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PENGARUH LATIHAN *PUSH-UP* TERHADAP KEMAMPUAN *LONG SERVICE* BADMINTON PADA SISWA EKSTRAKURIKULER SEKOLAH DASAR

THE EFFECT OF PUSH-UP TRAINING ON THE LONG SERVICE ABILITY IN BADMINTON AMONG ELEMENTARY SCHOOL EXTRACURRICULAR STUDENTS

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Abstrak

Permasalahan dalam pembelajaran dan latihan badminton di sekolah dasar masih banyak ditemukan pada keterampilan long service, seperti kesalahan teknik pukulan, kurangnya kekuatan lengan, serta ketidaktepatan arah shuttlecock. Salah satu bentuk latihan fisik yang diduga berpengaruh terhadap kemampuan long service adalah latihan push-up. Penelitian ini bertujuan untuk mengetahui pengaruh latihan push-up terhadap kemampuan long service badminton pada siswa ekstrakurikuler sekolah dasar. Metode penelitian yang digunakan adalah metode kuantitatif dengan desain eksperimen one group pretest-posttest. Subjek penelitian berjumlah 15 siswa kelas IV dan V yang mengikuti kegiatan ekstrakurikuler badminton di UPT SD Negeri 060879. Teknik pengumpulan data dilakukan melalui tes long service badminton yang dilaksanakan sebelum (pretest) dan sesudah (posttest) pemberian perlakuan latihan push-up selama enam minggu. Data dianalisis menggunakan analisis statistik deskriptif dan inferensial. Hasil penelitian menunjukkan adanya peningkatan kemampuan long service badminton setelah diberikan latihan push-up, dengan rata-rata nilai pretest sebesar 22,06 dan meningkat menjadi 39,46 pada posttest. Temuan ini menunjukkan bahwa latihan push-up memberikan pengaruh positif terhadap peningkatan kemampuan long service badminton siswa. Dengan demikian, latihan push-up dapat dijadikan sebagai salah satu alternatif latihan fisik untuk mendukung peningkatan keterampilan teknik dasar badminton di sekolah dasar.

Kata kunci: latihan, *push-up*, badminton, siswa, ekstrakurikuler, sekolah dasar

Abstract

Problems in badminton learning and training in elementary schools are still commonly found in long service skills, such as incorrect stroke techniques, lack of arm strength, and inaccurate shuttlecock direction. One form of physical training that is thought to affect long service skills is push-up training. This study aims to determine the effect of push-up training on long service skills in elementary school extracurricular students. The research method used is a quantitative method with a one-group pretest-posttest experimental design. The research subjects consisted of 15 fourth and fifth grade students who participated in badminton extracurricular activities at UPT SD Negeri 060879. Data collection techniques were carried out through a badminton long service test conducted before (pretest) and after (posttest) the push-up training treatment for six weeks. The data were analyzed using descriptive and inferential statistical analysis. The results showed an increase in badminton long service ability after push-up training, with a pretest average score of 22.06 and an increase to 39.46 on the posttest. These findings indicate that

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push-up training has a positive effect on improving students' badminton long service ability. Thus, push-up training can be used as an alternative physical exercise to support the improvement of basic badminton skills in elementary schools.
***Keywords**: exercise, push-up, badminton, students, extracurricular activities, elementary school*

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INTRODUCTION

Physical education in elementary schools is an integral part of the educational process, aiming to comprehensively develop students' physical, motor, cognitive, and affective aspects. Through physical education lessons and extracurricular sports activities, students gain movement learning experiences that contribute to the development of physical fitness, motor skills, and the development of sportsmanship and discipline from an early age (Limbong & Helmi, 2025; Rusdi & Helmi, 2025). Planned and systematic learning is essential for optimal motor development in elementary school children, in accordance with the growth stages and developmental characteristics of elementary school children (Pratama et al., 2025).

One sport that is widely sought after and developed in extracurricular activities in elementary schools is badminton. Badminton is a game that requires mastery of basic techniques, good physical condition, and optimal motor coordination to achieve effective performance (Jufrianis et al., 2024; Nasution et al., 2024). Mastering basic badminton techniques is the main foundation for supporting overall playing skills, as good basic techniques facilitate students' development of advanced skills and improve their playing quality (Kumesan, 2025; Sudiadharma & Rahman, 2023).

One of the most important basic techniques in badminton is the long serve. The long serve serves as the initial shot, setting the tempo of the game and placing the shuttlecock behind the opponent's court, putting the opponent on the defensive (Nasution et al., 2024; Jufrianis et al., 2024). Successful long serves are influenced by several factors, including racket swing technique, body position, hand-eye coordination, and arm and shoulder muscle strength (Kumesan, 2025; Sudiadharma & Rahman, 2023).

However, in elementary school badminton instruction and practice, many students are still unable to execute long serves optimally and consistently. Common errors include insufficient distance, incorrect shuttlecock direction, and a height that does not meet the standard for long serves (Jufrianis et al., 2024; Nasution et al., 2024). This indicates that students' technical abilities are not optimally supported by adequate physical fitness, particularly in the arm muscle strength component (Kumesan, 2025).

Arm muscle strength is a component of physical fitness that significantly contributes to generating propulsion when hitting shots in badminton. Strong arm muscles enable players to produce more powerful, stable, and targeted shots, enabling the shuttlecock to reach the back of the opponent's court (Nasution et al., 2024; Kumesan, 2025). Previous research has also shown that arm muscle strength is significantly related to hitting skills such as long serves and smashes in badminton (Sudiadharma & Rahman, 2023; Jufrianis et al., 2024).

Improving arm muscle strength in elementary school students should be done through exercises tailored to the child's developmental characteristics. The exercises provided should adhere to the principles of safety, simplicity, and sustainability to minimize the risk of injury and remain effective in improving students' physical abilities. This principle aligns with the

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physical education learning approach, which emphasizes safety and the long-term development of students (Limbong & Helmi, 2025).

One form of exercise that is appropriate for elementary school students is the push-up. Push-ups are a simple yet effective exercise for improving arm, shoulder, and chest muscle strength without the need for special equipment (Sudiadharma & Rahman, 2023; Jufrianis et al., 2024). Besides being easy to implement, push-ups can also be modified to suit the student's abilities, making them safe for use in extracurricular sports activities in elementary schools.

In the implementation of extracurricular badminton activities, physical training is often not provided in a structured and programmed manner. Training activities tend to focus more on game practice without adequate physical conditioning training, resulting in suboptimal improvement in students' technical skills (Rusdi & Helmi, 2025; Pratama et al., 2025). However, integrating appropriate physical training into training programs can significantly improve the effectiveness of sports skills learning (Nasution et al., 2024).

Previous studies have shown that arm muscle strength training has a positive effect on improving hitting skills in various sports, including badminton (Sudiadharma & Rahman, 2023; Jufrianis et al., 2024). However, research specifically examining the effect of push-up training on badminton long serve ability in elementary school students is still relatively limited, necessitating empirical studies to strengthen the scientific basis in the context of elementary physical education (Kumesan, 2025; Nasution et al., 2024).

Based on this description, this study aims to determine the effect of push-up training on badminton long serve ability in extracurricular elementary school students. The results of this study are expected to provide practical benefits for physical education teachers and trainers in designing physical exercise programs that are simple, effective, and appropriate to the characteristics of elementary school students, as well as providing theoretical contributions to the development of physical education and sports studies in elementary school environments.

METHOD

This study employed a quantitative method with a one-group pretest–posttest experimental design. This design was used to determine the effect of push-up training on badminton long serve ability by comparing pre- and post-treatment test results in the same group. This research design was chosen because it is appropriate for measuring changes in ability resulting from the training treatment.

The subjects were students participating in extracurricular badminton activities at the UPT SD Negeri 060879. The total number of subjects was 15, consisting of fourth and fifth graders. The sampling technique used was total sampling, as the entire population was used as the sample.

Table 1. One-Group Pretest–Posttest Research Design

Group	Pretest	Treatment	Posttest
Experiment	O_1	X	O_2

Description:
O_1 = Initial long service ability test
X = Push-up training treatment
O_2 = Final long service ability test

The instrument used in this study was a badminton long serve ability test. The test was conducted by having students hit a long serve toward a predetermined target area. Assessment was based on the accuracy and distance the shuttlecock landed, according to the assessment

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criteria. The assessment aspects of badminton long serve ability are presented in Table 2.

Table 2. Aspects of Badminton Long Service Ability Assessment

No.	Assessment Aspects	Indicators
1	Hitting distance	Shuttlecock reaches the back of the court
2	Directional accuracy	Shuttlecock lands in the target area
3	Punch technique	Body posture, racket swing, and movement coordination

The research procedure was carried out in three stages: pretest, treatment, and posttest. In the pretest, students were given a long service ability test to determine their initial abilities. Next, students were given treatment in the form of push-up training for six weeks, training three times per week. After the treatment was completed, students were given a posttest to determine their improvement in badminton long service ability. Details of the push-up training implementation are presented in Table 3.

Table 3. Push-Up Exercise Program

Components	Description
Exercise Form	Push-ups
Exercise Duration	6 weeks
Frequency	3 times per week
Sets	3 sets
Repetitions	8–12 reps
Rest Period	60 seconds between sets

The data analysis techniques used descriptive and inferential statistics. Descriptive statistics were used to determine the average badminton long serve ability scores in the pretest and posttest. Inferential statistics were used to examine the effect of push-up training on badminton long serve ability by comparing the pretest and posttest results.

RESULTS

The results of this study present data on students' badminton long serve abilities before (pretest) and after (posttest) push-up training. Data were obtained from a badminton long serve ability test administered to 15 elementary school extracurricular students. The results of the descriptive statistical analysis of students' badminton long serve abilities in the pretest and posttest are presented in Table 4.

Table 4. Descriptive Statistics of Badminton Long Service Ability

Tes	N	Min	Max	Average
Pretest	15	10	35	22,06
Posttest	15	25	55	39,46

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Table 4 shows that the average score for students' badminton long serve ability increased from 22.06 in the pretest to 39.46 in the posttest after receiving push-up training.

To determine the effect of push-up training on badminton long serve ability, inferential statistical analysis was conducted. The results showed a significant difference between the pretest and posttest results for students' badminton long serve ability.

Table 6. Results of the Test of the Effect of Push-Up Training on Badminton Long Service Ability

Statistical Test	Value
Pretest Mean	22,06
Posttest Mean	39,46
Mean Difference	17,40
Note	There is an Influence

The results of statistical tests show that push-up training influences improving the long service badminton skills of extracurricular elementary school students.

DISCUSSION

The results of this study indicate that push-up training has a positive effect on improving long serve ability in badminton among extracurricular elementary school students. This improvement is evident in the difference in average long serve ability scores between the pretest and posttest, indicating that the push-up training treatment significantly improved students' long serve performance. This finding aligns with research showing that arm muscle strength is strongly associated with long serve ability in badminton, both in novice athletes and school-age students (Wijaya et al., 2025; Dhanamjaya et al., 2023).

Push-ups are a form of upper body muscle strength training that predominantly involves the arms, shoulders, and chest. Increasing arm muscle strength through this exercise allows students to generate greater thrust when swinging their rackets for the long serve technique. Biomechanically, increases in swing force and speed are strongly influenced by the strength capacity of the muscles involved in the stroke (Ningrum et al., 2022; Rahmat et al., 2025). Therefore, students with better arm muscle strength tend to be able to hit the shuttlecock farther and more accurately into the back of the opponent's court (Wijaya et al., 2025).

The results of this study also indicate that push-up training can be effectively implemented in elementary school students if provided with an intensity and duration appropriate to the child's developmental characteristics. A six-week training program, conducted three times per week, was shown to provide positive physical adaptations without causing excessive fatigue. These adaptations were characterized by increased consistency and control in students' long serves during skills tests. This aligns with previous research findings that programmed and measured strength training can gradually and safely improve badminton skill performance at a young age (Muhammad et al., 2024; Aswad et al., 2025).

In addition to improving physical aspects, push-up training also has an indirect impact on students' psychological aspects, particularly confidence in executing long serves. Increased arm muscle strength makes students more confident in swinging the racket and directing the shuttlecock to the back of the court without hesitation. This self-confidence plays a crucial role in improving the quality of students' hitting technique and the stability of their performance during practice and skill assessments (Muhammad et al., 2024; Dhanamjaya et al., 2023).

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The findings of this study reinforce previous research that suggests that arm muscle strength training significantly contributes to improving hitting skills in badminton. Systematically designed physical training tailored to student characteristics has been shown to improve the effectiveness of sports learning and training, both in novice athletes and school-age students (Wijaya et al., 2025; Banjanahor & Wiriawan, 2022). Therefore, push-ups can be a simple, practical, and effective alternative physical training method to support the improvement of basic badminton technical skills, particularly the long serve.

In the context of extracurricular activities in elementary schools, the results of this study have practical implications for physical education teachers and coaches. Integrating push-ups into extracurricular badminton training programs can improve the overall quality of training and help students develop technical skills more optimally. Training programs that combine technical and physical conditioning training have been shown to yield better results than purely technical training, as good physical condition is the foundation for performing sports skills (Arief & Wiriawan, 2022; Banjanahor & Wiriawan, 2022).

The results of this study indicate that push-ups are an effective, practical, and appropriate form of physical training for elementary school students to improve their badminton long serve skills. These findings underscore the importance of systematic and developmentally oriented physical training planning in elementary school sports learning and training (Wijaya et al., 2025; Rahmat et al., 2025).

CONCLUSION

Based on the research results, it can be concluded that push-up training has a positive effect on improving badminton long service skills in extracurricular elementary school students. Providing push-up training for six weeks with a frequency of three times per week can significantly increase the average badminton long service ability of students. Push-up training has been proven effective in increasing arm muscle strength which plays a crucial role in producing stronger, more targeted, and consistent long service strokes. Thus, push-up training can be used as an alternative physical exercise that is simple, practical, and appropriate to the characteristics of elementary school students to support the improvement of basic badminton technical skills.

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