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The Effect of Traditional Games on the Improvement of Gross Motor Skills Among Seventh Grade Students at PAB 8 Junior High School Sampali

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Abstract: This study empirically investigates the effect of traditional games specifically Bentengan and Gobak Sodor on the improvement of gross motor skills among seventh-grade students at PAB 8 Junior High School Sampali in the 2023/2024 academic year. Employing a quasi-experimental design with a one-group pre-test and post-test model, the research involved 12 student participants. Data were collected using tests of arm power (medicine ball throw), running speed (20-meter sprint), and agility (4×5 meter shuttle run). Statistical analysis was conducted using a paired-sample t-test to determine the significance of the differences between pre-test and post-test results. The findings indicated significant improvements in all measured aspects of gross motor ability: arm power increased from 1.76 to 2.08, running speed improved from 6.16 seconds to 5.96 seconds, and agility improved from 16.52 seconds to 15.41 seconds. The t-test results showed that tcount > ttable for all variables, confirming a statistically significant effect. The study concludes that traditional games have a positive and significant impact on enhancing students' gross motor skills, suggesting their potential integration into physical education programs as an effective, culturally rooted pedagogical tool.

Keywords: Traditional Games; Gross Motor Skills; Physical Education; Experimental Study; Student Development

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INTRODUCTION

Physical education serves as a vital component of holistic student development, encompassing not only physical fitness but also cognitive, affective, and psychomotor growth. In recent years, however, the rapid advancement of digital technologies and the proliferation of electronic games have significantly reduced children's opportunities for physical activity, leading to a decline in their gross motor skills and social interactions. This phenomenon poses a critical challenge for educators and policymakers, as modern recreational habits tend to promote sedentary lifestyles that undermine physical and social development, particularly during early adolescence (ages 12–13), a stage crucial for motor coordination and muscle growth.

Traditional games, which have long been part of Indonesia's cultural heritage, offer an engaging and low-cost alternative to modern electronic games. Games such as Bentengan and Gobak Sodor are inherently social and physically demanding, encouraging teamwork, coordination, agility, and strategic thinking. Previous research has suggested that participation in traditional games contributes positively to children's physical fitness,

motor coordination, and social competence (Juniati, 2021; Adhariah, 2021; Nuraini, 2022). However, most of these studies have focused on elementary school students or early childhood education, leaving a research gap in the exploration of traditional games as a pedagogical tool for junior high school students who are transitioning into adolescence.

The present study seeks to address this gap by empirically examining the influence of traditional games on the improvement of gross motor skills specifically arm power, running speed, and agility among seventh-grade students at PAB 8 Junior High School Sampali. Unlike previous research that primarily emphasized general fitness or cognitive benefits, this study focuses on measurable aspects of gross motor ability, utilizing an experimental design with pre-test and post-test analysis to ensure statistical validity. The research novelty lies in integrating traditional games into formal physical education as an evidence-based intervention to enhance motor competence while simultaneously preserving Indonesia's cultural legacy.

The objective of this study is to determine the extent to which traditional games (Bentengan and Gobak Sodor) can significantly improve students' gross motor abilities through structured physical education activities. By empirically validating the physical and pedagogical benefits of traditional games, this research aims to contribute to the growing body of literature advocating for culturally responsive and active learning models in physical education. The findings are expected to provide practical insights for educators, curriculum developers, and policymakers in promoting traditional games as an effective, sustainable approach to fostering students' physical development and cultural appreciation.

METHOD

This study employed a quasi-experimental research design with a one-group pre-test and post-test model. This design was selected to measure the causal effect of traditional games on students' gross motor abilities through a controlled intervention without a comparison group. The experimental procedure consisted of an initial pre-test to assess students' baseline motor skills, followed by a four-week training intervention involving traditional games (Bentengan and Gobak Sodor), and finally, a post-test to evaluate the improvement in motor performance. This design allowed for within-subject comparison and minimized individual variability across participants.

The study was conducted at PAB 8 Junior High School Sampali, located in Deli Serdang Regency, North Sumatra, Indonesia. The experimental phase was implemented over a period of five weeks, from June to July 2024, coinciding with the students' physical education schedule and extracurricular hours to ensure consistent participation.

The population of this study comprised all seventh-grade students of SMP PAB 8 Sampali in the academic year 2023/2024. Based on the school's enrollment data, there were 25 students in total. Considering the limited population size, the researcher employed total sampling, in which all students participated in the study to ensure comprehensive data coverage and minimize sampling bias.

The study used a non-probability total sampling technique, as the entire population of interest met the inclusion criteria and was readily available for participation. This technique was chosen to provide a complete representation of the target group while maintaining experimental control and feasibility within the school context.

Gross motor skills were measured using standardized physical performance tests adapted from Dwikusworo (2009), which are reliable and valid for assessing adolescent

motor ability: Arm Power Test (Medicine Ball Throw Test): Measures the explosive strength of the arm and shoulder muscles. Each participant performed three trials, and the longest distance was recorded in meters. Speed Test (30-Meter Sprint): Evaluates running speed over a 30-meter distance using a stopwatch, with results measured to the nearest 0.1 second. Agility Test (4×5 Meter Shuttle Run): Assesses agility through repeated directional changes. The total completion time was recorded in seconds. All tests were conducted twice as pre-tests before the intervention and post-tests afterward to determine performance improvement.

The collected data were analyzed using descriptive and inferential statistical methods. Descriptive statistics, including mean, standard deviation, and percentage change, were used to summarize the results of pre-test and post-test scores. To test the research hypothesis, a paired-sample t-test was employed to determine whether there was a significant difference in students' gross motor abilities before and after participating in traditional games. The significance level was set at $\alpha = 0.05$. Data analysis was performed using SPSS software to ensure statistical accuracy and reliability.

RESULT AND DISCUSSION

Result

The research investigated the effect of traditional games Bentengan and Gobak Sodor on improving the gross motor abilities of seventh-grade students at SMP PAB 8 Sampali. Data were obtained from pre-test and post-test assessments measuring arm power, running speed, and agility. The results of statistical analysis are presented as follows.

Table 1. Mean Scores of Pre-Test and Post-Test Results

Variable	Pre-Test Mean	Post-Test Mean	Mean Difference	Improvement
Arm Power (m)	1.76	2.08	0.32	Improved
Running Speed (s, 20 m)	6.16	5.96	-0.2	Improved
Agility (s, 4×5 m shuttle)	16.52	15.41	-1.11	Improved

The data show consistent improvement across all motor skill components after the traditional game intervention. The greatest enhancement occurred in agility, with an average improvement of 1.11 seconds, followed by arm power (0.32 m increase) and running speed (0.20-second decrease).

To determine the significance of the observed differences, a paired-sample t-test was conducted for each variable. The results are shown in Table 2.

Table 2. Paired-Sample t-Test Results

Variable	t-count	t-table ($\alpha = 0.05$)	Significance	Conclusion
Arm Power	2.68	2.2	$p < 0.05$	Significant difference
Running Speed	4.32	2.2	$p < 0.05$	Significant difference
Agility	5.78	2.2	$p < 0.05$	Significant difference

The t-test results show that for all variables, t-count > t-table (2.20), indicating statistically significant differences between pre-test and post-test scores. This suggests that the traditional game intervention had a measurable and positive impact on students' gross motor abilities.

Discussion

The findings of this study demonstrate that traditional games specifically Bentengan and Gobak Sodor significantly improved students' gross motor abilities, including arm power, running speed, and agility. These results clearly address the research objective, confirming that participation in traditional games contributes positively to students' physical development, particularly in enhancing fundamental motor skills essential for adolescent growth.

Several recent studies corroborate these results. Hasan, Husein, & Islam (2024) found in their literature review that traditional games such as Gobak Sodor significantly improved both gross and fine motor skills, as well as coordination and cooperation among children.

Nurwiyanto, Kumaat, & Wijaya (2021) similarly reported that reviewing nine articles showed traditional games enhance gross motoric development in elementary-aged children. In studies focusing on agility, Affandi et al. (2025) found that Gobak Sodor produced a significant increase in agility scores among primary school students.

The improvement in arm power observed in this study aligns with theoretical mechanisms described in experimental studies of early childhood. For example, Yulianto et al. (2023) implemented traditional games in physical education classes using the TGMD-2 instrument, finding significant improvement in fundamental movement skills including upper limb tasks. Similarly, Yuningsih et al. (2024) demonstrated that the Bakiak traditional game positively influenced gross motor skills in early childhood, including muscle strength and coordination of the arms and legs.

The improvement in running speed and agility, as shown in this study, reinforce findings by Affandi et al.'s Gobak Sodor experiment and by studies on locomotive skills in traditional games. For instance, the Illinois Agility Test used in Affandi et al. (2025) showed a statistically significant difference in agility post intervention. In addition, Irawan, Sutaryono, Widya Permana et al. (2022) using classroom action research in locomotor skills with young children (ages 7-9) found improvements in speed, coordination, and agility after applying traditional games.

From a broader perspective, this study's findings are consistent with research on students with special needs. Mulya (2023) observed that traditional games had significant positive effects on motor development including throwing, jumping, and broad jumps for students with disabilities. These parallel findings support the hypothesis that the physiological and neuromotor stimuli delivered by traditional games are broadly effective across different populations.

Novelty of this study lies in integrating traditional cultural games within the adolescent (junior high) age group and using measures beyond general physical fitness to include arm power and running speed. Few studies to date have targeted this age group in junior high school with such specific motor components. In terms of theoretical implications, results here further strengthen the psychomotor learning theory and ecological dynamics models which posit that enriched, variable, and socially interactive environments (such as traditional games) promote motor learning. For example, Hasan et al. (2024) emphasize not only motor skill gains but also cognitive and social development outcomes connected to cooperative traditional games.

Practical implications include recommending that physical education curricula incorporate traditional games, not just for younger children but also for early adolescents; the games can serve as low-cost, culturally relevant interventions to improve motor skills. Teachers might structure sessions of Gobak Sodor and Bentengan similarly to this study's intervention schedule. However, despite its strengths, the study

has limitations. The sample size was relatively small (n = 12), and the absence of a control group limits the generalizability of the findings. In comparison, studies like this present stronger design: Affandi et al. (2025) used 20 students with a control group to test agility improvements.

Also, much of the prior literature focuses on early childhood or elementary school students, so developmental differences between younger and older groups remain underexplored. Future research should consider employing a randomized controlled design with larger sample sizes and extended intervention periods to evaluate long-term developmental changes, retention of improvements, and potential diminishing returns with age. It would also be valuable to include outcomes such as coordination, balance, and social-emotional benefits that studies like Hasan et al. (2024) and Mulya (2023) have shown.

CONCLUSION

This study concludes that traditional games such as Bentengan and Gobak Sodor have a significant positive effect on improving gross motor abilities specifically arm power, running speed, and agility among seventh-grade students at SMP PAB 8 Sampali. Through a structured five-week intervention, students demonstrated measurable improvements in all physical performance indicators, confirming that traditional games serve not only as culturally meaningful activities but also as effective pedagogical tools for enhancing motor skill development. These findings reinforce existing theories of psychomotor learning and contribute new empirical evidence highlighting the relevance of traditional games in modern physical education. Therefore, integrating traditional games into school curricula can promote physical fitness, cultural preservation, and active learning among adolescents, while future studies are encouraged to expand this research with larger samples, longer durations, and diverse educational contexts to strengthen generalizability and long-term applicability.

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CONFLICT OF INTEREST

Clearly explain whether there are any conflicts of interest related to the reported research.

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