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Fundamental Movement Skills Profile of Elementary School Children Based on TGMD-3: A Descriptive Profile of The Locomotor Domain

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ABSTRACT

Fundamental movement skills (FMS) provide an important foundation for children's motor development, physical activity participation, and subsequent acquisition of more complex movement skills. This study aimed to describe the locomotor profile of elementary school children using the Test of Gross Motor Development–Third Edition (TGMD-3), with particular attention to descriptive differences between boys and girls. A descriptive cross-sectional design was used with 60 elementary school children aged 8–10 years from grades III and IV, comprising 30 boys and 30 girls. Six locomotor skills were assessed: run, gallop, hop, skip, horizontal jump, and slide. Data were analyzed descriptively using means, standard deviations, minimum and maximum scores, and mean differences between boys and girls. The overall locomotor score was 32.95 ± 2.78. Boys obtained a mean score of 33.77 ± 3.05, whereas girls obtained 32.13 ± 2.26, representing a mean difference of 1.63 points. At the individual skill level, boys tended to obtain higher mean scores across the locomotor skills, although the magnitude of the differences varied between skills. Skipping showed the lowest overall mean score (4.03 ± 1.12), whereas running showed the highest mean score (6.30 ± 1.12). The findings provide a descriptive picture of locomotor competence among elementary school children and indicate that skill-specific profiling may be useful for identifying learning priorities in physical education. Gender should be considered as a descriptive characteristic rather than as a basis for restricting movement-learning opportunities.

Keywords: fundamental movement skills, TGMD-3, locomotor skills, elementary school children, gender

INTRODUCTION

Fundamental movement skills (FMS) are a group of basic movement competencies that provide an important foundation for motor development, physical activity participation, and the acquisition of more complex movement skills. In physical education, these skills should not be viewed simply as the ability to perform a movement, but as competencies that develop through interactions among individual characteristics, environmental conditions, movement experiences, and opportunities for practice. Recent evidence indicates that FMS are associated with several health-related fitness components, including cardiorespiratory fitness and muscular strength and endurance (Liu et al., 2023).

The locomotor domain specifically involves moving the body through space and includes skills such as running, galloping, hopping, skipping, horizontal jumping, and sliding. Mastery of these skills is important because they provide a foundation for games, physical activities, and sport-related movement patterns. However, FMS do not necessarily develop automatically with age. Opportunities for movement, structured practice, the quality of the learning environment, teacher and family support, and children's physical activity experiences may all contribute to motor competence development (Flynn et al., 2023; Koolwijk et al., 2024).

Reliable assessment is essential for identifying children's FMS profiles. The Test of Gross Motor Development–Third Edition (TGMD-3) is widely used to assess gross motor

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competence through two major domains: locomotor skills and ball skills. Psychometric research has demonstrated strong construct validity, high test–retest reliability, and measurement invariance across age and gender groups, supporting the use of TGMD-3 in children (Magistro et al., 2020).

Profiling FMS is particularly important during the elementary school years because assessment results can identify relatively stronger and weaker skills. A profile-based approach provides more information than a single total score because two children with similar total scores may have very different configurations of individual skills. Cross-cultural research has demonstrated variation in locomotor development across populations, suggesting that opportunities for movement and contextual characteristics should be considered when interpreting children's motor competence (Valentini et al., 2022).

Gender is frequently considered when describing variation in FMS. Nevertheless, the evidence does not support a simple assumption that one gender consistently outperforms the other across all movement skills. A meta-analysis by Zheng et al. (2022) indicated that gender differences are more consistently observed in object-control skills, whereas locomotor differences tend to be smaller. Therefore, gender comparisons in children's locomotor profiles should be interpreted empirically and descriptively rather than through gender stereotypes.

The present study aimed to describe six locomotor skills assessed using TGMD-3 among elementary school children aged 8–10 years and to present the descriptive profile of boys and girls. The contribution of this study lies in presenting skill-specific scores together with the overall locomotor score, providing information that can support the identification of learning priorities and the development of more targeted FMS instruction.

METHOD

Research Design

This study employed a descriptive cross-sectional design. The design was selected because the primary purpose was to describe locomotor skill profiles at a single point in time and to present the magnitude of score differences between boys and girls. No hypothesis testing or causal inference was conducted.

Participants

The participants were 60 elementary school children in grades III and IV, aged 8–10 years, comprising 30 boys and 30 girls. The age distribution was 16 children aged 8 years, 22 aged 9 years, and 22 aged 10 years. Specific school information, data-collection period, final sampling procedure, inclusion and exclusion criteria, and ethical approval details should be completed from the original research records before submission.

Table 1. Participant Characteristics

Characteristics	n	%
Boys	30	50.0
Girls	30	50.0
Age 8 years	16	26.7
Age 9 years	22	36.7
Age 10 years	22	36.7
Grade III	29	48.3
Grade IV	31	51.7

Instrument

Locomotor skills were assessed using six TGMD-3 subtests: run, gallop, hop, skip, horizontal jump, and slide. TGMD-3 evaluates performance criteria across two trials, with each

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criterion scored according to whether the expected performance was demonstrated. Previous psychometric studies provide substantial support for the reliability and validity of TGMD-3 in children.

Important scoring note: all subtest scores should be audited against the official TGMD-3 manual and original scoring sheets before submission. TGMD-3 contains different numbers of performance criteria across skills, and the maximum locomotor domain score is 46. The present dataset contains several subtest ranges that are narrower than the theoretical maximum. Therefore, the findings should only be labeled as official TGMD-3 scores after the scoring process has been verified.

Data Collection Procedure

Data collection was conducted in a safe and suitable area for performing the six locomotor skills. The examiner provided standardized demonstrations and practice opportunities before the assessment trials. The same instructions, demonstration position, testing sequence, and environmental conditions should be maintained across participants. If video recordings are available, scoring may be independently verified by a second assessor.

Data Analysis

Descriptive statistics were used to summarize the locomotor profile of the participants. For the overall sample and each locomotor skill, the mean, standard deviation, minimum score, and maximum score were calculated. The scores of boys and girls were then compared descriptively using group means, standard deviations, and mean differences for the total locomotor score and each individual locomotor skill. No inferential hypothesis testing was conducted because the primary objective of the study was to describe the characteristics and score distribution of the sample rather than to determine statistical significance. All analyses were based on the raw scores contained in the study dataset.

RESULTS AND DISCUSSION

Result

Locomotor Score Profile

The overall mean locomotor score was 32.95 ± 2.78, with scores ranging from 27 to 39. Among the six locomotor skills, running had a mean score of 6.30 ± 1.12 (range: 4–8), galloping 5.65 ± 1.45 (range: 3–8), hopping 5.53 ± 1.19 (range: 2–8), skipping 4.03 ± 1.12 (range: 2–6), horizontal jumping 5.52 ± 1.20 (range: 2–8), and sliding 5.92 ± 1.29 (range: 3–8). Thus, running showed the highest mean score, whereas skipping showed the lowest mean score among the six locomotor skills.

Tabel 2. Locomotor Score Profile

Skill	Mean	SD	Min	Max
Run	6.30	1.12	4	8
Gallop	5.65	1.45	3	8
Hop	5.53	1.19	2	8
Skip	4.03	1.12	2	6
Horizontal jump	5.52	1.20	2	8
Slide	5.92	1.29	3	8
Locomotor total	32.95	2.78	27	39

Descriptive Comparison by Gender

Descriptively, boys obtained a total locomotor score of 33.77 ± 3.05, whereas girls obtained 32.13 ± 2.26. The mean difference was 1.63 points, indicating that the boys in this sample had a higher average total locomotor score. At the individual skill level, boys also

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showed higher mean scores than girls for all six locomotor skills. The largest mean difference was observed for horizontal jumping (0.43 points), followed by skipping (0.40 points), whereas the smallest difference was observed for galloping (0.16 points).

Tabel 3. Comparison by Gender

Skill	Boys	Girls	Mean Difference
Run	6.40 ± 1.19	6.20 ± 1.06	0.20
Gallop	5.73 ± 1.51	5.57 ± 1.41	0.16
Hop	5.67 ± 1.15	5.40 ± 1.22	0.27
Skip	4.23 ± 1.07	3.83 ± 1.15	0.40
Horizontal Jump	5.73 ± 1.23	5.30 ± 1.15	0.43
Slide	6.00 ± 1.14	5.83 ± 1.44	0.17

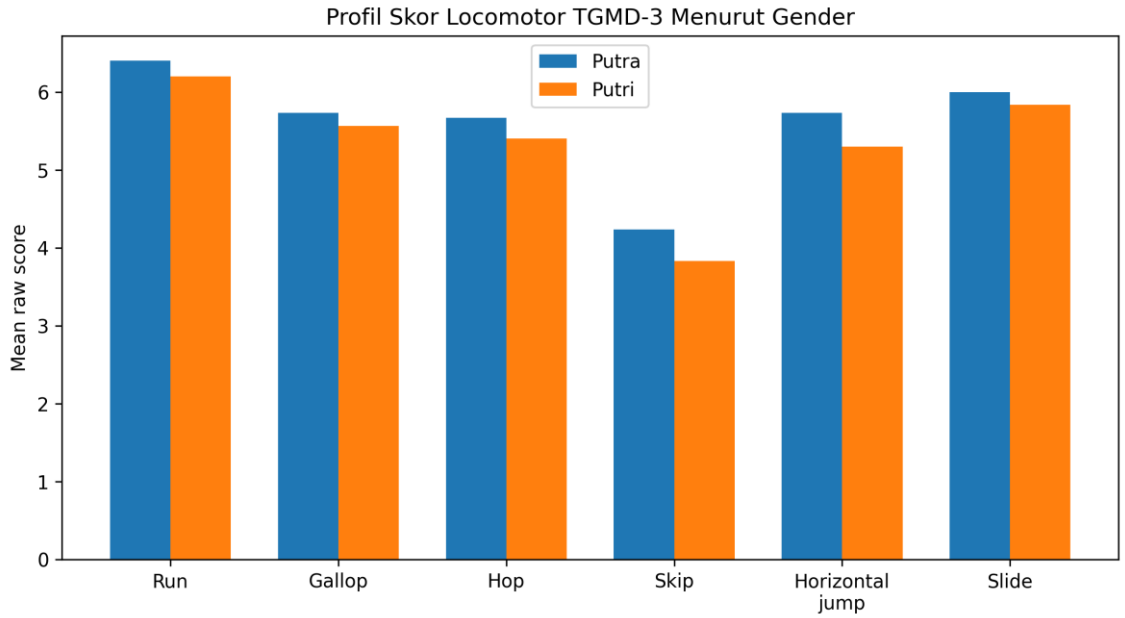


Figure 1. Mean profile of the six TGMD-3 locomotor skills by gender.

Discussion

The main finding was that boys had a higher mean total locomotor score than girls, with a mean difference of 1.63 points. At the individual skill level, boys also tended to show higher mean scores across the observed locomotor skills. Because this study was designed as a descriptive profile, these patterns are interpreted as characteristics of the sample rather than evidence of an inferential gender advantage.

The score pattern observed in this study indicates that the locomotor profile should be examined at the skill level rather than solely according to gender categories. Zheng et al. (2022) demonstrated that gender differences in fundamental movement skills (FMS) are not consistent across domains. In the present dataset, boys tended to achieve higher mean scores across the locomotor skills assessed; however, the magnitude of these differences should be interpreted as descriptive information reflecting the characteristics of the sample.

Skipping showed the lowest overall mean score. Skipping is a relatively complex locomotor pattern because it combines step and hop actions rhythmically and requires bilateral coordination, dynamic balance, and timing. This characteristic makes skipping an important target for explicit instruction through rhythm-based activities, progressive step-hop exercises,

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changes of direction, and movement games.

Running showed the highest mean score. Running is relatively familiar in children's everyday movement experiences; however, TGMD-3 scoring focuses on the quality of movement performance rather than speed alone. Therefore, physical education teachers should emphasize movement quality and performance criteria rather than simply asking children to move faster. The use of TGMD-3 for movement profiling is supported by psychometric evidence. Magistro et al. (2020) reported strong construct validity, gender and age measurement invariance, and high test–retest reliability in a large sample of children. Rasch-based research has also demonstrated variation in item difficulty, suggesting that age and developmental characteristics should be considered when interpreting individual performance.

From a physical education perspective, a locomotor profile should be used to support differentiated instruction rather than to label children. For example, children with relatively lower skipping scores may benefit from additional practice emphasizing rhythm, coordination, weight transfer, and step-hop combinations. Learning opportunities should remain equitable for boys and girls. Recent evidence also supports structured, varied, and sufficiently frequent FMS interventions. Yin et al. (2025) reported that school-based interventions can improve FMS and that program characteristics such as frequency and duration are relevant to intervention effectiveness. Thus, locomotor profiling can provide a practical starting point for subsequent targeted intervention.

In the Indonesian context, local data are particularly valuable because motor development may vary across populations. Valentini et al. (2022) demonstrated variation in motor-skill trajectories between populations from high-income settings and LMIC contexts. Differences in environmental opportunities, physical activity experiences, and access to movement resources should therefore be considered when interpreting children's motor profiles. The study has several limitations. The cross-sectional design does not permit causal conclusions; the sample size is relatively small and drawn from a limited school context; only the locomotor domain of TGMD-3 was analyzed; and detailed information on the school, data-collection period, and scorer reliability was not contained in the dataset. In addition, the original scoring sheets should be audited against the official TGMD-3 criteria before the findings are submitted as formal TGMD-3 scores.

CONCLUSION

The locomotor profile of the elementary school children in this dataset showed variation across the six TGMD-3 skills. The overall mean locomotor score was 32.95 ± 2.78. Boys had a higher mean total score than girls (33.77 ± 3.05 vs. 32.13 ± 2.26), with a mean difference of 1.63 points. At the individual skill level, boys also obtained higher mean scores across all six locomotor skills. Skipping had the lowest overall mean (4.03 ± 1.12) and may therefore represent an important instructional priority.

These findings highlight the value of skill-specific FMS profiling in physical education. Future studies should involve larger samples from multiple schools, incorporate physical activity and environmental factors, and use fully verified TGMD-3 scoring. If the next research objective is to evaluate an intervention, a pretest–posttest design with a comparison group would be appropriate.

PRACTICAL IMPLICATIONS

1. Prioritize skipping in supplementary activities because it showed the lowest overall mean score.
2. Use game-based, rhythm-based, coordination-oriented, and varied movement activities to enrich locomotor experiences.

3. Provide equitable learning opportunities for boys and girls and avoid using gender as a basis for restricting participation.
4. Conduct periodic skill-level assessments to monitor individual development.
5. Use locomotor profiles to support differentiated instruction rather than permanent ability labels.

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