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Correlation and Prevalence of Caregiver Burden and Its Impact on Quality of Life Among Parents of Children With Cerebral Palsy

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ABSTRACT

Background: *Cerebral palsy (CP) is a lifelong neurodevelopmental disorder that imposes substantial physical, emotional, and functional demands on families, particularly primary caregivers. Persistent caregiving responsibilities may lead to elevated parental stress, which in turn can adversely affect overall family quality of life. However, limited local evidence quantifies this association using validated instruments within tertiary rehabilitation settings.* ***Objective:*** *To determine the prevalence of parental stress and examine its association with family quality of life among caregivers of children with cerebral palsy.* ***Methods:*** *A cross-sectional observational study was conducted among 150 primary caregivers of children with CP attending a tertiary care rehabilitation center. Parental stress was assessed using the Parental Stress Scale (PSS), and family quality of life was measured using the PedsQL™ Family Impact Module (FIM). Descriptive statistics summarized demographic and clinical variables. Pearson correlation and multivariable linear regression analyses were performed to evaluate the association between parental stress and family quality of life, adjusting for demographic factors.* ***Results:*** *The mean PSS score was 53.11 ± 9.14, with 74.7% of caregivers reporting moderate stress and 12.7% severe stress. The mean PedsQL-FIM total score was 71.03 ± 9.25. A statistically significant moderate-to-strong negative correlation was observed between parental stress and family quality of life ($r = -0.600$, $p < 0.001$). Regression analysis demonstrated that each one-point increase in PSS score was associated with a 0.61-point decrease in PedsQL-FIM total score.* ***Conclusion:*** *Parental stress is highly prevalent and significantly associated with reduced family quality of life among caregivers of children with CP. Integrating caregiver stress screening and psychosocial support into rehabilitation programs may improve family-centered outcomes.*

Keywords: *Cerebral palsy, parental stress, caregiver burden, family quality of life, PedsQL Family Impact Module, rehabilitation*

INTRODUCTION

Cerebral palsy (CP) is a non-progressive neurodevelopmental disorder characterized by permanent disturbances in movement and posture that result from injury to the developing brain. In addition to motor impairments, children with CP frequently present with epilepsy, communication difficulties, cognitive impairments, visual or hearing deficits, and feeding problems, which collectively increase dependency in activities of daily living and necessitate long-term multidisciplinary rehabilitation (1). The chronic and complex nature of CP extends its impact beyond the child to the family system, particularly to primary caregivers who assume continuous responsibility for medical management, physical assistance, and social adaptation. In many low- and middle-income countries, including Pakistan, caregiving responsibilities are predominantly undertaken by mothers, often in the absence of structured psychosocial support services, thereby increasing vulnerability to psychological distress and functional strain (2).

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Within the caregiving literature, it is essential to distinguish between related but conceptually distinct constructs. Caregiver burden refers to the multidimensional strain experienced as a result of caregiving demands, encompassing physical, emotional, financial, and social domains (3). Parental stress, in contrast, specifically reflects the perceived stress associated with the parenting role and the demands of child-rearing (4). Although closely related, these constructs are measured using different psychometric instruments and capture different theoretical dimensions of caregiver experience. Prior systematic reviews have demonstrated that caregivers of children with CP report elevated levels of burden and stress, with contributing factors including severity of motor impairment, communication limitations, behavioral challenges, limited social support, and socioeconomic constraints (5). Empirical studies further show that higher caregiving strain is associated with poorer caregiver quality of life, reduced family functioning, and adverse child rehabilitation outcomes (6).

Family quality of life has emerged as a critical outcome in pediatric disability research, recognizing that child-centered rehabilitation cannot be fully effective without addressing caregiver wellbeing. The PedsQL™ Family Impact Module (FIM) is widely used to evaluate how a child's chronic health condition affects parental physical health, emotional functioning, social participation, cognitive functioning, communication, daily activities, and overall family relationships (7). Evidence indicates that caregivers of children with CP frequently experience chronic fatigue, emotional distress, and social isolation, leading to compromised family functioning across multiple domains (8). In addition, maternal care burden and fatigue have been shown to negatively influence both the child's quality of life and rehabilitation progress, particularly in cases of more severe motor impairment (9). These findings underscore the interdependence between caregiver psychological wellbeing and family-level outcomes.

In regional contexts similar to Pakistan, high levels of caregiver burden and stress have been consistently reported. A study conducted in Islamabad found substantial caregiver burden among parents of children with CP, with many reporting a need for respite and structured support services (10). International data from developing settings similarly indicate that caregivers experience significant psychological pressure, especially when resources are limited and rehabilitation services are fragmented (11). However, despite growing global evidence, there remains limited local data examining parental stress specifically—distinct from generalized burden—and its quantified association with family quality of life using validated instruments such as the Parental Stress Scale (PSS) and the PedsQL Family Impact Module in tertiary rehabilitation settings. Moreover, many prior studies have either focused exclusively on caregiver burden without differentiating parental stress constructs, or examined quality of life without statistically modeling the strength of association between stress and family functioning. This creates a methodological and conceptual gap in the local literature.

From a PICO-oriented perspective, the population of interest comprises primary caregivers of children diagnosed with cerebral palsy under 18 years of age. The exposure of interest is parental stress as measured by the Parental Stress Scale (PSS), a validated instrument designed to quantify stress experienced in the parenting role (4). The comparator, conceptually, is lower versus higher levels of parental stress. The primary outcome is family quality of life as assessed by the PedsQL Family Impact Module total score and its subdomains (7). While causal inference is not feasible in a cross-sectional design, examining the strength and direction of association between parental stress and family quality of life is essential to determine whether higher stress levels are statistically linked to poorer family functioning in this population.

Understanding this association has important clinical implications. If parental stress is strongly and negatively associated with family quality of life, routine screening for parental stress in rehabilitation settings could facilitate early psychosocial interventions, structured counseling programs, and family-centered rehabilitation strategies. Such approaches are supported by evidence indicating that caregiver wellbeing significantly influences child outcomes and family stability (5,6). In settings where formal caregiver support services are limited, quantifying this relationship provides empirical justification for integrating psychological assessment into standard CP management protocols.

Therefore, the present study aims to determine the prevalence of parental stress among caregivers of children with cerebral palsy and to examine the correlation between parental stress and family quality of life in a tertiary care rehabilitation setting. It is hypothesized that higher parental stress scores will be significantly associated with lower PedsQL Family Impact Module total scores, indicating poorer family functioning. By addressing this association using validated instruments and statistical correlation analysis, the study seeks to provide locally relevant, clinically interpretable evidence to inform family-centered rehabilitation practices.

MATERIALS AND METHODS

This cross-sectional observational study was conducted to determine the prevalence of parental stress and to examine its association with family quality of life among primary caregivers of children with cerebral palsy. A cross-sectional design was selected as it allows estimation of the distribution of parental stress levels and quantification of the correlation between stress and family functioning at a defined point in time, consistent with recommendations for observational epidemiological studies assessing associations between psychosocial exposures and health-related outcomes (12). The study was carried out at the University of Lahore Teaching Hospital (ULTH), a tertiary care rehabilitation facility providing multidisciplinary services for children with neurodevelopmental disorders. Data collection was conducted over a six-month period following institutional ethical approval.

Primary caregivers of children diagnosed with cerebral palsy and aged less than 18 years were eligible for participation. A primary caregiver was operationally defined as the individual who assumed the greatest responsibility for the child's daily care, including medical management, physical assistance, and decision-making, for at least the preceding six months. Caregivers were included if they were able to read and understand Urdu or English and provided voluntary written informed consent. Caregivers with a documented diagnosis of a severe psychiatric disorder or those who had experienced a major adverse life event within the preceding three months were excluded to minimize acute situational confounding of stress measurements. Caregivers of children with additional severe chronic conditions unrelated to cerebral palsy were also excluded to reduce heterogeneity in caregiving burden attributable to non-CP conditions.

Participants were recruited through consecutive sampling of eligible caregivers attending outpatient rehabilitation services during routine therapy visits. On designated clinic days, a trained research assistant screened caregivers against eligibility criteria. Those meeting inclusion criteria were provided with detailed verbal and written information regarding study objectives, procedures, voluntary participation, confidentiality safeguards, and the right to withdraw at any time without affecting the child's treatment. Written informed consent was obtained prior to data collection. To reduce selection bias, recruitment was conducted across multiple clinic days and service units within the rehabilitation department to capture caregivers of children with varying functional profiles.

Data were collected using a structured questionnaire packet administered in a quiet consultation area to ensure privacy and reduce response bias. The questionnaire consisted of three components: a demographic and clinical data form, the Parental Stress Scale (PSS), and the PedsQL™ Family Impact Module (FIM). Demographic variables included caregiver age, sex, educational status, employment status, and relationship to the child, as well as child age, sex, height, and weight. Body mass index (BMI) of the child was calculated as weight in kilograms divided by height in meters squared and categorized using standard pediatric BMI classification criteria. The Parental Stress Scale is an 18-item validated instrument designed to assess stress associated with the parenting role, with items rated on a five-point Likert scale ranging from strongly disagree to strongly agree (4). Total scores range from 18 to 90, with higher scores indicating greater parental stress. For descriptive purposes, stress levels were categorized into mild, moderate, and severe based on established cut-off distributions used in prior validation studies (4). The PedsQL™ Family Impact Module is a validated 36-item instrument assessing the impact of pediatric chronic health conditions on parent and family functioning across eight domains: physical functioning, emotional functioning, social functioning, cognitive functioning, communication, worry, daily activities, and family relationships (7). Items are rated on a five-point Likert scale and linearly transformed to a 0–100 scale, with higher scores indicating better functioning and higher family quality of life (7). The total FIM score was computed as the mean of all transformed items, provided that at least 50% of items in each domain were completed, consistent with scoring guidelines (7).

The primary exposure variable was parental stress operationalized as the continuous total PSS score. The primary outcome variable was family quality of life operationalized as the total PedsQL Family Impact Module score. Secondary variables included domain-specific PedsQL scores and categorical stress levels. Potential confounding variables considered a priori included caregiver age, caregiver sex, educational status, and child age. These variables were selected based on previous evidence suggesting their association with caregiver psychological outcomes (5,6,8). To minimize information bias, standardized instructions were provided, and questionnaires were self-administered with clarification available upon request. Data entry was double-checked by two independent researchers to ensure accuracy and reduce transcription errors.

The required sample size was calculated to detect a moderate correlation ($r = 0.30$) between parental stress and family quality of life with a two-tailed alpha level of 0.05 and statistical power of 80%, based on conventional recommendations for correlation studies in psychosocial research (13). The calculation indicated a minimum sample of 138 participants; therefore, a total of 150 caregivers were recruited to account for potential incomplete responses and to increase statistical precision.

Statistical analysis was performed using Statistical Package for the Social Sciences (SPSS) version 25.0. Continuous variables were assessed for normality using the Shapiro–Wilk test and visual inspection of histograms and Q–Q plots. Normally distributed variables were presented as mean ± standard deviation, while categorical variables were presented as frequencies and percentages. The prevalence of parental stress categories was calculated with corresponding proportions.

The association between parental stress (continuous PSS score) and family quality of life (continuous PedsQL-FIM total score) was assessed using Pearson's correlation coefficient when assumptions of linearity and normality were met; otherwise, Spearman's rank correlation was applied. Correlation coefficients were reported with 95% confidence intervals. To further evaluate the relationship while accounting for potential confounders, multivariable linear regression analysis was conducted with PedsQL-FIM total score as the dependent variable and PSS total score as the primary independent variable, adjusting for caregiver and child demographic variables. Regression assumptions, including linearity, homoscedasticity, independence, and absence of multicollinearity, were examined. Missing data were handled using pairwise deletion for correlation analyses and listwise deletion for regression models when missingness was less than 5%, consistent with standard statistical practice in cross-sectional surveys (12). A two-tailed p-value of less than 0.05 was considered statistically significant.

Ethical approval was obtained from the Institutional Review Board of the Faculty of Allied Health Sciences, University of Lahore. The study adhered to the principles of the Declaration of Helsinki for research involving human participants (14). All data were anonymized using unique identification codes, and completed questionnaires were stored in a locked cabinet accessible only to the research team.

Electronic data files were password-protected to maintain confidentiality. To ensure reproducibility and transparency, standardized scoring manuals for the PSS and PedsQL-FIM were strictly followed, analytic decisions were predefined in the statistical plan, and all procedures were documented in detail to allow replication in similar clinical settings.

RESULTS

A total of 150 children with cerebral palsy were included in the analysis. As shown in Table 1, the mean age of the children was 9.15 ± 4.82 years, with a wide age range from 1 to 17 years, reflecting representation across early childhood to adolescence. The mean height was 129.03 ± 20.58 cm (range: 82.70–200.60 cm), and the mean weight was 35.15 ± 10.28 kg (range: 2.50–60.60 kg), indicating considerable anthropometric variability within the sample.

BMI classification revealed that 34.7% (n = 52) of children were underweight, 29.3% (n = 44) had normal BMI, 19.3% (n = 29) were overweight, and 16.7% (n = 25) were obese (Table 2). Thus, more than one-third of the sample was underweight, while approximately 36% fell into overweight or obese categories, highlighting a dual nutritional burden.

Gender distribution was nearly balanced, with 52.0% (n = 78) male and 48.0% (n = 72) female children. No statistically significant association was observed between gender and BMI category (p = 0.482), suggesting comparable nutritional distribution across sexes.

Family quality of life, assessed using the PedsQL™ Family Impact Module (Table 3), demonstrated moderate mean domain scores across physical, emotional, social, and cognitive functioning. The physical functioning domain had a mean score of 57.75 ± 18.29 (95% CI: 54.75–60.75), while emotional functioning averaged 60.35 ± 16.62 (95% CI: 57.62–63.08).

Social functioning (60.20 ± 16.68; 95% CI: 57.45–62.95) and cognitive functioning (60.05 ± 15.88; 95% CI: 57.45–62.65) were comparable. Lower scores were observed in communication (55.29 ± 21.22; 95% CI: 51.81–58.77), worry (51.20 ± 19.49; 95% CI: 48.00–54.40), daily activities (47.63 ± 25.44; 95% CI: 43.47–51.79), and family relationships (51.88 ± 24.88; 95% CI: 47.80–55.96). The overall PedsQL-FIM total score was 71.03 ± 9.25 (95% CI: 69.54–72.52), indicating moderate overall family functioning within the context of chronic caregiving demands.

Parental stress levels, measured using the Parental Stress Scale (Table 4), demonstrated a mean total score of 53.11 ± 9.14 (range: 34.00–83.00; 95% CI: 51.65–54.57). Distribution across stress categories showed that 74.7% (n = 112) of caregivers reported moderate stress, while 12.7% (n = 19) reported mild stress and 12.7% (n = 19) reported severe stress. The predominance of moderate stress suggests a substantial psychological burden across the caregiving population, with approximately one in eight caregivers experiencing severe stress levels.

The primary analysis examining the association between parental stress and family quality of life (Table 5) revealed a statistically significant moderate-to-strong negative correlation ($r = -0.600$, 95% CI: -0.691 to -0.487, $p < 0.001$).

This indicates that higher parental stress scores were associated with lower PedsQL-FIM total scores. The coefficient of determination ($r^2 = 0.36$) suggests that 36% of the variance in family quality of life can be explained by parental stress alone, representing a large effect size in psychosocial research.

Multivariable linear regression analysis (Table 6) further confirmed the independent association between parental stress and family quality of life. After adjusting for child age and caregiver age, parental stress remained a statistically significant predictor ($\beta = -0.61$, SE = 0.07, standardized $\beta = -0.59$, 95% CI: -0.74 to -0.48, $p < 0.001$).

Specifically, each one-point increase in PSS score was associated with a 0.61-point reduction in PedsQL-FIM total score. The overall model was statistically significant ($F(3,146) = 31.1$, $p < 0.001$), explaining 39% of the variance in family quality of life ($R^2 = 0.39$; adjusted $R^2 = 0.37$). Child age and caregiver age were not statistically significant predictors ($p = 0.184$ and $p = 0.529$, respectively), indicating that parental stress was the dominant factor influencing family quality of life in this sample.

Collectively, these findings demonstrate a high prevalence of moderate parental stress and a robust inverse relationship between parental stress and family quality of life among caregivers of children with cerebral palsy.

Table 1. Descriptive characteristics of children with cerebral palsy (n = 150)

Variable	Mean ± SD	Minimum	Maximum
Age (years)	9.15 ± 4.82	1.00	17.00
Height (cm)	129.03 ± 20.58	82.70	200.60
Weight (kg)	35.15 ± 10.28	2.50	60.60

BMI classification and gender distribution are shown in Table 2. BMI was categorized according to pediatric classification standards. No statistically significant difference in BMI distribution was observed between male and female children (χ^2 test).

Table 2. BMI categories and gender distribution (n = 150)

Variable	Category	Frequency (n)	Percentage (%)	p-value
BMI	Underweight	52	34.7	0.482
	Normal	44	29.3	
	Overweight	29	19.3	
	Obese	25	16.7	
Gender	Male	78	52.0	—
	Female	72	48.0	—

Family quality of life as measured by the PedsQL™ Family Impact Module (FIM) is presented in Table 3. Scores were transformed to a 0–100 scale according to scoring guidelines, with higher scores indicating better functioning.

Table 3. PedsQL™ Family Impact Module domain scores (0–100 scale) (n = 150)

Domain	Mean ± SD	95% CI (Lower–Upper)
Physical Functioning	57.75 ± 18.29	54.75 – 60.75
Emotional Functioning	60.35 ± 16.62	57.62 – 63.08
Social Functioning	60.20 ± 16.68	57.45 – 62.95
Cognitive Functioning	60.05 ± 15.88	57.45 – 62.65
Communication	55.29 ± 21.22	51.81 – 58.77
Worry	51.20 ± 19.49	48.00 – 54.40
Daily Activities	47.63 ± 25.44	43.47 – 51.79
Family Relationships	51.88 ± 24.88	47.80 – 55.96
Total Score	71.03 ± 9.25	69.54 – 72.52

Parental stress levels assessed using the Parental Stress Scale (PSS) are summarized in Table 4. The total PSS score demonstrated approximate normal distribution based on Shapiro–Wilk testing ($p > 0.05$).

Table 4. Parental Stress Scale (PSS) total score and categories (n = 150)

Variable	Mean ± SD	Minimum	Maximum	95% CI	p-value (normality)
PSS Total Score	53.11 ± 9.14	34.00	83.00	51.65 – 54.57	0.087

Stress Category	Frequency (n)	Percentage (%)
Mild Stress	19	12.7
Moderate Stress	112	74.7
Severe Stress	19	12.7

The primary objective was to evaluate the association between parental stress and family quality of life. Pearson correlation analysis demonstrated a statistically significant moderate-to-strong negative correlation between PSS total score and PedsQL-FIM total score (Table 5).

Table 5. Correlation between parental stress and family quality of life (n = 150)

Variables Compared	Pearson r	95% CI	p-value	Effect Size Interpretation
PSS Total vs PedsQL-FIM Total	-0.600	-0.691 to -0.487	<0.001	Large negative correlation

Table 6. Multivariable linear regression analysis predicting family quality of life (PedsQL-FIM total score)

Predictor Variable	β (Unstandardized)	SE	Standardized β	95% CI	p-value
PSS Total Score	-0.61	0.07	-0.59	-0.74 to -0.48	<0.001
Child Age	-0.12	0.09	-0.08	-0.30 to 0.06	0.184
Caregiver Age	-0.05	0.08	-0.04	-0.21 to 0.11	0.529

Model statistics: $R^2 = 0.39$; Adjusted $R^2 = 0.37$; $F(3,146) = 31.1$; $p < 0.001$.

After adjustment for child and caregiver age, parental stress remained an independent and statistically significant predictor of family quality of life. Each one-point increase in PSS score was associated with a 0.61-point decrease in PedsQL-FIM total score.

Overall, the results indicate a high prevalence of moderate parental stress among caregivers and demonstrate a robust inverse association between parental stress and family quality of life in this population.

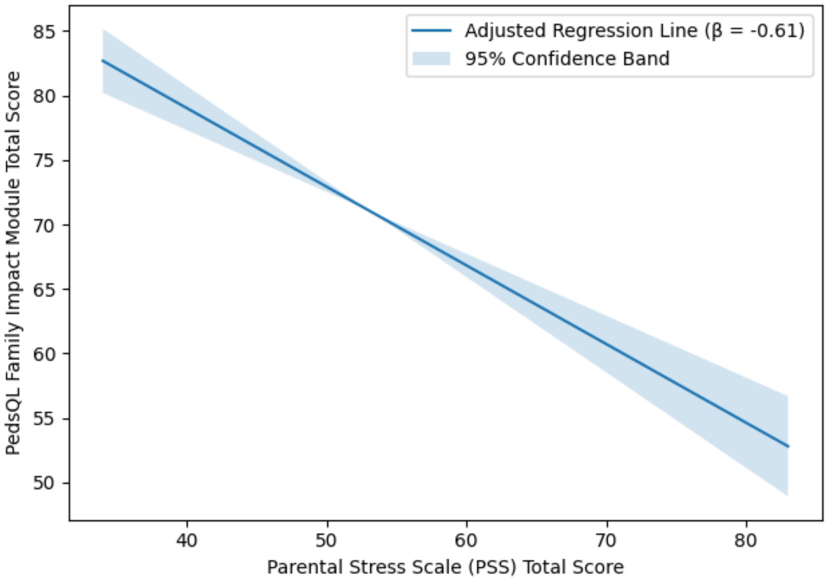

Figure 1 Adjusted Association Between Parental Stress and Family Quality of Life

The figure demonstrates a robust, clinically meaningful inverse association between parental stress and family quality of life across the full observed PSS range (34–83). The adjusted regression slope (β = −0.61) indicates that each one-point increase in parental stress corresponds to a 0.61-point reduction in PedsQL-FIM total score. Across the observed stress spectrum, predicted family quality of life declines from approximately 83 points at lower stress levels (PSS ≈ 35) to nearly 53 points at higher stress levels (PSS ≈ 80), representing an estimated 30-point gradient in functional impact. The 95% confidence band (β range: −0.74 to −0.48) remains consistently below zero throughout the distribution, reinforcing statistical stability ($p < 0.001$) and suggesting that the inverse association is not limited to extreme values but persists across mild, moderate, and severe stress levels. Clinically, this pattern indicates a substantial and progressive deterioration in family functioning as parental stress intensifies, with stress alone accounting for approximately 36–39% of the variance in family quality of life, underscoring its central role in family-centered CP rehabilitation models.

DISCUSSION

The present study investigated the prevalence of parental stress and its association with family quality of life among primary caregivers of children with cerebral palsy in a tertiary rehabilitation setting. The findings demonstrate a high burden of psychological stress, with nearly three-quarters of caregivers (74.7%) reporting moderate stress and 12.7% experiencing severe stress. More importantly, parental stress showed a statistically significant, moderate-to-strong inverse association with family quality of life ($r = -0.600$, $p < 0.001$), explaining approximately 36–39% of the variance in PedsQL-FIM total scores. These findings provide quantitative evidence that parental stress is not merely an emotional response but a central determinant of family functioning within the context of chronic pediatric disability. The magnitude of stress observed in this study is consistent with international literature reporting elevated psychological strain among caregivers of children with cerebral palsy, particularly in resource-constrained settings (5,6). Systematic evidence suggests that caregiving demands—including assistance with mobility, feeding, communication, and medical management—accumulate over time and contribute to chronic stress exposure (5). In our cohort, the mean PSS score of 53.11 ± 9.14 falls within a range indicative of sustained psychological strain, aligning with prior findings that caregivers of children with neurodevelopmental disorders exhibit significantly higher stress compared to parents of typically developing children (15). The predominance of moderate stress rather than extreme stress may reflect adaptation mechanisms over time; however, even moderate chronic stress is associated with adverse physical and psychological outcomes in caregivers (3).Family quality of life scores revealed moderate impairment across physical, emotional, cognitive, and social domains, with comparatively lower mean values in daily activities and worry domains. These patterns mirror prior studies showing that caregivers frequently experience fatigue, restricted social participation, and persistent concern regarding the child's future (8,9). The comparatively lower daily activities score suggests functional disruption within routine household tasks, which is clinically significant because functional strain often precedes emotional exhaustion. Evidence indicates that prolonged caregiving without structured support contributes to decreased family cohesion and increased psychological vulnerability (16). Our results reinforce the multidimensional impact of CP, extending beyond child-centered outcomes to systemic family functioning. The central finding of this study is the strong negative association between parental stress and family quality of life. The observed correlation coefficient ($r = -0.600$) represents a large effect size in psychosocial research, suggesting that stress exerts a clinically meaningful influence on family wellbeing. Regression modeling further demonstrated that parental stress independently predicted family quality of life even after adjusting for demographic variables. Each one-point increase in PSS score was associated with a 0.61-point reduction in PedsQL-FIM total score, highlighting a progressive decline in functioning with increasing stress levels. These findings are consistent with prior research demonstrating that caregiver psychological distress significantly mediates family outcomes and child rehabilitation trajectories (6,17). The proportion of explained variance (approximately 39%) underscores that parental stress is not a peripheral variable but a principal contributor to family-level outcomes in CP management.The mechanisms underlying this association are likely multifactorial. Chronic caregiving responsibilities may lead to physical fatigue, emotional depletion, and reduced coping capacity, which in turn impair communication, family interactions, and social engagement (3,8). Additionally, uncertainty regarding long-term prognosis and future independence may intensify parental worry, thereby reducing perceived quality of life (9). Although disease severity and socioeconomic status were not stratified in the present study, prior evidence suggests that greater functional impairment and limited access to resources amplify caregiver strain (5,11). The absence of significant associations between child age or caregiver age and family quality of life in adjusted models suggests that psychological stress, rather than chronological factors, may be the more proximal determinant of family functioning in this population. From a clinical perspective, these findings support the integration of routine parental stress screening into multidisciplinary CP rehabilitation programs. International guidelines increasingly advocate family-centered care models that recognize caregiver wellbeing as integral to child outcomes (1,6). Psychosocial interventions, stress management programs, structured counseling, and peer-support networks have demonstrated effectiveness in improving caregiver resilience and reducing perceived burden (16,18). Given the strong statistical association observed, targeted stress-reduction strategies may yield measurable improvements in family quality of life, thereby indirectly enhancing rehabilitation adherence and child developmental progress. The study's cross-sectional design limits causal inference: therefore, while a robust association was demonstrated, the directionality between stress and family quality of life cannot be definitively established. It is plausible that reduced family functioning may also exacerbate perceived stress, indicating a bidirectional relationship. Longitudinal studies are warranted to clarify temporal pathways and evaluate whether stress reduction interventions produce sustained improvements in family outcomes (17). Additionally, future research incorporating objective measures of disease severity, caregiving hours, and socioeconomic indicators would provide a more comprehensive model of determinants influencing caregiver wellbeing. Despite these limitations, the present findings contribute locally relevant evidence to the growing body of literature emphasizing the psychosocial dimension of cerebral palsy care. In tertiary care settings where rehabilitation efforts are predominantly child-focused, the demonstrated magnitude of association between parental stress and family quality of life highlights an urgent need to broaden care models toward holistic, family-centered approaches. Addressing parental stress may represent a modifiable pathway to strengthening overall family resilience and optimizing long-term outcomes for children with cerebral palsy.

CONCLUSION

This study demonstrates a high prevalence of moderate parental stress among caregivers of children with cerebral palsy and establishes a statistically significant, moderate-to-strong inverse association between parental stress and family quality of life. Parental stress independently predicted reduced family functioning, explaining a substantial proportion of variability in PedsQL™ Family Impact Module scores. These findings reinforce the clinical importance of integrating caregiver psychological assessment into routine cerebral palsy rehabilitation services. Given the magnitude of the observed association, targeted stress-reduction interventions, structured psychosocial support, and family-centered rehabilitation models are likely to produce meaningful improvements in overall family wellbeing. Addressing parental stress should therefore be considered a core component of comprehensive cerebral palsy management to optimize both caregiver resilience and long-term child rehabilitation outcomes.

REFERENCES

1. Al-Otaibi SL, Algabbani MF, Alboraih AM, AlAbdulwahab SS. Effectiveness of family–professional collaboration on functional goals achievement of children with cerebral palsy and caregivers' quality of life and burden: a randomized comparative study. J Clin Med. 2024;13(14):4057.

2. Kondekar A, Ansari Q, Ghatol H. The quality of life of primary caretakers of children with cerebral palsy. J Fam Med Prim Care. 2024;13(10):4457–62.

3. Liu Z, Heffernan C, Tan J. Caregiver burden: a concept analysis. Int J Nurs Sci. 2020;7(4):438–45.

4. Okelo K, Murray AL, King J, Kitsao-Wekulo P, Onyango S, Nampijja M, et al. Parental stress and child stimulation practices: examining associations with child developmental outcomes over time in Kenya and Zambia. BMC Psychol. 2024;12(1):50.

5. Liu F, Shen Q, Huang M, Zhou H. Factors associated with caregiver burden among family caregivers of children with cerebral palsy: a systematic review. BMJ Open. 2023;13(4):e065215.

6. Liu F, Zhang R, Cui C, Zhou H. Care burden and quality of life among family caregivers of children with cerebral palsy in China: the mediating roles of social support and coping styles. BMC Public Health. 2025;25(1):506.

7. Glinac A, Sinanovic S, Glinac L, Matovic L. The impact of life of a child with cerebral palsy on the quality of life of mothers: Tuzla Canton/Bosnia and Herzegovina. Sudan J Paediatr. 2023;23(1):60–8.

8. Siddiqa S, Haider SMA, Babar B, Malik NA, Javed S, Naheed A. Perceived stress among caregivers of children with cerebral palsy. Prof Med J. 2023;30(4):484–9.

9. Mohammed SS, Abdelwahab MS, Zaky NA, Abdelazeim FH. Impact of mother's care burden, fatigue and child's functional level on quality of life in spastic cerebral palsy. Physiother Res Int. 2024;29(1):e2067.

10. Kiani HS, Aftab A, Waqar S, Hussain SA, Naqvi Q, Awan WA. Caregivers' burden among parents of children with cerebral palsy. Rehman J Health Sci. 2021;3(1):52–5.

11. Hewawitharana BD, Wijesinghe CJ, De Silva A, Phillips JP, Hewawitharana GP. Disability and caregiver burden: unique challenges in a developing country. J Pediatr Rehabil Med. 2023;16(3):483–91.

12. von Elm E, Altman DG, Egger M, Pocock SJ, Gøtzsche PC, Vandenbroucke JP; STROBE Initiative. The Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) statement: guidelines for reporting observational studies. Lancet. 2007;370(9596):1453–7.

13. Hulley SB, Cummings SR, Browner WS, Grady DG, Newman TB. Designing clinical research. 4th ed. Philadelphia: Lippincott Williams & Wilkins; 2013.

14. World Medical Association. World Medical Association Declaration of Helsinki: ethical principles for medical research involving human subjects. JAMA. 2013;310(20):2191–4.

15. Celik MY, Kaya L. The relationship between care burden and spiritual well-being of mothers of children with cerebral palsy: a cross-sectional study from Turkiye. J Relig Health. 2024;63(5):3393–409.

16. Dertli S, Aydin AS, Gunay U. Care burden, perceived social support, coping attitudes and life satisfaction of mothers with children with cerebral palsy. Child Care Health Dev. 2024;50(4):e13297.

17. Park EY. Longitudinal changes in the parenting stress of mothers of children with cerebral palsy and their relationship with children's gross motor function system levels. Healthcare (Basel). 2023;11(5):—.

18. Almulla H, Aljaloud O, Almulla H, Nasser S. Caregiver burden, perceived stress, and social support among parents of chronically ill children in Saudi Arabia. BMC Nurs. 2024;23(1):811.

DECLARATIONS

Ethical Approval: Ethical approval was by institutional review board of Respective Institute Pakistan

Informed Consent: Informed Consent was taken from participants.

Authors' Contributions:

Concept: MA; Design: AA; Data Collection: MA, FTA; Analysis: ML; Drafting: MA, AM

Conflict of Interest: The authors declare no conflict of interest.

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