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Hanging ball training on top serve ability in extracurricular volleyball

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Abstract

This study aims to determine the effect of hanging ball training on top serve ability in volleyball extracurricular activities for female students of North Indralaya 1 Public Senior High School. The method used in this research was a quasi-experiment with a pretest-posttest one group design. The sampling technique is total population sampling with a sample size of 30 people. The treatment in this study was hanging ball training given for 6 weeks with a training frequency of 3 times a week. The results of data processing and analysis using the data normality test and hypothesis testing with the t test formula show that hanging ball training has an effect on the results of the top serve. This can be seen from the results of data analysis through calculating the t test formula with the criterion tcount being greater than ttable (19.28 > 1.70) with a significance level of α = 0.05 and the number of samples (N = 30), then the hypothesis proposed accepted. Hanging ball training has an influence on the results of top serve ability. The research results showed that hanging ball training hanging ball training is useful for teachers and coaches as a guide to improving the top serve in volleyball extracurricular activities for female students of North Indralaya 1 Public Senior High School.

Keywords: *hang ball, top serve, volleyball*

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INTRODUCTION

Sports are a physical activity where the aim is to achieve the highest level of performance as much as possible, whether individually or as a team. Sport is an activity good physical for body health, helps stimulate the muscles and other parts of the body to move especially if done regularly because by exercising our body becomes healthy and fit (Sinurat et al., 2023). To excel in the field of sports, it is hoped that the correct knowledge and technology will be applied, (Daulay, 2018). Volleyball is a game created to fill the winter season in America, specifically in the city of Holyoke. When winter came, people in America, especially in Holyoke, couldn't do outdoor activities, so the game was designed to be played indoors. The game of volleyball, which involves hitting the ball before it touches the ground, allows each team to hit the ball twice within their own area, while the third hit must cross over the net to the opponent's side.

Subsequently, the game spread worldwide, (Sukirno & Andriyanto, 2017). Volleyball is a team sport that begins with a serve, where the ball must be kept in the air and should not fall on your own court. The goal is to score points as quickly as possible by attacking the opponent's area. There are several basic techniques in volleyball, including: smashing/spiking; passing; serving; blocking; and receiving serves. Serving is one of the techniques in volleyball that is categorized as an attack move (sujarwo, 2021). According to

Sinurat et al., (2023) purpose of training is to help athletes improve skills and the performance is as maximum as possible. Syauki, (2020) also believes that the ball hanging is one of the media conveying information to the recipient, in this case, is position information correct body and momentum contact of the palm with the ball. The top serve has a fairly high level of difficulty, the main aim of the top serve is to accelerate the speed of the ball diving from top to bottom (Irfandi & Kristiyanto, 2015).

Based on observations and interviews with the extracurricular volleyball coach at putri North Indralaya 1 Public Senior High School, many students in the extracurricular activities struggle with overhead serves in volleyball. They often fail to hit the ball correctly during an overhead serve, resulting in the ball going out of bounds or not clearing the net. The lack of mastery in the serving technique causes the team to risk losing points unnecessarily, potentially leading to a loss. This occurs despite having adequate facilities and infrastructure, such as a good court, proper poles and nets, quality balls, and a supportive school environment. To improve overhead serving skills and make them more effective against opponents, specialized training focusing on ball-hitting techniques is required.

One training method that can be used is hanging ball training, which aims to enhance overhead serving skills. Previous studies have shown that hanging ball training significantly impacts serving skills among students (Sukendro et al., 2021). The Research continued this research as a form of repeat research with a larger sample and conducted another research location for top serve ability in volleyball games. Hanging ball training involves repeatedly hitting a ball attached to a device, allowing players to practice serving consistently. This method is used to improve serving skills in volleyball (Mahfud et al., 2023). The hanging ball is a modified training model where a ball is tied to a rubber band and suspended at the height of a player's reach. The purpose of the hanging ball is to help athletes perform correct and proper movements before applying them on the court (Mariadi et al., 2020). Based on the challenges and previous research, this study discusses "The Impact of Hanging Ball Training on Overhead Serving Skills in Extracurricular Volleyball Activities of Female Students at North Indralaya 1 Public Senior High School."

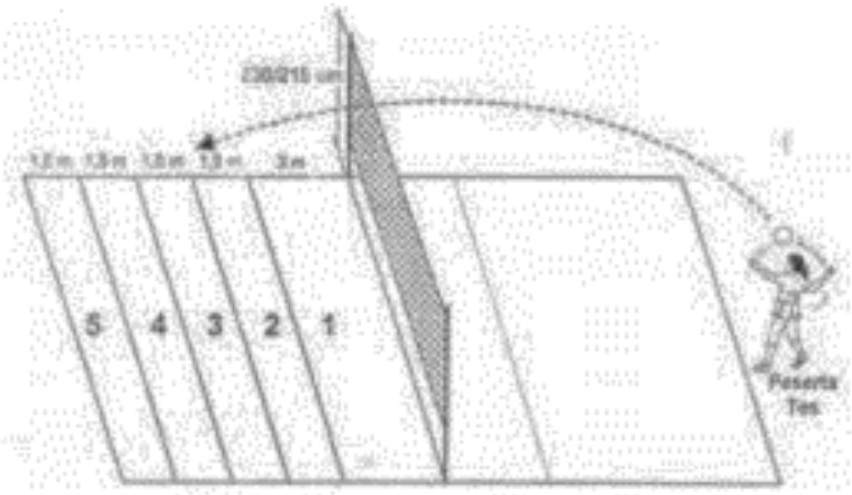
METHOD

This research is quantitative research using a quasi-experimental design. It utilizes a one-group pretest-posttest design, where data from the pretest and posttest are compared to measure the effect. In this study, the researcher aims to determine whether hanging ball training has an impact on overhead serving skills in volleyball during extracurricular

activities at North Indralaya 1 Public Senior High School. A sample is a portion of the total number and characteristics found in a population. When the population is large and it is not feasible for researchers to study everything within it—perhaps due to limitations in funding, resources, or time—researchers can use a sample taken from the population (D. Sugiyono, 2017). A sample is a subset of the population that will serve as the data to be studied (Maretno & Arisman, 2020). This study's sample consists of 30 students as the experimental group. The sampling technique used in this research is total sampling, where the sample comprises female students who participate in the extracurricular volleyball activities at North Indralaya 1 Public Senior High School. The students' heights range from 145 to 165 cm, their weights range from 45 to 55 kg, and their ages range from 15 to 18 years. This research was carried out at North Indralaya 1 State High School starting from January 22 – March 3, 2024, with a research duration of 6 weeks involving 18 meetings every Tuesday, Thursday and Saturday. The research time starts after school from 15.00 WIB to 17.30 WIB.

A research instrument is a tool used to measure observed natural or social phenomena. More specifically, all these phenomena are referred to as research variables (Sugiyono, 2017). Instruments are methods used to collect the data required by the researcher (Maretno & Arisman, 2020). Implementation Test: (1) the test is carried out on the volleyball court or in the back line area of the volleyball court; (2) the ball is thrown in front of the head using the left hand, then the right hand hits the ball that is thrown above the head until it passes or exceeds the net and enters the opposite side of the court where there is a target with numbers; (3) the criteria for the ball to be served above are in accordance with the hand abilities of all test participants, whether hitting using the right or left hand in the same direction that has been determined; (4) the opportunity to serve up is 5 times. The top service that is considered valid is if the ball falls in the target place whose value has been determined. If the ball falls between two targets, then the value calculated is the large value. The top serve that is considered failed is if the ball touches the net and the ball goes out or falls outside the court that has been determined by the researcher; (5) warming up is permitted and allowed in the usual way. However, it is prohibited to try while the test is being carried out; (7) the final score is the total score obtained from the 5 top serves that have been performed; and (8) the height of the net follows the standard size of a volleyball net for women, namely 2.24 meters high. This is to anticipate that the net is not too high when collecting data in the field. Note that between the initial test and the final test, the net height is the same, namely 2.24 meters. Results logger: (1) scores are given to test participants who perform the top serve correctly; (2) the value corresponds to the ball falling on one of the numbers 1, 2, 3, 4 and 5; and (3) If

the ball that falls on the boundary line will be given a higher target value, for example between numbers 2 and 3, then it will be calculated with a value of 3.



Picture 1. Field for Top Serviceability Test (Nurhasan, 2016)

The instrument used in this study is the overhead serve test (Nurhasan, 2016).

Table 1. Top Serviceability Test Assessment

No	Score	Predicate
1	5	Excellent
2	4	Good
3	3	Enough
4	2	Less
5	1	Very Less

Participants who have completed the overhead serve test will have their scores calculated. The scoring criteria for the overhead serve test are as follows:

Table 2. Top Serviceability Test Norms Assessment

No	Top Service Criteria	Total Of Values
1	Excellent	21-25
2	Good	17-20
3	Enough	12-16
4	Less	8-11
5	Very Less	2-7

Source : (Nurhasan, 2016)

Data collection in this study used tests for initial measurement (pretest) and final measurement (posttest) with a technique that tests performance changes, specifically an overhead volleyball serve skill test. A hypothesis that will be accepted depends on the data results. The data analysis technique used by researchers in this research is the t test.

RESULTS

The In this study, the population targeted comprises all female students who participate in extracurricular volleyball activities at North Indralaya 1 Public Senior High School,

totaling 30 female students. After conducting the initial test or pretest, the sample of 30 students was given a training program for six weeks with an intensity of 60% to 70%. After the six-week training period, a final test was conducted. The study was carried out from January 22 to March 3, 2024, with a research duration of six weeks, involving 18 sessions every Tuesday, Thursday, and Saturday. During the initial test or pretest, each participant was given the opportunity to test their overhead serving skills, with each student required to perform five overhead serves. Following the pretest, a treatment was administered in the form of hanging ball training, where participants practiced hitting the ball as much as possible to obtain the average score. The training consisted of three sets, with the number of sets increasing with each session. The training sessions were held at an intensity between 60% and 70% over 18 meetings. Following this, a posttest was conducted to determine the significant impact of hanging ball training on the improvement of overhead serving skills in volleyball during extracurricular volleyball activities with female students at North Indralaya 1 Public Senior High School.

Description of Pretest Data for Overhead Volleyball Serve in the Experimental Group

At the beginning of the study, a pretest was conducted on the experimental group. Following this, the group underwent a treatment consisting of hanging ball training for six weeks with a frequency of three times per week. After the treatment period concluded, a posttest was conducted to observe whether any changes had occurred. Below are the results of the pretest for the experimental group.

Table 3. Hanging Ball Training Improvement Data description

Results	N	Highest Top Service	Lowest Top Service	Mean	Mean Difference of Pretest and Posttest
Pretest	30	11	2	5,3	
Posttest	30	14	3	7,9	2,6

The comparison of the pretest and posttest results above shows that the comparison results from the pretest, the highest number of upper serves reached 11, while the lowest number of upper serves was 2. As for the data from the posttest results, it is known that the highest number of upper serves reached 14, while the lowest number of upper serves was 3. The mean or average obtained from the pretest is 5.3, while the average from the posttest is 7.9. So, the mean difference between the pretest and posttest is 2.6. This data was obtained from calculating the pretest results on January 22 2024, a pretest was carried out for the experimental group, and the results obtained were. The highest Upper Service test score is 11. The lowest Upper Service test score is 2, and the range is 9. The average of the

experimental group's volleyball Upper Serve test was 5.3 and calculation of posttest results. On February 24 2024, a posttest was carried out for the experimental group, and the results obtained were: the highest score achieved was 14, while the lowest score was 3. The resulting range was 11. The average of the posttest was 7, 9, with a standard deviation of 20.22.

The results of the pretest data in the experimental group showed the highest value was 11 and the lowest value was 2. The average of the pretest was 5.3, the mode was 5.05, the standard deviation reached 15.53, and the slope of the curve was 0.01. Meanwhile, posttest data in the experimental group showed the highest value of 14 and the lowest value of 3. The average of the posttest was 7.9, the mode was 7.6, the standard deviation reached 20.22, and the slope of the curve was 0.01. The following is a picture of the pretest and posttest comparison table for the experimental group as follows:

Table 4. List of Improved Pretest and Posttest Results for Top Services

Results	N	Highest Top Service	Lowest Top Service	Mean	Increase in Mean Pretest and Posttest	Modus	SD
Pretest	30	11	2	5,3		5,05	15,53
Posttest	30	14	3	7,9	2,6	7,6	20,22

Comparative data on the results of the pretest and posttest top serves with a total of N of 30. It can be seen in the table above, the pretest results show that the highest number of top service scores is 11 and the lowest number of top serve scores is 2, with a mean of 5.3. The mode of the pretest data is 5.05, and the deviation is 15.53. The posttest result data shows that the highest number of upper serve scores is 14 and the lowest number of upper serve scores is 3, with a mean of 7.9. The mode of the posttest data is 7.6, and the deviation is 20.22. Thus, there is an increase in the mean between the pretest and posttest of 2.6.

Table 5. Distribution of Frequency Pretest

No	Total of Values	Criteria	Frequency	Percentage
1	21-25	Excellent	0	0%
2	17-20	Good	0	0%
3	12-16	Enough	0	0%
4	8-11	Less	3	10%
5	2-7	Very Less	27	90%
Amount			**30**	**100%**

Based on table 5, above, data obtained from the top service test results is that there are 2 athletes in the "Poor" category, and 28 athletes in the "Very Less" category.

Based on the data obtained in the upper service pretest, there were 2 people with a median score of 1.5 (interval class 1–2), a median score of 3.5 (internal class 3–4) there were 8 people, a median score of 5.5 (internal class 5 –6) there are 14 people, median score is 7.5 (internal class 7–8) there are 4 people, median score is 9.5 (internal class 9–10) there is 1 person, median score is 11.5 (internal class 11–12) there is 1 person.

Table 6. Distribution of Frequency Posttest

No	Total of Values	Criteria	Frequency	Percentage
1	21-25	Excellent	0	0%
2	17-20	Good	0	0%
3	12-16	Enough	2	7%
4	8-11	Less	16	53%
5	2-7	Very Less	12	40%
Amount			**30**	**100%**

Based on table 6 above, data obtained from the top service test results is that there are 2 athletes in the "Enough" category, 16 athletes in the "Poor" category, and 12 athletes in the "Very Less" category. Based on the data obtained in the upper service posttest, there were 2 people with a median score of 3.5 (interval class 3–4), a median score of 5.5 (internal class 5–6) there were 6 people, a median score of 7.5 (internal class 7 –8) there are 11 people, median score 9.5 (internal class 9–10) there are 7 people, median score 11.5 (internal class 11–12) there are 3 people, median score 13.5 (internal class 13–14) there is 1 person.

Normality test

Testing data normality, the formula used is the curve slope test or Km person. Based on the calculations above, it is known that the curve slope value for the experimental group's pretest data is 0.01, while the curve slope value for the experimental group's posttest data is 0.01. Based on these values, it can be concluded that both during the pretest and posttest, the data was normally distributed, namely between (-1) and (+1).

Hypothesis Testing

Table 5. Hypothesis Test SPSS Results Difference of Top Serve Ability

Variabel	Mean	Std.Deviation	Sig	Lower	Upper	t	df
Pretest	5,33	1,971	<0,001	-2,997	-2,403	-18,616	29
Posttest	8,03	2,428	<0,001				

The results of the Paired Sample T-Test show a significant number between the pretest and posttest scores for top service with a significance value (2-tailed) p = 0.001, <0.05. The alternative hypothesis (Ha) is accepted where there is a change between before being given treatment (pretest) and after being given treatment (posttest) in the form of hanging ball

training on upper serve ability in volleyball extracurricular activities for female students at North Indralaya 1 Public Senior High School.

Table 6. Hypothesis test data of hanging ball training

Results	N	Mean	∑d	∑Xd	$\sum Xd^2$
Pretest	30	5,3	81	1,3	18,3
Posttest	30	7,9			

Based on the results of the hypothesis test in the table, it can be seen that the results of the experimental group pretest data with an average of 5.3, and the experimental group posttest data with an average of 7.9 and it is also known that ∑d is 81, ∑xd is 1.3 and ∑ xd2 amounts to 18.3. The results of the Paired Sample T-Test show a significant number between the pretest and posttest scores for top service with a significance value (2-tailed) p = 0.001, <0.05. The alternative hypothesis (Ha) is accepted where there is a change between before being given treatment (pretest) and after being given treatment (posttest) in the form of hanging ball training on upper serve ability in volleyball extracurricular activities for female students at North Indralaya 1 Public Senior High School.

DISCUSSION

The results from the hanging ball exercises showed an improvement in overhand serve performance. This is due to a systematic process of training or repetitive practice aimed at consciously refining an athlete's quality to achieve optimal performance by gradually increasing the workload and exercise intensity, (Destriana et al., 2021). The purpose of training is to build a solid foundation for more complex movements and to enhance physical functionality and endurance, with the ultimate goal being improved sports performance, (Febriyanto & Fahmi, 2022). Training also aims to assist coaches in applying conceptual skills to help athletes reach peak performance. The training's objective is to boost athletes' readiness to achieve their highest potential, (Daulay, 2018). The goal is to improve functional capacity and overall athletic performance by gradually increasing the training load, (sukirno & Waluyo., 2017). The principles of training must be adhered to by both coaches and athletes, with a proper understanding being crucial for effective training and development, (Destriana et al., 2021). It is stated that six weeks of training can improve the outcome of overhand volleyball serves.

The overhand serve is a basic volleyball technique that is difficult to master and is typically performed by experienced players. The author’s observations indicate that arm muscles play a key role in performing overhand serves, with strong arm muscles being essential for generating a powerful serve, (Kuncoro, 2021). A powerful serve can increase the

difficulty for the receiving team. One way to achieve this is by improving serve technique through arm strength training, (Faridhatunnisa & Pratama, 2019). Explosive power (power) is a combination of physical condition components between speed and strength that work dynamically in a short time (Kadafi & Irsyada, 2021). Hanging ball exercises are conducted to improve overhand serve strength. This involves a volleyball suspended by a rope attached to a fixed point, set at a height within the player's reach, (Jaya et al., 2018). According to (Lubis & Agus, 2017) volleyball game is a skip the ball from above the net so that it can fall touches the bottom of the field floor opponents as well as to prevent the ball being thrown the same as the opponent, each team can plays three bounces for return the ball out of bounds blocks.

The improvement in overhand serve is attributed to six weeks of hanging ball training. To enhance serving ability in volleyball, proper training is required, with hanging ball training being an effective method. This form of training involves hitting a suspended ball with precision, (Sukendro et al., 2021). The hanging ball provides feedback on correct body positioning and timing for the hand's contact with the ball, (Syauki, 2020). This method helps athletes practice correct overhand serving techniques before applying them on the court, (Mariadi, dkk., 2021). The hanging ball exercise has been shown to positively affect serve accuracy and success in volleyball, (Zainudin, 2021). Overall, the increase in overhand serve skill is due to appropriate training with the hanging ball, (Rifaldi & Syafaruddin, 2021).

The training method used to improve overhand serving skills involves using the hanging ball exercise. This study was conducted on 30 female students in the volleyball extracurricular program at Indralaya Utara 1 Public Senior High School. A sample of 30 students was designated for this experimental research. This group underwent six weeks of hanging ball training with a frequency of three sessions per week. After six weeks of training, a final test, or posttest, was conducted. The skewness for the experimental group's pretest data was 0.01, and the skewness for the posttest data was also 0.01. Given these values, both the pretest and posttest data were normally distributed, with skewness falling between -1 and +1.

According to the research and previous studies, the hanging ball exercise has a positive impact on improving overhand volleyball serves. The hanging ball exercise can be utilized as one type of training to enhance overhand serving skills in students. It has a significant effect on the overhand serving abilities of volleyball athletes. Thus, it can be concluded that the hanging ball training has a significant impact on the overhand serving skills of female

students in the volleyball extracurricular activities at North Indralaya 1 Public Senior High School.

CONCLUSION

Based on the research results, it was found that hanging ball training can improve the top serve. Furthermore, this research can be an additional reference for teachers or coaches in improving the top serve in volleyball games. The implications of the research show that hanging ball training hanging ball training is useful for teachers and coaches as a guide in improving peak serves in volleyball extracurricular activities for female students at North Indralaya 1 Senior High School.

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