The Influence of Leg Muscle Exercise Variations on the Jump Results of Extracurricular Volleyball Players at SMPN 1 Bangkalan

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ABSTRACT
The purpose of this study was to determine the effect of variations in leg muscle training on the jumping results of extracurricular volleyball players at SMPN 1 Bangkalan. Which aims to find out whether there is an effect of variations in leg muscle training on the jumping results of extracurricular volleyball players at SMPN 1 Bangkalan. The research method uses a quasi-experimental design method (pseudo-experiment). The data analysis technique used is paired sample t-test, with the results of the t-test where t-count = 16.20 with a significant level obtained that the value of t-table = 0.05 this means that the value of t-count is greater than t-table or 16.20 > 0.05. Then H0 is accepted. Thus the hypothesis states "There are variations in leg muscle strength training on the jumping results of extracurricular volleyball players at SMPN 1 Bangkalan.

Keywords: Exercise Variation; Vertical Jump.

INTRODUCTION
Student activities at school do not only take part in learning, but students are also required to take part in extracurricular activities, one of the extracurricular activities that students like is volleyball, volleyball is a type of game sport (Sahabuddin & Hakim, 2019). The volleyball game is played by two teams, each of which consists of 6 people in this game separated by a net in the game, each team tries to make points by dropping the ball on the opponent's field which is held under the rules (Pardjiono, Hidayat, & Indahwati, 2015).

Volleyball is a big ball game. The volleyball game aims to drop the ball into the opponent's area so that the opponent cannot return the ball to look for numbers (Wibowo, 2015). Volleyball is one of the big ball games that is in great demand by the public (Huda, 2018) (Sahabuddin et al., 2022). In this game, some procedures or techniques must be mastered by the players (Umar, 2020).
The game procedure is as follows; the game in which one team tries to serve the ball, from behind the boundary line of the match field over the net and into the opponent's field (Sahabuddin, 2018). The opposing team may not let the ball enter their territory, they touch the ball three times (Hermansyah & Permadi, 2018), usually the reception of the first and second balls is arranged so that they can return to attack, and also as an effort to direct the ball so that it does not fall on its field (Pardjiono, Hidayat, & Indahwati, 2015).

Smash is one of the most frequently used attacks to score or produce scores or numbers. Several factors can influence the success of a volleyball smash, one of which is having a high jump (Puskaria.A, 2020). The ability to jump cannot be separated from the physical abilities of athletes because the ability to jump is related to power, namely in the leg muscles (Sahabuddin, 2019). Exercises carried out to improve the player's jumping ability can be carried out using training techniques that function to increase the ability of leg muscle power (Irwansyah, 2012).

The definition of exercise that comes from the word exercise is the main device in the daily training process to improve the quality of the function of the human body's organ systems so that it makes it easier for athletes to perfect their movements (Anwar, 2019). The composition of the training material in one face-to-face contains opening/introductory exercises, warm-up (warming up), core exercises, additional exercises (supplements), and closing (cooling down) (Asnaldi, 2020). The definition of training that comes from the word training is a process of improving sports ability which contains material, theory and practice (Suriatno & Yusuf, 2018), using methods and implementation rules with a scientific approach, using the principles of planned and regular training, so that training goals can be achieved on time (Wati, Sugihartono, & Sugiyanto, 2018) (Suaidah et al., 2020).

Based on the description above, training can be described as a process of activity or sports activity that is carried out in stages and takes a long time to get the desired performance (Fallo & Hendri, 2016) (Sahabuddin et al., 2021). If these achievements have been obtained, it is necessary to have a program or arrangement of forms of training to see the basic technical abilities of an individual or athlete, by visiting and participating in training (Srianto, 2018).

Exercise variation is a form of exercise or change in the activation process that aims to increase athlete motivation (Zakaria et al., 2018), as well as reduce boredom and boredom, exercise variations are carried out to improve athlete performance for the better and exercise variations also eliminate boredom in the process of training activities from
this method is an activity in the form of repeated repetition of the same thing, thereby forming ready knowledge or ready skills which can be used at any time by the person concerned (Nainggolan & Sinulingga, 2021).

Variation training is an attempt to change the atmosphere and provide new things to avoid boredom. Exercises performed properly usually require a lot of time (Nasriani & Mardela, 2019). Hundreds of hours of hard work are required by athletes to be able to gradually increase their work intensity, repeat each form of training and improve their performance (Indrayana, 2018). Therefore it is not surprising that such practice can often lead to boredom. Sports activities that have elements of minimal variation will make athletes feel bored in doing so (Asnaldi, 2020), so boredom in training will be detrimental to the progress of their achievements, exercises that are carried out actively and correctly will give good results for students or athletes who want to practice, with variations in training can create an attraction for athletes and avoid boredom in students or athletes who practice (Amansyah & Sinaga, 2015).

From the quotation above it can be seen that the exercises provided aim to improve a skill, the exercises are applied following the training material that has been prepared and planned in such a way that participants who take part in the training can practice a skill in a fun way (Jusran, 2019), while in practice activities a supporting factor is needed in an exercise such as balls, fields and others that aim to simplify and expedite the training process and get maximum results, regular practice will produce good results (Karmida et al., 2017).

Leg muscle explosive power is the leg muscle explosive power used when jumping in doing Jump service, smash and block in volleyball games. In the game of volleyball, it takes a variety of physical conditions, such as strength, speed, agility, balance, explosive power and others (Kurniawan & Ramadan, 2016). All of these components are needed to support game activities such as jumping, blocking, smashing, and jump service. Among the several physical conditions that are important in the game of volleyball, one of them is the explosive power of the leg muscles (Wismiarti & Hermanzoni, 2020). The correct vertical jump height will make it easier for an athlete to do Jump service, smash and blocking correctly (Bakar & Nur, 2020), for that every volleyball athlete is required to have the ability to jump vertically perfectly (Vai et al., 2018). The ability to jump must be developed in every volleyball athlete. To increase the ability to jump vertically, it can be done by training the leg muscles to produce explosive power which is useful for supporting the
implementation of the jump service carried out to the opponent's area in volleyball games (Mardela & syukri, 2016).

From the above opinion, it can be concluded that the explosive power of the leg muscles is the strength and speed of the leg muscle contractions dynamically in the shortest time to provide the best momentum, as well as the explosive power of the leg muscles is a relationship that mutually influences the muscles of the body of an athlete who has good leg muscle explosive power will support smash ability.

METHOD

The type of research used is quantitative and uses a descriptive experimental approach. The research design used was quasi-experimental. Experimental research is strict to determine the causal relationship between variables (Maksum, 2012). The research design used was one group pretest-posttest design. Data analysis is a series of activities that aim to evaluate, classify, systematize, interpret and validate data so that phenomena have a social, academic and scientific value. So the researchers used the formula that was used was the t-test formula. Because this study uses the t formula, there are many variations of the t formula and its use is adjusted to the characteristics of the differentiated data. Several prerequisites must be met before conducting the t-test. The prerequisites are:

The normality test is intended to ensure that the data obtained is symmetrical or normally distributed, which resembles a bell or curve because the distribution of numbers is mostly in the middle, and the distribution of numbers decreases to the right or left (Maksum, 2012). The homogeneity test is to ensure that the variance of each group is the same or similar to enable a fair comparison (Maksum, 2012).

The t-test is a procedure in which the distribution of the data being compared comes from the same group of subjects. For example, to analyze the differences between the results of the pre-test and post-test for certain groups, you can use a similar t-test (Maksum, 2012).

RESULTS AND DISCUSSION

Results

This chapter describes the results of data analysis and discussion. The following are the results of Vertical Jump research on volleyball game practice for students who take part in extracurricular activities at SMP Negeri 1 Bangkalan.
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Table 1.
Pretest dan posttest Vertical Jump

<table>
<thead>
<tr>
<th>Number</th>
<th>Name</th>
<th>Pretest</th>
<th>Posttest</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Hasan Alik Mumtaz W</td>
<td>45 cm</td>
<td>50 cm</td>
</tr>
<tr>
<td>2</td>
<td>Nabil Aidil Fitroh</td>
<td>60 cm</td>
<td>65 cm</td>
</tr>
<tr>
<td>3</td>
<td>Surya Pangestra</td>
<td>56 cm</td>
<td>61 cm</td>
</tr>
<tr>
<td>4</td>
<td>Nathan Qodir Wira P</td>
<td>59 cm</td>
<td>65 cm</td>
</tr>
<tr>
<td>5</td>
<td>M. Imam Ibnu Z</td>
<td>52 cm</td>
<td>56 cm</td>
</tr>
<tr>
<td>6</td>
<td>Haddan Firmansah</td>
<td>53 cm</td>
<td>56 cm</td>
</tr>
<tr>
<td>7</td>
<td>Moh Taufan DW</td>
<td>62 cm</td>
<td>65 cm</td>
</tr>
<tr>
<td>8</td>
<td>Moh Maulana Aprilianto</td>
<td>55 cm</td>
<td>59 cm</td>
</tr>
<tr>
<td>9</td>
<td>Ahmad Fauzan Hanif</td>
<td>57 cm</td>
<td>63 cm</td>
</tr>
<tr>
<td>10</td>
<td>Alif Utul Albab</td>
<td>56 cm</td>
<td>62 cm</td>
</tr>
<tr>
<td>11</td>
<td>Sandy Febrio</td>
<td>61 cm</td>
<td>65 cm</td>
</tr>
<tr>
<td>12</td>
<td>Tri Dika</td>
<td>45 cm</td>
<td>52 cm</td>
</tr>
<tr>
<td>13</td>
<td>Alan Ardiaysyah Akbar</td>
<td>49 cm</td>
<td>55 cm</td>
</tr>
<tr>
<td>14</td>
<td>Abrisam Aflah Fauzi</td>
<td>48 cm</td>
<td>53 cm</td>
</tr>
<tr>
<td>15</td>
<td>Fausi Rahman</td>
<td>50 cm</td>
<td>56 cm</td>
</tr>
<tr>
<td></td>
<td>Amount</td>
<td>808</td>
<td>883</td>
</tr>
</tbody>
</table>

Based on the table above, the pretest and posttest for the vertical jump in volleyball games before being given treatment and after being given leg muscle strength training variations in extracurricular students at SMPN 1 Bangkalan obtained results of an increase in vertical jump after being given leg muscle variation training treatments.

The data normality test is a test to find out whether the data obtained is normal or not. This normality test uses the Kolmogorov Smirnouv with the data criteria being normally distributed if the significance or probability value of K-S > 0.05 and the significance or probability value of K-S < 0.05. At 0.05 the data is not normally distributed. The following are the results of the normality test for the pretest and posttest data for vertical jump accuracy at SMP Negeri 1 Bangkalan.

Table 2.
Kolmogorov-Smirnov Test

<table>
<thead>
<tr>
<th></th>
<th>Pretest</th>
<th>Posttest</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>15</td>
<td>15</td>
</tr>
<tr>
<td>Normal Parameters a,b</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>53,8667</td>
<td>58,8667</td>
</tr>
<tr>
<td>Std. Deviation</td>
<td>5,57887</td>
<td>5,22175</td>
</tr>
<tr>
<td>Most Extreme Differences</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Absolute</td>
<td>.116</td>
<td>.175</td>
</tr>
<tr>
<td>Positive</td>
<td>.089</td>
<td>.175</td>
</tr>
<tr>
<td>Negative</td>
<td>-.116</td>
<td>-.147</td>
</tr>
<tr>
<td>Test Statistic</td>
<td>.116</td>
<td>.175</td>
</tr>
<tr>
<td>Asymp. Sig. (2-tailed)</td>
<td>.200 ^d</td>
<td>.200 ^d</td>
</tr>
</tbody>
</table>

From the data above, the calculation of the smash accuracy pre-test value uses the Kolmogorov-Smirnov test with a value of 0.116 at a probability level of 0.200 greater than 0.05 and the post-test smash accuracy value given by the Kolmogorov-Smirnov test value
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is 0.175 which has a probability level of 0.200 higher than the value of 0.05. That is, the data is normally distributed before and after testing the accuracy of the smash data.

Homogeneity tests are designed to ensure that the variances of each group are the same or form a fair comparison. Alternatively, homogeneity calculations are designed to ensure that the groups that make up the sample come from the same population. This normality test uses Kolmogorov-Smirnov to test the uniformity of decisions. If the p-value is greater than 0.05, the data is said to be homogeneous. Preferably, if the p-value is less than 0.05 then the data is declared heterogeneous.

Table 3.
Test of Homogeneity of Variances

<table>
<thead>
<tr>
<th>Levene Statistic</th>
<th>df1</th>
<th>df2</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pretest - postest</td>
<td>Based on Mean</td>
<td>.021</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Based on Median</td>
<td>.004</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Based on Median and with adjusted df</td>
<td>.004</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Based on trimmed mean</td>
<td>.022</td>
<td>1</td>
</tr>
</tbody>
</table>

From the data above, the accuracy of the smash tested by the Kolmogorov-Smirnov test has a pre-test value of 0.947 and a probability level of 0.887 which is greater than the value of 0.05. Therefore, the pretest and posttest data on smash accuracy obtained are evenly distributed.

Table 4.
Paired Samples Test

<table>
<thead>
<tr>
<th>Paired Differences</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>Std. Error Mean</th>
<th>95% Confidence Interval of the Difference</th>
<th>t</th>
<th>df</th>
<th>Sig. (2-tailed)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pair 1 pretest - postest</td>
<td>-5,000</td>
<td>1,195</td>
<td>.309</td>
<td>-5,662</td>
<td>-4,338</td>
<td>-16,202</td>
<td>14</td>
</tr>
</tbody>
</table>

From the results of the data above, it can be concluded that the statistical calculations obtained t-count = 16.20 with a significant level obtained that the value of t-table = 0.05, this means that the value of t-count is greater than t-table or 16.20 > 0.05. Based on this study, it was stated that "there is an influence of variations in leg muscle strength training on the jumping results of extracurricular volleyball players at SMPN 1 Bangkalan".

Discussion

Testing the hypothesis in this study proved that the average smash accuracy in volleyball games was obtained from the pretest and posttest results. The average pretest score was 53.9 and the posttest average score was 58.9. From these average results,
researchers can conclude that extracurricular volleyball players at SMPN 1 Bangkalan significantly improve their jumping results in volleyball games after being given leg muscle strength training variations. Based on the results of the t-test calculation where t-count = 16.20 with a significant level, it is obtained that the value of t-table = 0.05, which means that the value of t-count is greater than t-table or 16.20 > 0.05. Then H0 is accepted. Thus the hypothesis states "There are variations in leg muscle strength training on the jumping results of extracurricular volleyball players at SMPN 1 Bangkalan".

Looking at the analysis above, it can be seen that the variation training method is an attempt to change the atmosphere and provide new things to avoid boredom. Exercises performed properly usually require a lot of time. Hundreds of hours of hard work are required by athletes to be able to gradually increase their work intensity, repeat each form of training and improve their performance (Pranopik, 2017). Therefore it is not surprising that such practice can often lead to boredom. Sports activities that have elements of minimal variation will make athletes feel bored in doing so, so boredom in training will be detrimental to the progress of their achievements, exercises that are carried out actively and correctly will give good results for students or athletes who want to practice, with variations in training can create an attraction for athletes and avoid boredom in students or athletes who practice (Amansyah & Sinaga, 2015) (Aulia & Hermanzoni, 2018).

This research explains that a volleyball player must realize the importance of training, both in the form of training to improve jumping results when doing a volleyball smash which is a fundamental technique to be mastered by all volleyball players/athletes. With this research, it is revealed that using a variety of exercises is quite effective for both training to improve physical abilities and improve basic technical abilities. A good smash can open up opportunities to score points because a smash is a fast attack and a hard blow to score points from your opponent in a volleyball match. The results of this study indicate that leg muscle strength variation exercises affect the accuracy of volleyball shots for Bangkalan 1 Public Middle School students. Because of this effect, leg muscle strength variation exercises can be used to improve jumping results in volleyball games.

**CONCLUSIONS AND SUGGESTIONS**

From the analysis of the data obtained, the authors concluded that in this study there were exercises to vary the strength of the volleyball leg muscles in Bangkalan 1 Public Middle School students after being treated with a variety of exercises. The calculated value is 16.20
and the t-table is 0.05 at the significance level. Based on the results of the research conducted, there are several suggestions that researchers can make: 1) For Students. By using the training variation method there is an influence and benefit on the accuracy of smashes in volleyball games, with this it is hoped that students who are members of the volleyball team will improve accuracy. smash by using a variety of exercises. 2) For coaches/coaches, this research is input for using good and correct training methods to improve the accuracy of volleyball smashes for students who are members of a volleyball team.

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