

SOCIOECONOMIC DISPARITIES IN PHYSICAL ACTIVITY AND GROSS MOTOR SKILL DEVELOPMENT AMONG MALAYSIAN PRIMARY SCHOOL CHILDREN: IMPLICATIONS FOR CHILD WELL-BEING AND INCLUSIVE DEVELOPMENT

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Abstract: Socioeconomic circumstances may influence children's opportunities to participate in physical activity and develop fundamental motor competencies through differences in family resources, recreational opportunities, and supportive environments. This study aimed to examine differences in physical activity levels and gross motor skill development among Malaysian primary school children across family socioeconomic groups and to consider the implications of these differences for child well-being and inclusive development. A cross-sectional study was conducted among 68 primary school children aged 7–9 years in Jengka, Pahang, Malaysia. Physical activity was assessed using the Physical Activity Questionnaire for Older Children (PAQ-C), while gross motor skill development was evaluated using the Test of Gross Motor Development–Second Edition (TGMD-2). Participants were categorized into three family socioeconomic groups: B40, M40, and T20. Descriptive statistics and multivariate analysis of variance (MANOVA) were used to examine differences in physical activity and gross motor skill development across socioeconomic groups. The multivariate analysis demonstrated a significant effect of socioeconomic status on the combined outcomes of physical activity and gross motor skill development (Pillai's Trace = .157, $F(4,130) = 2.775$, $p = .030$, partial $\eta^2 = .079$). The proportion of children classified as highly physically active was 81.8% among M40 participants, 77.8% among T20 participants, and 57.1% among B40 participants. Differences were also observed in gross motor skill classifications, with the B40 group displaying a wider

distribution of performance from above average to poor. The findings suggest that children's physical activity and gross motor development should be understood within their broader socioeconomic and family environments. Socioeconomic differences may reflect variations in opportunities, resources, and environments that support active participation and motor development. Schools and communities may serve as important settings for providing equitable opportunities for physical activity and motor skill development, particularly for children experiencing socioeconomic constraints.

Keywords: *socioeconomic status; physical activity; gross motor skills; primary school children; child well-being; social inequality; inclusive development*

Introduction

Childhood is a critical period for physical, cognitive, psychological, and social development. During this stage, regular physical activity and the development of fundamental motor skills provide an important foundation for children's health, participation in sport and recreation, and long-term engagement in active lifestyles. Physical activity has been associated with numerous developmental and health benefits, while adequate motor competence enables children to interact effectively with their physical environment and participate confidently in movement-related activities. Gross motor skills include fundamental movement patterns such as running, jumping, leaping, throwing, catching, kicking, and other locomotor and object-control skills. These competencies form the foundation for more complex movements required in sport, recreation, and everyday physical activity (Veldman et al., 2018). Developing these skills during childhood is therefore important not only for physical development but also for children's continued participation in active lifestyles.

Physical activity and gross motor skill development are closely interconnected. Previous studies have suggested a reciprocal relationship between the two constructs, whereby children with greater motor competence may be more likely to participate in physical activity, while regular physical activity provides opportunities to practice and improve movement skills (Burns et al., 2019). This relationship highlights the importance of providing children with sufficient opportunities to engage in movement experiences during the formative years. However, children's opportunities for physical activity and motor development do not occur independently of their social and economic environments. Family socioeconomic status (SES) is a multidimensional concept commonly associated with household income, parental education, occupation, wealth, and access to resources. These socioeconomic circumstances may shape children's opportunities to participate in organized sport, access recreational facilities and equipment, engage in outdoor play, and receive family support for physical activity.

Previous research has demonstrated socioeconomic differences in children's physical activity. Children from lower socioeconomic backgrounds may experience limited access to recreational facilities, sporting equipment, safe outdoor environments, and structured physical activity opportunities (Gerber et al., 2021; Wong et al., 2022). These disparities may influence children's participation in physical activity and potentially contribute to differences in developmental outcomes. Socioeconomic circumstances may also influence gross motor skill development. Motor competence develops through interactions between biological maturation, practice, environmental exposure, instruction, and opportunities for movement. Family resources and the home environment may therefore influence the frequency and quality of

opportunities available for children to develop fundamental movement skills. Previous research has reported associations between socioeconomic circumstances and children's motor development (Ferreira et al., 2018; Kakebeeke et al., 2021). Social-development perspective, socioeconomic differences in physical activity and motor development are important because they may represent unequal developmental opportunities during childhood. Children who have fewer opportunities to participate in structured and unstructured physical activities may have fewer opportunities to practice and refine fundamental motor skills. Such differences may subsequently influence participation, confidence, social interaction, and overall well-being. Schools and communities are therefore important environments for addressing potential inequalities. Unlike opportunities that depend primarily on household resources, school-based physical education and community programs can provide structured opportunities for children from diverse socioeconomic backgrounds to participate in physical activity and develop movement competence. In Malaysia, socioeconomic diversity remains an important contextual consideration when examining children's health and development. Nevertheless, evidence concerning differences in both physical activity and gross motor skill development across family socioeconomic groups remains relatively limited, particularly among younger primary school children outside major urban settings. Therefore, this study aimed to examine differences in physical activity levels and gross motor skill development among primary school children across B40, M40, and T20 family socioeconomic groups in Jengka, Pahang. The study also considers the implications of these differences for child well-being, equitable developmental opportunities, and inclusive social development.

Literature Review

Physical Activity and Child Development

Physical activity is an important component of healthy childhood development and contributes to children's physical, psychological, cognitive, and social well-being. Regular participation in physical activity provides children with opportunities to improve physical fitness, practice movement skills, interact with peers, and establish active behavioral patterns that may continue into adolescence and adulthood. Conversely, insufficient physical activity during childhood may contribute to sedentary lifestyles and increase the risk of adverse health outcomes later in life (Janssen & LeBlanc, 2010; Rhodes et al., 2020).

Physical activity during childhood is also associated with broader developmental outcomes. Participation in structured and unstructured physical activities provides opportunities for children to develop confidence, social interaction, and movement competence. Furthermore, evidence suggests that physical activity and motor competence may be associated with aspects of academic achievement and cognitive development. De Bruijn et al. (2019), for example, reported relationships between motor skills, physical fitness, and academic performance among primary school children. Children's physical activity is influenced by multiple individual, family, school, and environmental factors. Family support is particularly important because parents may influence children's participation through encouragement, role modelling, transportation, financial resources, and access to organized activities. Rhodes et al. (2020) emphasized the important role of the family in shaping children's physical activity and other movement behaviors. Therefore, children's physical activity should not be considered solely as an individual behavioral choice. Instead, it develops within broader family and social environments that may either facilitate or constrain opportunities for active participation.

Gross Motor Skill Development

Gross motor skills are fundamental movement competencies involving large muscle groups and are essential for children's participation in physical activity, sport, recreation, and daily movement. These skills are generally categorized into locomotor skills and object-control skills. Locomotor skills include movements such as running, galloping, hopping, leaping, jumping, and sliding, whereas object-control skills include striking, dribbling, catching, kicking, throwing, and rolling.

The development of gross motor competence is particularly important during childhood because fundamental movement skills provide the foundation for more complex movement patterns required in sports and recreational activities. Veldman et al. (2018) highlighted the importance of fundamental movement skills during childhood and their relationship with physical activity and health-related outcomes. Motor competence does not develop solely as a consequence of biological maturation. Rather, it is influenced by opportunities for practice, instruction, environmental exposure, and participation in movement experiences. Children who are provided with regular opportunities to practice fundamental movement skills may develop greater competence and confidence in physical activity settings.

The relationship between physical activity and gross motor competence may also be reciprocal. Burns et al. (2019) reported associations between gross motor skills and physical activity among school-aged children. Children with higher levels of motor competence may be more confident and willing to participate in physical activities, while frequent participation in physical activity provides additional opportunities to practice and refine movement skills. This reciprocal relationship highlights the importance of providing children with sufficient opportunities to develop motor competence during the early school years.

Socioeconomic Status and Children's Physical Activity

Socioeconomic status is a multidimensional construct that commonly reflects family income, parental education, occupation, wealth, and access to material and social resources (Salem et al., 2022). These socioeconomic circumstances can influence children's health behaviors by shaping the environments, resources, and opportunities available to them. Previous studies have demonstrated associations between socioeconomic status and children's physical activity. Gerber et al. (2021), for example, identified relationships between household socioeconomic status, physical activity, and cardiorespiratory fitness among primary school children. Similarly, Ke et al. (2022) reported significant associations between socioeconomic status and physical activity among children and adolescents.

Family socioeconomic circumstances may influence children's access to organized sport, recreational facilities, sporting equipment, transportation, and safe environments for active play. Wong et al. (2022) further demonstrated that early-life activities may mediate the association between family socioeconomic status during childhood and subsequent physical fitness. However, the association between socioeconomic status and physical activity is not necessarily linear. Children from higher-income households may have greater access to structured sporting opportunities, while children from other socioeconomic groups may participate in different forms of unstructured or community-based physical activity. Salem et al. (2022), for instance, reported that the relationship between socioeconomic status and aspects of children's development may vary according to population and context.

Consequently, household income alone may not fully explain children's physical activity. Parental involvement, neighborhood environments, school opportunities, family routines, cultural practices, and accessibility to recreational resources may interact with socioeconomic circumstances to influence children's participation.

Socioeconomic Status and Gross Motor Skill Development

Socioeconomic circumstances may also contribute to differences in children's gross motor development. Motor skills develop through repeated opportunities for movement, practice, instruction, and interaction with supportive physical environments. Families with different socioeconomic resources may provide different levels of access to equipment, organized sports, recreational facilities, and other opportunities that facilitate motor development. Ferreira et al. (2018) reported that the home environment, including socioeconomic characteristics, was associated with motor development among school-aged children. Their findings highlight the importance of considering the broader family environment when examining children's movement competence. Similarly, Kakebeeke et al. (2021) identified an association between socioeconomic status and motor development among children and adolescents. Such findings suggest that motor development may be influenced not only by biological characteristics but also by the social and environmental contexts in which children grow.

Importantly, socioeconomic differences in motor performance should not be interpreted as inherent differences in children's physical capabilities. Rather, these differences may partly reflect unequal opportunities for practice, instruction, active play, participation in organized sport, and access to appropriate facilities and equipment. This distinction is important from a social-development perspective because it shifts attention from individual deficits towards the environmental and socioeconomic conditions that may facilitate or constrain children's developmental opportunities.

Interrelationship between Physical Activity and Gross Motor Competence

Physical activity and gross motor competence should not be considered independently. Evidence suggests that children who demonstrate greater motor competence may participate more frequently in physical activity because they possess the skills and confidence necessary to engage in games, sport, and recreational activities. Burns et al. (2019) demonstrated an association between gross motor skills and physical activity among school-aged children. Similarly, Veldman et al. (2018) highlighted the relationship between fundamental movement skills and physical activity outcomes during childhood.

The relationship may operate in both directions. Greater motor competence can facilitate participation in physical activity, while greater exposure to physical activity provides children with opportunities to practice and further develop their movement skills. Consequently, children with limited opportunities for physical activity may potentially experience fewer opportunities to develop motor competence. Socioeconomic circumstances may influence this relationship by determining the types and frequency of movement opportunities available to children. Access to sporting programs, recreational environments, equipment, family support, and school-based opportunities may therefore represent important mechanisms linking socioeconomic circumstances with both physical activity and gross motor development.

Family and Environmental Influences on Child Development

The family represents one of the most influential environments for children's health and developmental behaviors. Parents and caregivers may facilitate physical activity through

encouragement, behavioral modelling, transportation, financial support, and participation in shared recreational activities. Rhodes et al. (2020) highlighted the central role of families in children's physical activity, sedentary behavior, and sleep. Family influence is particularly relevant during the primary school years, when children remain substantially dependent on parents or caregivers for access to recreational and sporting opportunities.

However, the capacity of families to provide such opportunities may vary according to socioeconomic circumstances. Families experiencing financial or environmental constraints may have fewer opportunities to enroll children in organized sport, purchase equipment, provide transportation, or access suitable recreational facilities. Environmental characteristics are equally important. Access to parks, playgrounds, sports facilities, school programs, and safe spaces for active play may facilitate children's physical activity and provide opportunities for motor skill development. Therefore, socioeconomic disparities in children's physical development may reflect not only household circumstances but also differences in community and environmental resources.

Method

Research Design

This study employed a cross-sectional research design to examine differences in physical activity levels and gross motor skill development among primary school children according to family socioeconomic status (SES). The study was conducted among primary school children aged 7–9 years in Jengka, Pahang, Malaysia. Physical activity level and gross motor skill development were treated as the primary outcome variables, while family socioeconomic status was categorized into three groups: B40, M40, and T20.

Participants and Sampling

A total of 68 primary school children aged 7–9 years participated in the study. The final sample consisted of 18 children from the T20 group, 22 from the M40 group, and 28 from the B40 group. The study employed a random sampling approach. The original sampling procedure involved the selection of the study location from primary schools in Pahang, followed by the selection of Maran and subsequently Jengka. Two primary schools within the selected study area were included in the study. Sample size estimation was performed using G*Power Version 3.1.9.7. Based on the parameters reported in the original study, including an alpha level of .05 and statistical power of .95, the minimum estimated sample size was 42 participants. The researchers initially targeted additional participants to account for potential missing data and attrition. The final analysis included 68 participants.

Research Instruments

Physical Activity Questionnaire for Older Children (PAQ-C)

Physical activity was assessed using the **Physical Activity Questionnaire for Older Children (PAQ-C)**. The PAQ-C is a seven-day recall questionnaire designed to assess general physical activity among school-aged children. It evaluates participation in physical activities across different contexts, including sports, games, school activities, and leisure-time activities. The questionnaire uses a five-point scoring system, with higher scores representing higher levels of physical activity. Based on the classification adopted in the study, PAQ-C scores were categorized as **low** (<2.04), **moderate** (2.04 to <2.9), and **high** (≥2.9) physical activity (Wong et al., 2016). For participants younger than 10 years, parents or guardians assisted in reporting

the children's physical activity. The PAQ-C demonstrated satisfactory internal consistency in the main study, with a **Cronbach's alpha of .811**.

Test of Gross Motor Development–Second Edition (TGMD-2)

Gross motor skill development was assessed using the **Test of Gross Motor Development–Second Edition (TGMD-2)**. The TGMD-2 evaluates two major dimensions of gross motor competence: **locomotor skills and object-control skills**. The locomotor subtest consisted of six skills: running, galloping, hopping, leaping, horizontal jumping, and sliding. The object-control subtest consisted of striking a stationary ball, stationary dribbling, catching, kicking, overhand throwing, and underhand rolling. Participants performed each skill following an explanation and practice trial. Each skill was evaluated according to the established performance criteria, with a score of 1 awarded when the criterion was correctly demonstrated and 0 when it was not correctly demonstrated. The performances were recorded to facilitate accurate evaluation. The resulting gross motor scores were used to classify participants according to their gross motor skill performance.

Pilot Study

A pilot study was conducted among **40 primary school children aged 7–9 years** from a primary school in Jengka, Pahang. The participants represented the three socioeconomic categories: T20, M40, and B40. The pilot study was undertaken to evaluate the feasibility of the study procedures and reliability of the research instrument. The PAQ-C demonstrated a **Cronbach's alpha coefficient of .831**, indicating satisfactory internal consistency for use in the main study.

Data Collection Procedure

The study procedures involved obtaining the relevant ethical and Ministry of Education approval, followed by participant recruitment from the selected schools. Informed consent was obtained before data collection. Participants first completed the PAQ-C assessment and subsequently undertook the TGMD-2 assessment. Prior to the motor skill assessment, participants received instructions and demonstrations of the required movements. The completed questionnaire and motor skill performance data were then compiled for statistical analysis. This sequence follows the data-collection process reported in the original manuscript.

Statistical Analysis

Data were analyzed using **IBM SPSS Statistics Version 28.0**. Descriptive statistics, including frequencies, percentages, means, and standard deviations, were used to summarize participant characteristics, physical activity levels, and gross motor skill performance. Normality was assessed using the **Shapiro-Wilk test**. Multivariate analysis of variance (**MANOVA**) was subsequently employed to examine differences in the combined dependent variables of physical activity level and gross motor skill development across the T20, M40, and B40 socioeconomic groups. Statistical significance was established at **$p < .05$**

Result

A total of 68 primary school children aged 7–9 years participated in this study. The participants were classified into three socioeconomic groups: T20 ($n = 18$), M40 ($n = 22$), and B40 ($n = 28$). The mean age of participants was 8.6 ± 0.48 years for the T20 group, 8.4 ± 0.63 years for the M40 group, and 8.0 ± 0.64 years for the B40 group.

Prior to the main analysis, the normality of the data was assessed using the Shapiro-Wilk test. The PAQ-C scores were normally distributed across the T20 ($p = .178$), M40 ($p = .858$), and B40 ($p = .241$) groups. For Gross Motor Quotient (GMQ), the M40 ($p = .063$) and B40 ($p = .061$) groups showed no significant departure from normality, whereas the T20 group demonstrated a significant deviation from normality ($p = .001$). Thus, the normality assumption was satisfied for PAQ-C across all socioeconomic groups but was not fully met for GMQ.

The distribution of physical activity levels according to socioeconomic status is presented in Table 1. None of the participants were classified as having a low physical activity level. Among children from the T20 group, 14 participants (77.8%) were classified as having a high physical activity level, while four participants (22.2%) were moderately active. The mean PAQ-C score for the T20 group was 2.78 ± 0.43 . In the M40 group, 18 participants (81.8%) demonstrated a high physical activity level and four participants (18.2%) demonstrated a moderate physical activity level, with a mean PAQ-C score of 2.82 ± 0.395 . Meanwhile, among the B40 group, 16 participants (57.1%) were classified as highly active and 12 participants (42.9%) as moderately active, with a mean PAQ-C score of 2.57 ± 0.504 .

Overall, the descriptive findings showed that the M40 group recorded the highest proportion of children with a high physical activity level (81.8%), followed by the T20 group (77.8%) and B40 group (57.1%). The M40 group also recorded the highest mean PAQ-C score (2.82 ± 0.395), whereas the B40 group recorded the lowest mean score (2.57 ± 0.504). These descriptive results indicate variation in physical activity levels across socioeconomic groups rather than a consistent linear increase in physical activity with higher socioeconomic status.

Table 1: Physical Activity Level According to Socioeconomic Status

Physical Activity Level	T20 (n=18)	M40 (n=22)	B40 (n=28)
Low, n (%)	0 (0.0)	0 (0.0)	0 (0.0)
Moderate, n (%)	4 (22.2)	4 (18.2)	12 (42.9)
High, n (%)	14 (77.8)	18 (81.8)	16 (57.1)
Mean $\pm$ SD	2.78 ± 0.43	2.82 ± 0.395	2.57 ± 0.504

Gross motor skill development also showed different descriptive patterns across socioeconomic groups. Among the T20 participants, five children (27.8%) were classified as above average and 13 children (72.2%) as average. None of the T20 participants were classified as below average or poor. In the M40 group, 15 children (68.2%) demonstrated average gross motor skill performance, while seven children (31.8%) were classified as below average. No M40 participants were classified as above average or poor. A wider distribution of gross motor skill performance was observed among children in the B40 group. Two participants (7.1%) were classified as above average, 11 participants (39.3%) as average, eight participants (28.6%) as below average, and seven participants (25.0%) as poor. Therefore, while all T20 participants were within the average or above-average categories, the B40 group demonstrated greater variability in gross motor skill performance, including participants within the below-average and poor categories.

Table 2: Gross Motor Skill Classification According to Socioeconomic Status

Gross Motor Skill Classification	T20 (n=18)	M40 (n=22)	B40 (n=28)
Above average, n (%)	5 (27.8)	0 (0.0)	2 (7.1)
Average, n (%)	13 (72.2)	15 (68.2)	11 (39.3)
Below average, n (%)	0 (0.0)	7 (31.8)	8 (28.6)
Poor, n (%)	0 (0.0)	0 (0.0)	7 (25.0)

To determine whether physical activity and gross motor skill development differed collectively across socioeconomic groups, a multivariate analysis of variance (MANOVA) was performed. The multivariate analysis revealed a statistically significant overall effect of socioeconomic status on the combined dependent variables, **Pillai's Trace = .157, $F(4,130) = 2.775$, $p = .030$, partial $\eta^2 = .079$** . Wilks' Lambda produced a consistent finding, **Wilks' $\lambda = .847$, $F(4,128) = 2.763$, $p = .030$, partial $\eta^2 = .079$** . Hotelling's Trace and Roy's Largest Root were also statistically significant ($p = .031$ and $p = .017$, respectively).

Table 3: Multivariate Effect of Socioeconomic Status on Physical Activity and Gross Motor Skill Development

Multivariate Test	Value	F	Hypothesis df	Error df	p	Partial η^2
Pillai's Trace	.157	2.775	4	130	.030	.079
Wilks' Lambda	.847	2.763	4	128	.030	.079
Hotelling's Trace	.175	2.751	4	126	.031	.080
Roy's Largest Root	.133	4.330	2	65	.017	.118

Based on Pillai's Trace, the findings indicate that the combined outcomes of physical activity and gross motor skill development differed significantly across the T20, M40, and B40 socioeconomic groups. The partial eta squared value of .079 indicates that approximately 7.9% of the multivariate variance in the combined dependent variables was associated with socioeconomic group. However, the multivariate result represents an overall group effect and does not, by itself, identify which specific socioeconomic groups differed significantly from one another. Therefore, conclusions regarding specific pairwise differences between T20, M40, and B40 should only be made if supported by appropriate follow-up or post-hoc analyses.

Overall, the findings demonstrated significant socioeconomic variation in the combined outcomes of physical activity and gross motor skill development among the participating primary school children. Descriptively, the M40 group recorded the highest proportion of highly active children, whereas the B40 group recorded the lowest mean PAQ-C score and showed the greatest variation in gross motor skill classifications. The significant multivariate effect further indicates that socioeconomic context is relevant when physical activity and gross motor development are considered collectively. Nevertheless, the observed patterns should not be interpreted as a simple linear relationship between higher socioeconomic status and better developmental outcomes.

Discussion

This study examined differences in physical activity levels and gross motor skill development among primary school children from different family socioeconomic groups in Jengka, Pahang. The principal finding was that socioeconomic status demonstrated a statistically significant

multivariate effect on the combined outcomes of physical activity and gross motor skill development.

The findings indicate that children's physical activity and motor development vary across socioeconomic contexts. Nevertheless, the pattern observed in the present study was not entirely linear. The M40 group recorded the highest proportion of highly active children (81.8%), followed by the T20 group (77.8%) and the B40 group (57.1%). In contrast, differences in gross motor skill classifications appeared more pronounced, particularly because the B40 group included children across all performance categories, including below-average and poor classifications. These findings suggest that socioeconomic status should be understood as part of a broader set of family, behavioral, and environmental factors influencing children's developmental opportunities rather than as a single deterministic factor.

Socioeconomic Status and Physical Activity

The findings demonstrated variation in physical activity levels across the three socioeconomic groups. The proportion of children classified as highly active was greater among M40 and T20 participants than among B40 participants. Previous research has similarly identified relationships between socioeconomic status and children's physical activity. Ke et al. (2022) reported associations between socioeconomic status and physical activity among children and adolescents, although the strength of these relationships differed according to demographic characteristics.

The present findings are also broadly consistent with previous Malaysian research demonstrating that children's physical activity differs according to sociodemographic characteristics (Wong et al., 2016). The current study extends this discussion by focusing specifically on children from B40, M40, and T20 family socioeconomic groups. However, the finding that M40 participants recorded slightly higher physical activity than T20 participants is particularly important. It indicates that socioeconomic status may not have a simple dose-response relationship with children's physical activity. Higher household socioeconomic position does not necessarily translate directly into higher physical activity. Instead, physical activity may be shaped by a combination of parental support, children's preferences, access to recreational spaces, organized sports participation, school environments, transportation, neighborhood characteristics, and family routines. Socioeconomic resources may facilitate some of these opportunities, but household socioeconomic classification alone is unlikely to explain all differences in children's activity patterns. Therefore, interventions aimed at increasing children's physical activity should consider the broader social and environmental circumstances affecting participation rather than focusing exclusively on household income.

Socioeconomic Status and Gross Motor Skill Development

The distribution of gross motor skill performance demonstrated notable differences across socioeconomic groups. T20 participants were represented only within the average and above-average categories, while M40 participants were classified as either average or below average. In contrast, B40 participants demonstrated the widest distribution, extending from above-average to poor performance. These findings are consistent with previous evidence suggesting that socioeconomic and home environments may be associated with children's motor development. Ferreira et al. (2018) reported that motor development among school-aged children was associated with characteristics of the home environment, including socioeconomic status. Kakebeeke et al. (2021) similarly reported an association between socioeconomic status and motor development. Nevertheless, the contribution of socioeconomic factors to motor

performance was relatively modest, suggesting that SES represents only one component of a complex developmental process.

More recent evidence also demonstrates that the relationship is not necessarily consistent across populations. Praxedes et al. (2024) found that family socioeconomic status was not significantly associated with fundamental movement skill performance after considering other biological and behavioral factors, whereas physical activity and sedentary behavior demonstrated significant associations. Taken together, these findings indicate that socioeconomic status should not be interpreted as an inherent determinant of children's motor ability. Instead, socioeconomic circumstances may shape access to developmental experiences such as active play, sporting equipment, recreational programs, structured instruction, and opportunities to practice movement skills.

Physical Activity and Gross Motor Development

Physical activity and gross motor skill development are theoretically and behaviorally interconnected. Children who participate regularly in physical activities are exposed to repeated opportunities to practice locomotor and object-control skills. Conversely, children who develop greater movement competence may experience greater confidence and enjoyment when participating in physical activities. The present study did not directly test the correlation between PAQ-C and TGMD-2 scores. Therefore, it would be inappropriate to conclude from the available analyses that higher physical activity **caused** or was directly associated with higher gross motor skill performance within this sample. Nevertheless, previous studies support the broader relationship between movement behavior and motor competence. This suggests that interventions providing children with regular, structured opportunities for physical activity may simultaneously contribute to motor skill development. This has particular relevance to children whose home or community environments may provide fewer opportunities for structured physical activity.

Conclusion

This study examined differences in physical activity levels and gross motor skill development among primary school children from different family socioeconomic groups in Jengka, Pahang. The findings demonstrated a significant multivariate difference in the combined outcomes of physical activity and gross motor skill development across the T20, M40, and B40 groups. Descriptively, the M40 group recorded the highest proportion of children with high physical activity levels, followed by the T20 and B40 groups. Gross motor skill performance also varied across socioeconomic groups, with T20 participants classified within the average and above-average categories, while the B40 group demonstrated a wider distribution of performance ranging from above average to poor. The significant multivariate effect indicates that socioeconomic context is relevant when children's physical activity and gross motor development are considered collectively. However, the findings should not be interpreted as demonstrating a simple linear relationship in which higher socioeconomic status necessarily results in higher physical activity or better motor competence. The observed patterns suggest that children's developmental outcomes may need to be understood within the broader context of family resources, opportunities for active participation, and the environments in which children live, learn, and play. The present cross-sectional findings also do not establish a causal effect of socioeconomic status on either outcome.

From a social-development perspective, the findings highlight the importance of providing equitable opportunities for children from different socioeconomic backgrounds to participate in

physical activity and develop fundamental motor skills. Schools and community settings may play an important role by providing accessible physical education, structured movement activities, recreational programs, and opportunities for active participation that are less dependent on household socioeconomic resources. Overall, promoting equitable access to physical activity and motor-development opportunities may contribute to children's health, well-being, participation, and inclusive development. Future studies involving larger and more diverse populations are recommended to examine the contribution of parental education, family support, neighborhood characteristics, access to recreational facilities, and school environments to children's physical activity and gross motor development.

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