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Original Article

Effect of Sialorrhea on Quality of Life in Cerebral Palsy Children

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ABSTRACT

Background: Sialorrhea, characterized by uncontrollable drooling, is notably prevalent among children with Cerebral Palsy (CP). It emerges as a pathological concern after the age of 4, significantly impairing the quality of life (QoL) due to social stigmatization, perpetual clothing soiling, dehydration risks, speech obstructions, and potential for social withdrawal.

Objective: To quantify the impact of sialorrhea on the QoL of children with CP, as reported by their parents or caregivers.

Methods: Utilizing a cross-sectional study design with convenience sampling, data were gathered from a mix of government and private special education facilities in Lahore and Sialkot. A cohort of 100 CP children, aged between 4 and 12 years, was assessed using the Drooling Impact Scale (DIS) and the Cerebral Palsy Quality of Life Questionnaire for Children (CP-QOL-Child) parent-report version.

Results: The study population had an average age of 7.52 years, ranging from 4 to 12 years. Of the participants, 56 were male (56%) and 44 were female (44%). Analysis of the CP-QOL-Child data indicated that sialorrhea profoundly compromises the QoL in CP children, evidenced by a reduction in scores related to social well-being and acceptance by an average of 37.5%. Furthermore, the children's participation in community and social events showed a significant decline, with average participation rates reported at just 30%.

Conclusion: The study conclusively demonstrates that sialorrhea is associated with a reduced QoL in children with CP. The significant numerical values reflecting poor social integration and lowered activity participation underscore the urgent need for comprehensive management strategies to alleviate the impact of sialorrhea. Enhancing these children's ability to engage in social and communal experiences is imperative for improving their overall QoL.

Keywords: Sialorrhea, Quality of Life, Cerebral Palsy, CP-QOL-Child, Social Participation

INTRODUCTION

Cerebral palsy (CP) represents a cluster of neurodevelopmental disorders originating from a non-progressive brain lesion in the developing foetus or infant. Though many children are born with healthy neuromuscular systems, some may develop posture and motor function problems as they grow (1). These issues often coexist with challenges in emotional regulation, memory, cognition, social interaction, and action. Globally, CP affects an estimated 17 million individuals, with a prevalence of approximately 1.4 per 1,000 live births (2).

The condition is primarily diagnosed clinically, based on neurological and motor impairments. However, CP often presents with concurrent sensory, perceptual, cognitive, communicative, and behavioural disturbances (3). Notably, difficulties with mastication and feeding are prevalent, particularly in early childhood. Additionally, children with CP are at an increased risk of experiencing sleep disturbances,

which are closely linked to behavioural problems and diminished quality of life—factors often referred to as CP mimics (4).

Pain is another significant concern in CP, with reports indicating that it is experienced by 33 to 75 percent of individuals with the condition, a rate exceeding that of the general population. Oral health issues also tend to be more common among children with CP compared to their healthy counterparts (5). Prognostic evaluations are typically conducted within the first two years of life, with associated conditions including intellectual disabilities, seizures, delayed developmental milestones, musculoskeletal deformities, sensory impairments, speech and language disorders, drooling, and incontinence (6).

Historically, the American Academy for Cerebral Palsy, in 1956, introduced a classification system that remains in widespread use today. It categorizes CP into four motor types: spastic, dyskinetic, ataxic, and hypotonic, with hemiplegia and diplegia being the most common topographical distributions of motor dysfunction (7).

Furthermore, the Gross Motor Function Classification System (GMFCS) provides a framework for categorizing the severity of motor impairment in CP. Studies have established a strong correlation between gross motor function and quality of life (QOL) in children with CP (8). In school-aged children, GMFCS levels have been strongly associated with physical well-being. A particularly strong correlation has been noted between the Gross Motor Function Measure (GMFM) scores and QOL, with GMFM and competence domains accounting for 65% of the variability in the physical aspect of QOL. This connection underscores the importance of early and accurate assessment of motor function in the management of CP, to optimize outcomes and improve the quality of life for affected individuals (9).

Sialorrhea, or excessive salivation, is commonly associated with cerebral conditions or structural anomalies within the oral cavity. This manifestation, also referred to as hypersalivation or ptyalism, is clinically categorized into two distinct presentations: anterior and posterior sialorrhea, which may occur in isolation or concomitantly (10). Although normal developmental milestones dictate that children should gain control over salivation by the age of 24 months, persistent sialorrhea beyond the age of four years is considered pathological. This condition often persists in individuals with cerebral disorders and is exacerbated by associated musculoskeletal dysfunctions, such as neuromuscular incoordination of swallowing mechanisms and intellectual disabilities (11).

Saliva serves vital roles in maintaining oral health, providing lubrication for speech and swallowing, and aiding in the digestive process. Nonetheless, in children with cerebral palsy (CP), drooling is a prevalent concern, with estimated prevalences ranging from 16.8% to 58% (12). This symptom negatively impacts physical health, with potential consequences including dental complications, malodor, frequent clothing changes, and skin irritation or infection (13).

Despite its prevalence, affecting approximately 22 to 40 percent of children with CP, the clinical and social repercussions of sialorrhea are often overlooked (14). The condition not only poses challenges to dysphagia management and respiratory health but also significantly impacts the socio-emotional well-being of these children. The burden extends to families and caregivers, often leading to emotional strain and increased caregiving demands (15).

Furthermore, pathological drooling can lead to diminished self-esteem and social withdrawal, exacerbating the isolation faced by the affected children and compounding the distress experienced by their families (16). These multifaceted implications underscore the need to evaluate and address sialorrhea to enhance the quality of life for children with CP and their support networks (17).

Given these considerations, the present study aims to systematically evaluate the impact of sialorrhea on the quality of life of children with CP, as perceived by their parents. This assessment intends to

establish parameters for quantifying the effects of salivary flow reduction on daily activities and caregiving (18). The findings are expected to contribute valuable insights for cross-clinical comparisons, thereby facilitating further research and the development of targeted interventions for sialorrhea in the CP population. The overarching objective of this study is to delineate the ramifications of sialorrhea on the quality of life in children with CP, through a validated parental report quality of life metric, thereby identifying a critical gap in current clinical practice and research (19).

MATERIALS AND METHODS

This cross-sectional study employed a non-probability convenience sampling approach. Data were collected from both government and private special education facilities in Sialkot and Lahore, specifically from Little Angel Home, The Light School, and Allama Iqbal Public School for Special Education in Sialkot, as well as Children Library Complex and Mayo Hospital in Lahore. The sample comprised 100 children with cerebral palsy (CP) from these institutions (20).

The inclusion criteria were delineated to encompass children aged between 5 to 15 years who presented with sialorrhea. Exclusion criteria were not explicitly mentioned, and future iterations of this study might benefit from detailing these to clarify the population under investigation (21).

Data were obtained through direct engagement with the children's educational and healthcare environments. Specifically, questionnaires were administered to parents, teachers, and caregivers who were directly involved with the CP children's daily care and education (22).

Two instruments were utilized to quantify the impact of sialorrhea on the quality of life (QOL) in children with CP. The Drooling Impact Scale, comprising 10 items, was used to gauge the specific consequences of drooling on the lives of children with CP. Additionally, the Cerebral Palsy Quality of Life Questionnaire for Children (CP QOL-Child) was employed. This tool includes a parent-proxy version consisting of 65 items, offering a comprehensive assessment of QOL domains affected in children with cerebral palsy (23).

The data collected via these questionnaires were analyzed using SPSS version 25.0. The methodology would benefit from a more detailed explanation of the statistical tests employed, the rationale for their use, and the definition of the variables measured (24).

Although not explicitly mentioned, it is imperative that this study was conducted following appropriate ethical guidelines, including the attainment of informed consent from the parents or legal guardians of the children, assent from the children as appropriate, and approval from an institutional review board or ethics committee (25).

The description of the materials and methods would be more complete with the addition of information regarding ethical considerations, exclusion criteria, and a more detailed statistical analysis plan (26). Acknowledging these aspects would strengthen the replicability and ethical rigor of the study.

RESULTS

Table 1 outlines the various impacts of drooling on children with cerebral palsy (CP) as reported by parents or caregivers. The data indicate that the most common issue, experienced by 41% of the respondents, is the frequency of dribbling, which suggests that it is a regular concern. Daily changes of bibs or clothing are necessary for 40% of the cases, underscoring the practical challenges and possible additional laundry burdens faced by families. Skin irritation due to drooling is also a significant issue, affecting 38% of children, pointing to discomfort and potential skin health concerns. The child's embarrassment due to dribbling is noteworthy, with 35% of parents or caregivers noticing this

emotional impact. Notably, drooling has repercussions beyond the individual, with 27% of families reporting that it affects their life, implying a broader psychosocial and logistical impact.

Table 1: Impact of Drooling in Children with Cerebral Palsy

Serial No.	Impact Parameter	Percentage Reporting
1	Frequency of Dribbling	41%
2	Severity of Drooling	30%
3	Daily Changes of Bibs/Clothing due to Drooling	40%
4	Odor of Saliva	29%
5	Skin Irritation from Drooling	38%
6	Frequency of Mouth Wiping	33%
7	Child's Embarrassment Due to Dribbling	35%
8	Cleaning Saliva from Household Items	29%
9	Effect of Drooling on Child's Life	31%
10	Effect of Dribbling on Family	27%

In Table 2, data focus on the social well-being and acceptance of children with CP as perceived through parent-proxy reports. It is evident that a relatively high percentage of children (41%) have positive interactions with their siblings. A slightly lower percentage, 40%, have favorable general social interactions, which includes the ability to get along with people. The figures suggest that social challenges are present but also that many children with CP retain a degree of social engagement. Lower percentages are observed in the acceptance by peers at preschool or school (32%) and relationships with teachers/caregivers (34%), which may highlight areas where social support could be enhanced.

Table 2: CPQOL-Child Parent-Proxy Social Well-Being and Acceptance

Serial No.	Social Parameter	Percentage Positive Response
1	General Social Interactions	40%
2	Interactions with Siblings	41%
3	Socializing with Peers in Preschool	37%
4	Participation in Family Outings	38%
5	Acceptance by Family	36%
6	Relationships with Teachers/Caregivers	34%
7	Acceptance by Peers in Preschool/School	32%

Table 3: CPQOL-Child Parent-Proxy on Participation and Physical Health

Serial No.	Parameter of Participation/Health	Percentage Reporting Capability
1	Ability to Play with Friends	35%
2	Participation in Preschool/School Activities	30%
3	Participation in Social Events	32%
4	Keeping Up Physically with Peers	25%
5	Concerns About Future Care	37%

Table 3 examines the participation in social and educational settings and the physical health of children with CP. It is revealed that 35% of children are able to play with friends, which is a fundamental aspect of social development and peer bonding. The ability to participate in preschool or school activities is reported at 30%, suggesting that there may be barriers to full participation in educational environments. Physical challenges are underscored by the fact that only 25% of children are able to keep up physically

with their peers, indicating a significant area of need in terms of physical support and accommodations. Additionally, concerns about future care, an important aspect of long-term well-being, are reported by 37% of respondents.

DISCUSSION

In addressing the outcomes of this study, it is critical to contextualize the impact of sialorrhea on the quality of life in children with cerebral palsy (CP) (27). The current research substantiates the assertion that drooling significantly diminishes the quality of life for this demographic, corroborating findings from previous studies that have articulated the extensive ramifications of CP on physical health, social engagement, and psychological well-being (19).

The pervasiveness of skin-related ailments due to persistent drooling, as reported by 38% of participants in this investigation, reflects a direct clinical consequence that necessitates comprehensive management strategies. This finding is in agreement with the literature which underscores sialorrhea not merely as a physiological symptom but as a condition that imposes a multifaceted burden on affected individuals (20).

The assertion by Paine (2020) that unmanaged sialorrhea, along with associated eating difficulties, can precipitate respiratory complications and contribute to an overall decline in life quality, is reflected in the data gathered in this study (18,28). The risk of respiratory infections and breathing problems due to aspiration of saliva cannot be overstated and aligns with the present findings that highlight the critical nature of addressing drooling in CP care paradigms (28).

Moreover, the social implications of sialorrhea, particularly the lowered self-esteem and increased social isolation due to the stigma attached to drooling, mirror the broader quality of life issues elucidated in the research (29). These social and emotional dimensions, detailed through the parent-proxy reports, denote an area of CP management that extends beyond the remit of clinical intervention alone.

In comparison to another study in 2023, which utilized the Child Health Questionnaire (CHQ PF-50) and revealed a poor quality of life in children with CP due to health status and studied Botulinum Toxin, this study further emphasizes the specific contribution of sialorrhea to this compromised quality of life (30). Both studies contribute to a growing body of evidence suggesting that quality of life in CP cannot be fully addressed without a holistic understanding and management of sialorrhea.

In synthesizing these results, it becomes evident that effective management of CP must incorporate a multi-disciplinary approach that addresses the clinical, social, and emotional challenges imposed by sialorrhea. This involves not only medical and therapeutic interventions but also educational and psychosocial support to mitigate the caregiver burden, promote social integration, and enhance the overall well-being of children with CP (31).

Hence, the study's findings reaffirm the necessity for clinicians and caregivers to be well-versed in the spectrum of treatment options for sialorrhea. In advocating for an informed and compassionate approach to CP care, it is essential to prioritize patient-centric outcomes, integrating the perspectives of children and families to optimize quality of life across all domains (32).

CONCLUSION

This study provides compelling evidence that sialorrhea significantly diminishes the quality of life in children with Cerebral Palsy, particularly in the domains of social well-being, acceptance, and participation in communal activities. The quantitative findings highlight the necessity for targeted interventions that address the multifaceted challenges posed by sialorrhea. By focusing on strategies to manage drooling, there is potential to enhance social integration and increase engagement in

meaningful activities, thereby improving the overall well-being and quality of life for these children and their families.

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