



The Students' Gross Motor Abilities

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ABSTRACT

Gross motor ability is an essential component of children's physical development and plays a significant role in supporting participation in physical activities, sports, and daily movement tasks. Adequate gross motor competence contributes to the development of agility, coordination, balance, and speed, which are fundamental for achieving optimal physical performance during elementary school years. Therefore, identifying students' motor ability levels is important for designing appropriate physical education programs. This study aimed to determine the level of gross motor ability among fourth-grade students at SD Negeri 22 Palu in the 2025/2026 academic year. This research employed a quantitative descriptive design using a survey method through tests and measurements. The participants consisted of 26 fourth-grade students selected using a saturated sampling technique. The research instrument was adapted from the Motor Ability Test, which assessed four components: agility (4 × 10-meter shuttle run), coordination (ball throw and catch test), balance (stork stand positional balance test), and speed (30-meter sprint test). Data were analyzed using descriptive statistics through T-score conversion and percentage distribution. The results revealed that the gross motor ability of the students was generally classified as moderate. The distribution showed that 11% of students were categorized as very good, 17% as good, 44% as moderate, 22% as poor, and 6% as very poor. The highest frequency was found in the moderate category, indicating that students' gross motor abilities have not yet reached an optimal level. In conclusion, the gross motor ability of fourth-grade students at SD Negeri 22 Palu is predominantly at a moderate level, highlighting the need for more structured and continuous physical education activities to enhance students' motor development.

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INTRODUCTION

Physical Education, Sports, and Health (PJOK) is an integral component of the educational process that aims to develop students holistically through structured physical activities, games, and movement experiences. In elementary schools, PJOK serves not only as a medium for improving physical fitness but also as an essential foundation for developing cognitive, affective, social, and psychomotor competencies



(Bailey et al., 2019; Barnett et al., 2022). Through systematic movement experiences, children acquire fundamental movement skills that support their participation in physical activities throughout life (Robinson et al., 2018; Logan et al., 2018).

One of the most important indicators of physical development during childhood is gross motor ability. Gross motor skills refer to movement competencies involving large muscle groups and whole-body coordination, including locomotor, non-locomotor, and manipulative movements (Gallahue et al., 2019). These abilities form the basis for more complex movement patterns and sport-specific skills that children will develop during later stages of growth (Barnett et al., 2016; Hulteen et al., 2018). Children who demonstrate good gross motor competence tend to participate more actively in physical activities, possess higher physical fitness levels, and exhibit better social interactions than their peers with lower motor competence (Stodden et al., 2021).

The development of motor skills is a continuous process influenced by biological maturation, environmental stimulation, learning opportunities, and movement experiences (Robinson et al., 2020). According to fundamental motor development theory, children require varied and meaningful movement experiences to achieve optimal motor competence (Logan et al., 2018). Schools therefore play a strategic role in facilitating motor development through quality PJOK programs that encourage active participation and skill acquisition (Webster & Ulrich, 2017).

At SD Negeri 22 Palu, motor development is incorporated into the curriculum as part of efforts to support students' overall growth both within and outside school environments. However, preliminary observations indicated that many students experience difficulties in mastering basic movement patterns. These limitations are reflected in insufficient coordination, balance, agility, speed, and overall movement efficiency during physical education activities. Such conditions may negatively influence students' participation in sports and physical activities, ultimately affecting their long-term physical development and health outcomes (Barnett et al., 2022).

Gross motor ability is particularly important because it serves as the foundation for sports performance. Students with better motor competence generally demonstrate superior performance in both individual and team sports, whereas those with inadequate motor skills often encounter challenges in learning new movement patterns and achieving optimal athletic performance (Lopes et al., 2021). Consequently, understanding the current profile of gross motor abilities among elementary school students is necessary for designing effective educational interventions and movement-based learning strategies. Gross motor development has become a major research focus in physical education, child development, and sports sciences during the last decade. Contemporary studies emphasize that motor competence is closely associated with physical activity participation, physical fitness, cognitive development, and psychological well-being among school-aged children (Robinson et al., 2018; Barnett et al., 2022).

Fundamental Movement Skills (FMS) theory classifies gross motor abilities into locomotor, non-locomotor, and manipulative movement categories (Gallahue et al.,

2019). Locomotor skills include walking, running, hopping, skipping, and jumping. Non-locomotor skills involve movements performed without changing location, such as bending, stretching, balancing, twisting, and rotating. Manipulative skills include throwing, catching, kicking, striking, and dribbling objects (Goodway et al., 2019).

Recent empirical evidence indicates that motor competence during childhood significantly predicts future physical activity participation. A longitudinal study by Hulteen et al. (2018) found that children with higher motor competence levels were more likely to maintain active lifestyles during adolescence. Similarly, Barnett et al. (2022) reported that gross motor proficiency contributes positively to physical fitness, sports participation, and health-related quality of life.

Research conducted in several Asian countries has demonstrated concerning trends regarding children's motor development. Studies in Indonesia, Malaysia, and China reported that many elementary school students exhibit moderate-to-low levels of motor competence due to reduced physical activity opportunities, increased sedentary behavior, and excessive screen time exposure (Hardy et al., 2021; Li et al., 2020). The COVID-19 pandemic further exacerbated these challenges by limiting children's participation in structured physical activities and school-based sports programs (Ng et al., 2022).

In the Indonesian context, several studies have assessed motor skills among elementary school students. Research by Widiastuti et al. (2020) revealed that many students demonstrated deficiencies in agility, coordination, and balance. Similar findings were reported by Prasetyo et al. (2021), who found that locomotor and manipulative skills among elementary school students remained below expected developmental standards. These findings highlight the need for continuous monitoring and evaluation of children's motor development within school settings.

Moreover, motor competence is influenced by numerous factors, including genetics, nutritional status, environmental conditions, socioeconomic status, physical activity participation, and educational experiences (Robinson et al., 2020; Lopes et al., 2021). Therefore, evaluating motor ability requires a comprehensive approach that considers the unique characteristics of the student population being studied.

Although numerous studies have investigated children's motor competence globally, several research gaps remain evident. First, most previous studies have focused on intervention-based approaches aimed at improving motor skills through specific training programs, while fewer studies have concentrated on descriptive surveys that comprehensively map students' actual motor competence profiles in specific school contexts (Barnett et al., 2022).

Second, research concerning gross motor abilities among elementary school students in Indonesia remains relatively limited, particularly in Eastern Indonesia. Existing studies predominantly originate from Java and other major urban regions, resulting in insufficient evidence regarding children's motor development in areas such as Central Sulawesi (Prasetyo et al., 2021). Consequently, regional variations in motor competence remain poorly understood.

Third, previous investigations often evaluate only one or two components of motor performance, such as balance or agility, without providing comprehensive assessments encompassing multiple dimensions of gross motor ability, including strength, speed, power, endurance, flexibility, coordination, and balance (Logan et al., 2018). Such partial evaluations may not accurately represent students' overall motor competence.

Fourth, there is limited empirical data regarding the motor ability characteristics of elementary school students in Palu after the educational and environmental disruptions experienced in recent years. Understanding current motor profiles is essential for designing evidence-based physical education programs that address students' specific developmental needs. These gaps indicate the necessity of conducting a comprehensive survey of gross motor abilities among elementary school students, particularly in underrepresented regions such as Palu.

Based on the aforementioned issues and research gaps, this study aims to determine the gross motor ability profile of fourth-grade students at SD Negeri 22 Palu. Specifically, the study seeks to assess students' motor competence across various components of gross motor performance and to categorize their abilities according to established evaluation standards.

The novelty of this study lies in several aspects. First, it provides empirical evidence regarding gross motor competence among elementary school students in Central Sulawesi, a region that has received limited attention in previous motor development research. Second, the study adopts a comprehensive survey approach that evaluates multiple dimensions of gross motor ability rather than focusing on a single movement component. Third, the findings are expected to contribute practical information for PJOK teachers, curriculum developers, and policymakers in designing movement-based learning programs tailored to students' developmental characteristics.

Furthermore, the results will serve as baseline data for future intervention studies aimed at enhancing motor competence among elementary school students. By identifying existing strengths and weaknesses in students' motor abilities, schools can implement more effective physical education strategies to support children's physical literacy and lifelong participation in physical activity.

Gross motor competence represents a fundamental component of children's physical development and serves as the foundation for successful participation in physical activity and sports. Despite its importance, evidence regarding the motor ability profiles of elementary school students in Eastern Indonesia remains limited. Preliminary observations at SD Negeri 22 Palu suggest that students experience varying levels of difficulty in mastering fundamental movement skills, highlighting the need for systematic assessment. Therefore, this study seeks to provide a comprehensive overview of the gross motor abilities of fourth-grade students at SD Negeri 22 Palu. The findings are expected to enrich the scientific literature on motor development, support evidence-based PJOK instruction, and contribute to the development of effective educational strategies for improving children's movement competence and physical literacy.

METHODS

This study employed a quantitative descriptive research design using a survey approach. Descriptive quantitative research is appropriate for identifying, measuring, and describing the characteristics of a population based on objective numerical data without manipulating research variables (Creswell & Creswell, 2018). The survey method was selected because it enables researchers to obtain comprehensive information regarding the current status of a phenomenon within a specific population, particularly in the field of physical education and motor development (Thomas et al., 2022). Previous studies have demonstrated that survey-based assessments are effective for evaluating children's motor competence and physical performance profiles in school settings (Barnett et al., 2022; Robinson et al., 2020). The study was conducted at SD Negeri 22 Palu and involved all fourth-grade students as research participants. Considering that the total number of subjects was fewer than 100 students, the entire population was included in the study, following the population research principle proposed by Arikunto (2015). This approach minimizes sampling bias and provides a comprehensive representation of students' gross motor abilities.

Data were collected through a series of standardized motor ability tests adapted from the Sports Measurement and Evaluation Module developed by Nurhasan (2004). The selected test battery has been widely utilized in physical education research and demonstrates acceptable validity and reliability for assessing children's gross motor performance (Logan et al., 2018; Goodway et al., 2019). The assessment consisted of four test items: (1) Shuttle Run 4 × 10 meters to measure agility, (2) Ball Throw and Catch Test at a distance of 1 meter to assess hand-eye coordination, (3) Stork Stand Positional Balance Test to evaluate static balance, and (4) 30-Meter Sprint Test to measure running speed. These components represent fundamental dimensions of gross motor competence, including speed, coordination, balance, and agility, which are essential indicators of motor development among elementary school children (Hulteen et al., 2018; Gallahue et al., 2019).

The collected raw scores were transformed into standardized T-scores to facilitate comparison across different motor ability components. For coordination and balance tests, the following formula was applied:

$$[T = 10 \left(\frac{X-M}{SD} \right) + 50]$$

where T represents the standardized score, X is the individual raw score, M is the mean score, and SD is the standard deviation. For the 30-meter sprint and shuttle run tests, where lower times indicate better performance, the formula used was:

$$[T = 10 \left(\frac{M-X}{SD} \right) + 50]$$

The standardized scores were subsequently analyzed using descriptive statistics, including mean, standard deviation, frequency, percentage, and categorical classification. Such procedures are commonly employed in motor competence research to provide an objective profile of students' gross motor abilities and facilitate educational decision-making (Barnett et al., 2022; Lopes et al., 2021).

RESULTS AND DISCUSSION

Result

Gross Motor Ability Profile of Fourth-Grade Students at SD Negeri 22 Palu

The assessment of gross motor ability was conducted using a motor ability test battery consisting of the 4 × 10-meter shuttle run, ball throw and catch test, stork stand positional balance test, and 30-meter sprint test. The results were converted into standardized T-scores and classified according to the research norms presented in Table 1.

Table 1.

Gross Motor Ability Classification Norms

No.	Norm Range	Category
1	$X > M + 1.5 \text{ SD}$	Very High
2	$M + 0.5 \text{ SD} < X \leq M + 1.5 \text{ SD}$	High
3	$M - 0.5 \text{ SD} < X \leq M + 0.5 \text{ SD}$	Moderate
4	$M - 1.5 \text{ SD} < X \leq M - 0.5 \text{ SD}$	Low
5	$X \leq M - 1.5 \text{ SD}$	Very Low

Source: Adapted from Nurhasan (2004)

The distribution of students' gross motor ability levels is presented in Table 2.

Table 2.

Gross Motor Ability Levels of Fourth-Grade Students at SD Negeri 22 Palu (n = 26)

Category	Frequency (n)	Percentage (%)
Very High	0	0.00
High	0	0.00
Moderate	2	7.69
Low	4	15.38
Very Low	20	76.92
Total	26	100.00

Table 2 demonstrates that the majority of students were classified in the Very Low category, accounting for 20 students (76.92%). Four students (15.38%) were categorized as Low, while only two students (7.69%) achieved the Moderate category. No students were classified in either the High or Very High categories.

To provide a clearer representation of the findings, the distribution of gross motor ability levels is illustrated in Figure 1.

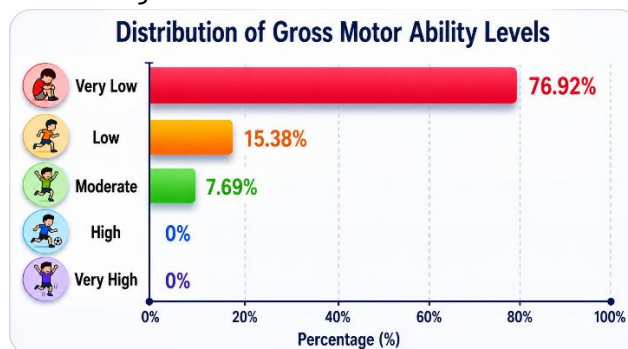


Figure 1.

Distribution of Gross Motor Ability Levels

The findings reveal that the gross motor ability of fourth-grade students at SD Negeri 22 Palu is generally categorized as very low. The predominance of students within this category indicates that most participants have not yet developed optimal fundamental movement competencies. Gross motor abilities encompass essential physical capacities such as speed, agility, coordination, balance, and movement control, all of which are fundamental prerequisites for successful participation in physical education and sports activities.

The absence of students in the high and very high categories suggests that the current level of motor competence among the participants remains below expected developmental standards for elementary school children. Furthermore, the limited proportion of students categorized as moderate (7.69%) indicates that only a small number have achieved adequate motor performance levels.

From a motor development perspective, these results imply that many students may still be in the early stages of motor skill acquisition. According to the motor learning theory proposed by Fitts and Posner, motor skill development progresses through three stages: the cognitive stage, the associative stage, and the autonomous stage. Students with low motor competence are likely still functioning within the cognitive stage, where movement execution is inconsistent and requires considerable conscious control.

The findings also suggest that students may have experienced limited opportunities for structured physical activity and movement practice. Since gross motor competence develops through repeated engagement in physical activities, inadequate participation in movement-based learning experiences can negatively affect the development of locomotor skills, balance, coordination, and agility.

Overall, the results indicate that gross motor ability among fourth-grade students at SD Negeri 22 Palu requires substantial improvement. These findings provide important baseline information for physical education teachers and school administrators in designing more effective learning programs aimed at enhancing students' motor development and physical literacy.

Discussion

The findings of this study indicate that the gross motor ability of fourth-grade students at SD Negeri 22 Palu is generally classified as very low, with 76.92% of students falling into the very low category, 15.38% in the low category, and only 7.69% in the moderate category. Furthermore, no students were categorized as high or very high. These results demonstrate that the majority of students have not yet achieved optimal development of fundamental movement skills, particularly in components such as speed, agility, balance, and coordination. This condition deserves serious attention because gross motor competence is a fundamental aspect of children's physical development and serves as the basis for participation in sports and physical activity throughout life (Barnett et al., 2022; Robinson et al., 2020).

From the perspective of motor development theory, gross motor skills develop progressively through continuous interaction between biological maturation and

environmental stimulation (Gallahue et al., 2019). Children who are regularly exposed to structured movement experiences tend to demonstrate better motor competence than those with limited physical activity opportunities (Logan et al., 2018). The very low motor ability profile found in this study suggests that many students may not have received sufficient movement stimulation, either within school-based physical education programs or through extracurricular physical activities.

The findings are consistent with previous studies reporting declining motor competence among elementary school children. Hardy et al. (2021) found that reduced physical activity participation contributes significantly to poor motor development outcomes. Similarly, Lopes et al. (2021) reported that children with low motor competence often exhibit weaker performance in agility, balance, and locomotor tasks compared to their peers. The present findings support these conclusions, as most students demonstrated motor abilities below expected developmental standards.

One possible explanation for the low gross motor competence observed in this study is the limited frequency and quality of physical activity engagement. According to Stodden et al. (2021), motor competence and physical activity share a reciprocal relationship. Children with low motor competence tend to avoid physical activities because they experience difficulties performing movement tasks, which subsequently reduces opportunities for motor skill improvement. This cycle may contribute to the persistence of poor motor development during childhood.

The results can also be interpreted through the motor learning framework proposed by Fitts and Posner. Their theory explains that motor skill acquisition progresses through three stages: cognitive, associative, and autonomous. Students with low movement proficiency generally remain in the cognitive stage, where movement execution is inconsistent and requires substantial conscious attention (Magill & Anderson, 2021). The dominance of students in the very low category indicates that many participants may still be struggling to understand and execute fundamental movement patterns effectively.

The low scores obtained in the agility, speed, coordination, and balance components further suggest weaknesses in neuromuscular control and movement efficiency. Research by Hulteen et al. (2018) demonstrated that children with limited motor competence often experience difficulties integrating sensory information with motor responses, leading to poorer movement performance. Balance and coordination, in particular, are essential for the successful execution of complex motor tasks and sports skills (Goodway et al., 2019). Therefore, deficiencies in these components may negatively affect students' overall physical literacy.

Environmental factors may also contribute to the findings. Robinson et al. (2020) emphasized that motor development is influenced not only by biological factors but also by environmental conditions such as access to play spaces, family support, school facilities, and opportunities for active recreation. Children who have limited access to safe and stimulating movement environments are more likely to exhibit delayed motor development. In several Indonesian contexts, inadequate sports facilities and limited

movement-based learning resources have been identified as barriers to children's physical development (Widiastuti et al., 2020; Prasetyo et al., 2021).

Another important factor relates to the implementation of physical education learning. Effective PJOK instruction should provide students with varied movement experiences that stimulate locomotor, non-locomotor, and manipulative skills (Webster & Ulrich, 2017). However, when physical education activities focus primarily on theoretical content or repetitive exercises without sufficient movement exploration, motor development may not progress optimally. Barnett et al. (2022) argued that movement-rich educational environments significantly improve children's motor competence and physical confidence.

The present findings also have implications for students' future participation in sports and physical activity. Motor competence has been identified as a strong predictor of physical fitness, sports performance, and lifelong physical activity engagement (Robinson et al., 2018; Barnett et al., 2022). Children with poor motor skills are more likely to experience lower self-confidence during physical activity participation, which may further reduce their motivation to engage in active lifestyles (Estevan & Barnett, 2018). Consequently, improving gross motor competence during elementary school years is essential for promoting long-term health and well-being.

The absence of students in the high and very high categories indicates that intervention programs are urgently needed. Previous studies have demonstrated that structured movement programs, fundamental movement skill training, game-based learning approaches, and active play interventions can significantly improve children's motor competence (Logan et al., 2018; Palmer et al., 2020). Incorporating these approaches into PJOK learning may help students develop stronger motor foundations and enhance overall physical literacy.

Overall, the findings suggest that the gross motor abilities of fourth-grade students at SD Negeri 22 Palu remain far below expected standards. This condition highlights the importance of strengthening physical education programs, increasing opportunities for structured movement experiences, and creating supportive environments that encourage active participation. Through systematic and sustainable interventions, students' motor competence can be improved, thereby supporting their physical, psychological, and social development. The results of this study therefore provide valuable baseline information for teachers, schools, and policymakers in designing evidence-based strategies to enhance gross motor development among elementary school children.

CONCLUSION

This study aimed to identify the gross motor ability profile of fourth-grade students at SD Negeri 22 Palu through a series of motor ability tests consisting of the 4 × 10-meter shuttle run, ball throw and catch test, stork stand positional balance test, and 30-meter sprint test. The findings revealed that the overall gross motor ability of the students was

predominantly categorized as very low. Of the 26 students assessed, 20 students (76.92%) were classified in the very low category, 4 students (15.38%) were categorized as low, and only 2 students (7.69%) reached the moderate category. No students were found in either the high or very high categories.

These results indicate that most students have not yet developed optimal fundamental movement skills, particularly in the areas of speed, agility, balance, and coordination. From a conceptual perspective, gross motor competence is a crucial foundation for physical literacy, sports participation, and lifelong engagement in physical activity. Therefore, the low motor ability profile identified in this study suggests the need for immediate and systematic interventions to support students' motor development.

The findings highlight the importance of strengthening Physical Education, Sports, and Health (PJOK) programs through structured, engaging, and movement-oriented learning activities. Teachers should provide more opportunities for students to practice fundamental movement skills through games, physical exercises, and active learning approaches. Overall, this study provides valuable baseline data for schools and educators in designing evidence-based strategies to improve gross motor competence and promote healthy physical development among elementary school students.

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