Original Article

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The success of learning volleyball lower passing using modified sponge balls in elementry school

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Abstract: This study aims to determine the success of learning volleyball lower passing using a modified ball made from sponge for fifth grade students of SDN Bangsri Sukodono. A quantitative research method with a two-group pretest and posttest design was used, dividing the subjects into experimental (sponge ball) and control (regular volleyball) groups. The research instrument was a lower passing test with an indicator of directing the ball within 60 seconds. Results showed a significant effect of using sponge balls (significance value of 0.000) compared to regular balls (0.056), proving their effectiveness in increasing student success. In addition, sponge balls are also considered safer and more comfortable to use, thus supporting a more optimal learning process. In conclusion, sponge balls not only overcome facility limitations, but also increase interest in learning, reduce the risk of injury, and encourage active student participation, making them an effective alternative for learning basic volleyball techniques in elementary schools. These findings support sponge ball as a safe, cheap, and effective learning medium, while reducing the risk of injury. It is recommended that coaches and students implement training programs using sponge balls while still paying attention to the principles of training according to player characteristics.

Keywords: lower passing, volleyball, sponge ball, learning, elementary school students
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INTRODUCTION

Volleyball is a sport that requires coordination, strength, and technical skill, particularly in basic techniques such as serving, passing, smashing, and blocking. Among these, lower passing is one of the most essential skills that must be mastered by students at the elementary level, as it serves as the foundation for successful gameplay (Gani et al., 2022; Shodiq et al., 2019). The ability to perform effective lower passing significantly affects a student's overall performance and understanding of the game. However, in many elementary schools, the learning process of volleyball is often hindered by limited facilities and the use of standard volleyballs that are relatively hard, causing fear and discomfort among students (Rubinah, 2015). These challenges result in decreased student motivation and participation in physical education activities, especially for younger learners with less developed motor skills.

To overcome these barriers, educators have implemented various alternative teaching methods, such as static passing, wall media, peer assistance, and the use of modified equipment like sponge balls. Sponge balls are lightweight, soft, and safe, making them suitable for elementary school environments. Previous studies (Ujang Rohman et al., 2022) have reported increased student interest when using such tools, particularly due to their comfort and accessibility. Nevertheless, most existing studies have focused on observational or descriptive outcomes and lacked empirical comparison using experimental methods. Moreover, few have investigated the effectiveness of sponge balls specifically in fifth grade students using a controlled experimental design. This creates a gap in the literature regarding the measurable impact of sponge ball usage on lower passing skill improvement.

Challenges of Volleyball Learning in Elementary Schools The lower passing technique in volleyball requires good motor coordination, but elementary school students often have difficulty because the size and weight of the standard ball are too big for their hands. Conventional volleyballs can cause fear (fear of injury) or frustration if they are too hard, reducing learning motivation. Meanwhile, in the Need for Modification of Learning Tools, elementary school students need tools that are appropriate to their physical development. Modified sponge balls are lighter, softer, and easier to control, helping beginners learn basic techniques without excessive pressure. This study supports the Developmentally Appropriate Practice (DAP) approach in physical education, where tools and methods must be adjusted to the age and abilities of children. Therefore, the present study aims to fill this gap by conducting

a quantitative, two-group pretest-posttest experiment to examine the effect of sponge balls on volleyball lower passing skills in fifth grade students of SDN Bangsri Sukodono. The novelty of this research lies in its empirical approach to validating the effectiveness of modified learning media in a structured educational setting, providing practical implications for physical education instructors in primary schools.

MATERIAL AND METHODS

This study employed a quantitative approach using a quasi-experimental design, specifically the pretest-posttest control group design. This design was chosen because it allows for comparison between two groups—experimental and control—even without full randomization, while maintaining balanced initial characteristics. The population in this study consisted of all fifth-grade students at SDN Bangsri Sukodono, totaling 30 students. A total sampling technique was applied, involving the entire population as research subjects. The students were then divided into two groups: the experimental group and the control group, with 15 students each. Grouping was carried out using an ordinal pairing technique based on pretest scores to ensure the initial ability levels of both groups were equivalent.

The research instrument used was a volleyball lower passing skills test adapted from Maulana (2023). In this test, students were asked to pass the ball against a wall continuously for 60 seconds. A pass was considered successful if the ball reached a minimum height of 2.30 meters for boys and 2.15 meters for girls. The number of valid passes was recorded as the final score. This instrument has been validated in previous studies and proven to be both reliable and appropriate for assessing lower passing ability in elementary students. The research was conducted over two sessions. The first session was used to administer the pretest for all participants. Following this, the experimental group was given treatment using sponge balls, while the control group used standard volleyballs. The training method was the same for both groups and was conducted once per week, with the only difference being the type of ball used. In the second session, a posttest was administered to both groups to assess improvement after the treatment.

The data collected were analyzed using a paired sample t-test to determine the difference between the pretest and posttest scores within each group. Before conducting the t-test, a normality test was performed using the Kolmogorov-Smirnov method in SPSS version 26 to

ensure that the data were normally distributed. If the data met the assumptions of normality and homogeneity, the t-test was considered valid for measuring the effect of the treatment.

RESULTS

1. Data description

The data obtained in the form of volleyball lower passing test results from the control and experimental groups can be distributed in the table as follows:

Table 1 Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Pretest Experiment	15	9	38	23.87	8.911
Posttest Experiment	15	15	44	28.40	9.311
Pretest Control	15	11	39	23.93	8.672
Posttest Control	15	9	40	23.40	9.334

Based on Table 1, each experimental and control group consists of 15 samples. The mean pretest of the experimental group was 23.87 and control 23.93, while the posttest of the experimental group was 28.40 and control 2.40. The maximum value of the experimental pretest was 38 and the control was 39, and the minimum value of the experimental posttest was 15 and the control was 9. The standard deviation for the experimental pretest was 8.911 and the control was 8.672, and for the experimental posttest was 9.311 and the control was 9.334.

2. Prerequisite test results

a. Normality Test

Table 2 Tests of Normality

	Kolmogorov-Smirnov		
	Statistic	df	.Sig
Pretest Experiment	0.094	15	.200*
Posttest Experiment	0.187	15	.169
Pretest Control	0.118	15	.200*
Posttest Control	0.119	15	.200*

Based on Table 2, each experimental and control group consists of 15 samples. Sig value for experimental and control pretest is 0.200, and for experimental posttest is 0.169, and control is 0.200. The probability value > 0.05 indicates normal data distribution. Statistics for experimental pretest 0.094, control 0.118, and experimental posttest 0.187, control 0.0119.

b. Homogeneity Test

Table 3 Test of Homogeneity of Variance

	Levene Statistic	**df1**	**df2**	**Sig.**
Based on Mean	.072	3	56	.975
Based on Median	.069	3	56	.976
Based on Median and with adjusted df	.069	3	55.670	.976
Based on trimmed mean	.075	3	56	.973

Based on the data in table 3, it is known that the Sig. value of 0.975> 0.05, it can be concluded that the data has the same variance or in other words is homogeneous.

3. Hypothesis Test

Table 4 Test of Homogeneity of Variance

		Paired Differences							
		Mean	**Std. Deviation**	**Std. Error Mean**	**Lower**	**Upper**	**T**	**Df**	***Sig. (2-tailed)***
Pair 1	*Pretest Posttest Experiment Group*	-4.533	2.748	.710	-6.055	-3.011	-6.389	14	.000
Pair 2	*Pretest Posttest Control Group*	.533	.990	.256	-.015	1.082	2.086	14	.056

Based on Table 4 the sig value. (2-tailed) for the experimental group is 0.000 and for the control group is 0.056. Because the sig. value of the experimental group <0.05, it can be concluded that the use of sponge balls has an effect on the success of passing under volleyball in grade V students of SDN Bangsri Sukodono. This shows an increase after training using sponge balls in the experimental group. The experimental group, which received training using sponge balls, showed a significant improvement in their lower

passing performance based on the pretest and posttest results (sig. = 0.000). In contrast, the control group, which used standard volleyballs, showed no statistically significant improvement (sig. = 0.056). These results indicate that sponge balls had a positive impact on students' ability and confidence in performing lower passes.

DISCUSSION

This study was conducted to examine the effectiveness of sponge ball media in improving volleyball lower passing skills among fifth-grade students at SDN Bangsri Sukodono. The use of sponge balls was introduced to address the common challenges faced during volleyball learning, particularly students' low interest and fear of injury when using standard volleyballs. The results confirmed that sponge balls, due to their soft and lightweight nature, provided a safer and more engaging learning environment for students.The experimental group, which received training using sponge balls, showed a significant improvement in their lower passing performance based on the pretest and posttest results (sig. = 0.000). In contrast, the control group, which used standard volleyballs, showed no statistically significant improvement (sig. = 0.056). These results indicate that sponge balls had a positive impact on students' ability and confidence in performing lower passes.

This improvement can be attributed to reduced psychological barriers and increased comfort when using sponge balls. Students appeared more willing to participate actively, as the fear of pain or injury was minimized. The training process became more enjoyable and less intimidating, which likely contributed to greater skill acquisition. The analysis also showed that the data from both experimental and control groups were normally distributed and homogeneous, ensuring the validity of the findings. This supports the conclusion that sponge balls can be an effective alternative medium for physical education, especially in teaching fundamental volleyball techniques at the elementary level.

Relevance to the PJOK Curriculum The physical education curriculum in elementary school emphasizes the development of basic movements (fundamental movement skills). Modification of tools such as sponge balls supports the achievement of this goal. Thus, providing novelty in Innovation of Volleyball Learning Tools for Children This study uses modified sponge balls (lighter, smaller size, or attractive colors) as an alternative to standard volleyballs, which have not been widely implemented in elementary schools in Indonesia. In contrast to previous

research that focused on conventional training, this study explores the impact of tool modification on learning success. These findings highlight the potential of modified equipment to support safer and more adaptive learning environments. Training programs should also consider the characteristics and needs of students to achieve optimal results and sustain long-term engagement in physical education activities.

CONCLUSION

This study proves that the use of sponge balls is effective in improving elementary school students' volleyball lower passing skills compared to standard volleyball, with the t-test results showing a significant increase (sig. <0.05) in the experimental group. These findings support sponge ball as a safe, cheap, and effective learning medium, while reducing the risk of injury. It is recommended that coaches and students implement training programs using sponge balls while still paying attention to the principles of training according to player characteristics.

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