13 (3) (2024) 451 - 455
Journal of Physical Education, Sport, Health and Recreations
https://journal.unnes.ac.id/journals/peshr

The Influence of Arm Muscle Strength and Leg Power on Smash Accuracy in Volleyball

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Article History

Received July 2024
Accepted October 2024
Published Vol.13 No.(3) 2024

Keywords:
Arm Muscle Strength; Leg Power; Volleyball

Abstract

This study uses a descriptive correlational method, because it can determine the relationship between 2 or more variables using a spearman correlation research design that aims to determine the relationship between 2 independent variables and 1 dependent variable. The independent variables are arm muscle strength, power leg, while the dependent variable is smash accuracy. The sample of this study were 20 students of elementary school Pakemitan II who were selected using purposive sampling technique. Based on the results of the research obtained push up results of 0.000, vertical jump results of 0.007 and smash results of 0.082 so the conclusion of this normality test is that the data is normal because the residual count is more than 0.05 with a push up test of 0.000> 0.05, vertical jump test results 0.007> and smash test 0.082> 0.05 so the data is normally distributed. Based on the results of the study it can be concluded that there is no significant relationship. Based on the sig. (tailed) value on push ups which is 0.542> 0.05 and on the vertical jump of 0.900> 0.05, it concludes that there is no significant relationship. when viewed from the guidelines for the degree of relationship based on the pearson correlation value on push ups classified as a very weak correlation category to smash and if the vertical jump is included in the category of very weak correlation to smash.

How to Cite

Nurohmmah, S., Saptani, E., & Dinangsit, D. (2024). The Influence of Arm Muscle Strength and Leg Power on Smash Accuracy in Volleyball. Journal of Physical Education, Sport, Health and Recreation, 13 (3), 451-455.

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p-ISSN 2460-724X
e-ISSN 2252-6773

INTRODUCTION

Volleyball has grown to become one of the most popular sports in the world, with players of all ages participating both indoors and on the beach. There are a number of volleyball tactics that help in performing smashes, serves, blocks and passes. To get the optimal or desired achievement, an athlete must master the existing techniques well. To support the technique, it is hoped that an athlete can train physical condition by doing exercises, because with good physical condition it will support the technique well too.Hermanzoni, (2020) Strength has a broad meaning, and there are several views in interpreting it. according to Gazali, (2016) strength can be divided into general strength, special strength, maximum strength, strength endurance, absolute strength, and relative strength. (Eshghi, Zarei, Abbasi, & Alizadeh, 2022).

stated that in jumping techniques, players still make mistakes that have an impact on non-optimal jumps. Non-optimal jump height will have an impact on the quality of smash performed by the player. The jump in a volleyball game is needed especially when someone is going to do a smash movement. stated that in doing basic smash techniques such as the prefix, repulsion when hitting and when landing, proper accuracy is needed, so that the results of the smash can be maximum and accurate. A player who has good accuracy will be able to hit the ball that is directed and on target, the better the accuracy ability, the more skilled a person will be to give direction to the target for specific purposes and purposes. (Zauharudin, Maulana, & Nugraheni, 2023)

When performing the smash technique, of course, requires arm muscle strength. Arm muscle strength can work optimally if the energy released can be controlled properly. arm muscle strength has a contribution or contribution that is quite dominant in smash ability. Therefore, it is very important for students to compare between arm muscle strength and jump height which is more influential in improving smash accuracy in volleyball games. (Supriyanto & Martiani, 2019).

Some relevant results related to the effect of arm muscle strength and jump height on smash accuracy in volleyball have been widely applied before, such as those studied by:

show that the goal jump training method has an effect on increasing the height of the player's smash jump. Goal jumping training has a positive influence in increasing the height of smash jumps in volleyball games. This is because this exercise can help increase the strength, agility, coordination, and explosive power of the muscles involved in the jump. Goal jumping training involves jumping repeatedly through consecutively placed wickets. (Zauharudin et al., 2023).

that the level of arm muscle strength in extracurricular students has a level of arm muscle strength in the sufficient category, namely with an average of 13.46 and the level of smash skills of extracurricular students has a level of smash skills in the good category, namely with an average of 18.33. (Supriyanto & Martiani, 2019)

The difference between this research and previous research is that if the previous research examines how to improve smash accuracy in contrast to this study, this study only compares which arm muscle strength and jump height have more influence on smash accuracy. The research location is also different, where this research location is at of elementary school Pakemitan II school. Apart from the different research locations, there are also samples used by previous studies, namely for high school students, in contrast to this study, namely for elementary school students.

Therefore, this research is important to study, because by doing this research, researchers can find out the comparison between arm muscle strength and jump height which is more influential on smash accuracy.

The lack of smash accuracy in volleyball affects many things such as less precise targeting when smashing, there are still balls that do not cross the net and the ball goes out of the field in the opponent's area. Therefore this study will answer 1. does arm muscle strength and leg power affect smash accuracy in volleyball? 2. How much influence does arm muscle strength and leg power have on smamsh accuracy in volleyball?.

METHODS

Since the Spearman rank correlation research design seeks to ascertain the relationship between two independent variables and one dependent variable, it is possible to ascertain the relationship between two or more variables using this method, known as descriptive correlation. Smash accuracy is the dependent variable, while arm muscle strength and leg power are the independent variables. (Christian, Krenadi, & Puspita, 2013). The variables in this study are arm muscle strength X1, jump height X2 and smash accuracy Y.

The subjects of this study were volleyball extracurricular children of of elementary school pakemitan II. sample selection was carried out

by purposive sumpling the following criteria: 1. children of elementary school Pakemitan II 2. age range 10-12 years 3. who take part in volleyball extracurricular. So that a sample was obtained from of elementary school Pakemitan. So that a sample of 20 people from of elementary school Pakemitan II was obtained. Researchers chose this population because it was affordable and could facilitate research. The instruments used in this study are as follows:

a. Smash accuracy test

The test used in this study is the smash accuracy test because it can make it easier for researchers to determine the accuracy of smash targets in accordance with previous research, namely according to (Putra, 2015).

b. Arm muscle strength test

Because it can make it easier to know the strength of the student's arm muscles according to previous research, namely according to (Nasrulloh, Deviana, Yuniana, & Pratama, 2021).

c. Leg power test

Jump height is measured through the vertical jump test. Because it can find out how high the student's jump is in accordance with previous research, namely according to (burhanudin, 2019)

Data collection techniques were carried out with 3 tests, namely tests of arm muscle strength, leg power and smash accuracy in volleyball. muscle strength X1 is measured through the push up test, leg power is measured through the vertical jump X2 test and smash accuracy through the smash test is done with the right target 3 times the data or points are counted when the ball enters and hits the field area given a number but when the ball for 3 hits does not or only hits the net the data is not counted.

Data analysis used in this study using normality test and Pearson correlation. Normality test is used to determine whether the data is normal or not If L count> L table means that the data is normally distributed and if on the contrary, the data is not normally distributed. (Puskari, 2020). Pearson correlation analysis or also known as Product Moment correlation is an analysis to measure the closeness of the linear relationship between two variables that have normal data distribution (Maros & Juniar, 2016).

RESULTS AND DISCUSSION

Data regarding arm muscle strength and leg power have been found based on the push up and vertical jump tests carried out, the first step should be to do a normality test to determine whether the data has a normal distribution or not.

Based on the normality test data is carried out through the saphiro-wilk test technique. If the significance value of the data point is more than 0.05, it is considered normal. Based on table 1 above, it is obtained that the push up result is 0.000, the vertical jump result is 0.007 and the smash result is 0.082 so the conclusion of this normality test is that the data is normal because the residual count is more than 0.05 with the push up test 0.000> 0.05, the vertical jump test result 0.007> and the smash test 0.082> 0.05 so that the data is normally distributed.

Based on the sig. (tailed) value on push ups which is 0.542> 0.05 and on the vertical jump of 0.900> 0.05, it concludes that there is no significant relationship. when viewed from the guidelines for the degree of relationship based on the pearson correlation value on push ups classified as a very weak correlation category to smash and if the vertical jump is included in the category of very weak correlation to smash.

then there is a relatively small correlation between the variables of leg power and arm muscle strength with smash. In conclusion, based on the analysis carried out, it can be concluded that there is no significant influence between arm muscle strength and leg power on smash. Then it is 0.543>0.05 on push ups with a weak correlation category and for vertical jump it is 0.900>0.05 with a weak correlation category.

Based on the results of the study when viewed on Normality test data is carried out through the saphiro-wilk test techniqueIf significance value of a data point is more than 0.05, then the data is considered normal. Table 1 above shows that the result for push-ups is 0.000, the result for vertical jump is 0.007, and smash is 0.007. result is 0.082 so the conclusion of this normality test is that the data is normal because the residual count is more than 0.05 with the push up test 0.000> 0.05, the vertical jump test result 0.007> and the smash test 0.082> 0.05 so the data is normally distributed.

Based on the results of the study it can be concluded that there is no significant relationship. Based on the sig. (tailed) value on push ups which is 0.542> 0.05 and on the vertical jump of 0.900> 0.05, it concludes that there is no significant relationship. when viewed from the guidelines for the degree of relationship based on the pearson correlation value on push ups classified as a very weak correlation category to smash and if the vertical jump is included in the category of very weak correlation to smash. then the level of influence between the arm muscle strength vari-

able and leg power has a very weak influence on smash.

based on the analysis conducted that there is no significant influence between arm muscle strength and leg power on smash at 0.543>0.05 on push ups with a weak correlation category and for vertical jump at 0.900>0.05 with a weak correlation category. It can be said that it has no effect on smash because in this study it shows that arm muscle strength and leg power have no significant effect on smash accuracy in volleyball and when viewed in the guidelines for the degree of relationship it is classified as a very weak correlation in arm muscle strength and leg power, because when collecting data in the push up test field, by looking from the outside the shape of the student's arm is not too large. In addition, when doing smash at the time of the jump is still lacking. This shows that the assessment of students' physical activity must be supported by regular training so that students' physical improvement increases.

when viewed at the time of the study, it may be that the student's muscle factor is still weak, so to do push ups, the student's physical activity must be supported by regular training Even up, students are not capable enough to do it optimally. In contrast to the results of research conducted by (Isabella & Bakti, 2021). this shows that arm muscle strength and leg muscle explosiveness are components of physical condition that greatly affect the accuracy of smash. Mastery of good basic techniques can also improve the athlete's ability to smash volleyball. The research is almost the same as this research but with the difference that the previous research was for smash accuracy while this research is to find out how arm muscle strength and leg power affect smash accuracy in volleyball and how much influence arm muscle strength and leg power have on smash accuracy in volleyball.

Arm muscle strength is the ability of arm muscles to develop maximum strength by maximising contractions to overcome loads and obstacles. In volleyball arm muscle strength also plays an important role in smashing, with better arm muscle strength a volleyball player can place the ball towards the desired target. (Ajmal & Arisman, 2023).

Volleyball is a team sport. Strong mental, physical, tactical and technical skills are required to improve volleyball performance. Training and perseverance are required for all of these areas, and must be supported by a methodical and gradual long-term programme. The majority of sports professionals and experts state that developing outstanding players on the international stage requires a long 10-year programme that improves both team and individual skills.(Wicaksono, Hidayatullah, Kristiyanto, & Purnama, 2022).

Smash is a fast, downward-directed shot with power, and sharp, to return a short ball that has been hit up In doing smash movements, a very strong foot repulsion is needed so that the body is lifted up, besides that, arm muscle strength is also needed to hit the ball so that it is right on target and not easily received by the opponent. (PEN & DI, 2021). Arm muscle strength is the thrust of the advanced movement of the arm that produces a stronger resulting in a stronger strike against the ball. Based on this, it is clear that arm muscle strength has a close relationship and has an important role in supporting the successful execution of volleyball top serves. In supporting the successful implementation of the volleyball top serve.(Pahrian & Esser, 2017). the strength of this jump height can affect the smash in volleyball. Good arm strength can control the shortest time when doing smash. (Azizah & Soleha, 2024).

Smash is the most important attacking technique in volleyball. The effectiveness of smash depends on physical prowess and competence of attacking skills. It is thought that interactive multimedia training or learning will be more successful and efficient to maximise or achieve sporting success, particularly in mastering volleyball skills. The ability to play volleyball is a prerequisite for success in the game. These abilities can be in the form of smash, block, up passing, down passing, and up passing. Smash is a fast, accurate, and sweeping shot. When the ball is over the net, form a powerful attack shot to enter the opponent's zone. (Suhairi, Asmawi, Tangkudung, Hanif, & Dlis, 2020).

CONCLUSION

Based on the results of research conducted by researchers regarding the findings of researchers on students who take part in extracurricular activities at Pakemitan II elementary school, Sumedang Regency. With unsatisfactory results that arm muscle strength and leg power have no significant effect on smash accuracy in volleyball. Researchers suggest that volleyball extracurricular participants who have poor smash skills are expected to increase arm muscle strength and leg power by increasing the portion of training outside extracurricular activities.

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