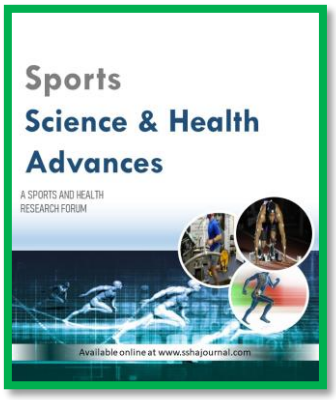
Original Article

The Relationship Between Gross Motor Skills and Fitness to Physical Activity of Indonesian Elementary Students

Mahreta Indayani Saputri [1]*, Ari Tri Fitrianto [2], Muhammad Habibie [3], Ahmad Maulana [4], Aulia Putri Yuliasti [5]

[1,2,3,4,5]Department of Physical Education, Faculty of Teacher Training and Education, University of Islam Kalimantan Muhammad Arsyad Al Banjari, Banjarmasin, Indonesia

*Correspondence: retaindayani04@gmail.com



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Abstract

Background: Physical activity plays a critical role in supporting the health and development of elementary school children. Gross motor skills and physical fitness are often considered important predictors of activity levels, but evidence in this area remains mixed, particularly in the Indonesian context. **Purpose**: This study investigated the relationship between gross motor skills, physical fitness, and physical activity among Indonesian elementary students. **Material and Methods**: A non-experimental quantitative design was employed using a correlational approach. Twenty students were selected through purposive sampling. Data were collected using the Physical Activity Questionnaire for Children (PAQ-C), the Test of Gross Motor Development–2 (TGMD-2), and the Tes Kebugaran Jasmani Indonesia (TKSI) Phase B. Descriptive statistics, multiple correlation, and the Kolmogorov–Smirnov test were applied. **Results:** The analysis revealed no statistically significant relationships between gross motor skills, physical fitness, and physical activity ($p > 0.05$). These null findings suggest that other factors may exert a stronger influence on children's activity engagement. **Conclusion:** Gross motor skills and physical fitness alone did not explain physical activity levels among the participants. The small, purposive sample (N = 20) and single-school setting limit the generalizability of the results. Future research should involve larger, more diverse samples and incorporate psychosocial, environmental, and cultural factors to better capture the complex determinants of physical activity in children.

Keywords: Gross Motor Skills, Physical Fitness, Physical Activity, Elementary Students, Indonesia

Introduction

The development of gross motor skills in early childhood plays a crucial role in children's overall growth and development. Gross motor skills, which involve the use of large muscle groups, serve as the foundation for more advanced physical abilities such as balance, coordination, agility, speed, and flexibility. These skills not only support physical development but also contribute to cognitive and social functioning, as well as children's ability to engage in physical activities (Asmuddin et al., 2022; Candra et al., 2023; Sumiyati, 2018).

Alongside motor skills, physical fitness is also considered an important factor for enabling children's active participation in daily and recreational activities. Key components such as muscular strength, endurance, and flexibility may facilitate more efficient movement and energy expenditure (de Sousa Pereira & Moreira, 2013; Mariawati et al., 2022). Conversely, insufficient fitness may hinder children's ability to perform fundamental movements effectively (Paspiani, 2015; Shanty et al., 2023).

Despite this theoretical foundation, field observations in Indonesia suggest that many elementary school students demonstrate low levels of gross motor skills and physical fitness (Pratama et al., 2021; Yusdianto & Wiguno, 2024). These findings raise questions about the extent to which motor competence and fitness are truly associated with children's physical activity. While previous studies often report positive associations, evidence remains limited and sometimes inconsistent. Therefore, this study was designed to investigate whether gross motor skills and physical fitness are related to physical activity levels among Indonesian elementary students, recognizing that other contextual and psychosocial factors may also play significant roles.

Materials and Methods

Participants

This study employed a non-experimental quantitative design using a correlational approach to examine the relationship between the variables under investigation. The research sample consisted of 20 Indonesian elementary students, selected through purposive sampling.

Procedures

Prior to data collection, participants were selected using purposive sampling based on predetermined criteria, specifically targeting Indonesian elementary students. Once the sample was finalized, the researcher provided a clear and comprehensive explanation of the study's objectives and procedures to the participants. Data collection began with the administration of a questionnaire designed to assess students' daily physical activity levels. A modified version of the *Physical Activity Questionnaire for Children* (PAQ-C), developed by Kowalski (Kowalski et al., 2004). Subsequently, the students' gross motor skills were evaluated using the *Test of Gross Motor Development–2* (TGMD-2) (Ulrich, 2000), which assesses six locomotor skills and six object control skills. To assess physical fitness, students completed the *Tes Kebugaran Jasmani Indonesia* (TKSI) Phase B (Risaldi et al., 2023), which provides a comprehensive measure of overall physical condition.

Statistical Analysis

Following data collection, appropriate statistical analyses were conducted. Descriptive statistics, including the mean and standard deviation, were calculated to summarize the characteristics of the data. To examine the relationship between the independent variables (gross motor skills and physical fitness) and the dependent variable (physical activity), multiple correlation analysis was applied. Additionally, the Kolmogorov–Smirnov test was conducted to assess the normality of the data distribution (Razali & Wah, 2011).

Results

Table 1 showed that the calculated t-value of 1.308 was lower than the critical t-value at the 0.05 significance level. Based on this result, it was concluded that there was no statistically significant relationship between gross motor skills (X1) and physical activity (Y) among Indonesian elementary students. This finding suggested that the students' gross motor skill levels did not have a direct correlation with their physical activity levels.

Table 1 Relationship between gross motor skills and physical activity

Variable	T-value	α	Conclusion
X1 – Y	1.308	0.05	Not significant

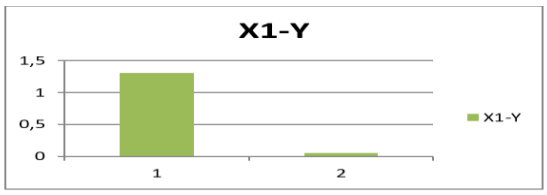

Figure 1 Graphical representation between gross motor movement and physical activity

Table 2 showed a t-value of 0.390, which was also below the critical t-value at the 0.05 significance level. Accordingly, the analysis indicated no significant relationship between physical fitness (X2) and physical activity (Y) among the same group of students. This result implied that higher physical fitness levels did not necessarily correspond to increased physical activity among third-grade students.

Table 2. Relationship between physical fitness and physical activity

Variable	T-value	α	Conclusion
X2 – Y	0.390	0.05	Not significant

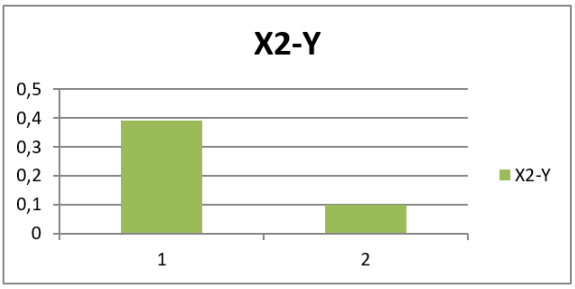

Figure 2 Graphical representation between physical fitness and physical activity

Table 3 showed that the calculated F-value was 0.436, which was lower than the critical F-value at the 0.05 significance level. This indicated that the combined influence of gross motor skills (X1) and physical fitness (X2) did not have a statistically significant effect on students' physical activity levels. In other words, these two variables, either individually or jointly, did not adequately explain the variation in physical activity among Indonesian elementary students.

Table 3 Relationship between gross motor skills, physical fitness, and physical activity

Variable	T-value	α	Conclusion
X1, X2 – Y	0.436	0.05	Not significant

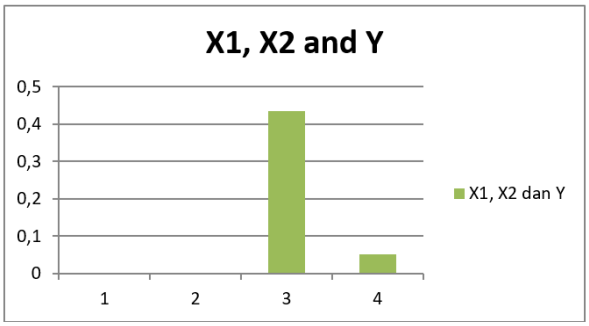

Figure 3 Graphical representation between gross motor skills, physical fitness, and physical activity

Discussion

Based on the findings of this study, no significant relationship was found between gross motor skills or physical fitness and physical activity among Indonesian elementary students. These results contrast with several previous studies that consistently reported a positive association between physical fitness and physical activity levels among elementary school students (Aprilia & Januarto, 2022; Huwaida et al., 2021; Nugraha et al., 2023). Furthermore, research by Yoga

(2023) also indicated a positive correlation between physical activity, motor skills, and students' physical fitness levels. This discrepancy may be attributable to the limited sample size in the current study, which involved only 20 participants from a single school. The small and homogeneous sample may have reduced the statistical power and limited the generalizability of the results.

A growing body of research emphasizes that children's physical activity is influenced by more than just motor skill proficiency and physical fitness. Although physical competence provides a necessary foundation, it does not independently determine a child's engagement in physical activity. Instead, motivation plays a pivotal role, driven by both intrinsic factors—such as enjoyment, self-confidence, and personal interest—and extrinsic influences, including encouragement from parents, teachers, and peers (Ayuningrum et al., 2023). Millstein (2011) and Dowda (2020) argued that the home environment also significantly shapes physical activity behaviors, with parental support and access to physical activity equipment being positively associated with increased activity levels. These psychosocial and environmental variables can either enhance or inhibit a child's willingness to engage in physical activity, even when the child possesses adequate physical capability.

Contextual factors specific to Indonesian elementary students may also help explain the null findings of this study. Many schools face limited infrastructure for physical education, lack of safe and accessible play areas, and insufficient time allocated for structured physical activity. Socioeconomic conditions may further restrict children's opportunities, as families with fewer resources may not provide extracurricular sports opportunities or necessary equipment. Cultural expectations and academic pressures may also prioritize classroom learning overactive play, reducing students' engagement in physical activity outside of school hours. In some urban areas, safety concerns and limited neighborhood facilities further constrain children's opportunities for outdoor movement.

In line with this perspective, Sudirjo and Sudrazat (2024) highlighted that children's physical activity is shaped by broader psychosocial factors, such as emotional climate at home, parental involvement, school environment, and the availability of safe and engaging recreational spaces. In addition, neighborhood conditions including perceived safety, aesthetics, and the presence of physical activity facilities—have been shown to influence children's participation in active behaviors (Colabianchi et al., 2019; Millstein et al., 2011). The interplay between psychosocial and environmental factors appears to be particularly influential, with supportive environments and social reinforcement working synergistically to promote physical activity.

These findings underscore the need to adopt a holistic and integrative approach to promoting physical activity among school-aged children. School-based interventions should not only target improvements in gross motor skills and physical fitness but also address motivational, environmental, cultural, and social determinants. In practice, this may include the implementation of comprehensive programs that combine structured physical education with positive reinforcement, family and community involvement, inclusive play opportunities, and infrastructure that encourages movement both within and beyond the school setting.

Limitations

This study has several limitations that should be acknowledged. First, the sample size was very small (N = 20) and drawn from a single school using purposive sampling. This substantially limits the generalizability of the findings and reduces the statistical power to detect meaningful relationships. Second, the study did not account for potential confounding variables such as socioeconomic status, school facilities, or gender differences, which may influence both fitness and activity levels. Third, although validated instruments were used, self-reported measures of physical activity (PAQ-C) may be subject to recall bias.

Future studies should therefore employ larger, more representative samples across diverse regions and incorporate additional psychosocial and environmental variables to better capture the complex determinants of children's physical activity.

Conclusion

Based on the results of this study, no statistically significant relationship was found between gross motor skills (X1), physical fitness (X2), and physical activity (Y) among Indonesian elementary students. Neither variable, whether examined individually or in combination, demonstrated a meaningful influence on students' activity levels. These findings suggest that children's physical activity may be shaped more strongly by psychosocial, cultural, environmental, and motivational factors than by physical competence alone.

It is important to note, however, that the small sample size (N = 20) and purposive selection from a single school substantially limit the generalizability of these findings. Limited infrastructure for physical education, socioeconomic barriers, and cultural priorities that emphasize academic achievement over active play may also help explain the discrepancy with previous studies.

Future research should therefore involve larger, more diverse samples across multiple schools and regions, while incorporating contextual variables such as school facilities, family involvement, neighborhood conditions, and cultural expectations. By adopting this broader perspective, future studies can provide more comprehensive insights into the determinants of physical activity among Indonesian children and support the development of more effective, contextually relevant physical education programs.

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Conflicts of interest

The authors declare no conflicts of interest.

ORCID

Mahreta Indayani Saputri https://orcid.org/0009-0001-0811-0859
Ari Tri Fitrianto https://orcid.org/0000-0002-0825-2128
Muhammad Habibie https://orcid.org/0009-0004-6624-6000
Ahmad Maulana https://orcid.org/0009-0006-7012-7228
Aulia Putri Yuliasti https://orcid.org/0009-0003-3105-8678

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