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Influence Of Traditional Games on Improving The Physical Fitness of Students at Murombuh 1 Elementary School

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ABSTRACT

This study was carried out to investigate how the traditional game of Bentengan affects the physical fitness of students aged 10 to 12 at SDN Morombuh 1, and to check the idea that traditional games can improve students' fitness levels significantly. A quantitative experimental method was used with a two-group pretest-posttest setup. The group included 32 elementary school students from the 2025/2026 school year. Participants were chosen through total sampling and divided equally into experimental and control groups using the ordinal pairing method. The data collection utilized the Indonesian Physical Fitness Test (TKJI), which assessed a 40-meter sprint, a 600-meter run, vertical jump, hanging jump, and sit-up exercises. The experimental group engaged in regular Bentengan game sessions two to three times each week, while the control group continued with their usual classroom activities. Data analysis was performed using descriptive statistics, the Shapiro-Wilk normality test, Levene's homogeneity test, paired sample t-test, independent sample t-test, and N-Gain analysis via SPSS software. The results indicated a significant improvement in the experimental group, which recorded a posttest average of 19.50, whereas the control group had an average of 17.75. Statistical evaluations showed significant differences both within the experimental group ($p = 0.000$) and between the two groups ($p = 0.012$). Additionally, the experimental group achieved an N-Gain score of 47.01%, classified as moderate, while the control group had a score of 25.31%, categorized as low. These findings suggest that traditional games can serve as a fun and effective method in physical education to boost students' fitness and aid in the preservation of local cultural traditions. This document contains 2 journal articles, 2 textbooks, 2 conference proceedings, 2 theses/dissertations, 7 tables, and 1 testing instrument (TKJI).

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INTRODUCTION

Physical fitness is a crucial aspect in supporting the growth and development of elementary school-aged children. A good level of physical fitness can help students perform daily activities optimally without experiencing excessive fatigue, while also supporting their learning abilities and motor development (Satriawan et al., 2024). In the

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context of physical education, physical fitness encompasses several key components such as endurance, muscle strength, speed, agility, and flexibility. Regular physical activity is a crucial factor in improving students' physical fitness (Irawati & Aziz, 2025). However, technological advancements and the increasing use of gadgets have led to a decline in children's physical activity, resulting in low levels of physical fitness.

One form of physical activity that can be used to improve students' physical fitness is traditional games. Traditional games are play activities passed down through generations and contain educational, social, and cultural elements (Nurwahidah et al., 2021). In addition to serving as a means of entertainment, traditional games can also develop children's motor skills, teamwork, sportsmanship, and social interaction. The movement activities in traditional games involve various physical skills such as running, jumping, dodging, and maintaining body balance, thus contributing to improving students' physical fitness (Ilmia Qurrota Nisa' et al., 2025).

One traditional game characterized by high levels of physical activity is Bentengan (Fatah et al., 2024). This game requires students to actively move through activities such as chasing opponents, defending territory, sprinting, and working together in groups. Previous research has shown that traditional games can have a positive influence on children's physical and social development. Research conducted by (Muhammad Imanda Ilham et al., 2025) showed that Bentengan games can increase children's social activity and involvement in physical activities. Furthermore, research by Manullang et al. showed that implementing traditional games can improve the physical fitness levels of junior high school students through improved fitness test results after treatment.

While numerous studies have explored the advantages of traditional games for students' physical exercise, there is still a lack of research focusing on how the Bentengan game specifically affects the physical fitness of elementary school children between the ages of 10 to 12. This is particularly true in the context of elementary schools located in the Bangkalan region (Indriyani et al., 2021). Many earlier studies have emphasized character traits, social interactions, and learning activities of students, whereas there is still a lack of research that connects the traditional Bentengan game with enhancement of physical fitness using the Indonesian Physical Fitness Test (TKJI) tool. Hence, this study presents a novel scientific contribution by utilizing the traditional Bentengan game as a type of organized physical activity intervention aimed at boosting the physical fitness of elementary students aged 10 to 12 years, with assessments conducted through the TKJI instrument.

The issue addressed in this research focuses on the insufficient physical fitness levels of students at SDN Morombuh 1 who are between the ages of 10 and 12, as observed from initial assessments and the TKJI scores of the students, which remain in a low range. This situation highlights the necessity for initiatives aimed at enhancing physical fitness through engaging, lively, and developmentally appropriate activities for elementary aged children. In light of this problem, the hypothesis of this study is that traditional game Bentengan has a noteworthy effect on the enhancement of students' physical fitness.

This research intends to assess how the conventional Bentengan game influences the physical fitness of pupils at SDN Morombuh 1 who are between 10 to 12 years old. Additionally, it seeks to measure the level of improvement in the physical fitness of students after they participate in the traditional Bentengan game activities.

METHODS

This research utilized an experimental design that incorporated a quantitative method. The quantitative method was selected as the research focused on measuring the impact of the intervention objectively through numerical data analyzed with statistical techniques. The experimental design was opted for to assess how the conventional Bentengan game influences enhancing students' physical fitness via direct intervention in the experimental group (Rahmawati et al., 2025). The study utilized a Two-Group Pretest–Posttest Design. In this setup, two research groups were formed: the experimental group and the control group. A pretest was administered to both groups to assess their physical fitness levels prior to the treatment being applied. Following this, the experimental group engaged in the treatment program, which consisted of the traditional Bentengan game, while the control group continued with standard learning procedures without any unique treatment. Once the program concluded, a posttest was conducted for both groups to evaluate any changes in the students' physical fitness levels following the treatment (Prakosa & Yuli Hartati, 2022).

The group involved in this research consisted of 32 students aged 10 to 12 at SDN Morombuh 1. The method of sampling employed was total sampling, which indicates that every member of the population was part of the study because of the small size of the population. The sample was further separated into two groups, each made up of 16 students: one group served as the experimental group and the other as the control group. The assignment of groups was carried out using the ordinal pairing method to guarantee that the preliminary skills of both groups were approximately equal based on the results from the pretest. The tool utilized for assessing the physical fitness of children between the ages of 10 and 12 was the Indonesian Physical Fitness Examination (TKJI)(Sastro Desmianto Ginting, 2022). This tool includes five components: a sprint covering 40 meters to assess speed, a 600-meter distance run to evaluate cardiorespiratory endurance, a vertical jump to gauge leg muscle explosiveness, a hanging jump to test arm and shoulder muscle strength, and sit-ups to assess abdominal muscle strength and endurance. The evaluations were performed following TKJI assessment protocols and standards.

The research treatment was delivered through a structured traditional game program, Bentengan, held 2–3 times per week. The game activities involved physical activities such as running, chasing opponents, dodging, defending the fort, and working together in groups, thus training the students' physical fitness components. Each treatment session consisted of a preparation phase, a warm-up, the main game activity, and a cool-down.

Data evaluation was conducted via SPSS. The evaluation commenced with initial assessments, which included testing for normality through the Shapiro-Wilk test and

homogeneity using the Levene test, ensuring that the data satisfied the conditions for parametric analysis. Following this, descriptive statistical examination was carried out to find the average, standard deviation, minimum, and maximum values of the study data. Hypothesis evaluation involved a paired sample t-test to assess the differences in pretest and posttest scores for each group, along with an independent sample t-test to identify the differences in outcomes between the experimental and control groups. Additionally, an N-Gain analysis was utilized to measure the degree of enhancement in students' physical fitness after being exposed to the traditional Bentengan game intervention.

RESULTS AND DISCUSSION

Result

This study aimed to determine the effect of the traditional game Bentengan on improving the physical fitness of students aged 10–12 at Morombuh 1 Elementary School. The study involved 32 students, divided into two groups: an experimental group and a control group, each with 16 students. Data were obtained through a physical fitness test using the Indonesian Physical Fitness Test (TKJI) instrument, administered before and after treatment (pretest) and after treatment (posttest).

Descriptive statistical analysis was performed to obtain a general overview of the research data, including the mean, standard deviation, minimum, and maximum values.

Table 1.
Descriptive Statistics of Research Results

Variable	Mean	Standar Deviation	Minimum	Maximum
Pretest	14.69	2.152	11	19
Posttest Kontrol	17.75	1.770	14	21
Posttest Eksperimen	19.50	1.932	17	23

Based on Table 1, the average pretest score was 14.69 with a standard deviation of 2.152. After treatment, the control group achieved an average posttest score of 17.75, while the experimental group achieved an average score of 19.50. These results indicate that the experimental group experienced a greater increase in physical fitness than the control group. The improved results in the experimental group indicate that the traditional game of Bentengan provides a more optimal stimulus for physical activity. Movement activities such as running, chasing, dodging, and defending the playing area cause students to move continuously, thus improving their physical condition.

Normality testing was performed using the Shapiro-Wilk test with a significance level of 0.05 to determine whether the research data were normally distributed.

Table 2.
Normality Test Results

Variable	Sig. Shapiro-Wilk	Information
Pretest	0,339	Normal
Posttest Kontrol	0,238	Normal
Posttest Eksperimen	0,102	Normal

Based on Table 2, all data have a significance value greater than 0.05, thus concluding that the research data are normally distributed. Therefore, the data meet the requirements for parametric statistical analysis.

The homogeneity test was conducted using Levene's test to determine the equality of variances between the control and experimental groups.

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Table 3.
Homogeneity Test Results

Data	Sig.	Information
Posttest Kelompok	0.809	Homogen

The homogeneity test results showed a significance value of 0.809, or greater than 0.05. This indicates that the variances of both groups are homogeneous, making them suitable for comparison in this study.

A paired sample t-test was conducted on the control group to determine the difference in pretest and posttest results without the traditional Bentengan game.

Table 4.
Paired Sample T-Test Results for the Control Group

Variable	Mean Difference	t	Sig. (2-tailed)
Pretest-Posttest Kontrol	-3.063	-4.054	0.001

Based on Table 4, a significance value of 0.001 was obtained, or less than 0.05. These results indicate a significant difference between the pretest and posttest results in the control group. However, the improvement was not as significant as in the experimental group because the control group did not receive special treatment in the form of the traditional Bentengan game.

A paired sample t-test was conducted on the experimental group to determine the effect of the traditional Bentengan game on improving students' physical fitness.

Table 5.
Paired Sample T-Test Results for the Experimental Group

Variable	Mean Difference	t	Sig. (2-tailed)
Pretest-Posttest Kontrol	-4.813	-6.291	0.000

Based on the analysis results in Table 5, a significance value of 0.000 was obtained, or less than 0.05. These results indicate a significant difference between the pretest and posttest results in the experimental group. The average difference of -4.813 indicates that the traditional game of Bentengan resulted in greater improvements in physical fitness compared to conventional learning.

An independent sample t-test was conducted to determine the difference in posttest results between the control and experimental groups.

Table 6.
Paired Sample T-Test Results for the Experimental Group

Variable	Mean Difference	Sig. (2-tailed)	Keterangan
Posttest Kontrol dan Eksperimen	-1.750	0.012	Signifikan

Based on the analysis results in Table 6, a significance value of 0.012 was obtained, or less than 0.05. These results indicate a significant difference between the control and experimental groups. The experimental group achieved better physical fitness results than the control group after being exposed to the traditional game of Bentengan.

The N-Gain test was conducted to determine the effectiveness of improving students' physical fitness in each group.

Table 7.
N-Gain Test Results

Group	Mean-N Gain (%)	Category
Kontrol	25.31	Rendah
Eksperien	47.01	Sedang

Based on the N-Gain test results, the experimental group achieved an average increase of 47.01%, categorized as moderate, while the control group achieved an average increase of 25.31%, categorized as low. These results indicate that the traditional game of Bentengan is more effective in improving students' physical fitness than conventional learning.

Discussion

The results of the study indicate that the traditional game of Bentengan significantly improves the physical fitness of students aged 10–12 at Morombuh 1 Elementary School. This scientific finding was supported by statistical analysis, which showed an increase in physical fitness scores in the experimental group after being exposed to the traditional game of Bentengan. The experimental group's average posttest score was 19.50, higher than the control group's 17.75. Furthermore, the paired sample t-test showed a significance value of 0.000 (<0.05) in the experimental group, while the independent sample t-test showed a significance value of 0.012 (<0.05). These results support the research hypothesis, which states that the traditional game of Bentengan significantly improves students' physical fitness. The increase in physical fitness in the experimental group occurred because the traditional game of Bentengan involves dynamic and repetitive physical activity (Apriani et al., 2021). In the game, students perform various movements such as sprinting, chasing opponents, avoiding contact, defending territory, and actively moving throughout the game. Continuous physical activity causes the body to undergo physiological adaptations, particularly in the cardiorespiratory system, muscle strength, and endurance. This adaptation occurs because the body receives regular training stimuli, resulting in improved physical abilities after treatment (Prayudho et al., 2026).

Scientifically, this increase in physical fitness can be explained through the principle of physical training (training adaptation). The Bentengan game activity is moderate to high intensity, which increases the work of the heart and lungs to meet the body's oxygen needs. When students engage in repetitive running and active movement, the cardiorespiratory system works more optimally to distribute oxygen to the muscles. This condition increases students' aerobic endurance. Furthermore, movements such as sprinting, sudden stops, and changing direction also train students' speed, agility, and coordination. Therefore, the

traditional Bentengan game can be an effective form of physical activity in simultaneously improving various components of physical fitness.

The findings of this study also showed that physical fitness improvements in the experimental group were greater than those in the control group. The control group did experience improvements in physical fitness, but not as significant as the experimental group. This occurs because the control group only received regular learning without intensive and structured game activities. In contrast, the experimental group received treatment in the form of the traditional game Bentengan, with a training frequency of 2–3 times per week, enabling students to engage in more active and sustained movement activities. This difference in treatment resulted in a difference in physical fitness improvement between the two groups.

The results of the N-Gain test also supported the findings of this study. The experimental group achieved an average N-Gain of 47.01%, categorized as moderate, while the control group achieved only 25.31%, categorized as low. These findings indicate that the traditional game Bentengan is more effective in improving students' physical fitness than conventional learning. This effectiveness is influenced by the game's characteristics, which require active, competitive, and enjoyable physical involvement, which motivates students to move without feeling burdened, unlike formal physical training.

Psychologically, traditional games also provide a pleasant learning environment, making students more enthusiastic about participating in activities. A positive emotional state can increase student participation in physical activities (Bete et al., 2026). When students feel happy and interested in an activity, the intensity of movement and physical engagement tend to increase. This is one factor contributing to the positive influence of the traditional game Bentengan on the physical fitness of elementary school students.

The results of this study align with previous research conducted by (Rijal et al., 2025) which stated that traditional games can improve students' physical fitness levels through active and repetitive physical activity. This study showed an increase in physical fitness outcomes after students were exposed to traditional games. Furthermore, research by (Maulida et al., 2024) also explained that traditional games contribute to improving children's motor skills and physical fitness because they involve active movements that train endurance. The findings of this study also support Desari's research, which states that the Bentengan game can improve children's kinesthetic intelligence and motor skills if played regularly. In this study, the improvement in students' physical abilities was evident in the increased TKJI scores after the treatment. Therefore, the traditional Bentengan game serves not only as a form of entertainment but also as an effective sports learning medium to improve the fitness of elementary school students.

Based on all the research findings and discussion, it can be concluded that the traditional Bentengan game can have a positive impact on improving the physical fitness of students aged 10–12 years. The movement activities contained in the game have been shown to improve students' endurance, strength, speed, and agility through active, structured, and enjoyable physical activity. Therefore, the traditional Bentengan game can be used as an alternative educational learning tool to improve student fitness in elementary schools.

CONCLUSION

This study shows that the traditional game of Bentengan has a significant effect on improving the physical fitness of students aged 10–12 years at SDN Morombuh 1. This improvement is evident from the results of the Indonesian Physical Fitness Test (TKJI) after students participated in the structured Bentengan game. Activities in the game, such as running, chasing, dodging, and defending territory, can improve students' endurance, speed, agility, and physical strength. The results of the study prove that traditional games not only function as a means of entertainment, but can also be used as an alternative to active and fun physical education (PJOK) learning to improve the physical fitness of elementary school students. Thus, the research hypothesis stating that the traditional game of Bentengan has an effect on students' physical fitness is accepted. Physical education teachers are advised to utilize traditional games in learning so that students' physical activity is more optimal while supporting the preservation of local culture. Future research is expected to involve a wider sample and a longer treatment duration so that the research results are more comprehensive.

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