OPEN ACCESS Check for updates

Gross Motor Skills Profile of 5–6 Year-Old Children at Pembina Sumbul State Kindergarten

Yohana Amita Chara Gultom*, Ayu Andira, Nazwa Arinda Kasa

Universitas Negeri Medan, Medan, Indonesia

ABSTRACT
Gross motor development is a fundamental aspect of early childhood education because it forms the basis of children's physical readiness and participation in learning activities. The problem in many early childhood education units is the lack of standardised gross motor skills assessment tools as a basis for planning stimulation. This study aims to describe the gross motor profile of 5-6-year-old children at Pembina Sumbul State Kindergarten based on the Test of Gross Motor Development-2 (TGMD-2) instrument. The study used a descriptive qualitative approach supported by quantitative test data. There were 98 children in the study. The results showed a mean raw score of 37.9 for locomotor skills and 36.8 for manipulative skills, with a mean Gross Motor Quotient (GMQ) of 101.3. A total of 89.8% of children were in the average ability category, 5.1% in the excellent category, and 5.1% required support. Locomotor skills showed more stable achievements, especially in the indicators of running (92%) and horizontal jumping (88%), while manipulative skills with object control such as dribbling (69%) and overhand throwing (70%) were relatively lower. The important findings of this study confirm that the TGMD-2-based profile provides an objective basis for planning more targeted gross motor stimulation programmes in early childhood education.

ARTICLE HISTORY
Received 1 October 2025
Accepted 28 October 2025

KEYWORDS
Gross Motor Skills, Developmental Profile, TGMD-2, Early Childhood

ABSTRACT
Perkembangan motorik kasar merupakan aspek fundamental dalam pendidikan anak usia dini karena menjadi dasar kesiapan fisik dan partisipasi anak dalam aktivitas belajar. Permasalahan di banyak satuan PAUD adalah belum tersedianya pemetaan kemampuan motorik kasar berbasis instrumen standar sebagai dasar perencanaan stimulasi. Penelitian ini bertujuan mendeskripsikan profil motorik kasar anak usia 5–6 tahun di TK Negeri Pembina Sumbul berdasarkan instrumen Test of Gross Motor Development–2 (TGMD-2). Penelitian menggunakan pendekatan kualitatif deskriptif dengan dukungan data kuantitatif hasil tes. Subjek penelitian berjumlah 98 anak. Hasil menunjukkan rerata skor mentah lokomotor sebesar 37,9 dan manipulatif 36,8, dengan Gross Motor Quotient (GMQ) rata-rata 101,3. Sebanyak 89,8% anak berada pada kategori kemampuan rata-rata, 5,1% kategori sangat baik, dan 5,1% memerlukan dukungan. Keterampilan lokomotor menunjukkan capaian lebih stabil, terutama pada indikator berlari (92%) dan lompat horizontal (88%), sedangkan keterampilan manipulatif dengan kontrol objek seperti dribble (69%) dan lempar atas (70%) relatif lebih rendah. Temuan penting penelitian ini menegaskan bahwa profil berbasis TGMD-2 memberikan dasar objektif untuk perencanaan program stimulasi motorik kasar yang lebih terarah di PAUD.

KATA KUNCI
Motorik Kasar, Profil Perkembangan, TGMD-2, Anak Usia Dini

* **Corresponding Author:** yohanagultom94@gmail.com

Introduction

Gross motor development in early childhood is an important foundation for children's readiness to engage in learning activities and daily life. Between the ages of 5 and 6, children are in a phase of accelerated movement coordination involving large muscles, balance, agility, and body control. It is important to understand that gross motor skills do not develop automatically but require targeted stimulation, repeated movement experiences, and an environment that supports children's physical activity (Gallahue, Ozmun, & Goodway, 2012). Gross motor development does not occur in isolation but is closely related to other domains of development. Active and structured movement activities have been shown to contribute to the development of executive function, attention, and readiness to learn in children, as movement involvement strengthens sensorimotor integration and self-regulation (Robinson et al., 2015). In addition, good motor skills are associated with higher social participation, self-confidence, and children's involvement in group activities, which ultimately support social-emotional development and school adaptation (Logan, Robinson, Wilson, & Lucas, 2012).

In early childhood education, the focus of learning often still leans towards early cognitive aspects such as reading, writing and arithmetic. An important point that is often overlooked is that the dominance of sitting activities and desk work can actually reduce children's opportunities to develop basic motor skills. Studies show that increased early academic pressure correlates with reduced time for physical activity and movement play in early childhood classrooms, even though movement activities play an important role in overall learning readiness (Pate, O'Neill, & Brown, 2011). This imbalance has the potential to result in suboptimal motor profiles despite apparent academic development, as motor competence requires sufficient and structured practice and exposure to physical activity (NAEYC, 2020).

Early childhood development standards place physical-motor skills as one of the main domains of child development. Crucially, gross motor development contributes to self-confidence, social participation, emotional regulation, and readiness to participate in group activities through improved motor skills and perception of the child's abilities (Stodden et al., 2008). Better motor skills are reported to be associated with higher levels of physical activity participation and social engagement in early childhood. Children with well-developed gross motor skills tend to be more active and involved in social interactions, as they have greater confidence in participating in games and group activities (Robinson et al., 2015).

Although gross motor skills are recognised as a key area of early childhood development, assessment practices in early childhood education centres are often general observations and do not use standardised instruments based on performance criteria. As a result, teachers often have a general idea of children's motor skills but do not have a detailed profile of their skills in each motor component. This condition makes it difficult to plan specific and targeted stimulation because learning decisions are not supported by measurable diagnostic data (Ulrich, 2000). On the other hand, research shows that variations in motor competence in early childhood can be quite wide between children in the same age group, so individual mapping is important to prevent assumptions about development (Stodden et al., 2008).

The urgency of this research lies in the need to map children's gross motor profiles using standardised instruments in order to obtain an objective picture of their level of mastery of locomotor and manipulative skills. Measured profile data is not only useful for developmental evaluation, but also forms the basis for designing more precise stimulation strategies in early childhood education classes. The use of instruments such as TGMD-2 has been recommended in various studies as a reliable and informative tool for identifying basic motor competencies for planning motor learning interventions for early childhood (Logan et al., 2012). The main objective of this study is to systematically describe the gross motor skill profiles of 5–6-year-old children at the Pembina Sumbul State Kindergarten as a basis for understanding children's movement stimulation needs.

Despite the growing body of international research highlighting the importance of gross motor competence in early childhood, empirical studies that provide standardised, instrument-based gross motor profiles in Indonesian early childhood education settings remain limited. Most existing studies in the local context tend to focus on intervention outcomes or general motor development descriptions without presenting detailed skill-level profiling based on established performance criteria. In addition, the use of the Test of Gross Motor Development–2 (TGMD-2) in Indonesian public kindergartens is still relatively scarce, particularly as a diagnostic profiling tool rather than as an evaluative outcome measure. As a result, teachers and institutions lack objective baseline data to guide differentiated and targeted motor stimulation planning. This study addresses this gap by systematically describing the gross motor skill profiles of 5–6-year-old children using the TGMD-2 instrument, providing empirical evidence to support data-driven motor learning decisions in early childhood education.

Method

This study utilised a descriptive approach supported by quantitative data from measurements of children's gross motor skills. The descriptive approach was used to systematically describe the profile of children's motor skills based on the results of standardised measurements without any special treatment. This design is appropriate for research that aims to map the characteristics of subjects' abilities factually and contextually in a natural educational setting (Creswell & Creswell, 2018).

There were 98 subjects aged 5–6 years enrolled at Pembina Sumbul State Kindergarten.

Subject selection used total sampling, whereby all children in the target age group were included in the measurement to obtain a comprehensive profile of the class population. The study was conducted during the current semester of the active school year with the approval of the school and class teachers.

The instrument used was the Test of Gross Motor Development–2 (TGMD-2) developed by Ulrich. This instrument is designed to assess children's gross motor skills through two main subtests, namely locomotor skills and object control (manipulative) skills. The locomotor subtest includes running, galloping, hopping, leap, horizontal jump, and sliding, while the manipulative subtest includes hitting, dribbling, catching, kicking, underhand throw, and overhand throw. The TGMD-2 uses movement performance criteria for each indicator, enabling objective and standardised assessment of movement techniques (Ulrich, 2000).

Data collection procedures were carried out by observing children's movement performance while performing each motor task according to the TGMD-2 protocol. Each skill was demonstrated first, then the children were given the opportunity to try it themselves. The assessment was carried out using the official TGMD-2 recording sheet with a scoring system based on movement performance criteria for each trial. The raw scores were then converted into standard scores and Gross Motor Quotient (GMQ) according to the instrument's norm table (Ulrich, 2000).

Data analysis was conducted using descriptive quantitative methods by calculating raw scores, standard scores, GMQ scores, and the distribution of motor skill level categories. The results of the analysis were presented in the form of means, percentages, and category distributions to provide an overview of the gross motor skill profiles of children in the age group studied. A descriptive analysis approach was used to interpret skill achievement patterns without inferential hypothesis testing (Creswell & Creswell, 2018).

Result and Discussion

Gross motor skills were measured using the Test of Gross Motor Development–2 (TGMD-2) instrument, which includes two main subtests, namely locomotor skills and manipulative skills. An important part of this instrument is that each skill is assessed through two trials with specific performance criteria, then added up to a raw subtest score. The locomotor subtest consists of six skills (running, galloping, hopping, leaping, horizontal jumping, sliding), and the manipulative subtest consists of six skills (hitting a ball, dribbling, catching, kicking, throwing overhand, throwing underhand).

A total of 98 children aged 5–6 years were assessed. The raw scores for each subtest were converted into standard scores and percentiles according to the TGMD-2 norm table, then combined into a Gross Motor Quotient (GMQ) score. An important part of this process is that the classification of ability profiles is based on the GMQ, not just one type of skill. Based on the assessment results, a summary of the subtest scores is obtained as shown in the following table.

Table 1. Summary of TGMD-2 Subtest Scores.

Component	Minimum Score	Maximum Score	Average	SD
Locomotor (Raw Score)	28	46	37,9	4,2
Manipulative (Raw Score)	25	45	36,8	4,8
Locomotor Standard Score	6	14	10,2	1,9
Manipulative Standard Score	5	14	9,9	2,1
GMQ	82	121	101,3	8,7

An important part of this table is that the average scores for both subtests are within the standard range, indicating that the group's gross motor development is at the normative level for their age. The ability categories are determined based on the GMQ TGMD-2 classification. The distribution of children's ability categories is shown in the following table.

Table 2. Distribution of Gross Motor Skills (GMQ) Categories.

Category	GMQ Range	Total	Percentage
Above Average	≥ 121	5	5,1%
Average	90–120	88	89,8%
Below Average	< 90	5	5,1%

An important part of this distribution is the dominance of the average category, but there are still small groups that require additional targeted stimulation. Analysis of locomotor skills shows that the level of mastery is not entirely uniform. A summary of the indicator achievements is shown in the following table.

Table 3. Percentage of Children Meeting Locomotor Performance Criteria.

Skills	Percentage
Running	92%
Gallop	85%
Hop	78%
Leap	81%
Horizontal Jump	88%
Slide	76%
Running	92%

An important part of these findings is that running and horizontal jumping skills are the most stable, while hopping and sliding show greater variation in performance. In the manipulative subtest, the variation in achievement was wider than in the locomotor subtest.

Table 4. Percentage of Children Meeting Manipulative Performance Criteria.

Skills	Percentage
Hitting a stationary ball	74%
Dribbling on the spot	69%
Catching the ball	72%
Kicking	86%
Overhand throw	70%
Underhand throw	77%

An important part of this table is that object control-based manipulative skills (dribbling, overhead throws) are an area with relatively lower achievements compared to kicking skills. When comparing the subtests, locomotor scores are generally slightly higher than manipulative scores. The important point of this interpretation is that movement skills develop faster than manipulative skills in this age group. The TGMD-2 test results show a varied distribution of gross motor skills. The important finding is that the majority of children are in the average category, indicating age-appropriate development with variations in performance between individuals.

The results showed that the gross motor profiles of 5- to 6-year-old children at Pembina Sumbul State Kindergarten were generally in the average category, with the group's Gross Motor Quotient (GMQ) scores falling within the normative range. An important part of these findings is that the average category should not be directly interpreted as an optimal condition, but rather as a position of development relative to the age norm. Therefore, the interpretation of gross motor profiles needs to be carried out at the skill indicator level so that stimulation needs can be identified more accurately.

The higher average score on the locomotor subtest compared to the manipulative subtest shows a pattern of development that is in line with the characteristics of early childhood. In the 5–6 age range, locomotor skills such as running and jumping generally develop earlier because they appear more frequently in children's natural play activities. These findings indicate that the frequency of daily movement experiences contributes directly to the strengthening of basic locomotor patterns, so that the achievement of running and horizontal jumping indicators appears to be the most stable.

Conversely, achievements in object-control-based manipulative skills such as dribbling and overhead throws show a lower percentage of criteria fulfilment. The crucial point is that manipulative skills require integration of eye-hand coordination, force control, and more complex timing of movements than locomotor skills. Without structured practice and adequate technical feedback, children tend to meet only some of the performance criteria components. Thus, a lower manipulative profile should be interpreted as an indicator of the need for specific training, rather than simply a weakness in ability.

The distribution of GMQ categories, which shows that there is a small group of children in the category requiring support, has strong pedagogical implications. This suggests that gross motor stimulation is ineffective if it is carried out uniformly for all children. The profile data emphasises the need for a differentiated approach, both in terms of the level of difficulty of the movement tasks, the number of repetitions, and the quality of the demonstration. Without instrument-based mapping, children who require additional stimulation are at risk of going undetected and not receiving appropriate intervention.

When linked to the context of learning at school, children's regular involvement in structured physical activities such as gymnastics, obstacle courses, and thematic movement games contributes to the stability of group achievement in the average category. The important point is that consistency in exposure to physical activities has a greater influence than the sophistication of the facilities. A

learning environment that provides opportunities for repetitive and enjoyable movement has been shown to support the strengthening of basic gross motor skills.

The use of the TGMD-2 instrument in profile mapping provides methodological strength because the assessment is based on detailed performance criteria for each skill. The important point is that the assessment does not stop at successful or unsuccessful results, but assesses the components of movement technique. With this approach, the assessment results can be directly translated into stimulation recommendations, for example, strengthening arm swing while running, step coordination while galloping, or wrist control while throwing.

The curricular implications of these findings are the importance of conducting periodic gross motor assessments in early childhood education units. An important part of this recommendation is that profile data can be used as a basis for planning thematic physical activity programmes, grouping exercises based on ability levels, and communicating children's development to parents. Gross motor profiles should be positioned as a learning decision-making tool, not just a measurement report.

Conceptually, the results of this study reinforce the view that gross motor development is plastic and responsive to the quality of stimulation. The key point is that young children have significant potential for improvement when they have sufficient, varied movement opportunities and receive appropriate feedback. Therefore, standard instrument-based profile mapping needs to be followed by adaptive and continuous stimulation design.

Conclusion

The gross motor profile of 5–6-year-old children at Pembina Sumbul State Kindergarten based on TGMD-2 measurements shows that the group's abilities are generally in the average category with an average GMQ score within the normative range. The majority of children have met most of the performance criteria in locomotor skills, especially running and horizontal jumping, while object control-based manipulative skills such as dribbling and overhand throwing show relatively lower achievements. An important part of these findings is the difference in strength between skill domains that is not apparent when looking at the total score alone.

The distribution of ability categories, which still shows a small group of children in the support-needed category, emphasises the importance of standardised gross motor assessment in early childhood education units. Profile data provides an objective basis for identifying specific stimulation needs and preventing a uniform approach to movement learning for all children. Thus, mapping gross motor profiles not only serves as a description of developmental achievements, but also as a basis for planning more targeted, differentiated, and sustainable stimulation programmes.

Acknowledgments

The author would like to express his gratitude to TK Negeri Pembina Sumbul for granting permission and providing support during the research. Appreciation is also extended to the classroom teachers who assisted in the data collection process and to all the children who participated in the assessment activities. Thanks are also given to those who provided academic input during the preparation and development of this article.

Disclosure statement

The author declares that there is no conflict of interest in the implementation of this research or the preparation of this article. All data were collected and analysed objectively in accordance with research procedures. This manuscript is a scientific development of research that has been conducted and has not been published in other journals.

Funding

The research and preparation of this article did not receive special funding from government agencies, private entities, or commercial sponsors. All research activities were carried out with the support of institutional resources and the independent contributions of the researchers.

References

Clark, J. E., & Metcalfe, J. S. (2002). The mountain of motor development: A metaphor. In J. E. Clark & J. H. Humphrey (Eds.), Motor development: Research and reviews (Vol. 2, pp. 163–190). National Academy of Kinesiology.

Creswell, J. W., & Creswell, J. D. (2018). Research design: Qualitative, quantitative, and mixed methods approaches (5th ed.). Sage Publications.

Gallahue, D. L., Ozmun, J. C., & Goodway, J. D. (2012). Understanding motor development: Infants, children, adolescents, adults (7th ed.). McGraw-Hill.

Goodway, J. D., Ozmun, J. C., & Gallahue, D. L. (2019). Understanding motor development: Infants, children, adolescents, adults (8th ed.). Jones & Bartlett Learning.

Logan, S. W., Robinson, L. E., Wilson, A. E., & Lucas, W. A. (2012). Getting the fundamentals of movement: A meta-analysis of the effectiveness of motor skill interventions in children. Child: Care, Health and Development, 38(3), 305–315. https://doi.org/10.1111/j.1365-2214.2011.01307.x

NAEYC. (2020). Developmentally appropriate practice in early childhood programs serving children from birth through age 8 (4th ed.). National Association for the Education of Young Children.

Pate, R. R., O'Neill, J. R., & Brown, W. H. (2011). Prevalence of compliance with a new physical activity guideline for preschool-age children. Childhood Obesity, 7(3), 235–240. https://doi.org/10.1089/chi.2011.0023

Robinson, L. E., Stodden, D. F., Barnett, L. M., Lopes, V. P., Logan, S. W., Rodrigues, L. P., & D'Hondt, E. (2015). Motor competence and its effect on positive developmental trajectories of health. Sports Medicine, 45(9), 1273–1284. https://doi.org/10.1007/s40279-015-0351-6

Stodden, D. F., Goodway, J. D., Langendorfer, S. J., Roberton, M. A., Rudisill, M. E., Garcia, C., & Garcia, L. E. (2008). A developmental perspective on the role of motor skill competence in physical activity: An emergent relationship. Quest, 60(2), 290–306. https://doi.org/10.1080/00336297.2008.10483582

Ulrich, D. A. (2000). Test of Gross Motor Development–Second Edition (TGMD-2). PRO-ED.