

Original Article



Communication and Social Interaction among Children with *Cerebral Palsy*: A Cross-Sectional Study in Lahore, Pakistan

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Abstract

Background: *Cerebral palsy* (CP) is a group of permanent, non-progressive disorders of movement and posture caused by disturbances that occur in the developing fetal or infant brain. These motor impairments are frequently accompanied by difficulties in communication and social interaction, which can significantly affect a child's participation and quality of life. Evidence on communication and social interaction among children with CP in the Pakistani context remains limited. **Objective:** To assess communication and social interaction among children with *cerebral palsy* in Lahore, Pakistan, using caregiver-reported quality-of-life ratings. **Methods:** A cross-sectional study was conducted at three private institutions in Lahore. Rising Sun Institute for Special Children, Dimensions, and Rehab Care from January to June 2024. Using convenience sampling, the communication- and social-interaction-related items of the *Cerebral palsy* Quality of Life Questionnaire for Children (CP QOL-Child, Primary Caregiver Questionnaire, Version 2, July 2013) were administered to parents/caregivers of children with CP aged 4–12 years, of all CP subtypes; children with epilepsy or visual impairment were excluded. The minimum required sample size was calculated as 169 (97% confidence level, 3% margin of error). Questionnaires were distributed to 240 parents/caregivers; 190–192 valid responses were obtained per item and included in the analysis. Data were analyzed descriptively (means, standard deviations, frequencies) using SPSS version 21.0; no inferential statistical tests were performed. **Results:** Of the 190 children included, 112 (58.9%) were male and 78 (41.1%) were female. Across 22 CP QOL-Child items covering relationships, acceptance, participation, and communication, caregiver-rated scores (1 = very unhappy, 9 = very happy) averaged 5.21 overall, ranging from 4.74 (participation in recreational activities) to 5.96 (getting along with siblings), indicating a generally moderate, mixed picture rather than a strong tendency toward either end of the scale. **Conclusion:** This cross-sectional survey of 190 children with *cerebral palsy* in Lahore, Pakistan, found that caregivers rated their children's communication and social interaction as moderate on average, with considerable variability across families and across domains. Participation-related items scored somewhat lower on average than relationship-related items, suggesting participation may be an area of unmet need. As a descriptive, cross-sectional study, it cannot establish the causes of this variability.

Introduction

Cerebral palsy (CP) is a group of permanent disorders affecting movement and posture that limit activity and are attributed to disturbances in the developing fetal or infant brain [1]. It is characterized by abnormalities in movement and posture and is frequently accompanied by disturbances in sensation, cognition, communication, perception, and behavior, as well as by seizure disorders. *Cerebral Palsy* may result from events occurring during fetal development or early infancy and is not necessarily evident at birth; early diagnosis and appropriate

intervention may help a child maintain independence and mobility [1].

Cerebral Palsy is a neurological disorder that can affect movement, posture, and functional abilities. It is primarily caused by abnormal development or injury to the developing brain. When CP is mild, it may not be identified within the first 12 months of life. Communication impairments are common in CP and may include difficulty with speaking, gesturing, or producing facial expressions, as well as difficulty

understanding or producing language; hearing and vision problems can further contribute to these difficulties. Speech difficulties affect approximately 36% of children with *CP*, and more than 42% have some form of communication problem [7].

Consistent outcome measures across studies could help build a broader evidence base on communication abilities in children with *CP* and their communication partners, which would support the identification of clinical subgroups and the evaluation of intervention effectiveness [3]. Reporting global effects using established outcome measures — rather than only individual targeted skills — would also allow researchers to track the rate of change over time for individuals and groups, regardless of whether they were receiving an intervention; such measures may be valuable both clinically and for future research [4].

The clinical presentation of *CP* varies considerably among individuals. Common features include ataxia (impaired coordination of voluntary movement), spasticity (increased muscle stiffness), and, in some children, a scissoring gait [2]. Muscle tone may range from hypotonia to hypertonia, and children may also experience increased salivation (which can contribute to difficulties with chewing and swallowing), reduced fine-motor skills, and cognitive impairment, which may result in a need for long-term support [4]. Dyskinetic presentations, involving involuntary movements, may result from involvement of the basal ganglia and can disrupt coordinated motor tasks such as eye-hand coordination, eating, and speech. *Ataxic CP* affects approximately 5–10% of individuals with *CP* and results from cerebellar involvement, typically presenting with hypotonia and uncoordinated, poorly controlled movements, as well as instability of the shoulder and pelvic girdles; this subtype is rare. *Mixed CP* occurs when a child with extensive neurological involvement shows features of more than one subtype — for example, spasticity combined with *dyskinesia* or *ataxia* [5].

The family and social environment significantly influences the development and care of children with disabilities [3]. Raising a child with *CP* can place greater demands on parents than raising a typically developing child, and parents' emotional and psychological well-being can affect how well they cope. Supporting parents' social and psychological well-being may, in turn, support the child's development [6].

A prior systematic review of speech and language therapy (SLT) for children with communication impairments linked to *CP* examined the methods used to treat different types and severities of communication impairment and compared their relative effectiveness. Given the limited evidence available at the time, the review remained largely exploratory [8].

Despite evidence that *Cerebral Palsy* can substantially affect communication and social participation, evidence from Pakistani children remains limited. This study therefore aimed to assess communication and social interaction among children with *Cerebral Palsy* in Lahore, Pakistan, using caregiver-reported quality-of-life ratings.

Materials and Methods

A cross-sectional study design was used to assess communication and social interaction, via caregiver-reported quality of life, among children with *Cerebral Palsy (CP)*. Parents/caregivers of children with *CP* from three private institutions in Lahore. Rising Sun Institute for Special Children, Dimensions, and Rehab Care were surveyed. The study was conducted over six months, from January 2024 to June 2024, following approval of the research synopsis.

Convenience sampling was used. The minimum required sample size was calculated as 169, using a sample-size calculator with a 97% confidence level and a 3% margin of error. Questionnaires were distributed to 240 parents/caregivers; complete, valid responses per item ranged from 190 to 192 (a small number of individual items had a few additional missing responses) and were included in the analysis.

The target population comprised children diagnosed with different types of *Cerebral Palsy*, including spastic, flaccid, ataxic, and mixed forms. Inclusion criteria comprised children aged 4–12 years, of both sexes, representing all *CP* subtypes. Children with comorbid epilepsy or visual impairment were excluded.

Written informed consent was obtained from the parents/caregivers before data collection.

The *Cerebral Palsy Quality of Life Questionnaire for Children (CP QOL-Child)*, Primary Caregiver Questionnaire (Version 2, July 2013, for ages 4–12 years), was used as the data collection tool. This questionnaire asks caregivers to rate, on a 9-point scale (1 = very unhappy to 9 = very happy), how they believe their child feels about various aspects of life, grouped into domains: Family & Friends, Participation, Communication, Health, Special Equipment, Pain and Bother, and Access to Services. For this study, only items from the domains most relevant to communication and social interaction, Family & Friends, Participation, and Communication were administered and analyzed; items from the Health, Special Equipment, Pain and Bother, and Access to Services domains were not used. Questionnaires were distributed to parents/caregivers through the participating institutions. Data were entered into and analyzed using SPSS version 21.0.

Descriptive statistics means, standard deviations, frequencies, and percentages were used to summarize responses to each item and to compute domain-level composite scores (the average of item means within each domain). No inferential statistical tests were performed.

Results

A total of 240 questionnaires were distributed to parents/caregivers of children with *CP*; valid responses per item ranged from 190 to 192. Of the 190 children with complete demographic data, 112 (58.9%) were male and 78 (41.1%) were female. Most families were of joint family structure (110, 57.9%) and middle socioeconomic status (97, 51.1%).

Table 1. Child and Family Characteristics (n = 190)

Variable	n	%
Gender — Male	112	58.9%
Gender — Female	78	41.1%
Socioeconomic status — Low	75	39.5%
Socioeconomic status — Middle	97	51.1%
Socioeconomic status — High	18	9.5%
Birth order — 2nd	61	32.1%
Birth order — 3rd	72	37.9%
Birth order — 4th	37	19.5%
Birth order — 5th	20	10.5%
Residence — Lahore	119	62.6%
Residence — Another city	71	37.4%
Family system — Joint	110	57.9%
Family system — Nuclear	79	41.6%
Number of siblings — 2	77	40.5%
Number of siblings — 3	81	42.6%
Number of siblings — more than 5	32	16.8%

Table 2. Domain-Level Composite Scores

Domain	Items (n)	Composite mean (1–9 scale)
Family&Friends — Relationships	7	5.45
Family&Friends — Acceptance&Play	8	5.10
Participation	4	5.04
Communication	2	5.01
Overall (all 22 items)	22	5.21

Table 3. Item-Level Scores (Family & Friends, Participation, and Communication domains)

Item	N	Mean	SD
The way they get along with people generally	190	5.01	2.14
The way they get along with you (caregiver)	191	5.70	2.05
The way they get along with their brothers & sisters	191	5.96	2.08
The way they get along with other children at preschool/school	192	5.86	2.03
The way they get along with other children outside preschool/school	191	5.05	2.28
The way they get along with adults	191	5.31	1.83
The way they get along with their teachers/carers	191	5.29	2.03
Their ability to play on their own	191	4.93	2.41
Their ability to play with friends	191	5.06	2.46

Going out on trips with family	191	4.94	2.30
How they are accepted by other children at preschool/school	191	5.00	2.16
How they are accepted by their family	191	5.29	2.41
How they are accepted by other children outside preschool/school	191	4.79	2.14
How they are accepted by adults	191	5.40	2.08
How they are accepted by people in general	191	5.37	2.11
Ability to participate in recreational activities	191	4.74	2.24
Ability to participate in sporting activities	191	5.13	2.10
Ability to participate in social events outside school	191	5.28	2.02
Ability to participate in their community	191	5.02	2.27
The way they communicate with people they know well	191	4.93	1.96
The way other people communicate with them	191	5.09	2.54
Ability to play games with other children (example item)	191	5.37	2.10

Table 4. Additional General Wellbeing Items

Five further items used a 5-point happiness scale (very unhappy / unhappy / neither / happy / very happy) rather than the 9-point scale, and their exact question wording was not clearly recorded in the thesis tables. They are reported here for completeness, without a specific item label:

Item (unlabeled)	Very unhappy	Unhappy	Neither	Happy	Very happy
Unlabeled item A (n=191)	13.3%	22.1%	20.4%	15.8%	7.9%
Unlabeled item B (n=191)	5.0%	13.8%	24.2%	25.4%	11.3%
Unlabeled item C (n=191)	13.8%	19.2%	20.0%	17.1%	9.6%
Unlabeled item D (n=224)	12.9%	19.6%	22.9%	21.7%	16.3%
Unlabeled item E (n=191)	12.9%	15.0%	20.0%	17.9%	13.8%

Discussion

Cerebral Palsy (CP) is a group of permanent movement disorders that appear in early childhood. It affects muscle tone, posture, and movement, and is often accompanied by associated impairments such as intellectual disability, seizures, and difficulties with speech and hearing. Among these, communication and social interaction are particularly significant, as they affect quality of life and social participation.

In this study, caregivers rated their children's relationships, acceptance, participation, and communication as moderate on average (overall composite mean 5.21 out of 9), with wide

variability across items (SDs generally between 2.0 and 2.5) and no strong tendency toward either the happy or unhappy end of the scale. Participation-related items — recreational activities, sport, social events, and community involvement — scored somewhat lower on average (composite mean 5.04) than relationship-related items such as getting along with siblings (mean 5.96) or the caregiver (mean 5.70), suggesting that participation outside the family may be a relatively greater area of difficulty for children with *CP* in this sample.

Children with *CP* frequently experience speech and language impairments that affect their communication modes and functions [12]. Communication and social interaction are closely linked: children with *CP* often experience difficulty initiating and maintaining social relationships as a result of their speech and language impairments, which can contribute to social isolation and difficulty forming peer relationships [11]. Pain, and difficulty communicating that pain, has also been shown to affect both the child's wellbeing and caregivers' perception of family impact and satisfaction with healthcare [10].

A range of factors affecting communication functioning in children with *CP* — including motor severity, cognitive level, and associated impairments — has been described in the literature [1]. Parents and caregivers of children with *CP* report both benefits and everyday challenges in integrating augmentative and alternative communication (AAC) into daily life [9], which may partly explain the relatively lower communication scores observed here.

Longitudinal evidence suggests that social functioning in children with *CP* can be tracked and supported over time with appropriate intervention [6]. Overall, communication and social interaction are important aspects of development for children with *CP*. The combination of motor impairment, speech and language disorders, and social isolation creates complex challenges requiring varied interventions. Speech therapy, AAC, and social-skills training may support communication development and social participation, improving quality of life and social inclusion for children with *CP*.

Conclusion

This cross-sectional survey of 190 children with *Cerebral Palsy* (aged 4–12 years) in Lahore, Pakistan, found that caregivers rated their children's communication and social interaction as moderate on average (overall mean 5.21 out of 9) across 22 questionnaire items, with considerable variability both within and across families. Participation in recreational, sporting, social, and community activities scored somewhat lower on average than close relationships with family and caregivers, suggesting participation may be a particular area of unmet need for children with *CP* in this context. These findings highlight the value of targeted communication and social-participation support for children with *CP* and their families in Pakistan. As a cross-sectional, descriptive study, it cannot establish which factors caused or predicted these differences.

Limitations

- Convenience sampling from three private institutions in Lahore limits generalizability to the wider population of children with *CP* in Pakistan, including those in public-sector or rural settings.
- The cross-sectional design does not allow conclusions about change over time or causal relationships.
- Reliance on parent/caregiver report may introduce response or recall bias.
- The absence of a comparison/control group limits the ability to contextualize the severity of findings.
- 50 of the 240 distributed questionnaires (about 21%) were incomplete or not returned, which may introduce non-response bias.
- Two questionnaire items (participation at preschool/school; communicating with people the child doesn't know well) and five items with unclear wording were not included in the main analysis; a complete dataset would allow a fuller picture.
- Small/limited sample size relative to the full population of children with *CP* in Lahore, and difficulty obtaining institutional permission and caregiver awareness, affected data collection, consistent with the constraints noted in the original thesis.

Ethical Approval

Institutional/ethical approval for this research was granted by the Research & Ethics Committee (REC), Riphah College of Rehabilitation and Allied Health Sciences, Faculty of Rehabilitation and Allied Health Sciences, Riphah International University, Lahore, Pakistan (Ref. No. REC/RCR&AHS/26/3002). Written informed consent was obtained from the parents/caregivers of all participating children before data collection.

Conflict of Interest: NIL

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Declarations:

Authors' Contribution:

- All authors Conceptualization, data collection, interpretation, drafting of the manuscript and intellectual revisions
- The authors agree to take responsibility for every facet of the work, making sure that any concerns about its integrity or veracity are thoroughly examined and addressed

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