explosive power* of leg muscles and long jump ability. Obtained Fhit = 1.645 < Ftab = 2.393 percentage relationship level of 10% with a relationship of 5.18%. Thus, speed and *explosive power* of the leg muscles must be trained together to produce better long jump abilities.

And it is relevant to (Pratama, 2021) that there is a significant relationship between the explosive power of the leg muscles and the results of the squat style long jump in Muhammadiyah Middle School students, Aimas District. Sorong is 42.30%. There is a significant relationship between running speed and long jump results in the squat style of Muhammadiyah Middle School students in Aimas District. Sorong is 24.40%. There is a significant relationship between leg

muscle explosive power and running speed on the results of the squat style long jump in Muhammadiyah Middle School students, Aimas District. Sorong is 50.30%.

And it is also relevant to (Arif, 2021) the explosive power of the leg muscles has a significant relationship with the long jump results of the squatting style of students at SMP Negeri 1 Kecepatan Hulu, with a contribution of 24.25%. And the speed of running 40 meters has a significant relationship with the results of the long jump squat style of students at SMP Negeri 1 Kepuasan Hulu, with a contribution of 23.85%.

CONCLUSION

Based on the results of the research that has been carried out, it can be concluded that: 1) There is a relationship between *explosive power* of leg muscles and long jump results in students son of class VIII1 of SMP Negeri 6 Siak Hulu with a calculated r greater than r table (0.571 > 0.482). 2) The is a relationship leg length with long jump results in students son of class VIII1 of SMP Negeri 6 Siak Hulu with a calculated r greater than r table (0.648 > 0.482). 3) There is a relationship between *explosive power* of leg muscles and leg length with long jump results in students son of class VIII1 of SMP Negeri 6 Siak Hulu with a calculated r greater than r table (0.755 > 0.482).

REFERENCES

Adityatama, F. (2017). The Relationship between Leg Muscle Power, Foot Ankle Coordination and Abdominal Muscle Strength with Ball Shooting Accuracy. *JUARA: Sports Journal* , *2* (2), 82. https://doi.org/10.33222/juara.v2i2.37

Adnan, A., & Arsil. (2010). *Evaluation of Physical Education and Sports*. Wineka Media.

Arikunto, S. (2006). *Research Procedures A Practical Approach*. Rineka Cipta.

Azizi, MM (2014). Contribution of leg muscle strength, body weight, and height to long jump ability in mid-air gait (Study on PASI-Tuban Athletes). *Journal of Sports Medicine*, *2* (2), 180–188.

Cendra, R. (2018). The Relationship between *Explosive Power* of the Leg Muscles and the Accuracy of the Men's Team Badminton Smash Jump in Development of Sports Education Student Achievement at the University of Riau. *Journal of Physical Education and Sport* , *3* (1), 69. https://doi.org/10.17509/jpjo.v3i1.10462

Djumidar, M. (2004). *Basic athletic movements in play* . Raja Grafindo Persada.

Dupri. (2016). Contribution of *Explosive* Arm Muscle Power and Eye-Hand Coordination to the Serving Ability of Kuansing Volleyball Athletes, Kuantan Singingi Regency. *Sport Area* , *1* (2), 23–30.

Febrionaldi, F., Maidarman, M., & Arsil, A. (2017). Contribution of Speed and Explosive Power of Leg Muscles to the Long Jump Ability of UNP Development Middle School Students. *Sport Science: Journal of Sport Science and Physical Education*, *17* (2), 63-76. https://dx.doi.org/10.24036/jss.v17i2.8

Haryanto, AI, & Fataha, I. (2021). Correlation of Leg Length, Leg Muscle Power and Running Speed with Long Jump Results. *Jambura Health and Sport Journal*, *3* (1), 42–50. https://doi.org/10.37311/jhsj.v3i1.9890

Herawan, MD, & Henjilito, R. (2022). Contribution of Sprinting and Leg Muscle Explosive Power to Long Jump Results in Squat Style in Class X IPS Students at SMA Negeri 3 Rupat. *Journal of Education and Counseling (JPDK)* , *4* (4), 2931–2936.

Ismaryati. (2008). *Sports Tests and Measurements* . UNS Press.

Iswandi, F., & Purnomo, E. (2013). The relationship between sprinting and leg muscle explosive power on the results of the squat style long jump. Journal of Equatorial Education and Learning (JPPK). *Equatorial Education and Learning Journal (JPPK)*, *2* (4).

Jarver, J. (2012). *Learning and Practicing Athletics for Coaches, Athletes, Sports Teachers and the General. Bandung: Pioneer Jaya* . Pioneer Jaya.

Makorohim, MF, Alficandra, A., Yani, A., & Friandi, E. (2022). Contribution of Leg Muscle Power and Leg Length to Sprinting. *Jambura Journal of Sports Coaching* , *4* (2), 55–60. https://doi.org/10.37311/jjsc.v4i2.13800

Meriyanto, D., Nurrochmah, S., & Heynoek, FP (2016). The relationship between leg muscle strength and long jump ability. *Journal of Physical Education*, *26* (1), 145–158. http://journal.um.ac.id/index.php/pendidikan-jasmani/article/view/7737/3555

Muklis. (2007). *My Favorite Sport: Athletics.* Intan Pariwara.

Mulyono, BA (2010). *Physical Education/Sports Tests and Measurements* . UNS Press.

Nugroho, RA, & Yuliandra, R. (2021). Analysis of Leg Muscle Power Capabilities in Basketball Athletes. *Sport Science and Education Journal*, *2* (1), 34–42. https://doi.org/10.33365/ssej.v2i1.988

PASI. (2011). *2010/2011 Competition Regulations*. PASI.

Paturohman., AD (2018). The Relationship Between Running Speed and Leg Muscle Power on Long Jump Results in Squat Style in Class V Students of Ciwiru State Elementary School, Dawuan District. *Scientific Journal* , *4* (1), 9.

Purnomo, E., & Dapan. (2011). *Basics of Athletic Movement* . Alpha Media.

Pratama, L., & Arruan, LV (2021). Contribution of leg muscle explosive power and running speed to the results of the long jump squat style in Muhammadiyah Middle School students. *UNIMUDA SPORT JOURNAL* , *2* (1), 26-31.

Ridwan, M., & Sumanto, A. (2018). Explosive Power of Leg Muscles, Speed and Flexibility with Long Jump Ability. *Journal of Sports Performance*, *2* (01), 69–81. https://doi.org/10.24036/jpo67019

Ritonga, Z. (2007). *Statistics for the Social sciences* . Scholar.

Setiadi. (2008). *Anatomy Physiology for Nursing Students* . RajaGrafindo Persada.

Sharkley, B. J. (2011). *Fitness and Health* . King Grafindo.

Sidik, DZ (2010). *Teaching and Coaching Athletics.* Rosda.

Syaifuddin. (2011). *Anatomy Physiology for Nursing Students* . Medical Books.

Wiarto, G. (2013). *Physiology and Sport* . Science House.

Wirasasmita, R. (2014). *Sports Anatomy II* . Alphabet.

Yulianti, M., Zega, FBSJ, & Sari, M. (2018). Efforts to Improve Basic Long Jump Technique Skills Through Play Methods in Class X 2 Students of SMA Lkmd Sukaramai Kampar Regency. *Rehearsals: Journal of Sports Science* , *9* (2), 86–95. https://doi.org/10.21009/gjik.092.02

Zuhdi, F., Kamarudin, & Candra, A. (2021). Contribution of leg muscle explosive power to long jump ability. *Journal of Athletics and Sport Nutrition*, *1* (1), 23–29.