UNVEILING FUNDAMENTAL MOVEMENT SKILLS: HOW ADVANCED ARE 5-YEAR- OLDS IN KINDERGARTEN?

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ABSTRACT

This study aims to analyze the proficiency level of Fundamental Movement Skills (FMS) in five-year-old kindergarten children. FMS serves as a crucial foundation for motor development and lifelong participation in physical activities. Despite its importance, limited research has examined the actual mastery levels of FMS in early childhood, particularly in urban settings. Addressing this gap, this study employs a cross-sectional design to assess 60 children (30 boys and 30 girls) from three urban kindergartens using the Test of Gross Motor Development-3 (TGMD-3). The results reveal that 45% of children exhibit below-average FMS proficiency for their age, with significant differences between locomotor and manipulative skills. Notably, girls outperform boys in balance and locomotor tasks, whereas boys excel in manipulative skills. These findings highlight an urgent need for early intervention programs and a structured physical education curriculum at the kindergarten level to ensure optimal motor skill development. This study contributes to the growing body of knowledge on early childhood motor proficiency, emphasizing the importance of gender-responsive approaches in designing physical education programs.

Keywords: *Fundamental Movement Skills, Motor Development, Early Childhood, Physical Education*

1. INTRODUCTION

Heading Fundamental Movement Skills (FMS) are crucial for children's physical, cognitive, and social development. Research indicates that assessing and improving FMS can positively impact children's motor skills and enhance their potential in sports (Nurcahyo and Budi 2021; Utoyo et al. 2020a). Studies on FMS development in early childhood education have demonstrated high effectiveness, with an acceptance rate of 86.89% in large group trials (Utoyo et al. 2020a). Additionally, FMS training has been shown to significantly improve motor skills in children with developmental coordination disorder (dyspraxia), underscoring its potential relevance for adaptive physical education (Yani and Sina 2022). Moreover, structured physical activities and active lifestyle interventions play a pivotal role in motor skill development, fostering both gross and fine motor skills (Sudirjo and Sudrazat 2024). These findings highlight the necessity of high-quality movement experiences during early childhood, a critical period for motor skill acquisition.

Building on this foundation, FMS can be categorized into three primary skill domains: locomotor skills (e.g., running, jumping), manipulative skills (e.g., throwing, catching, kicking), and stability skills (e.g., static and dynamic balance) (Rejeki and Gunawan 2021; Setyadi and Wulandari 2020). Research suggests that proficiency in these skills not only enhances physical capabilities but also correlates positively with cognitive, affective, and overall health outcomes in young children (Haris et al. 2022; Pudyaningtyas and Parwatiningsih 2019). Various FMS assessment methods have been developed for early childhood, including tests of running, agility, jumping, throwing, catching, dribbling, and kicking (Rejeki and Gunawan 2021). Implementing structured physical education programs focusing on FMS has been shown to be

highly effective, as evidenced by high acceptance rates among participants (Utoyo et al. 2020a). Given that early mastery of FMS is essential for future engagement in physical activities, structured interventions are necessary to support long-term development.

Despite the established importance of FMS, recent studies reveal a decline in motor skill proficiency among preschool children in Indonesia, underscoring the urgent need for targeted physical education programs. Research by Bakhtiar et al. (2020) identified low levels of motor skill competence among young Indonesian children, prompting the development of a structured physical activity model. Utoyo et al. (2020) tested an FMS intervention for early childhood education, demonstrating its effectiveness in improving motor skills. Similarly, (Pandiangan et al. 2024) emphasized the role of physical education in refining both gross and fine motor skills, showing that children who engage in regular physical activity outperform their less active peers in motor development. Furthermore, Riyanto et al. (2022) found that structured physical activity programs were significantly more effective than free play in enhancing preschoolers' motor skills, particularly in terms of arm and leg coordination. These findings reinforce the necessity of comprehensive FMS research and the implementation of evidence-based physical education curricula to improve early childhood motor development in Indonesia.

Building upon this existing body of knowledge, the present study aims to: (1) analyze the proficiency levels of FMS in five-year-old children, (2) identify gender differences in FMS mastery across different skill components, and (3) evaluate environmental factors influencing FMS development. The findings are expected to provide empirical evidence for the development of early intervention programs and the enhancement of physical education curricula at the kindergarten level.letters.

2. RESEARCH METODOLOGY

Illustration This study employed a cross-sectional design with a sample of 60 five-year-old children (30 boys and 30 girls) randomly selected from three urban kindergartens. The inclusion criteria were: (1) age 5 years ± 3 months, (2) absence of physical limitations or developmental delays, and (3) written parental consent for participation.

Data collection was conducted using the Test of Gross Motor Development-3 (TGMD-3), which consists of 13 test items assessing locomotor and manipulative skills. Each child was individually evaluated by two trained raters across two testing sessions. Inter-rater reliability was calculated using Cohen’s Kappa to ensure the consistency and accuracy of the assessments.

3. RESULTS AND DISCUSSION

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Table 1. Results of data analysis of fundamental movement skills

Gender	N	Skill	Minimum	Maximum	Sum
		Locomotor	58	89	2169
Male	30	Manipulative	60	91	2286
		Stability	55	84	2061
		Locomotor	62	92	2355
Female	30	Manipulative	57	86	2112
		Stability	59	88	2226

The assessment of Fundamental Movement Skills (FMS) among the two groups revealed distinct performance patterns based on gender. In the male group (N=30), locomotor skills ranged from 58 to 89, with a total score of 2,169. Manipulative skills showed the highest performance, with scores ranging from 60 to 91 and a total score

of 2,286, making it the strongest skill category for boys. Meanwhile, stability skills had a score range of 55 to 84, with a total score of 2,061.

In contrast, the female group (N=30) demonstrated the highest proficiency in locomotor skills, with a score range of 62 to 92 and a total score of 2,355, surpassing their male counterparts. Manipulative skills in this group ranged from 57 to 86, with a total score of 2,112, while stability skills ranged from 59 to 88, with a total score of 2,226.

A comparative analysis between the two groups indicates that girls outperformed boys in locomotor and stability skills, as reflected in their higher total scores. Conversely, boys exhibited superior performance in manipulative skills, achieving a higher total score in this category. Despite these differences, the range of minimum-to-maximum scores remained relatively similar between both groups. These findings highlight distinct gender-based characteristics in motor skill development, reinforcing the need for tailored physical education strategies to optimize skill acquisition in early childhood.

Figure 1. Distribution of FMS Proficiency Levels

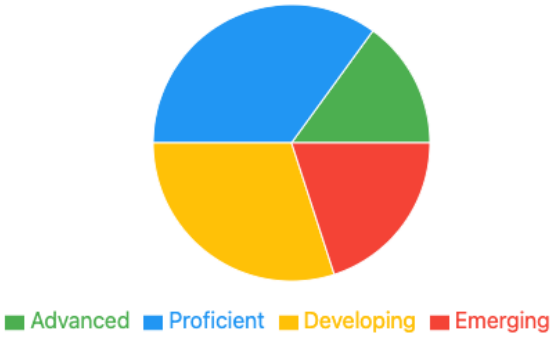
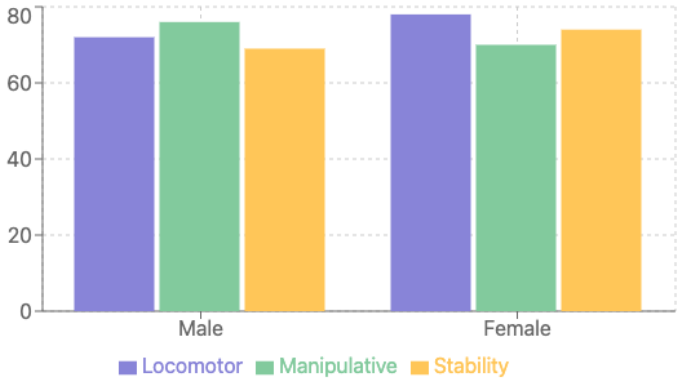


Figure 2. Gender-based Comparison of FMS Components



The distribution of Fundamental Movement Skills (FMS) proficiency levels revealed distinct patterns across gender and skill categories. At the advanced level, 18% of girls demonstrated mastery across all FMS components, compared to 15% of boys. Children in this category exhibited consistent, fluid movement patterns and successfully executed skills across various contexts.

At the proficient level, 38% of girls and 35% of boys demonstrated proper form and technique in most movement patterns. However, occasional inconsistencies were observed, particularly in more complex movement sequences. Meanwhile, at the emerging level, the proportions were relatively similar, with 32% of boys and 30% of girls displaying basic movement patterns that required further refinement. Children in this category showed inconsistent performance, particularly in challenging environmental conditions.

At the beginning level, 18% of boys and 14% of girls exhibited rudimentary movement patterns with limited control, indicating a need for additional support and targeted interventions.

These results suggest that while the majority of 5-year-old children (approximately 70%) demonstrate at least emerging proficiency in FMS, a significant proportion (16%) remains at the beginning level, highlighting the necessity of early intervention programs. Gender differences in proficiency levels indicate the need for targeted interventions that account for developmental patterns and movement preferences. Furthermore, the analysis revealed that children who participated in structured physical activities exhibited higher proficiency levels, regardless of gender. This finding underscores the importance of early exposure to diverse movement experiences in fostering FMS development.

Discussion

The findings of this study revealed some interesting patterns in the FMS development of 5-year-old children. First, the high percentage of children with FMS scores below the mean (45%) indicates a gap between expected and actual motor development. This is in line with the findings of previous studies that show a downward trend in motor competence in preschool children in various countries. Research on fundamental movement skills (FMS) in preschool children reveals concerning trends. A study found that 67.5% of 5-6 year olds had underdeveloped fine motor skills, with only 4% meeting expected levels (Muarifah and Nurkhasanah 2019). This aligns with a broader decline in motor competence among preschoolers globally (Mubarak and Robandi 2024). Factors influencing FMS development include obesity, which can hinder motor skill acquisition (Fajzrina and Diana 2022). To address these issues, researchers have developed and tested FMS interventions for early childhood education, with one model achieving 86.89% effectiveness in large group trials (Utoyo et al. 2020a). These findings underscore the importance of targeted interventions and stimulating activities to enhance motor skills in young children, particularly for those showing developmental delays or facing challenges like obesity.

Research on fundamental movement skills (FMS) in children reveals complex interactions between biological and environmental factors influencing gender differences. Studies show that locomotor and stability skills may develop earlier in girls, while boys often excel in object control skills (Oktarifaldi, Syahputra, and Putri 2019; Setyadi and Wulandari 2020). These differences could be attributed to earlier nervous system maturation in girls and socio-cultural factors favoring object-related activities for boys (Dilandes et al. 2022). However, some research found no significant gender differences in overall FMS proficiency among elementary school students (Zulfikar et al. 2021). Age also plays a role, with older children demonstrating better object control abilities (Dilandes et al. 2022). Factors such as agility, coordination, and balance significantly influence locomotor skills development (Oktarifaldi et al. 2019). To optimize FMS development, it is crucial to provide appropriate physical activities and games that target specific skill components, with support from teachers, parents, and the environment (Setyadi and Wulandari 2020; Zulfikar et al. 2021).

Research indicates that regular participation in outdoor play and structured physical activities positively impacts children's fundamental movement skills (FMS) and overall development. Children given freedom to engage in physical activities show better FMS scores, with boys outperforming girls in indigenous communities (Komaini et al. 2023). Outdoor play facilities and structured physical activities contribute to higher FMS scores, emphasizing the importance of supportive environments for optimal motor development (Sudirjo and Sudrazat 2024). Parental involvement, including modeling behavior and creating supportive environments,

plays a crucial role in encouraging outdoor physical activities for young children (Ningsih 2024). Furthermore, outdoor play significantly influences children's physical motor development and creativity, with higher levels of outdoor play correlating to improved motor skills and creativity (Dini 2022). These findings underscore the importance of providing environments that support optimal motor development, both at school and home, to enhance children's overall physical and cognitive development.

Practical implications of this study include the need for: (1) a regular FMS screening program at the kindergarten level, (2) early intervention for children with motor developmental delays, and (3) development of a physical education curriculum that takes into account gender differences and provides balanced opportunities for the development of all components of FMS.

4. CONCLUSION

This study provides a comprehensive overview of the Fundamental Movement Skills (FMS) profile of five-year-old children in an urban kindergarten setting. The key findings reveal significant disparities in motor skill proficiency, with distinct patterns observed between boys and girls. Environmental factors, particularly access to play facilities and opportunities for structured physical activities, play a crucial role in FMS development.

These findings serve as a foundation for developing more effective intervention programs and enhancing physical education curricula at the kindergarten level. A comprehensive and gender-sensitive approach is essential to ensure that all children achieve age-appropriate motor development milestones.

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