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# The Impact of Socioeconomic Conditions and Residential Areas on the Development of Gross Motor Skills in Elementary School Age Children

**Imam Hariadi *[1], Mashuri Eko Winarno [2], Nurrul Riyad Fadhli [3], Dona Sandy Yudasmara [3], Taufik [4], Galih Purnomo Aji [5].**

[1]Affiliation : Sport Coaching Education, Faculty of Sport Science, Universitas Negeri Malang, Indonesia

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**Abstract**

This study analyzed the differences in gross motor skills in children aged 7-9 years in urban and rural areas and the influence of socioeconomic conditions on them. The study involved 100 children evenly divided between the two areas, with measurements using the AMC-2 instrument. The results showed significant differences in gross motor skills between urban (M=138.8) and rural (M=127.9) children with p=0.003. Urban children performed better in locomotor (70.3 vs 65.2) and object control (68.5 vs 62.7). Multiple regression analysis confirmed that both socioeconomic conditions (B=0.45, p=0.004) and residential area (B=0.39, p=0.008) had a significant effect on gross motor skills. These findings indicate the importance of considering environmental and socioeconomic factors in the development of children's gross motor skills.

*Corresponding email : imam.hariadi.fik@um.ac.id
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## INTRODUCTION

Gross motor skills are basic abilities that involve large body movements such as running, jumping, and kicking, which are important for a child's physical and social development. Gross motor skills involve large body movements that are important for activities such as running and jumping, which are essential for physical health (Ushtelenca et al., 2024a). The level of motor skills of elementary school children in Indonesia shows significant variation, influenced by differences in access to physical activity and quality physical education. Many children in urban areas have better opportunities to develop motor skills through extracurricular programs and sports facilities. In contrast, in rural areas or areas with limited resources, this has an impact on basic motor development. In addition, the increasing use of digital devices among children also reduces the time for physical activity needed for motor development (Agafonov et al., 2021) (Rocha Neto et al., 2023). This phenomenon shows that collaborative efforts are needed between schools, families, and communities to ensure that children have adequate opportunities to develop optimal motor skills during growth.

The environment in which a child grows up plays a major role in supporting or inhibiting the development of gross motor skills. Research shows that structured physical education programs significantly improve gross motor skills in children, with tailored interventions producing even better outcomes (Ushtelenca et al., 2024b). Outdoor game-based learning models have been effective in improving motor skills, making learning interesting and beneficial for the development of early childhood (Muhammad nasihul waffak et al., 2024). Access to play facilities, open spaces, and structured physical activities tends to vary based on environmental conditions, such as differences between urban and rural areas. Other factors that influence motor skill levels include Gender and Weight Considerations. Research shows that boys often outperform girls in gross motor skills, and overweight children typically show poorer coordination (Andli Marta et al., 2024) (Sui et al., 2024). Addressing these gaps through targeted exercise programs can help improve motor skills across demographics (Sui et al., 2024).

Socioeconomic conditions, such as family income, play an important role in children's motor development, as families with higher incomes generally have better access to sports facilities, educational toys, and safe environments for physical activity. In contrast, families with lower incomes may face limitations that hinder children's motor skills. Children from low socioeconomic backgrounds demonstrate lower basic motor skills compared to their peers from higher socioeconomic backgrounds, as evidenced by significant differences in locomotor skills and object control (Adkins et al., 2017a). A study found that 33.9% of children aged 3-5 years scored below average in gross motor skills, with those living below the poverty threshold more likely to have lower scores (Kwon & O'Neill, 2020). Access to safe play areas and organized physical activity is often limited in low-income

neighborhoods, which can hinder the development of motor skills (Ishee & Hoffman, 2003a). Interventions aimed at improving motor skills in disadvantaged children have shown positive results, suggesting that environmental factors can be modified to support development (Ishee & Hoffman, 2003a).

Children living in rural or low-resource areas may have limited access to sports facilities and physical activity programs. The lack of these facilities can have a negative impact on the development of gross motor skills compared to children in more well-equipped areas, such as urban areas. Rural children often have limited access to sports facilities, which limits their opportunities for physical activity (Kellstedt et al., 2021). In contrast, research shows that while rural children may show certain physical advantages, urban children often demonstrate superior muscle strength and lung capacity as they age (Saldan et al., 2019).

Although the influence of socioeconomic and physical environment on motor development has been studied, there is limited literature specifically linking these two factors to the development of gross motor skills in children. This research is important to understand the gaps that may occur due to economic and geographic factors. This study aims to analyze the impact of socioeconomic conditions and residential areas on gross motor skills in children. The results of this study are expected to provide insight into how various external factors affect children's motor development and offer recommendations for policies or programs that support motor skill development in various environmental and economic conditions.

## METHODS

This study uses a quantitative approach with a correlational design to analyze the relationship between socioeconomic conditions, residential areas, and the development of gross motor skills in children. The subjects of the study were children aged 7-9 years from various urban and rural areas, with a sample size of 100 children selected by purposive sampling based on age and residential criteria. Data collection in this research was carried out at SDN 1 Srigonco, SDN 3 Srigonco, SDN 3 Sukun, SD Santa Maria 3 Malang City.

Research instruments includes Active Motor Card Level 3 (AMC-3) which includes running, jumping, sideways running, jumping, rolling, bouncing, catching, throwing, kicking, agility, balance, and speed. This instrument is used to measure children's gross motor skills and a socioeconomic questionnaire of parents to find out information about income, education, and environmental conditions of the place of residence (Taufik et al., 2024).

Data analysis conducted with multiple regression test to test the influence of socioeconomic variables and residential areas on gross motor skills. In addition, a difference test (independent t-test) was used to compare gross motor skills between children in urban and rural areas. The results of the analysis are expected to provide an overview of the significant impact of the two independent variables on children's motor skills.

## RESULT

The following table presents demographic data from 100 children (research subjects) taken from urban and rural areas with an age range of 7-9 years.

**Table 1.** Description of Research Subject Data

| Category | Urban (N=50) | Rural (N=50) |
|---|---|---|
| Average Age (years) | 8.2 | 8.1 |
| Gender (M/F) | 26/24 | 28/22 |
| Socioeconomic Conditions | Upper-Middle (N=30), Lower-Middle (N=20) | Upper-Middle (N=15), Lower-Middle (N=35) |

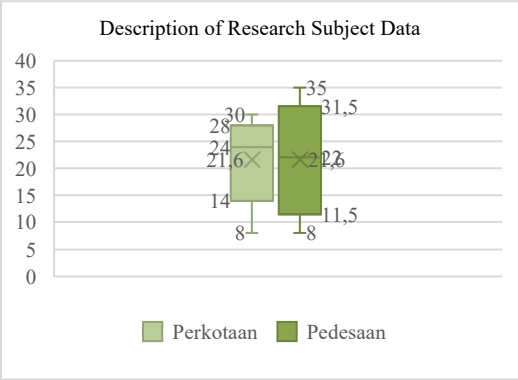


**Figure 1.** Description Data

The TGMD-3 results include gross motor skill scores of each child measured in two main aspects: locomotor skills and object control. The average score data for each group can be presented as follows

**Table 2.** AMC-2 Gross Motor Skills Test Results

| Residential Area | Average Locomotor Score | Average Object Control Score | Total Gross Motor Score |
|---|---|---|---|
| Urban | 70.3 | 68.5 | 138.8 |
| Rural | 65.2 | 62.7 | 127.9 |

The results of multiple regression analysis were used to see the influence of socioeconomic conditions and area of residence on the total gross motor score.

**Table 3.** Multiple Regression Analysis

| Independent Variables | Coefficient (B) | t-count | p-value |
|---|---|---|---|
| Socioeconomic Conditions | 0.45 | 2.89 | 0.004 |
| Residential Area | 0.39 | 2.67 | 0.008 |

These results indicate that socioeconomic conditions and area of residence have a significant influence on gross motor skills, with a p value < 0.05 for both variables.

To determine the differences in gross motor skills between urban and rural children, an independent t-test was conducted

**Table 4.** Difference Test (Independent t-test)

| Variables | Mean (Urban) | Mean (Rural) | t-count | p-value |
|---|---|---|---|---|
| Total Gross Motor Score | 138.8 | 127.9 | 3.02 | 0.003 |

## DISCUSSION

This study aims to analyze the relationship between socioeconomic conditions and location of residence (urban-rural) on gross motor skills of children aged 7-9 years. This understanding is important to identify gaps in motor development and design appropriate interventions for children from various socioeconomic and geographic backgrounds. According to (Venetsanou & Kambas, 2010), understanding contextual factors such as socioeconomic and residential location is essential in developing effective and inclusive motor programs. Key Results

The study showed that these data indicate a significant effect of socioeconomic and residential conditions on gross motor skills.

Analysis of how parental socioeconomic status affects children's motor development reveals significant differences in access to resources that facilitate motor skills. Research shows that lower socioeconomic status is correlated with limited access to sports facilities, play activities, and social interactions, which are critical for developing motor skills. Several studies have elaborated on these findings. Children from low SES backgrounds demonstrate poorer motor skills compared to their higher SES peers, as evidenced by a systematic review that showed lower motor skills in infants from low SES families (Laguna Celia et al., 2023). A study found that early childhood motor development is influenced not only by parental SES but also by the availability of playgrounds and play spaces at home (Stephani et al., 2019).

The positive coefficient of 0.35 indicates that every one unit increase in socioeconomic status is associated with a 0.35 unit increase in children's gross motor scores. This indicates that children from families with higher socioeconomic status tend to have better gross motor scores, possibly due to better access to sports facilities and opportunities for motor skill development. This is due to several factors, including access to facilities. Children from families with higher socioeconomic status often have better access to sports facilities and have organized physical activities, which can improve motor skill development (Adkins et al., 2017b). Next is educational opportunities. High socioeconomic status is associated with better educational resources, including physical education programs that improve gross motor skills (Klein et al., 2016). And finally, regarding health disparities. Children from low socioeconomic backgrounds face more health problems, which can hinder their physical development and participation in activities that improve motor skills (Ruijsbroek et al., 2011).

Environmental influences also play a significant role. Research highlights that children in low SES areas show lower motor performance and inhibitory control, suggesting that environmental factors play an important role in the development of motor skills (Schott et al., 2023). Home environment mediates the relationship between family SES and children's play behavior, with higher SES families providing more stimulating play opportunities (Li et al., 2022). A study on home affordability for motor development found a positive correlation between family SES and the availability of resources that support motor skills (Ms Sumandeep Kaur & Kaur Randhawa, 2022). In contrast, some studies have shown that while SES is a significant factor, the quality of early childhood education and community resources may moderate its effects, suggesting a more complex interaction between socioeconomic conditions and motor development. Another influence may be related to parental education level. Findings from European countries suggest that parental education level,

especially of mothers, is positively associated with children's PA (Mota et al., 2011) (Jiménez-Pavón et al., 2012). However, a study from Türkiye showed that parental education level was negatively associated with children's PA levels (Akpınar & Cankurt, 2015).

A study from the Netherlands found that the perception of greater availability of sports facilities tends to increase sports participation among adolescents aged 12 to 15 years (Prins et al., 2009). Increasing the perception of availability of PA space can lead to an active lifestyle after school. Although the perception of availability of PA space is usually limited by objective availability, several studies have found that objective facility size is not related to PA (Maddison et al., 2009) (Scott et al., 2007a). There may be a discrepancy between the perceived and objectively assessed environment (e.g., PA room), especially among young and older women (Ball et al., 2008). In addition, the perception of the availability of PA space can be influenced by individual subjective factors. Research shows that people who are more active tend to pay attention to facilities that provide opportunities for PA (Scott et al., 2007b). Rural students who are more physically active are more sensitive to the opportunities available for PA (Maddison et al., 2009).

Differences in locomotor and object control scores in children have significant implications for their social lives. Balance in the development of these two aspects is important to support optimal social development. The level of these skills will affect the choice of social activities in children. Motor skills, including locomotor (e.g., running, jumping) and object control (e.g., throwing, catching), are the foundation for children's behavioral development (Adolph & Hoch, 2020). Mastery of these skills opens up opportunities for social interaction and participation in various activities, which enhances social competence (Temple et al., 2019). Understanding these differences helps parents and educators in both urban and rural settings provide appropriate support for holistic child development. Children with well-developed motor skills are more likely to engage in a variety of social activities, which foster friendships and social networks (Ishee & Hoffman, 2003b). In contrast, children with poor motor skills may face social exclusion, which limits their participation in group activities and sports (Leonard, 2016). Urban and rural environments can influence motor skill development due to differing access to resources and recreational opportunities (Temple et al., 2019).

The results of the study show significant practical implications for children's gross motor development, especially in rural and low-income areas. According to(Jacqueline D. Goodway, John C. Ozmun, 2017), gross motor development is influenced by environmental factors and learning opportunities. In line with this theory, (Haywood, K., & Getchell, 2024) emphasizes the importance of community-based interventions in supporting motor development. Development programs can be carried out through an integrated approach involving parents, educators, and policy

makers.(Stodden et al., 2008) recommend local resource-based implementation strategies, such as the use of traditional games and the natural environment. Periodic evaluation using AMV-2 is needed to monitor the effectiveness of the program. As expressed by the high (Yoda et al., 2024), Local Wisdom-Based Motor Learning Model effectively improves basic skills in early childhood education through traditional Balinese games, achieving a level of participation and skills that. Other studies have found that Community Empowerment Initiatives have successfully integrated traditional games into learning, promoting motor development and cultural education (Asyura et al., 2023). These approaches allow for optimization of gross motor development even in resource-limited settings.

The limitations of this study include several important methodological aspects, including: The study sample was limited to children aged 7-9 years, so it cannot be generalized to other age groups. The cross-sectional data collection method cannot capture longitudinal changes (Thomas, J. R., & Nelson, 1996)Genetic factors and unstructured daily activities outside of observation cannot be completely controlled (Newell, 1986). Based on the limitations found, several recommendations can be put forward for future research. First, longitudinal research needs to be conducted with larger and more diverse samples, covering various age groups and geographic areas. According to (Malina et al., 2004), a longitudinal approach may provide a deeper understanding of motor development patterns. Second, further research should integrate daily physical activity measurements using accelerometers, as suggested by (Pate & O'Neill, 2012), to obtain more accurate data. The addition of variables such as parenting, nutrition, and genetic factors is also important to provide a comprehensive picture (Robinson et al., 2015) suggest the use of mixed-methods to examine socio-cultural factors that influence motor development across socioeconomic levels. In addition, community-based intervention studies are needed to test the effectiveness of motor development programs tailored to local contexts.

## CONCLUSION

Based on the research results, there are significant differences in gross motor skills between urban and rural children. Urban children showed higher gross motor total scores than rural children, with differences seen in both aspects: locomotor and object control. Multiple regression analysis confirmed the significant influence of socio-economic conditions and area of residence on gross motor skills. This finding is in line with research Barnett et al (2013) which emphasizes the importance of environmental and socio-economic factors in children's motoric development. Middle to upper socio-economic conditions in urban areas show a greater proportion than in rural areas, this shows that there is a gap in access and resources that can affect motor development. The results of this research emphasize the importance of appropriate intervention and equitable distribution of

gross motor development facilities, especially in rural areas with low to middle socio-economic conditions.

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