The Effect of Half Squat Jump and Hurdle Jump Training on Short Distance Running of 60 Meters in Class IX Students of SMP Negeri 11 Makassar

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ABSTRACT
This study aims to test the effect of half squat jump and hard jump training on short-distance running of 60 meters. The method used in this research is experimental research. This research was conducted at SMP Negeri 11 Makassar with participants in this research being students who were willing to follow all research procedures. The sample in this research was 20 students. The instrument used in this research was a 60-meter short-distance running test. Based on the results of data analysis, it can be concluded that the half squat jump training and hurdle jump training on the ability to run a short distance of 60 meters in class IX students of SMP Negeri 11 Makassar, obtained the average value of the half squat jump training group, namely 9.716, which is smaller than the average value of the half squat jump training group. The average for the hurdle jump training group was 9.082 with a value of t-count = 2.244 > t-table = 2.101 or significant 0.038 < 0.05. The results of this study show that hurdle jump training is better than half squat jump training for short-distance running of 60 meters in class IX students of SMP Negeri 11 Makassar.

INTRODUCTION
Athletics is an individual sport, which is known as the mother of sports because the movements in athletics still exist in other sports and it cannot be denied that athletics is very important in improving physical fitness, ability, quality, speed and endurance.
well as movement reactions both in other sports and in everyday life which has many challenges (Cania and Alnedral, 2019). According to Sumarsono (2017) "Athletics is the oldest branch of sport and is the mother of all sports whose movements are a variety and basic movement patterns of human life". In line with the opinion of Ramadan and Sidiq (2019), "Athletics is a branch of sport which consists of dynamic and harmonious movements such as walking, running, throwing and jumping". In athletics, the dominant physical condition elements are endurance, leg muscle explosive power, flexibility, leg muscle strength, and speed (Aryatama, 2021). Physical condition is a basic element or ability that every athlete must have to achieve achievement. The physical condition shows the condition or ability to function as a whole of the body, such as the ability to function of the heart, lungs, circulatory system, muscles, joints, breathing, and so on. "Without good physical condition, it is difficult for athletes to master sports techniques" (Syafruddin, 2016).

Short-distance running (sprinting) is any type of running that is carried out from start to finish at maximum speed (Nurhayati and Widodo, 2018). Running speed is the product of the length and frequency (number per second) of strides, whoever wants to run fast must take longer strides and make more steps per second (Mustakim and Priyanto, 2019). Sprinting requires a very high striding strength (speed of muscle contraction), trying to make the runner get used to the ideal steps in the race and the runner adapts himself to the balanced effort that exists in him, then when changing steps, control is needed. to yourself, a feeling of relaxation and acceleration of running. To achieve good running results, several elements must be considered, namely: starting movement, sprint movement, and finishing movement. The element of speed movement is an element of basic movement ability after strength and endurance which is useful for achieving excellent quality performance. According to Ramadhan (2018), several factors play an important role in sprint performance, namely: 1) stride length; 2) step frequency; 3) power; 4) technique; 5) coordination; 6) flexibility; and 7) special durability.

Reality in the field, based on observations by researchers at SMP Negeri 11 Makassar. In athletics, especially the 60-meter sprint, the majority of class IX students at SMP Negeri 11 Makassar have not been able to complete the sprint with a minimum time of 00.00 - 15.00 (Yani and Hasri, 2020). Because most of the class IX students at SMP Negeri 11 Makassar do not have the strength and explosive power in their legs they have a squatting start technique, good running technique, and also do not want to do physical activity, sprinting is carried out during the day in hot weather and students experience weakness in their legs. his physical condition. In athletics, especially the 60-meter sprint, there are still many students who experience problems when performing sprint techniques in a short time. It can be said that students, especially in the 60-meter running event, have less foot reach and footstep frequency, which results in changes that result in slower movement over time, and also less foot reaction speed which causes disadvantages for these student runners. Based on these problems, the researcher hypothesizes that half squat jump training and hurdle jump training can improve students' 60-meter sprints.

In sports, achievement ability is a combination of many abilities that determine
achievement, which are built in a training process that takes place over a long period. Tarju and Wahidi (2017) state that "exercise is a way of carrying out movement techniques that are given repeatedly with rest time so that fatigue will decrease and students can measure or calculate again about the movements that will be carried out in the next training session". Exercise is a type of physical activity that requires planning, is structured, and is carried out repeatedly to improve or maintain one or more components of physical fitness (Nasrulloh, Prasetyo, and Apriyanto (2018). Furthermore, it is said to be full of risks because, in the process of sports, training will certainly cause changes or damage both physical and psychological. According to Mylsidayu and Kurniawan (2015), supporting knowledge in the process of training is as follows: "1) Anatomy, 2) Psychology, 3) Physiology, 4) Motor learning, 5) Biomechanics, 6) Statistics, 7) Tests and Measurements, 8) Sports Health, 9) Educational Sciences, 10) Nutrition, 11) History, and 12) Sociology".

These training principles are the most basic but important principles and can be applied to every sport. These principles must be known and truly understood by coaches and players. According to Nala (2011), there are several training principles, namely: 1) the principle of being active and serious in participating in training; 2) the principle of multilateral development; 3) specialization in training; 4) individual training; 5) variety in training; 6) training model; and 7) the principle of progressive program improvement. All components are made in various models that suit the functional characteristics and psychological characteristics of the sport being studied. According to Ramli (2015–67), the important components that must be considered in training include: "(1) training volume, (2) training intensity, (3) training density, (4) training complexity, (5) quality exercise and, (6) variations in exercise".

The squat exercise is a very simple movement. According to Syamsudar, Kusmayadi, and Jaman (2020), squat jumps are a form of exercise to train and increase the endurance component of leg muscle strength. Physical condition is very important to support a player's movements. Skilled movements can be done if the physical condition is good. The squat jump exercise is carried out with one leg forward and one leg back, the body lowered down, and jumping up or in the air. Try when the individual squat jumps to land on the tip of the toe, and put the body weight on the heel (Hasibuan, Alkahfi and Sukendro, 2019). This exercise starts from a slightly squatting body position with your feet shoulder-width apart, then your hands interlocked behind your head. The movement of this squat jump exercise is to jump vertically as hard as possible, try to keep your legs straight when floating in the air, land back to the starting position, and do it repeatedly depending on the sets and repetitions (Sarwita, 2019). To perform the squat movement, you must have the right basic strength. For athletes or players who have poor basic strength and flexibility, it is recommended to do the squat movement without using weights first. The squat movement is one of the weight training movements, namely training using external weights. Squat jump is an exercise that aims to train the muscles: hamstrings (biceps femoris) from the back of the upper leg, gluteus maximus. Squat jump training at short intervals can increase leg muscle power (Pratama and Erawan, 2019).
Implementation of squat jump training, namely the position of one leg forward and one leg back. Lower your body, then jump into the air. While in the air, switch leg positions so that the back leg is now in front and vice versa. Land on your toes, then bring your weight back to your heels. So squat jump training can increase strength, explosive power, and footsteps when sprinting.

Hurdle jump training is also an exercise that can increase leg strength and explosive power. According to Chu (2013), hurdle jump training is an exercise that has a special characteristic, namely standing with your feet shoulder-width apart at the end of a row of obstacles with the length stretched out in front. Starting from the end of the barrier line, jump forward over the barrier, placing your feet together. This movement comes from the hips and knees to keep the body vertical and straight and does not allow the knees to separate or to either side. Furthermore, Sari and Rahayu (2018) stated that "plyometric training aims to move the leg muscles because the leg muscles are the centre of power for the vertical jump movement." Meanwhile, according to Rizki, Supriatna, and Adi (2020), "Hurtle hopping training is one of the plyometric exercises which is done by lifting both legs and passing over the goal. "The jumps carried out in this exercise must be maximal and use the correct technique with speed and movement." Hurdle jump training is training by jumping over several hurdles, where the hurdles are also obstacles in training (Suriatno and Yusuf, 2019). Hurdle jump training is an exercise that has the special characteristic of standing with your feet shoulder-width apart at the end of a row of obstacles with your length stretched out in front. Starting from the end of the barrier line, jump forward over the barrier, placing your feet together. This movement comes from the hips and knees to keep the body vertical and straight and does not allow the knees to separate or to either side.

**METHODS**

This research was conducted using experimental methods. An experiment is research carried out on variables for which data does not yet exist, so it is necessary to carry out a manipulation process by providing certain treatments to research subjects whose impact is then observed/measured (future data) (Hardani, 2020). The research method used in this research was experimental research carried out in 10 meetings to see the significance of the two treatments. This research consists of independent variables and dependent variables, where the independent variables are half squat jump and hurdle jump exercises and the dependent variable is 60 meter short distance running. The population in this study were all students of SMP Negeri 11 Makassar Class IX, totalling 40 male students. The sampling technique is a saturated sample. The sample in this study consisted of 20 class IX students of SMP Negeri 11 Makassar. The data analysis techniques used in this research generally use computer analysis and the SPSS Version 20 program with a significance level of 95% or \( \alpha = 0.05 \).
RESULTS AND DISCUSSION

The research results from initial test data on the ability to run a short distance of 60 meters in students at SMP Negeri 11 Makassar for the half squat jump training group were overall obtained with a period of 2.44. The average score for the 60-meter short-distance running ability test is 13.77 with a standard deviation of 0.37 and a frequency distribution as in Table 1 below:

Table 1.
Frequency distribution of initial test of 60 meter short distance running ability among students at SMP Negeri 11 Makassar using half squat jump training

<table>
<thead>
<tr>
<th>No</th>
<th>Interval Class</th>
<th>Absolute Frequency</th>
<th>Relative Frequency (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>9.03 – 9.60</td>
<td>3</td>
<td>30</td>
</tr>
<tr>
<td>2</td>
<td>9.61 – 10.16</td>
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<td>20</td>
</tr>
<tr>
<td>3</td>
<td>10.17 – 10.73</td>
<td>2</td>
<td>20</td>
</tr>
<tr>
<td>4</td>
<td>10.74 – 10.30</td>
<td>2</td>
<td>20</td>
</tr>
<tr>
<td>5</td>
<td>11.31 – 11.87</td>
<td>1</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>Amount</td>
<td>10</td>
<td>100</td>
</tr>
</tbody>
</table>

Figure 1.
Histogram of the initial 60-meter distance running test with squat jump training

Furthermore, research results from initial test data on the ability to run a short distance of 60 meters in students at SMP Negeri 11 Makassar for the overall hurdle jump training group were obtained with a period of 2.09. The average score for the 60-meter short-distance running ability test is 10.14 with a standard deviation of 0.77 and a frequency distribution as in Table 2 below:

Table 2.
Distribution of frequency of initial test of ability to run a short distance of 60 meters in students at SMP Negeri 11 Makassar using hurdle jump training

<table>
<thead>
<tr>
<th>No</th>
<th>Interval Class</th>
<th>Absolute Frequency</th>
<th>Relative Frequency (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>9.22 – 9.71</td>
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<td>40</td>
</tr>
<tr>
<td>2</td>
<td>9.72 – 10.19</td>
<td>2</td>
<td>20</td>
</tr>
<tr>
<td>3</td>
<td>10.20 – 10.68</td>
<td>1</td>
<td>10</td>
</tr>
<tr>
<td>4</td>
<td>10.69 – 11.16</td>
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<td>10</td>
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<td>5</td>
<td>11.17 – 11.65</td>
<td>2</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td>Amount</td>
<td>10</td>
<td>100</td>
</tr>
</tbody>
</table>
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The histogram of ability to run a short distance of 60 meters with hurdle jump training

Figure 2.

Meanwhile, the results of hypothesis testing were carried out using paired and unpaired t-tests. Where, 1) The half squat jump training group in the initial test (A1) compared with the final test (A2) obtained a t-value of 7.604 > t-tab (0.05) of 2.262 and it can be said that there is a significant difference in the ability to run a distance of 60 meters; 2) The hurdle jump training group in the initial test (B1) and final test (B2) obtained a t-hit score of 9.865 > t-tab (0.05) of 2.262 and it can be said that there is a significant difference in the ability to run a distance of 60 meters; and 3) The half squat jump training group in the final test data (A2) was compared with the hurdle jump training group in the final test data (B2), where the result was t-hit of 2.244 > t-tab(0.05) of 2.101. For more details, it is summarized and presented in Table 3 below:

Table 3

<table>
<thead>
<tr>
<th>Variable</th>
<th>t_hit</th>
<th>t_tab</th>
<th>Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>A1 dan A2</td>
<td>7.604</td>
<td>2.262</td>
<td>Significant</td>
</tr>
<tr>
<td>B1 dan B2</td>
<td>9.865</td>
<td>2.262</td>
<td>Significant</td>
</tr>
<tr>
<td>A2 dan B2</td>
<td>2.244</td>
<td>2.101</td>
<td>Significant</td>
</tr>
</tbody>
</table>

Based on the results of the research data, it was found that half squat jump training had an average time of 60-meter short distance running for students at SMP Negeri 11 Makassar of 9.716 and hurdle jump training had an average time of 9.082. It can be concluded that hurdle jump training is better than half squat jump training based on the average time.

Discussion

According to the t-test results of the initial test data and final test data for the 60-meter short distance run in class IX students of SMP Negeri 11 Makassar in the half squat jump training group, it turns out that from the calculation results, it was obtained that the observation t value was greater than the t table value at a significance level of 95 %. This proves that the first hypothesis proposed is accepted at a significance level of 95%. The prediction that can be made is that by providing half squat jump training in a systematic programmed manner, it will be possible to improve short-distance running of
60 meters. This proves that squat jump training plays a role in improving 60-meter short-distance running. These results explain that half squat jump training in an athlete greatly influences movement speed in their ability to run a short distance of 60 meters.

According to Pratama and Erawan (2019) stated that: “Squat jump training at short intervals can increase leg muscle power.” So, the half squat jump exercise is a plyometric exercise to train the lower body. This exercise targets the quadriceps, hamstrings, glutes, and calves. How to exercise: squat down to a squat position, press your toes, and push your body as high as possible into the air. When descending, immediately bend your knees, lower back into a squat position, and jump again. The position of the feet must be on tiptoe when landing within the specified time. This squat jump exercise will stimulate the calf and thigh muscles. The muscles involved when performing the half squat jump are the gluteus maximus, gluteus medius, quadriceps (rectus femoris, vastus lateralis, vastus intermedius, vastus medialis), hamstrings (biceps femoris, semitendinosus, semimembranosus). The link between the half squat jump exercise movement in carrying out short-distance running movements of 60 meters is that the half squat jump exercise is one of the exercises that can increase the explosive power of the legs, therefore, when performing sprint movements, explosive power is needed, especially the explosive power of the legs which can pushing the body to produce speed in running quickly.

Hurdle jump training for 60-meter short-distance running for class IX students at SMP Negeri 11 Makassar. According to the t-test results of the initial test data and final test data for the 60-meter short distance run in class IX students of SMP Negeri 11 Makassar in the hurdle jump training group, it turns out that from the calculation results, it was obtained that the observation t value was greater than the t table value at the 95% significance level. The prediction that can be made is that by providing hurdle jump training in a systematic programmed manner, it will be possible to improve short-distance running of 60 meters. This proves that an athlete performs hurdle jump training to achieve a sprint speed of 60 meters. These results provide an explanation that an athlete’s hurdle jump training greatly influences movement speed when running a short distance of 60 meters. Hurdle jump training is training by jumping over several hurdles, where the hurdles are also obstacles in training. Hurdle jump training is an exercise that has the special characteristic of standing with your feet shoulder-width apart at the end of a row of obstacles with your length stretched out in front. Starting from the end of the barrier line, jump forward over the barrier, placing your feet together. This movement comes from the hips and knees to keep the body vertical and straight and does not allow the knees to separate or to either side.

The connection between the hurdle jump training movement in carrying out short-distance running movements of 60 meters is that the hurdle jump exercise is one of the exercises that can increase the explosive power of the legs, therefore, when performing sprint movements, explosive power is needed, especially the explosive power of the legs which can push the body to produce speed in running quickly. Thus, hurdle jump training has a significant influence on 60-meter short-distance running in class IX students at SMP Negeri 11 Makassar.
Half squat jump training and hurdle jump training for 60-meter short-distance running for class IX students at SMP Negeri 11 Makassar. According to the results of the t-test data from the final 60-meter distance running test for class IX students at SMP Negeri 11 Makassar in both groups, it turns out that from the calculation results, it was found that the observed t value was greater than the t table value at the 95% significance level. This proves that the third hypothesis proposed is accepted at a significance level of 95%. Hurdle jump training is better in improving 60-meter short-distance running than half squat jump training. In running a short distance of 60 meters, students carry out repeated exercises to gain practical skills and dexterity regarding the knowledge learned. Therefore, to run a good 60-meter short distance, you need to practice repeatedly. Analysis of the movement that occurs when students run a short distance of 60 meters is that the athlete must start squatting and then hear the signal "yes" to run as fast as possible to the finish line.

From the analysis of the sprint speed movement, it can be seen that to produce a running speed of 60 meters, good physical condition is required, such as the physical condition of the most dominant explosive power. The half squat jump exercise and the hurdle jump exercise are almost the same form of exercise, namely, they can increase the explosive power of the legs, but the difference is that the half squat jump exercise using one's body weight is done by jumping over the equipment by the rules, while the hurdle jump exercise is an exercise without using goal tool according to the predetermined goal height. Thus, half squat jump training and hurdle jump training have a significant difference in effect on 60-meter short distance running in class IX students of SMP Negeri 11 Makassar, and hurdle jump training is better in improving 60-meter short distance running than half squat jump training.

CONCLUSION

The conclusion of this research is that hurdle jump training is better than half squat jump training for short-distance running of 60 meters in class IX students at SMP Negeri 11 Makassar. Therefore, it is recommended that the club needs to facilitate training facilities and infrastructure at the training ground so that problems do not occur that could hinder the training process being carried out and further research should involve other variables that are relevant to this research as well as the population and sample. wider.

REFERENCES


