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Motor function, quality of life, and prevalence among children in a cerebral palsy community

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ABSTRACT

Background: Cerebral palsy (CP) is the most common motor disability in children. It often causes motor impairments that reduce functional independence and participation, particularly in countries like Indonesia and low- and middle-income countries. The aim of this study was to assess motor function, quality of life, and prevalence of CP in a community-based population.

Methods: A cross-sectional descriptive study was conducted on 80 children with CP from a community in Jakarta aged 5–18 years. They were selected through purposive sampling. All participants had a confirmed diagnosis of CP and consent from their parents or guardians. Children with other physical disabilities or who were unable to communicate were excluded. The Gross Motor Function Classification System (GMFCS) was used to assess motor function, and the Cerebral Palsy Module of the Pediatric Quality of Life Inventory (PedsQL) 3.0 was used to measure quality of life.

Results: A total of 83.8% of participants were adolescents aged 13–18 years with spastic CP. With 46.3% at GMFCS level IV and 28.7% at level V, severe motor impairments were common, but 61.3% of children reported a good quality of life. Motor function and quality of life were positively and significantly correlated ($r = 0.345$, $p = 0.002$).

Conclusion: The motor function of children with CP is strongly associated with their quality of life. This suggests that comprehensive and ongoing rehabilitation is necessary to improve functional participation and overall well-being.

Keywords: cerebral palsy, GMFCS, motor function, pediatric rehabilitation, PedsQL, quality of life.

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INTRODUCTION

One of the most common motor disabilities in children is cerebral palsy (CP), which is caused by permanent impairments in movement and posture caused by non-progressive brain injury during early development. In addition to motor deficits, CP can affect cognitive, sensory, and communication skills, making it more difficult to carry out daily life.[1-3] The prevalence of CP averages 2 to 3 per 1,000 live births worldwide, with higher rates found in low- and middle-income countries due to poor perinatal care, late diagnosis, and lower access to rehabilitation services.[4-6]

In some low- and middle-income countries in Asia and the Middle East, children with CP often face greater functional limitations and lower participation compared to their peers from high-income countries. In Indonesia, the quality of life and disability of children with disabilities are increasingly deteriorating due to limited rehabilitation coverage, economic challenges, and the increasing availability of healthcare. Community-based rehabilitation and early intervention have shown promise in improving functional outcomes and social integration within their communities.[3,7,8]

Motor function in children with CP is commonly classified using the Gross Motor Function Classification System (GMFCS), which categorizes mobility into five levels, ranging from independent ambulation to severe limitations.[9,10] Higher GMFCS levels are consistently linked to reduced independence, increased caregiver burden, and greater participation restrictions, emphasizing the need for targeted interventions.[11]

Health-related quality of life (HRQoL) is a multidimensional concept that includes physical, emotional, social, and school functioning and is frequently measured using the Pediatric Quality of Life Inventory (PedsQL).[12,13] International studies consistently show that poorer motor function is associated with lower quality-of-life scores, particularly in daily activities and social participation.[14-16] These findings highlight the importance of rehabilitation approaches addressing both physical and psychosocial needs.[17,18]

The relationship between motor function and quality of life has been extensively studied in high-income countries and some low- and middle-income countries. However, evidence from Indonesia is limited, particularly in the community context. In Indonesia, most studies have focused on hospital samples and have not fully investigated the distribution of motor skill severity, quality of life outcomes, or prevalence at the community level.[16,19] Understanding these components is crucial to tailor rehabilitation approaches to specific situations. Therefore, the objectives of this study were to assess motor function using the GMFCS, assess quality of life using the PedsQL, and describe the number of children with motor skill impairments within a community in Jakarta. This study provides data to guide policy and interventions.

METHODS

This study used a quantitative descriptive design with a cross-sectional approach to examine motor function, quality of life, and prevalence among children with cerebral palsy in a community setting. Conducted at a Cerebral Palsy Community in Jakarta, Indonesia, from September to October 2025, the study employed purposive sampling to select participants. Inclusion criteria were children aged 5–18 years diagnosed with cerebral palsy whose parents or guardians provided informed consent, while children with other physical disabilities or those unable to communicate were excluded. A total of 80 children met the criteria and were included in the study. Ethical approval was obtained from the Ethics Committee of Universitas Pembangunan Nasional Veteran Jakarta (approval number 197/IX/2025/KEP), and the study adhered to the Declaration of Helsinki and international guidelines, with parental consent and strict confidentiality maintained.

Two trained researchers independently assessed each variable in the study to reduce measurement bias and increase data accuracy. Prior to data collection, raters performed calibration to ensure consistent interpretation of the assessment criteria across instruments. Evaluations were conducted in the presence of parents or caregivers to facilitate communication, ensure participant safety, and maintain morale. The Gross Motor Function Classification System (GMFCS), a validated tool, divides children into five levels (I–V) based on their typical daily performance. Higher levels indicate greater limitations. Direct observation of activities such as sitting, crawling, standing, walking, stair climbing, and the use of assistive devices was part of the assessment. Assessments were conducted by trained physiotherapists, physicians, and researchers in accordance with age-specific GMFCS guidelines. The Indonesian version of the Pediatric Quality of Life Inventory (PedsQL) 3.0 Cerebral Palsy Module, consisting of 35 items across seven domains, was used to assess quality of life. When possible, self-report questionnaires were used for children aged 5–18 years. For children with limited communication skills, parental proxy reports were used. Respondents were scored on a scale from 0 to 100, with higher scores indicating better quality of life. Children who were unable to communicate verbally or nonverbally, even with the assistance of a caregiver, were excluded from the PedsQL assessment. This may lead to underrepresentation of children with more severe impairments, particularly those with GMFCS levels IV and V, and this should be taken into account when interpreting the study results.

Data analysis was conducted using Microsoft Excel and SPSS version 26.0. Prevalence data and participant characteristics were described using descriptive statistics. The relationship between motor function and quality of life was examined using the chi-square test and Spearman's rank correlation. Motor function was considered the independent variable, while quality of life was considered the dependent variable.

RESULTS

A total of 80 children with cerebral palsy were included in the study (**Table 1**). Participants were categorized into three age groups 5–7, 8–12, and 13–18 years corresponding to early childhood, middle childhood, and adolescence. Most participants were aged 13–18 years (40; 50.0%), followed by 8–12 years (21; 26.3%) and 5–7 years (19; 23.8%). The gender distribution was equal (40 males and 40 females). Spastic cerebral palsy was the most common type (67; 83.8%), with ataxic (8; 10.0%) and dyskinetic (5; 6.3%) forms less frequently observed.

As shown in **Table 1** (n = 80), most participants were classified at GMFCS Level IV (37; 46.3%), followed by Level V (23; 28.7%) and Level I (12; 15.0%). Only a small proportion were classified at Levels II and III (4; 5.0% each), indicating that most children had severe motor function limitations. Quality of life was assessed using the PedsQL 3.0 Cerebral Palsy Module and categorized as "good" or "poor" based on the sample mean

Table 1. Characteristics of the 80 patients with cerebral palsy

Variables	N	Percentage (%)
Age, years		
5 – 7	19	23.8
8 – 12	21	26.3
13 – 18	40	50
Gender		
Male	40	50.0
Female	40	50.0
Classification of cerebral palsy		
Spastic	67	83.8
Ataxic	8	10.0
Dyskinetic	5	6.3
Motor Function		
Level I	12	15.0
Level II	4	5.0
Level III	4	5.0
Level IV	37	46.3
Level V	23	28.7
Quality of life		
Good	49	61.3
Poor	31	38.8

N, number of participants

total score. Using this cut-off, 49 children (61.3%) were classified as having good quality of life and 31 (38.7%) as having poor quality of life.

The association between motor function and quality of life is shown in Table 2 (n = 80). Children classified at higher GMFCS levels (IV–V) were more likely to have poor quality of life than those at lower levels. Spearman's rank correlation analysis demonstrated a significant positive correlation between motor function and quality of life (r = 0.345, p = 0.002), indicating that better motor function was associated with higher quality-of-life scores.

Table 2. **Correlation between motor function and quality of life among children with cerebral palsy**

GMFCS	Quality of life category		
	Good n (%)	Poor n (%)	Total n (%)
Level 1	6 (7.5)	6 (7.5)	12 (15.0)
Level 2	4 (5.0)	0 (0.0)	4 (5.0)
Level 3	2 (2.5)	2 (2.5)	4 (5.0)
Level 4	16 (20.0)	21 (26.3)	37 (46.3)
Level 5	3 (3.8)	20 (2.5)	23 (28.7)
Total	31 (38.8)	49 (61.3)	80 (100)
r	0.345		
P-value	0.002		

GMFCS, gross motor function classification system; r, Spearman's rank correlation

DISCUSSION

This study provides a community-based overview of motor function and quality of life in children with cerebral palsy in Jakarta. Most participants were adolescents aged 13–18 years, underscoring that cerebral palsy is a lifelong condition requiring long-term rehabilitation, especially during adolescence when physical growth and functional demands increase. Consistent with previous research, children with cerebral palsy often need ongoing therapy due to progressive musculoskeletal challenges, such as muscle stiffness and contractures.[9] Moreover, population-based studies indicate that quality of life in these adolescents is closely linked to health status and motor function, highlighting the need for sustained rehabilitative interventions to preserve physical abilities and overall well-being.[15]

Spastic cerebral palsy was the most common type in this study, consistent with global and regional data.[1] Characterized by increased muscle tone and impaired motor control, spasticity limits mobility and daily activity participation. Most children were classified at GMFCS levels IV–V, reflecting severe motor impairment and reliance on caregivers or assistive devices. These findings highlight that community-based populations in low- and middle-income countries often include many children with complex rehabilitation needs. Severe motor impairments are also associated with malnutrition and other risks, emphasizing the need for expanded rehabilitation services and improved access.[20,21,22]

The significant positive correlation between motor function and quality of life observed in this study reinforces evidence that better motor abilities are linked to higher quality-of-life outcomes in children with cerebral palsy.[16,23] Children with lower GMFCS levels typically exhibit greater independence and have more opportunities for social and educational participation, enhancing psychosocial well-being. In contrast, children with severe motor limitations often face restricted participation, increased dependence on caregivers, and fewer opportunities for peer interaction, which can negatively affect the emotional and social aspects of quality of life.[7,15]

Adolescence is a particularly vulnerable period for children with cerebral palsy, as social, emotional, and academic demands increase. Previous studies indicate that health-related quality of life may decline during this stage, especially in areas of general health and social participation.[15] The findings of this study highlight the importance of addressing not only motor impairments but also the psychosocial challenges faced by adolescents with cerebral palsy, particularly those with severe motor limitations.

From a clinical perspective, these findings highlight the importance of comprehensive, multidisciplinary rehabilitation that goes beyond motor training alone. For children with severe motor impairments (GMFCS IV–V), programs should prioritize assistive technology, postural management, caregiver education, and participation-focused interventions to enhance daily functioning and quality of life. Community-based rehabilitation services must be strengthened to ensure equitable long-term therapy access, particularly for families with limited resources. These results also support incorporating quality-of-life assessments into routine clinical evaluations to guide individualized treatment and policy development.[24]

Several limitations of this study should be noted. First, its cross-sectional design prevents causal inferences between motor function and quality of life. Second, cognitive function was not formally assessed, though it may affect quality-of-life outcomes. Third, caregiver-reported measures were used, which could introduce reporting bias, especially for children with severe motor or communication impairments. Excluding children unable to communicate verbally or non-verbally may have underrepresented the most severely affected. These limitations underscore the need for longitudinal, comprehensive assessments in future research.

CONCLUSION

Most children with cerebral palsy in this Jakarta community were adolescents with spastic-type CP and severe motor impairments (GMFCS IV–V). Despite these limitations, over half reported good quality of life. Motor function was positively associated with quality-of-life outcomes, confirming its role as a key determinant of health-related quality of life. These findings emphasize the need for comprehensive rehabilitation that integrates motor, psychosocial, family-centered, and participation-focused strategies, alongside strengthened community-based services to optimize long-term function and well-being.

ETHICAL CLEARANCE

The study began with administrative preparations, including submission for ethical approval to the Research Ethics Committee of Universitas Pembangunan Nasional Veteran Jakarta. Approval was granted under clearance number 197/IX/2025/KEP on September 16, 2025.

CONFLICT OF INTEREST

The authors declare that they have no conflicts of interest.

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AUTHOR CONTRIBUTIONS

MO conceptualized the study, supervised data collection, and drafted the manuscript. AS, RD, and GAP contributed to data collection, management, and interpretation. FCSA and SSP helped refine the study design, revised the manuscript, conducted the final review, and ensured content accuracy. All authors approved the final version.

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