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Research Article

Survey of gross motor skills in students with intellectual disabilities aged 6-10 years at State Special Education School C Pembina Malang

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ABSTRACT
Background: This research was conducted because of the lack of understanding of motor skills in children with disabilities. Objective: This study aims to evaluate and understand the level of gross motor skills of students with mental impairment in State Special Education SCHOOL C Pembina Malang Regency. Methods: The method used was a quantitative descriptive survey, with purposive sampling of the sample that considered the criteria of students between 6 and 10 years. The TGMD-2 (Test of Gross Motor Development-2) tool measured students' gross motor ability (Ulrich, 2000). The sample of this study involved nine students from SLB and 23 from primary school. Result: The results of this study show that the gross motor skills of children with disabilities are at a shallow level, so it is necessary to develop a unique education program focused on improving the gross motor skills of children with disabilities. Conclusion: These results also show the importance of improving professional skills and understanding the methods of measuring motor abilities in children with special needs and intellectual disability in State Special Education School C Pembina Malang Regency.

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Introduction

Intellectual disability can be defined as limited intellectual development, resulting in delayed thinking abilities and intelligence that fall below average (Saputra & Febriyanto, 2019). According to Minsih et al. (2021), it is explained that intellectual disabilities can impede the development of gross motor skills in children, thus requiring particular intervention. Intellectual disability, also known as intellectual impairment, is a complex condition characterized by low intelligence levels in children, affecting adaptive behaviors' development (Sefriana & Armisesna, 2021). In other words, children with intellectual disabilities struggle with understanding information, learning daily life skills, and interacting socially within their environment (Sanusi et al., 2020). Social interaction is also a significant challenge for children with intellectual disabilities (Mullah et al., 2024). This statement aligns with findings by Khamidun & Yuwono (2022), which explain that children with intellectual disabilities struggle to understand social cues, communicate with peers, and form social relationships.

Furthermore, these children often appear awkward in social situations, requiring guidance to develop practical social skills (Naufal et al., 2023). In addition, intellectual disabilities often impact both gross and fine motor development. Children with intellectual disabilities experience delays in physical abilities such as walking, running, and hand-eye coordination, necessitating support and specialized training (Kurniawan et al., 2022).

This condition directly affects the development of children's gross motor skills, resulting in difficulties in coordinating movements related to gross motor abilities (Nababan, 2019). Delays in gross motor development often pose significant challenges for children with intellectual disabilities. They require more time and assistance to learn and master these motor skills (Ngaisah et al., 2023). The learning process may involve intensive training and repetitive approaches, as these children need to

build a strong foundation in basic skills before developing more complex movements (Krismon, 2023). Furthermore, assessing gross motor skills in children with intellectual disabilities becomes crucial in evaluating their development, as these skills include large movements such as walking, running, jumping, and other physical activities (Katagiri et al., 2021). In measuring the gross motor skills of children with intellectual disabilities, movement is a crucial factor to consider because, generally, if children can perform many movements, they will gradually understand and become more proficient in motor skills (Bukti & Pramono, 2021). Assessing gross motor skills in children with intellectual disabilities can help them learn gross motor movements, starting from the simplest to more complex ones (Lufthansa et al., 2022). This assessment also provides valuable information for educators and therapists to design intervention programs tailored to the child's individual needs, thereby helping children with intellectual disabilities develop their gross motor skills and improve their overall quality of life (Meilinda et al., 2024).

The critical point highlighted in this study is the measurement of gross motor skills in children with intellectual disabilities. According to previous research by Juriana et al. (2020) titled "Application of TGMD-2 for Children with Intellectual Disability," it is explained that a set of test instruments, namely the TGMD-2 (Test of Gross Motor Development-2), can be applied to children with intellectual disabilities aged 6-12 years to assess their gross motor skills. This is supported by a study conducted by Djuric-Zdravkovic et al. (2021) titled "Gross Motor Skills in Children with Cerebral Palsy and Intellectual Disability," which investigated the relationship between intellectual ability and gross motor performance in children aged 5-10. Another study by Taylor et al. (2023) titled "Associations Between Motor Competence and Physical Activity Levels of Children with Intellectual Disabilities and Autism Spectrum Disorder: Movement Matters" also discusses the gross motor skills of children with intellectual disabilities aged 7-12 years and even suggests that TGMD-2 can be applied to children with autism.

From the interviews and observations, it was found that knowledge about the application of TGMD-2 at State Special Education School C Pembina is still lacking, leading to the objective of evaluating and understanding the motor skills of students with intellectual disabilities compared to regular students using TGMD-2 for the age group of 6-10 years. Therefore, this study is essential, involving regular students as supporting data, highlighting the motor skills gap between inclusive and regular students. This research provides insights regarding the special needs for the motor development of children with intellectual disabilities at State Special Education School C Pembina, Malang Regency. Therefore, although its application remains limited, TGMD-2 can be valuable in identifying and evaluating gross motor skill outcomes. By addressing these limitations, it is hoped that TGMD-2 can contribute more significantly to the scientific literature and clinical practice and strengthen efforts to improve the quality of life for children with intellectual disabilities through more targeted and evidence-based interventions (Putri & Damri, 2020).

Method

Research Design

This study employs a survey method to assess the gross motor skills of students with mild intellectual disabilities aged 6-10 years at State Special Education School C Pembina, Malang Regency, Indonesia. A purposive sampling technique was applied to select student samples, focusing on those aged 6-10. The research focuses on the gross motor skill abilities of students with intellectual disabilities. A quantitative descriptive method was used in this study, with the Test of Gross Motor Development-2 (TGMD-2) as the measurement tool to assess the gross motor skills of children aged 6-10 years (Ulrich, 2000).

Participants

This study involved all students with intellectual disabilities at State Special Education School C Pembina, Malang Regency, and State Elementary School 1 Bedali Malang, with a total population of 290 students. The sampling technique used was purposive sampling, where the researcher selected samples based on regional similarity and predetermined age limits (Sugiyono, 2015). In the sampling process, the decision must consider the characteristics of the population so that the information obtained can represent the entire population.

Research Instruments

The Test of Gross Motor Development-2 (TGMD-2) is a research instrument designed to measure the development of gross motor skills in children aged 3-10 years (Ulrich, 2000). This test consists of 12 subtests that assess various aspects of gross motor skills, such as running, jumping, and throwing. TGMD-2 uses standardized norms and criteria to evaluate children's performance based on age and region. This study, TGMD-2, assessed the gross motor skills of children with mild intellectual disabilities aged 6-10 years at State Special Education School C Pembina, Malang Regency.

Table 1. Participatns

Description	Total Regular Students		Total Intellectual Disabled Students	
	F	%	F	%
Gender				
Male	13	57%	7	77%
Female	10	43%	2	23%
	23	100%	9	100%
Age				
10	0	0%	0	0%
9	3	13%	1	11%
8	20	87%	6	67%
7	0	0%	2	22%
6	0	0%	0	0%
	23	100%		100%

Table 1 presents data on gender distribution and ages 6-10 years among students at State Elementary School 1 Bedali Malang and State Special Education School C Pembina, Malang Regency. At State Elementary School 1 Bedali, 57% of the students are male (13 students) and 43% are female (10 students). The age distribution shows that 13% of the students are 9 (3), and 87% are 8 (20). At State Special Education School C Pembina, 77% of the students are male (7 students) and 23% are female (2 students). The age distribution at State Special Education School C Pembina is 11% for 9-year-olds (1 student), 67% for 8-year-olds (6 students), and 22% for 7-year-olds (1 student).

In line with the research objectives and the data characteristics from the Test of Gross Motor Development-2, the appropriate data analysis technique is quantitative descriptive. Sugiyono (2015) explains that this technique focuses on objectively describing the data without drawing conclusions or generalizations. Before analysis, the data were transformed into the available norm format. The TGMD-2 measures 12 gross motor skills, categorized into two subtests: locomotor movements and manipulative movements. The Test of Gross Motor Development-2 (TGMD-2) has a high level of validity and reliability. This is evidenced by a t-value (1.65) more excellent than the critical t-value, indicating statistically significant test results. The high reliability is also shown by a reliability coefficient correlation of 0.765. This means that TGMD-2 produces consistent and reliable scores, making it a consistent and highly reliable measurement tool (Apriyani et al., 2018; Ulrich, 2000).

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Data Analysis

The Test of Gross Motor Development-2 (TGMD-2) was used to collect data on individuals' gross motor skills in various locomotor and manipulative movements. Locomotor movements, such as running, sprinting, jumping, and throwing, are assessed based on 22 criteria, while manipulative movements, such as catching, kicking, and dribbling, are evaluated based on 21 criteria. The test is conducted twice; each movement is scored one if it meets the criteria and 0 if it does not. The total score from the two trials is converted into a raw subtest score ranging from 0 to 48. This raw score is then converted into a standard score and percentile based on the individual's age and gender, according to the norm tables in the TGMD-2 manual (Ulrich, 2000). The gross motor quotient is calculated from the standardized overall results of the locomotor and manipulative subtests. Based on this gross motor quotient, test subjects can be categorized into seven descriptive categories: superior, superior, above average, average, below average, poor, and very poor.

Results and Discussion

Result

This study aims to evaluate the results of the standard scores in the locomotor and object control aspects and to calculate the Gross Motor Quotient (GMQ) for students at Special Schools (SLB) and Elementary Schools (SD). The research is conducted to better understand students' gross motor skills in both types of schools. The analysis of the research results is expected to provide a clear picture of the differences or similarities in locomotor and object control abilities between SLB and SD students. Additionally, interpreting the Gross Motor Quotient will offer insights into the level of gross motor development these students achieve.

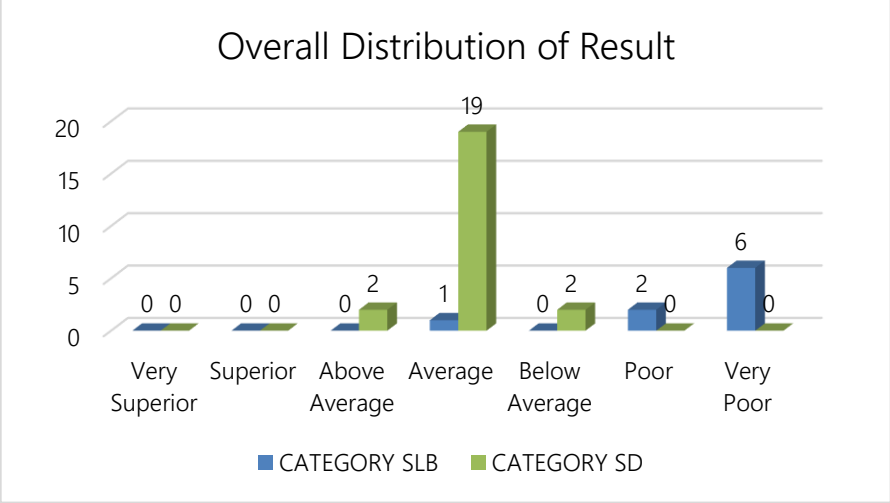

Figure 1. Overall Distribution of Results

Figure 1 illustrates the overall results of gross motor skills for students at Special Schools (SLB) and Elementary Schools (SD), which are classified into six categories. In this case, the gross motor skills of SLB students are distributed across three categories: average, low, and shallow. In contrast, the gross motor skills of SD students are spread across different categories: above average, average, and below average.

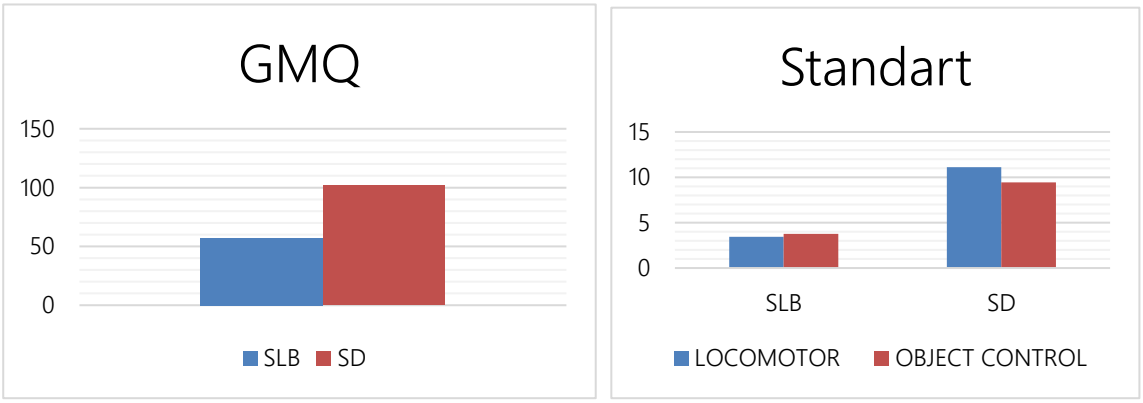

Figure 2. Gross Motor Quotient (GMQ) and Standart Score

Figure 2 The results of this study show that the average Gross Motor Quotient scores are 57.2 for students with intellectual disabilities and 101.6 for regular students. The average standardized locomotor score for students with intellectual disabilities is 3.4, while the average standardized locomotor score for regular students is 11.1. Additionally, the average standardized object control score for students with intellectual disabilities is 3.7, compared to an average standardized object control score of 9.4 for regular students.

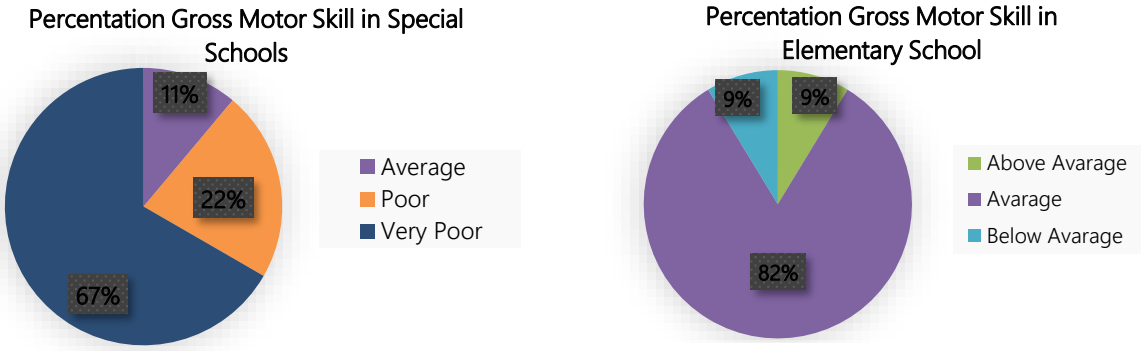

Figure 3. Percentation Gross Motor Skill SLB and SD

Figure 3 shows the interpretation of motor skill levels for students with intellectual disabilities aged 6-10 years at State Special Education School C Pembina, Malang Regency, categorized into three criteria: very low at 67%, low at 22%, and average at 11%. The largest category in this data interpretation is deficient, with a score percentage of 67%. In contrast, the interpretation of motor skill levels for students aged 6-10 years at State Elementary School 1 Bedali Malang is categorized into three criteria: average at 82%, above average at 9%, and below average at 9%. The largest category in this data interpretation is average, with a score percentage of 82%.

Discussion

In this study, the researcher measured gross motor skills among students at State Special Education School C Pembina Malang and State Elementary School 1 Bedali, Malang Regency, as supporting data. This measurement was conducted considering the criteria of regional similarity and the age category of 6-10 years. Generally, children aged 6-10 are in a transitional phase towards more specialized movement stages, with more complex movements affecting gross motor skills (Ardi & Purwanto, 2020). Motor skills are closely related to overall development (Kurniawan et al., 2022). The

gross motor skills test results for children with mild intellectual disabilities aged 6-10 years at State Special Education School C Pembina, Malang Regency, indicate a deficient category. This can be analyzed through the average standard scores in locomotor and object control aspects, which are low for the 6-10-year age category. These results are consistent with research by Purnamasari, Arfifah, & Hardianto (2022), which found that the gross motor skills of children with intellectual disabilities aged 5-14 years at SLB Reskiani in Makassar City showed that most students had below-average motor skills.

Additionally, research by Ardianto & Purwanto (2019) on children with intellectual disabilities in grades 1-5 at SLB Bakti Putra Ngawi, Gunungkidul Regency, also showed that most students were in the low criteria for motor skills. In contrast, the gross motor skills test for students aged 6-10 years at State Elementary School 1 Bedali Malang showed results in the average category. This was determined through the TGMD-2 norms analysis, which indicated average standard scores in locomotor and object control aspects, aligning with the normal category for children aged 6-10 years. Further, research by Kurniawan et al. (2024) in their survey of gross motor skills among lower-grade students in State Elementary School Pujon, Malang Regency, showed that nearly all students were in the average category, followed by below average, above average, and low categories. This finding is supported by Oulvan et al. (2023) in their study on the association of physical activity (3-5 years) with gross and fine motor abilities in preschool children, which indicated that children exhibited excellent gross motor skills based on data analysis.

From the standard scores obtained through the GMQ from TGMD-2, it is evident that the majority of students with mild intellectual disabilities fall into the deficient category. This indicates that their gross motor skills are generally below the established standards. In contrast, regular students show standard scores predominantly in the average category. Their Gross Motor Quotient reflects gross motor abilities that align with the average expectations for their age group. Therefore, there is a significant difference between the gross motor skills of students with intellectual disabilities and regular students, with regular students performing better in this aspect (Hidayat et al., 2024). This difference can be explained by various factors, including cognitive and physical development levels and access to and participation in appropriate physical activities. Regular students typically have more opportunities to engage in physical activities to develop their gross motor skills (Fu & Burns, 2018). On the other hand, students with intellectual disabilities face various barriers that affect their gross motor development. These barriers may include limitations in movement coordination, difficulty understanding instructions, and a lack of support or specialized programs tailored to their needs (Lau et al., 2020).

Gross motor skills are particularly beneficial for children with intellectual disabilities, as noted by Yumaika (2020), who explained that motor skills are essential for the development of physical fitness (movement skills) and for rehabilitating movement disorders, as well as for cognitive patterns, affective stability, social interactions, and healthy living practices. According to Top (2021), intellectual disabilities are a neurological developmental condition that affects an individual's ability to form and maintain interpersonal relationships and to perform practical daily skills. This condition also results in limitations in motor skills, including difficulties in performing coordinated and skilled physical movements (Darti & Fatimah, 2020). As a result of these impairments, individuals with intellectual disabilities often face barriers in various aspects of life, including social interactions, work, and daily activities that require specific motor skills (Calero-Morales et al., 2023). From these viewpoints, it is clear that developing and improving gross motor skills in children with intellectual disabilities is essential to help them better navigate daily life and enhance their overall quality of life.

Gross motor skills encompass body movements that involve coordination between the brain, nervous system, and muscles (Desiana & Khan, 2022). Gross motor skills involve large muscle groups, such as walking, running, jumping, throwing, and climbing (Yugis & Wiguno, 2024). This aligns with Sutini's (2018) description of movements that involve body muscles, particularly skeletal muscles, to

perform basic movements regulated by the brain, such as running, jumping, kicking, throwing, and pulling, which are fundamental elements of basic movement. Additionally, Kurniawan et al. (2022) explains that gross motor skills are abilities that utilize the brain and muscle strength of the arms and legs to achieve specific movements and exercises. The better the fundamental students' movement skills and abilities are, the more smoothly they can perform activities requiring these skills. According to Kurniawan et al. (2022), motor skills include locomotor movements such as running, jumping, side jumps, vertical jumps, jumping from heights, running while jumping, galloping, sliding, and hopping. Manipulative movements are fundamental to locomotor and non-locomotor movements (Kurniawan, 2018). Basic manipulative movements include using body parts to control objects, such as performing strikes, throwing, kicking, and dribbling a ball (Burns et al., 2017). Thus, developing gross motor skills is crucial for enhancing basic movement abilities and performance in various physical activities, highlighting the need for measuring gross motor abilities.

Based on the statements by Amin (2022), it is essential to measure the motor skills of children with intellectual disabilities to adjust their learning and play environments, thereby better supporting their motor needs. This view is supported by Trimarta et al. (2024) and Kurniawan et al. (2022), who explain that gross motor skills are a tool that can be used to assess the potential of children with intellectual disabilities to identify skills and interests similar to those of other children. In this study, the motor skills of children with intellectual disabilities aged 6-10 years at State Special Education School C Pembina Kabupaten Malang were tested using the TGMD-2 assessment tool. Thus, it is clear that there is a significant difference in motor skills between students with special needs and regular students in the same geographic area. The data and previous research show that the motor skills of children with intellectual disabilities aged 6-10 years at State Special Education School C Pembina Kabupaten Malang are predominantly categorized as very low, whereas the motor skills of children aged 6-10 years at State Elementary School 1 Bedali Malang are predominantly categorized as average.

Conclusions

Based on the research findings, many students with intellectual disabilities are still categorized as below standard and very low. Given this fact, parents, physical education teachers, and school authorities must pay extra attention to students in these categories. They need to provide high-quality, specialized instruction, such as additional exercises to improve coordination, agility, balance, and self-confidence in a fun and engaging manner. This aims to ensure that the student's gross motor skills develop well, allowing them to benefit from these skills in their daily lives fully.

In the future, it is hoped that broader research will use larger samples and a more varied range of schools. The continuity of research is also crucial for monitoring the development and effectiveness of special education programs designed based on these findings. Long-term research with periodic evaluations will help identify the progress of children with intellectual disabilities and adjust educational programs to meet their needs. Thus, efforts to improve the gross motor skills of children with intellectual disabilities can be more targeted and positively impact the long term.

Authors' contributions

EF was responsible for data collection, analysis, article design, writing, and revision. RK and HARK were responsible for the article's conceptualization and conducted a rigorous and critical manuscript revision. All authors have read and approved the final manuscript.

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Competing interests

The authors declare no competing interests.

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