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The Relationship Between Intelligence Quotient Level and Quality of Life in Children with Intellectual Disability at Special Schools in Padang City

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ABSTRACT

Background: Intellectual disability affects intellectual functioning and adaptive behavior, leading to a generally lower quality of life compared to the general population. The relationship between Intelligence Quotient (IQ) levels and quality of life requires further exploration in Indonesia.
Objective: To investigate the relationship between IQ levels and quality of life in children with intellectual disabilities at special schools in Padang City.
Methods: A cross-sectional study was conducted among 95 children with intellectual disabilities aged 12-18 years from May to August 2025. IQ was assessed using the Coloured Progressive Matrices and the Culture Fair Intelligence Test. Quality of life was measured using the PedsQL 4.0 Generic Core Scales parent-report version. The Chi-Square test was used to evaluate relationships between variables ($p<0.05$ was considered significant).
Results: The mean age of participants was 14.8±2.1 years with an equal gender distribution. Most subjects had mild intellectual disabilities (61.1%), followed by moderate (35.8%) and severe (3.2%). The mean IQ was 52.8±12.3. Overall, 68.4% had impaired quality of life (mean score 57.7±13.9). Physical functioning scored the highest (60.1), while school functioning scored the lowest (56.7). A highly significant relationship existed between IQ level and quality of life ($p<0.001$). Among those with mild disabilities, 50% achieved good quality of life, compared to 2.9% in moderate cases and 0% in severe cases. Maternal education ($p<0.001$) and socioeconomic status ($p<0.001$) significantly influenced quality of life.
Conclusion: IQ level significantly correlates with quality of life in children with intellectual disabilities, with environmental and family factors playing crucial roles. Comprehensive interventions addressing cognitive, psychosocial, and environmental factors are essential for optimizing outcomes.
Keywords: Intellectual disability, Intelligence Quotient, Quality of life, PedsQL, Children, Special education

INTRODUCTION

Intellectual disability is a neurodevelopmental disorder characterized by significant limitations in both intellectual

functioning and adaptive behavior, with an onset before the age of 18. This condition affects reasoning, problem-solving, planning, abstract thinking, judgment, and academic learning. Diagnosis traditionally relies on IQ scores below 70, although contemporary approaches emphasize a comprehensive assessment, including adaptive functioning.[1,2]

The global prevalence of intellectual disability is estimated at 10.37 per 1,000 individuals, while the Autism and Developmental Disabilities Monitoring Network in the United States reports a prevalence of 11.8 per 1,000 children.[3,4] In Indonesia, the 2023 Health Survey indicated a prevalence of 1% in children aged 5-17 years, with West Sumatra reporting 0.8.[5]

Childhood is a critical developmental period. Children with intellectual disabilities face unique challenges that affect their learning, social interaction, and environmental adaptation. Quality of life (QoL) is a multidimensional concept that reflects satisfaction with living standards, health, achievements, relationships, and future security. Children with intellectual disabilities typically experience a lower QoL compared to their typically developing peers, particularly in areas such as social functioning, school participation, and interactions with their environment.[6,7,8]

IQ levels in intellectual disability range from mild (IQ 50-69), moderate (35-49), severe (20-34), to profound (<20). Approximately 85% of individuals with intellectual disabilities have mild disabilities, allowing them to retain capabilities in academics, self-care, and practical skills. Several studies indicate that higher IQ scores correlate with better QoL in specific domains, particularly in academic ability and independence. However, this relationship is not always linear and may be influenced by factors such as social support, educational environment, socioeconomic status, and access to healthcare.[9,10]

While extensive research has been conducted in developed countries, studies in Indonesia remain limited, especially concerning the QoL of children with intellectual disabilities and its relationship with IQ.[11] Understanding this relationship can inform the development of interventions, educational planning, and comprehensive healthcare services. This study aims to explore the relationship between IQ levels and QoL in children with intellectual disabilities at special schools in Padang City.

MATERIALS & METHODS

This cross-sectional analytical observational study was conducted at State Special Schools in Padang City, West Sumatra, Indonesia, from May to August 2025. Consecutive sampling was used to enroll children with intellectual disabilities who met the eligibility criteria until the required sample size was reached. Inclusion criteria consisted of: a diagnosis of intellectual disability with significant limitations in intellectual and adaptive functioning; an age range of 12 to 18 years; and signed informed consent from parents. Children were excluded if they had severe uncontrolled medical conditions affecting QoL assessment, uncorrectable severe sensory disabilities, and hospitalization within the past month.

Intelligence Quotient levels were measured using the Culture Fair Intelligence Test and Coloured Progressive Matrices, administered by qualified psychologists. Scores were categorized according to Diagnostic and Statistical Manual (DSM-5) criteria: mild (50-69), moderate (35-49), severe (20-34), and profound (<20). Quality of life was assessed using the PedsQL 4.0 Generic Core Scales Indonesian version, through parent reports. This measure included 23 items covering physical functioning (8 items), emotional functioning (5 items), social functioning (5 items), and school functioning (5 items). A five-point Likert scale was utilized (0=never, 1=almost never, 2=sometimes, 3=often, 4=almost always a problem). Raw scores were transformed to a 0-100 scale (0=100, 1=75,

2=50, 3=25, 4=0). Scores of 70 or above indicated good QoL, while scores below 70 indicated impaired QoL. Additional variables collected included parental education, family socioeconomic status based on the Padang Regional Minimum Wage, and the presence of comorbid conditions.[12,13,14]

STATISTICAL ANALYSIS

Data were analyzed using SPSS version 26. Descriptive statistics were presented as frequencies and percentages for categorical data, and means ± standard deviation (SD) and medians (range) for numerical data. Chi-Square tests examined the relationships between IQ levels and QoL, along with other variables affecting QoL. Significance was set at $p<0.05$ with a 95% confidence interval (CI).

RESULT

The study successfully enrolled 95 children with intellectual disabilities from State Special Schools in Padang City. The mean age was 14.8 ± 2.1 years (see Table 1). The gender distribution was balanced, with males constituting 50.5% and females 49.5%. In terms of parental education, fathers predominantly had completed secondary education (46.3%), a trend mirrored by mothers, where secondary education was also the most common level (46.3%). Regarding family socioeconomic status, the majority of families fell into the middle economic category (50.5%), followed by low (41.1%) and high (8.4%). Comorbid conditions accompanied the intellectual disability in 42 children (44.2%). All subjects were undergoing various forms of rehabilitation therapy, most commonly combination therapy involving more than one modality (48.4%). Most subjects (67.4%) received therapy twice or more per week. Concerning the age at diagnosis, most subjects, specifically 60 children (63.2%), were diagnosed before the age of five, while 35 children (36.8%) were diagnosed at age five or older. A family history of intellectual disability was present in 15 subjects (15.8%).

Table 1. Characteristics of study subjects

Category	n (%) / Mean±SD
Demographic Characteristics	
Age (years)	14,8 ± 2,1
Gender	
Male	48 (50,5)
Female	47 (49,5)
Father's Education	
Primary Education	29 (30,5)
Secondary Education	44 (46,3)
Higher Education	22 (23,2)
Mother's Education	
Primary Education	37 (38,9)
Secondary Education	44 (46,3)
Higher Education	14 (14,8)
Economic Status	
Low	39 (41,1)
Middle	48 (50,5)
High	8 (8,4)
Clinical Characteristics Comorbidity	
Present	42 (44,2)
Absent	53 (55,8)
Therapy Status	
Yes	95 (100)
No	0 (0)
Type of Therapy	
Speech Therapy	10 (10,5)

Occupational Therapy	37 (38,9)
Physiotherapy	2 (2,1)
Combine Therapy	46 (48,4)
Therapy Frequency/week	
1 time	31 (32,6)
≥ 2 times	64 (67,4)
Age at Diagnosis	
<5 years	60 (63,2)
≥5 years	35 (36,8)
Family History of ID	
Yes	15 (15,8)
No	80 (84,2)

The IQ scores of study subjects indicated a mean of 52.8 ± 12.3, demonstrating considerable variability in cognitive functioning levels (see Table 2). Based on DSM-5 classifications, the majority of subjects were categorized as having mild intellectual disability, with 58 children (61.1%). Moderate intellectual disability was identified in 34 children (35.8%), while only three children (3.2%) were classified as having severe intellectual disability. No subjects were classified as having profound intellectual disability.

Table 2. Distribution of Intelligence Quotient levels of subjects

Variable	**Results**
IQ Score	
Mean ± SD	52,8 ± 12,3
Median (Min-Max)	47 (29-69)
Intellectual Disability severity category	**n (%)**
Mild (IQ 50-69)	58 (61,1%)
Moderate (IQ 35-49)	34 (35,8%)
Severe (IQ 20-34)	3 (3,2%)
Profound (IQ <20)	0 (0,0%)

Overall quality of life scores had a mean of 57.7 ± 13.9, indicating that children with intellectual disabilities generally experienced quality of life below the cutoff score of 70 for good quality of life (see Table 3). When examined by domain, physical functioning exhibited the highest mean score of 60.1 ± 14.7, followed by social functioning (57.2 ± 13.6), emotional functioning (56.8 ± 13.9), and school functioning with the lowest mean score of 56.7 ± 13.8. All domains had mean scores below 70, indicating impaired quality of life across all facets. The distribution of quality-of-life categories revealed that the majority of subjects, 65 children (68.4%), had impaired quality of life with total scores below 70, while only 30 children (31.6%) achieved good quality of life with total scores of 70 or above (see Table 4).

Table 3. Distribution of quality-of-life scores per domain

Quality of Life Domain	**Mean ± SD**	**Median (Min-Max)**
Physical functioning	60,1 ± 14,7	65,6 (25,0-78,1)
Emotional functioning	56,8 ± 13,9	60,0 (20,0-75,0)
Social functioning	57,2 ± 13,6	60,0 (20,0-75,0)
School functioning	56,7 ± 13,8	60,0 (20,0-75,0)
Overall quality of life scores	**57,7 ± 13,9**	**61,4 (21,3-75,8)**

Statistical analysis found a highly significant relationship between IQ levels and quality of life in children with intellectual disabilities ($p<0.001$) (see Table 4). Among children with mild intellectual disabilities, the distribution between good

and impaired quality of life was balanced, with twenty-nine children (50.0%) in each category. In contrast, among children with moderate intellectual disabilities, a significantly higher proportion had impaired quality of life, with thirty-three children (97.1%) classified as impaired and only one child (2.9%) achieving a good quality of life. In the severe intellectual disability group, all three children (100%) experienced impaired quality of life, with none achieving good quality of life.

Table 4. Relationship between IQ level and quality of life

Intellectual Disability Level	Good Quality of Life	Impaired Quality of Life	Total	p value
Mild (IQ 50-69)	29 (50,0%)	29 (50,0%)	58 (100%)	
Moderate (IQ 35-49)	1 (2,9%)	33 (97,1%)	34 (100%)	<0,001*
Severe (IQ 20-34)	0 (0,0%)	3 (100,0%)	3 (100%)	
Total	**30 (31,6%)**	**65 (68,4%)**	**95 (100%)**	

Chi-square

The analysis found no significant relationships between age (p = 0.943) or gender (p = 0.943) and QoL (see Table 5). However, both paternal education level (p = 0.009) and maternal education level (p < 0.001) showed significant relationships with the quality of life. Additionally, family socioeconomic status was found to have a highly significant relationship with quality of life (p < 0.001). Meanwhile, all clinical factors, including age at diagnosis (p = 0.051), family history of intellectual disability (p = 0.294), type of therapy (p = 0.628), and frequency of therapy (p = 0.357), showed no significant relationships with QoL.

Table 5. Relationship between demographic and clinical characteristics and quality of life

Variable	Good Quality of Life	Impaired Quality of Life	p value*
Age			
12-14 years	15 (31,3%)	33 (68,8%)	0,943
15-18 years	15 (31,9%)	32 (68,1%)	
Sex			
Male	15 (31,3%)	33 (68,8%)	0,943
Female	15 (31,9%)	32 (68,1%)	
Father's Education			
Primary Education	3 (10,3%)	26 (89,7%)	
Secondary Education	13 (29,5%)	31 (70,5%)	0,009
Higher Education	14 (63,6%)	8 (36,4%)	
Mother's Education			
Primary Education	3 (8,1%)	34 (91,9%)	
Secondary Education	13 (29,5%)	31 (70,5%)	<0,001
Higher Education	14 (100,0%)	0 (0,0%)	
Economic Status			
Low	3 (7,7%)	36 (92,3%)	
Middle	13 (27,1%)	35 (72,9%)	<0,001
High	8 (100,0%)	0 (0,0%)	
Age at Diagnosis			
<5 years	23 (38,3%)	37 (61,7%)	0,051
≥5 years	7 (20,0%)	28 (80,0%)	
Family History of ID			
Yes	3 (20,0%)	12 (80,0%)	0,294
No	27 (33,8%)	53 (66,3%)	
Therapy Status			
Yes (all subjects)	30 (31,6%)	65 (68,4%)	-
Type of Therapy			
Speech Therapy	4 (40,0%)	6 (60,0%)	
Occupational Therapy	10 (27,0%)	27 (73,0%)	0,628

Physiotherapy	0 (0,0%)	2 (100,0%)	
Combine Therapy	16 (34,8%)	30 (65,2%)	
Therapy Frequency/week			
1 time	8 (25,8%)	23 (74,2%)	0,357
≥ 2 times	22 (34,4%)	42 (65,6%)	

Chi-square

DISCUSSION

This study provides important insights into the relationship between IQ levels and the quality of life in children with intellectual disabilities in Padang City, Indonesia. The findings confirm that IQ levels significantly influence quality of life outcomes and highlight the crucial roles of family and environmental factors in determining child well-being.

In this study, the distribution of intellectual disability severity revealed that 61.1% of participants were classified as having mild disabilities, 35.8% as moderate, and 3.2% as severe. This distribution largely aligns with epidemiological patterns reported in international literature. Classical studies suggest that approximately 85% of individuals with intellectual disabilities fall within the mild category. The slightly lower proportion of mild cases and the higher proportion of moderate cases in this research, compared to theoretical distributions, may be explained by the special school setting. Children with mild intellectual disabilities are increasingly integrated into mainstream education with inclusive support in many countries, which could account for the lower proportion in specialized school environments. This finding aligns with the study by Petrenko et al., which demonstrated the increasing integration of children with mild intellectual disabilities into general education systems.[9,15]

The study found that 68.4% of children with intellectual disabilities experienced impaired quality of life, with a mean total score of 57.7. This is consistent with extensive literature indicating that children with intellectual disabilities generally experience a lower quality of life compared to typically developing populations. In a previous study by Mediani et al., it was reported that 55.6% of children with intellectual disabilities in Bandung had impaired quality of life, a finding that aligns remarkably well with this study. International studies, such as one by Basgul et al. in Turkey, similarly reported quality of life scores close to the findings in this study, with a mean score of 60.4.[11,16]

Domain-specific analysis revealed that physical functioning was the highest-scoring domain at 60.1, while school functioning received the lowest score at 56.7. Although the differences between domains were relatively small and all domains scored below the cutoff for a good quality of life, this pattern provides important clinical insights. The relatively higher scores in physical functioning can be understood in several ways. First, most subjects had mild to moderate intellectual disabilities, where physical and motor abilities are generally less affected than cognitive, emotional, and social aspects. Children with mild to moderate intellectual disabilities typically can perform basic physical activities, such as walking, running, and engaging in physical play, albeit possibly at slightly lower skill levels than their peers. Second, the rehabilitation therapy programs, including occupational and physical therapy, that all subjects were receiving may have helped to maintain and improve their physical functioning.

The lower scores in school functioning reflect the significant challenges that children with intellectual disabilities face in educational contexts. The cognitive limitations characterizing intellectual disabilities directly impact the ability to follow academic curricula, understand instructions, complete school tasks, and concentrate for the periods required for effective learning. This finding is consistent with the study by Mediani et al., which also

found that school functioning had the lowest scores among all quality of life domains, with primary difficulties related to completing schoolwork, concentrating, and reliance on adults.[11]

Challenges in the emotional and social functioning domains underscore the complexity of the psychosocial experiences of children with intellectual disabilities. These children often struggle with emotion regulation, understanding and appropriately expressing feelings, and navigating complex social relationships. Research by Dekker et al. demonstrates that children with intellectual disabilities face a significantly higher risk of experiencing mental health issues, including anxiety, depression, and behavioral difficulties, compared to the general population, which may explain the low scores in the emotional functioning domain. In the social domain, children with intellectual disabilities often have trouble understanding social cues, maintaining friendships, and participating in social activities with peers, partly due to cognitive limitations and partly due to the stigma and social exclusion they may experience.[17,18]

The clear gradient indicating that higher IQ is correlated with better quality of life confirms that cognitive functioning plays a crucial role in determining well-being. In the case of mild disability, there is a balanced distribution between good and impaired quality of life (50% each), demonstrating a reasonable potential for good quality of life, although other factors are also important. The dramatic shift observed in moderate disability—where 97.1% have impaired quality of life and no individuals experience good quality of life in severe cases—shows that increasing severity significantly reduces the capacity for good quality of life. These findings align with studies conducted by van Timmeren et al. in the Netherlands, which identify a correlation between higher IQ and better QoL scores, particularly in areas related to independence and social participation. The research by Tavernor et al. further supports this, indicating that cognitive functioning is a significant predictor of quality of life in children and adolescents with intellectual disabilities.[19,20]

Several mechanisms explain this relationship. Higher cognitive ability facilitates better adaptive functioning, promoting independence in daily living skills such as self-care, financial management, and navigation of transportation—all of which contribute to an improved quality of life. A study by Shogren et al. demonstrates that adaptive functioning is an important mediator between cognitive ability and QoL outcomes in individuals with intellectual disabilities. Additionally, higher cognitive ability is linked to improved communication skills. Children with higher IQs generally possess more advanced language abilities, enabling them to express their needs and desires effectively, understand instructions better, and engage in more complex social interactions.[21,22]

Cognitive ability also affects children's capacity to understand and navigate their social environment. Children with higher IQs are more adept at grasping social rules, interpreting cues, and adjusting behaviors in various social contexts. Those with milder intellectual disabilities are more likely to participate in a range of academic, recreational, and vocational activities, enriching their life experiences and contributing to overall satisfaction and well-being. They are also more likely to engage in inclusive settings, allowing them opportunities to interact with a broader spectrum of individuals and experiences.[23,24]

One of the most striking findings of this study was the strong relationship between parental education level—especially maternal education—and the child's quality of life. Maternal education showed an extremely strong correlation with QoL ($p < 0.001$), with all children of higher-educated mothers achieving a good QoL, compared to only 8.1% of children from primary-educated mothers. This relationship appears to be stronger than some aspects of the child's IQ itself, highlighting the importance

of environmental and family factors in determining outcomes for children with intellectual disabilities. This aligns with extensive literature indicating that maternal education is one of the strongest predictors of child outcomes. Mothers with higher education levels tend to have better health literacy, which enables them to more effectively understand their child's condition, identify their child's needs, and seek out relevant information about available interventions and support. A study by Fernandez et al. shows that parental health literacy is an important mediator between parental education and child health outcomes. Higher education enhances skills in navigating complex healthcare and educational systems, resulting in more effective advocacy and proactive parenting approaches.[25,26,27]

Family socioeconomic status also exhibited a highly significant relationship with QoL ($p < 0.001$), where all children from high-income families achieved a good QoL, compared to only 7.7% of those from low-income families. This finding is consistent with extensive research demonstrating the impact of poverty and socioeconomic status on child outcomes. Poverty and low socioeconomic status are correlated with various adverse outcomes in children, such as poorer physical health, slower cognitive development, mental health issues, and limited access to healthcare and educational services. Families with limited resources may face food insecurity or rely on less nutritious diets, affecting children's physical health and development. Financial stress can negatively impact parental mental health and well-being, which in turn affects the quality of caregiving and the emotional environment at home. Research has shown that financial stress is associated with higher levels of depression and anxiety in parents, impacting their ability to provide responsive and supportive care.[28,29]

The age at diagnosis also showed a trend toward significance ($p = 0.051$), with earlier diagnosis associated with better QoL. This finding supports the principles of early intervention, which demonstrate that comprehensive early interventions can lead to meaningful developmental improvements. Early diagnosis allows for interventions during critical periods of neuroplasticity, when foundational skills are being established. Research indicates that children diagnosed and receiving interventions before the age of five show better cognitive, language, and social outcomes than those diagnosed later. Furthermore, the lack of significant relationships between therapy type or frequency and QoL may suggest that the quality and appropriateness of therapy are more important than the quantity alone.[30]

Several limitations should be considered in this study. The assessment of quality of life relied solely on parent reports, which may differ from the children's self-reports. Additionally, the small sample size for severe disabilities ($n = 3$) limits the ability to draw robust conclusions for that group. Several potentially important factors, such as family cohesion, parental stress, social support quality, and environmental accessibility, were not measured. The socioeconomic status was assessed through self-reporting, which may be subject to bias. Moreover, since the study was conducted in one city in Indonesia, its generalizability to other regions with different cultural contexts, healthcare systems, or educational resources is limited. Multi-center studies across diverse settings would help determine whether these findings are applicable in a broader context.

CONCLUSION

This study demonstrates a significant relationship between IQ levels and the quality of life in children with intellectual disabilities attending Special Schools in Padang City, exhibiting clear gradients across severity levels. However, environmental factors, particularly maternal education and family socioeconomic status, have a considerable impact on outcomes, sometimes rivaling the influence of cognitive factors. Most children in the study

experienced impaired quality of life, with school functioning posing the greatest challenge. While physical functioning remained relatively intact, emotional and social domains displayed substantial difficulties that require attention. These findings highlight that improving outcomes for children with intellectual disabilities necessitates comprehensive approaches addressing not only cognitive limitations but also family education, economic support, and environmental factors. Key components of effective care include early diagnosis, intensive early intervention, family empowerment through education and support, and coordinated multi-disciplinary services. Future research should investigate the longitudinal trajectories of quality of life, the effectiveness of interventions across different severity levels, and the mechanisms through which family and environmental factors influence outcomes. Larger studies that adequately represent all severity levels would enhance the evidence base for this important population.

Declaration by Authors

Ethical Approval: Approved

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