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Developing The Gross Motor Abilities Of Elementary School Students Through The Traditional Kopral Game

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ABSTRACT
Gross motor abilities play an important role in the physical, cognitive, and social development of elementary school children. They are especially important for supporting academic achievement and social interaction. However, the rise of digital technology has altered children's play patterns, causing them to engage more frequently with electronic devices than in physical activities. This shift has the potential to hinder motor development. This study explores the role of traditional Kopral games in developing elementary school students' gross motor skills. The study used a quasi-experimental pretest-posttest control group design. Fifth and sixth grade students from Gayam 1 elementary school were the research subjects, with two classes sampled: one experimental class and one control class. Each class consisted of 20 students. while the experimental group experienced significant changes, moving from the low to high and very high categories. A t-test revealed that the increase in gross motor skills in the experimental group was significantly greater than in the control group ($p < 0.05$; t-count = 10.262 > t-table = 2.021). These results suggest that traditional Kopral games effectively improve students' gross motor abilities. The findings also have practical implications for schools and educators, suggesting that traditional games can be integrated into physical education classes as an engaging, inexpensive, and culturally relevant alternative learning strategy that supports children's holistic motor development.
Keywords: *traditional games; kopral; gross motor ability*

ABSTRAK

Kemampuan motorik kasar memainkan peran penting dalam perkembangan fisik, kognitif, dan sosial anak sekolah dasar, terutama dalam mendukung prestasi akademik dan interaksi sosial. Namun, perkembangan teknologi digital telah mengubah pola bermain anak, sehingga mereka lebih sering bermain menggunakan perangkat elektronik dibandingkan terlibat dalam aktivitas fisik, yang berpotensi menghambat perkembangan motorik. Penelitian ini bertujuan untuk mengeksplorasi peran permainan tradisional Kopral dalam mengembangkan kemampuan motorik kasar siswa sekolah dasar. Penelitian ini menerapkan metode kuasi-eksperimen *pretes-posttes control grup design*. Subjek penelitian adalah siswa kelas V dan VI di SD Negeri Gayam 1, dengan dua kelas yang dijadikan sampel yaitu satu sebagai kelas eksperimen dan satu sebagai kelas kontrol. Masing-masing berjumlah 20 siswa. Hasil penelitian menunjukkan bahwa kelompok kontrol mengalami peningkatan yang minimal, sedangkan kelompok eksperimen mengalami perubahan signifikan dari kategori rendah menjadi tinggi dan sangat tinggi. Uji-t menunjukkan bahwa peningkatan kemampuan motorik kasar pada kelompok eksperimen secara signifikan lebih tinggi dibandingkan kelompok kontrol ($p < 0.05$; t-hitung = 10.262 > t-tabel = 2.021). Temuan ini menunjukkan bahwa permainan tradisional Kopral secara efektif meningkatkan kemampuan motorik kasar siswa. Temuan ini juga memberikan implikasi praktis bagi sekolah dan pendidik, menunjukkan bahwa permainan tradisional dapat diintegrasikan ke dalam mata pelajaran pendidikan jasmani sebagai strategi pembelajaran alternatif yang menarik, murah, dan relevan secara budaya, yang mendukung perkembangan motorik holistik anak-anak.

Kata Kunci: permainan tradisional, kopral, gross motor ability

INTRODUCTION

Physical development in children is a crucial and multifaceted process that encompasses both physical growth and motor development. Significant physiological changes occur during childhood, particularly between the ages of 7 and 12, that influence the enhancement of motor skills (Wu & Wang, 2022). Children at this stage experience rapid increases in height and weight, altering their physical appearance and affecting their ability to engage effectively in physical activities and sports (Nasution et al., 2023). Furthermore, incorporating fundamental movement exercises into physical education has been demonstrated to positively impact motor development, effectively improving movement skills among early elementary school students (Oktadinata et al., 2023).

Motor skills play a crucial role in the physical, cognitive and social development of elementary school children. Well-developed motor skills can prevent learning difficulties that may lead to poor academic performance and social challenges at school (Rahmawati et al., 2021), while also supporting cognitive and academic growth. This includes enhancing critical reading skills (Sayekti et al., 2024). Furthermore, research indicates that movement learning in students is closely linked to cognitive function, with those demonstrating stronger cognitive abilities tending to exhibit better motor performance (Lardika et al., 2023). Motor skills are generally categorised as either fine motor skills or gross motor ability. In the context of physical education, gross motor ability is the dominant component that underpins physical activity. Therefore, optimally developing motor skills significantly contributes to children's readiness to engage in various movement and sports activities.

However, the rapid advancement of digital technology has significantly transformed children's play patterns, as many now prefer engaging in electronic games over participating in physical activities that promote social interaction. Studies have indicated that excessive

reliance on technology can lead to a decline in children's motor skills and impede their social development (Hadjarati et al., 2021; Pujihartati & Wijaya, 2019). Moreover, exposure to inappropriate content on social media has been found to negatively influence children's behavior, leading some students to adopt improper language due to frequent encounters with offensive expressions (Bakistuta & Abduh, 2023). Therefore, it is essential to re-examine the potential role of traditional games within physical education as a medium to enhance both motor and social skills in children.

Traditional and small-scale games have long been recognized as effective tools for improving gross motor skills among primary school students. These games typically involve dynamic physical movements that stimulate motor development and contribute to physical literacy, which is essential for healthy growth (Gentry et al., 2019; Lopez-Fernandez et al., 2021). Furthermore, empirical studies highlight that participation in traditional games significantly improves agility, motor coordination, and cognitive functioning while nurturing social and physical values in physical education settings (H. Aliriad, 2023; Hilmy Aliriad et al., 2024; Pratama et al., 2023). These findings reinforce the pedagogical relevance of integrating traditional games into structured learning environments.

Despite a growing body of literature demonstrating the effectiveness of traditional games in enhancing children's gross motor development and social competencies, research examining the Kopral game specifically remains limited. Most existing studies focus on more widely known traditional games, such as Engklek, Gobak Sodor, and sack races, and use quasi-experimental or controlled designs to provide empirical findings (Oktavia & Sutapa, 2019; Sunanto et al., 2024; Taufiqurrahman et al., 2024). In contrast, no published experimental or quasi-experimental studies have rigorously examined the effects of Kopral on gross motor development. Current references to Kopral tend to be conceptual, descriptive, or anecdotal, lacking systematic measurement, controlled comparisons, or motor-skill assessment frameworks. This absence of empirical findings on the effects of the Kopral game on children's gross motor ability, despite its cultural importance and recognized potential to promote active play, indicates a significant research gap.

This study is innovative in that it provides the first experimental, empirical evidence of the impact of the traditional Kopral game on children's gross motor development. Unlike prior studies that examined general categories of traditional games or focused on more popular, widely researched activities, this study introduces an underexplored, culturally embedded game into a structured experimental design. This study is novel in that it (1) empirically validates Kopral as a pedagogical tool in physical education, (2) integrates culturally relevant movement activities into motor-skill assessment, and (3) contributes new evidence to the field of traditional-game-based motor learning. This approach advances both the theoretical understanding and the practical application of culturally grounded physical education interventions.

This study examines whether participating in the Kopral game leads to significant improvements in gross motor ability in elementary school students compared to those who participate in conventional physical education activities. Accordingly, the hypothesis proposes that students who engage in the Kopral game will demonstrate significantly greater improvements in gross motor ability than students who receive conventional physical education instruction.

METHODS

Type and Design

This study employed a quantitative experimental research designs, quasi-experimental approach with a pre-test/post-test control grup design (Maksum, 2018). İts sought to determine the effectiveness of the traditional Kopral game in improving students' gross motor ability through a pre-test–post-test control group design. The experiment involved two groups: (1) an experimental group participating in Kopral game activities during physical education sessions, and (2) a control group engaging in conventional physical education activities without the Kopral intervention. The treatment was implemented for 12 sessions over a period of six weeks.

Data and Data Sources

The study was conducted at SD Negeri Gayam 1, Bojonegoro Regency, during June–July 2025. The population comprised all 40 students from grades 5 and 6, who were considered to possess sufficient cognitive and physical maturity for motor ability assessments. Due to the relatively small number of participants, the research employed saturation sampling (total sampling), where all members of the population were included as research subjects.

Participants were then randomly assigned into two groups: Experimental group (n = 20): participated in physical education sessions incorporating the Kopral game. Control group (n = 20): participated in regular physical education sessions without Kopral activities. The primary data sources consisted of the students' motor ability scores obtained through standardized testing. Secondary data included observational notes and teacher feedback to support the quantitative description of students' performance and engagement.

Data collection technique

Data were collected through testing and observation procedures before and after the intervention. Both the experimental and control groups underwent pre-tests to assess baseline motor ability and post-tests after 12 sessions to evaluate improvement. The Barrow Motor Ability Test (BMAT) was used as the main instrument to measure students' gross motor ability. Each student's performance in these six components was scored according to standardized criteria based on (Nurhasan, 2000). In addition, qualitative observations were conducted during intervention sessions to document behavioral and participation patterns, providing supporting data on students' motor engagement during the Kopral game activities.

Table 1. This standardized test assesses six fundamental motor skill components

Test	Measured Aspect	unit of measurements
Standing Broad Jump	Measures leg power	Centimeter
Softball Throw	Measures upper body coordination and strength	Centimeter
Zig-Zag Run	Assesses agility and coordination	Seconds
Wall Pass	Measures eye–hand coordination	Score

60-Yard Dash	Measures running speed and endurance	Seconds
Medicine Ball Put	Evaluates upper body power	Centimeter

Prior to conducting the statistical analysis, the raw data obtained from the Barrow Motor Ability Test were standardized using T-score transformation to ensure comparability across different measurement units and test components. Table 1 shows the series of motor ability tests given in this study The BMAT comprised six measured aspects of gross motor ability, each representing a distinct domain of physical performance: Standing Broad Jump (measuring leg power, in centimeters), Softball Throw (assessing upper body coordination and strength, in centimeters), Zig-Zag Run (evaluating agility and coordination, in seconds), Wall Pass (measuring eye–hand coordination, expressed as a score), 60-Yard Dash (assessing running speed and endurance, in seconds), and Medicine Ball Put (evaluating upper body power, in centimeters). The use of the T-score transformation allowed all performance results to be expressed on a common standardized scale, thereby minimizing the influence of differing measurement units and enabling a more accurate and reliable comparison of students' overall motor ability across all test components.

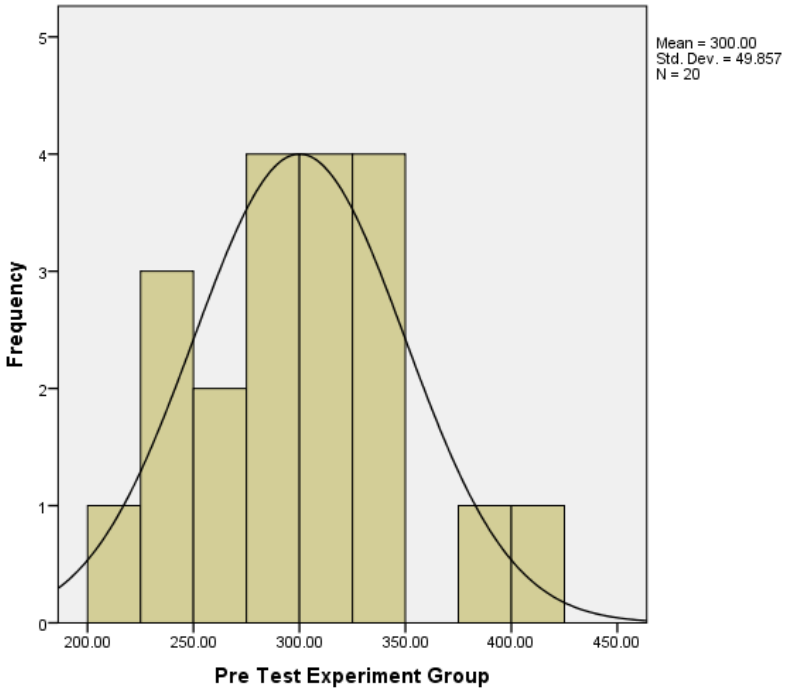
Data analysis

Data analysis in this study inferential statistical techniques. The paired sample t-test was employed to determine whether there were significant differences between pre-test and post-test results within each group. Furthermore, an independent sample t-test was conducted to compare the post-test mean scores between the experimental and control groups. Data normality and homogeneity were tested prior to the t-tests to ensure the validity of the statistical assumptions. Statistical analyses were performed using the SPSS software (version 26) with a significance level of $\alpha = 0.05$.

The inferencial analyses ensured a comprehensive understanding of the Kopral game's impact on students' gross motor development. Data analysis is the process of cleaning, transforming, and modeling data in order to discover useful information for determining the research's outcome. The objective of data analysis is to extract useful information from data and make decisions based on this information.

RESULTS AND DISCUSSION

The research conducted at Gayam 1 Public Elementary School aimed to improve the gross motor ability of elementary school students through the traditional game of Kopral in physical education lessons. This study involved 40 fifth and sixth grade students from Gayam 1 Public Elementary School, divided into two groups: an experimental group that participated in the traditional Kopral game program and a control group that followed conventional teaching methods.



Figur 1 Histogram of Pre-test Data for the Experimental Group

Figur 2 Histogram of Post-test Data for the Experimental Group

Figure 1 and 2 presents the distribution of pre-test and post-test scores for the experimental group. The histogram illustrates the frequency distribution of students' gross motor ability scores before and after participating in the Kopral game intervention. The pre-test scores show a relatively normal distribution with a mean value of 300.00 and a standard deviation of 49.057, indicating moderate variability in students' initial motor abilities. Most students' scores were

concentrated between 280 and 360, suggesting that the majority had average gross motor performance prior to the intervention.

Following the intervention, the post-test distribution shifted noticeably toward higher score ranges, while maintaining a similar overall shape. The post-test mean slightly increased to 541.02 with a standard deviation of 93.295. This shift suggests an improvement in students' gross motor ability after the Kopral game sessions. The increase in mean scores and the rightward shift in the histogram confirm that the Kopral game had a positive effect on students' physical performance, enhancing various aspects of their gross motor ability as measured by the Barrow Motor Ability Test.

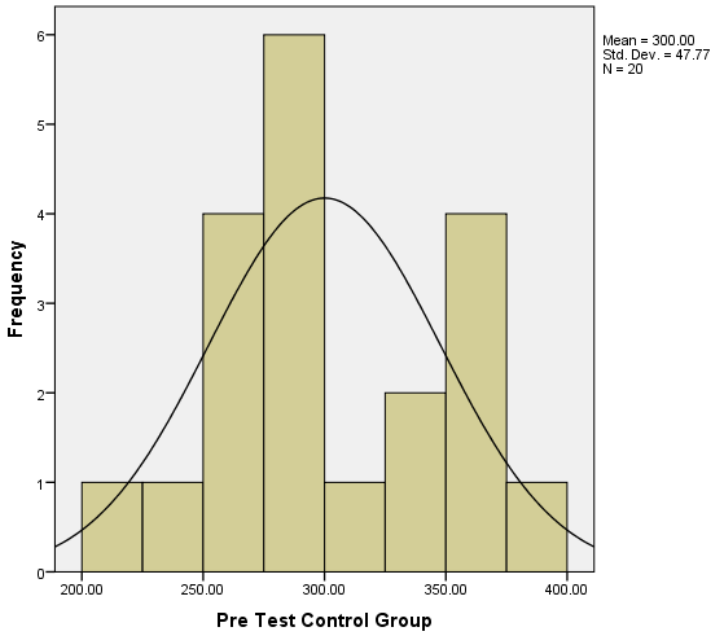


Figure 3 Histogram of Pre-test Data for the Control Group

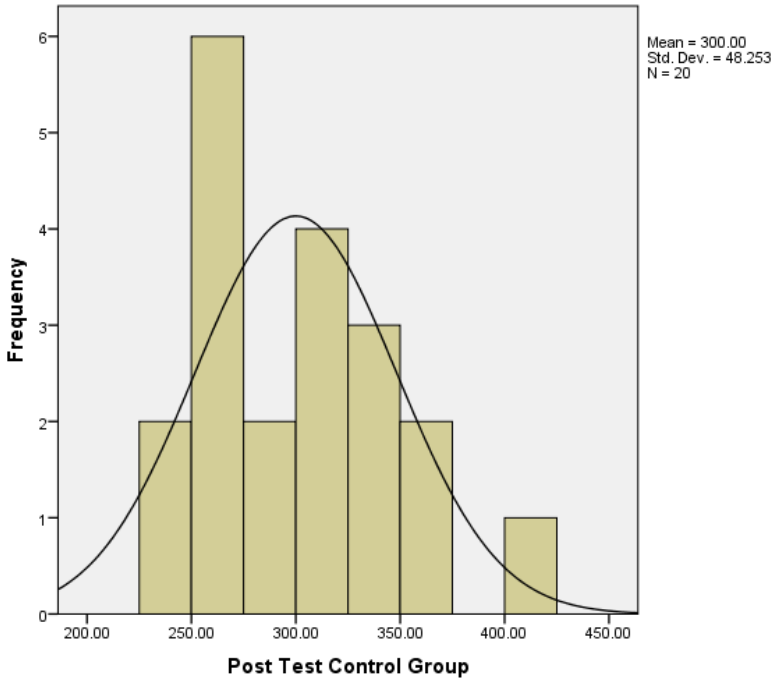


Figure 4 Histogram of Post-test Data for the Control Group

Figure 3 and 4 illustrates the frequency distribution of the control group's pre-test and post-test scores on gross motor ability. The pre-test results show a mean score of 300.00 with a standard deviation of 47.777, indicating moderate variability in the students' initial motor performance. The distribution appears relatively normal, with most scores concentrated between 280 and 360. After the intervention period, the post-test mean slightly increased to 300.00 with a standard deviation of 48.253, suggesting minimal improvement in motor ability. The overall shape of the histogram remained similar, showing that the control group, which participated in conventional physical education activities, experienced only marginal progress compared to the experimental group. This finding indicates that the Kopral game intervention contributed more effectively to improving gross motor performance than traditional physical education practices.

A descriptive analysis indicates that the experimental group experienced a substantial improvement in gross motor ability. The mean score increased from 300.00 in the pretest to 541.02 in the posttest, reflecting a significant improvement in performance. In contrast, the control group showed no observable progress, maintaining a consistent mean score of 300.00 across both assessments. Further inferential analysis using an independent t-test confirmed that the improvement observed in the experimental group was statistically significantly greater than that of the control group, supporting this descriptive trend.

Table 1 Normality and homogenity posttest data

Grup	Sapiro-Wilk (sig.)	Keterangan	Levene`s test (sig.)	Keterangan
Experiment	0.305	Normal	0.115	Homogeneous
Control	0.146	Normal		

Table 1 shows the results of the normality and homogeneity tests. These tests indicate that both the experimental and control groups meet the statistical assumptions required for further parametric analysis. The Shapiro–Wilk test shows that the data in each group are normally distributed, with significance values of 0.305 and 0.146 for the experimental and control groups, respectively, both of which exceed the 0.05 threshold. Additionally, Levene's test yielded a significance value of 0.115 for the experimental group, demonstrating that the variance between the two groups is homogeneous. Together, these results confirm that the dataset satisfies the assumptions of normality and homogeneity required for subsequent analyses, such as the independent samples t-test.

Table 2 Independent t-test results for posttest

Variabel	t-value	Sig.(2-tailed)	Keterangan
Gross Motor Abilities	10.262	0.000	Significan (p<0.01)

Table 2 shows the results of the independent samples t-test comparing the post-test gross motor ability scores of the experimental and control groups. The analysis revealed a t-value of 10.262, exceeding the critical t-table value of 2.429 with a significance level of 0.000 ($p < 0.01$). These results indicate a statistically significant difference in gross motor ability between the two groups. Specifically, students in the experimental group who played the traditional Kopral game had significantly higher gross motor ability scores than students in the control group who participated in conventional physical education activities. These results provide strong evidence that the Kopral game intervention effectively enhances students' gross motor development.

The effectiveness of the traditional Kopral game intervention can be explained by the theoretical principles of motor learning, such as repetition, movement variability, and cognitive-motor integration. Kopral requires children to perform a variety of repeated movements. These varied motor experiences stimulate neuromuscular adaptations essential for improving coordination, balance, and physical resilience (Gustian et al., 2019; Maulidiyyah & Purwoko, 2023). Additionally, Kopral demands rapid decision-making, spatial awareness, and cooperative interaction. These elements strengthen the integration between cognitive processes and physical execution. This cognitive-motor interplay enhances children's motor proficiency by engaging both perceptual and executive functions during dynamic play (Charles et al., 2017).

Additionally, Kopral aligns closely with the principles of physical literacy by emphasizing meaningful, enjoyable, and culturally relevant movement experiences that motivate children to actively participate in physical activities. The engaging and culturally embedded nature of Kopral fosters children’s emotional involvement, promoting enjoyment and sustained participation, which are key drivers of physical literacy development (Dzakiyyah, 2024; Gustian et al., 2019). Participation in the game also promotes confidence and competence in children's physical abilities. These abilities are foundational for lifelong engagement in physical activity and the cultivation of positive movement identities (Maulidiyyah & Purwoko, 2023).

This study demonstrates that an active learning approach incorporating traditional games has been proven to be more effective than conventional teaching methods in enhancing

children's motor skills. This effectiveness is attributed to its ability to significantly optimize physical movement, foster social interaction, and support the development of fundamental locomotor skills (Abdullah et al., 2017; Fadlan et al., 2023; Festiawan, 2020; Maulidiyyah & Purwoko, 2023). In summary, the findings indicate that implementing traditional Kopral games in physical education can substantially enhance the gross motor abilities of elementary school students compared to traditional approaches. Therefore, it is recommended that schools integrate traditional Kopral games into their curriculum and provide appropriate teacher training to ensure successful implementation.

The findings of this study strongly suggest that traditional Kopral games effectively improve children's gross motor abilities. However, several limitations should be acknowledged when considering the generalizability of the results. First, the study was conducted in a setting where traditional games were familiar to the students, which may not be the case in regions with different cultural backgrounds or school environments. Students' prior exposure to, cultural affinity for, and enthusiasm about traditional games could have increased their engagement and performance, which could have amplified the observed effects (Abdullah et al., 2017; Festiawan, 2020). Additionally, the sample size was relatively small and came from one school, which limits generalization to more diverse populations. Teacher expertise and instructional quality may have also influenced outcomes, as teachers with stronger pedagogical skills or cultural familiarity with Kopral games might deliver the intervention more effectively.

Furthermore, the feasibility of implementing similar interventions in other educational settings depends on several contextual factors, such as school infrastructure, adequate space for physical activities, and institutional support for incorporating traditional games into the curriculum. Schools with limited physical facilities or rigid curricular structures may have difficulty adopting game-based learning approaches. Differences in students' baseline motor abilities, socioeconomic backgrounds, and physical activity habits outside of school may also influence the extent to which such interventions yield positive outcomes, introducing variability across contexts (Agustiani et al., 2022; Basri et al., 2024; Saefullah et al., 2024). Traditional games like Kopral have cultural and educational value, but successfully integrating them into formal curricula requires aligning them with educational standards and providing sustained teacher training to ensure consistent and effective delivery. Previous studies have shown that incorporating traditional games into elementary school curricula can enhance students' learning experiences by providing engaging and meaningful activities (Fathihah, 2024; Ramadhan et al., 2024; Trajkovik et al., 2018). Accordingly, the findings of this study provide a strong empirical foundation for educators to adopt traditional games as a holistic, culturally grounded, alternative learning strategy.

One potential threat to the internal validity of this study is maturation. The participants are elementary school children who may naturally experience improvements in gross motor abilities over time due to developmental progression rather than solely as a result of the Kopral game intervention. Children at this stage typically experience rapid gains in strength, coordination, balance, and locomotor proficiency, which could contribute to the observed performance increases, regardless of the instructional method. Consequently, while the findings suggest that incorporating traditional Kopral games improves gross motor skills more effectively than traditional methods, some of the improvement may be due to normal

developmental growth. Without controlling for maturation effects through methods such as age-matched control groups, repeated baseline measurements, or shorter intervention periods, it is possible that natural developmental changes influenced some of the outcomes attributed to the Kopral game–based learning intervention.

Based on the findings of this study, traditional Kopral games should be integrated into elementary school physical education curricula as an evidence-based strategy to enhance children's gross motor abilities and support the development of physical literacy. This intervention aligns with motor learning principles, such as repetition, movement variability, and cognitive-motor integration, and it offers enjoyable, meaningful, and culturally relevant movement experiences that promote sustained participation, improved coordination, balance, and decision-making. To ensure effective implementation, schools should provide structured teacher training that equips educators with the necessary pedagogical and cultural competencies to consistently and safely deliver traditional games. Additionally, policymakers and curriculum developers should support the inclusion of traditional games by allocating adequate space, resources, and institutional backing. Due to limitations regarding sample size, cultural familiarity, and potential maturation effects, future research should examine implementation across varied educational contexts, apply stronger controls for developmental changes, and involve larger and more diverse populations to strengthen the generalizability and long-term applicability of Kopral game–based learning interventions.

CONCLUSION

Based on the results of the study, the active learning approach based on traditional games, particularly the Kopral game, has been proven to be more effective than conventional methods in significantly improving children's gross motor ability. These results suggest that Kopral-based learning provides enjoyable, meaningful, and culturally relevant movement experiences that foster children's motivation, confidence, and competence-all of which are key components for long-term participation in physical activity. While the results strongly support integrating traditional games into the school curriculum, contextual and methodological limitations such as cultural familiarity, limited sample size, teacher expertise, and maturation effects require careful interpretation and limit generalizations. The feasibility of implementation also depends on factors such as school infrastructure, curriculum flexibility, and ongoing teacher training. Therefore, while this study establishes a solid empirical basis for using traditional games as a holistic, culturally grounded learning strategy, further research involving more diverse settings and stronger controls for developmental factors is necessary to validate and refine the application of Kopral-based interventions in broader educational contexts.

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