

Vol 48 (4) December , 2024

Print: ISSN 0304 4904
Online: ISSN 2305-820X



PAKISTAN PEDIATRIC JOURNAL



A JOURNAL OF PAKISTAN PEDIATRIC ASSOCIATION

Indexed in EMBASE/Excerpta Medica, Index Medicus WHO, CPSP
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ORIGINAL ARTICLE

Impact of Parental Depression on the Gross Motor Function in Children with Cerebral Palsy

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Pak Pediatr J 2024; 48(4): 393-98

ABSTRACT

Objective: To investigate the relationship between the gross motor features in children with CP and the parental depression level.

Study Design: A cross-sectional study design

Place and Duration of Study: The research was carried out in the Helping Hand Institute of Rehabilitation Sciences situated in Mansehra, and was completed within six months.

Material and Methods: A cross-sectional survey was conducted with 126 children (aged up to 18) with cerebral palsy and their parents. GMFM 88 examined gross motor function, whereas DASS 42 assessed parental depression. The statistical analysis in IBM SPSS 22 included mean, standard deviation, frequency, percentage, Spearman correlation, and linear regression.

Results: Mean age of children was 6.76 ± 3.92 yr; it was 33.21 ± 7.06 years in parents. Of these, the majority, that is 89.7%, were identified as having spastic cerebral palsy. Some relationship pattern was noted between GMFCS level and parental depression in that higher level of GMFCS was linked to heightened depression. Regression analysis data provided more evidence in support of the existence of a link; regression coefficients meant that gross motor impairment in children might be used to explain the level of depression in parents. However, the study discovered that female parents were more likely to develop depression than male parents.

Conclusion: This study provides a significant association between the severities of gross motor function in children with CP.

Key Words: *Depression, Cerebral palsy, Gross motor function.*

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Received 25th March 2024;
Accepted for publication
21st September 2024

INTRODUCTION

Cerebral palsy (CP) is a long-term neuromuscular disorder that originates from traumatic brain injury that occurs in childhood that is resistant to treatment. The condition was first recognised in 1861 and for some time it was referred to as cerebral paresis.¹

Cerebral palsy rate in Europe, Australia and United States of America has been estimated to be 1.8-2.3 per 1000 live birth. The research shows that the prevalence is slightly higher in the rural areas than in the high-income countries.² As a case study of Pakistan, the perceived prevalence rate is slightly more with 1.22 children diagnosed with cerebral palsy per 1000 births in the Swabi

district.³ CP may occur prenatally, perinatally, or postnatally, and several reasons exist for developments of brain disorders. Of all the causes of CP, the lack of oxygen to the brain during labor is one of the most common.⁴ Other risk factors include mother's anemia, hypertension and hypotension during pregnancy. From the causes, prenatal causes constitute⁵ 70-80%, postnatal causes, 20% and few others are perinatal causes, low birth weight, which is less than 5 pounds and a premature birth before 32 weeks.⁶

The results also confirmed that children with CP had movement and posture dysfunction, consequently have restricted movements, and lesser physical activity. Motor disturbances are attributed to musculoskeletal ailments and seizures.⁷ Depending on motor signs, topographic localization, origin, anatomical lesion site, severity and tone and additional information, CP is categorized.⁸ The spastic and mixed motor disorders are observed in 85 percent of children and adjust for dyskinetic CP. Children usually present with spastic hemiplegia or diplegia, or less commonly with quadriplegia.⁹ The level of gross motor function is directly related to the location, degree, and severity of cerebral lesions: While children with hemiplegia are often able to perform many tasks independently children with diplegia need mobility aids and children with quadriplegia do not usually even walk at all.¹⁰ Comorbidities that occur in cerebral palsy are 75% pain, 50% intellectual disability, 33% walking disabilities and hip displacement, 25% speaking disorders, epilepsy, and incontinence with 20-25% behavioral or sleep disorders.¹¹

The mental and physical health of parents is directly influenced by the health of the child.¹² The lives of parents and caregivers of CP children are affected due to changes in their routine and cause physical and emotional stress, tiredness depression.¹³ The burden of caregiving lies on several factors such as increased age of caregiver, increased child disability and lower socioeconomic status. The impact of lowered support and a heavy caregiving workload in this sense is to breed emotional pressure and stress, most often is borne by the women, traditionally assigned the caregiver's role as a mother.¹⁴ It is found that the level of disability in a child is

positively correlated to the amount of stress the caregiver has to bear, higher the level of disability, higher is the amount of stress.¹⁵ Other studies indicated that the depression in mothers or primary caregivers of children with CP is four times above the normal average.¹⁶ For this reason, there is the increasing demand to address parental mental health needs along with the child treatment.

Studies have been conducted to measure the occurrence and severity of depression in parents of children with CP. The objective of this study was to see if there was a link between the degrees of parental level of depression to degree of gross motor dysfunction in their children having CP.

MATERIAL AND METHODS

Cross-sectional survey was conducted with permission having been granted by the Helping Hand Research and Ethical Committee (HHREC). The sample comprised children with CP, aged between one and eighteen years; and parents who had the most contact time with their children. Children older than 18 years, children with serious systemic illnesses or moderate to severe autism, parents with psychological disorders, severe systemic illness or if they refused to take part were excluded. A non-probability convenience sampling technique was employed, resulting in a sample size of 126, calculated using G*Power with a correlation coefficient of 0.3, an alpha value of 0.05, and a power of 0.95.¹⁷ The gross motor function of the children was assessed using the Gross Motor Function Measure (GMFM-88) questionnaire,¹⁸ while parental depression levels were evaluated through the Depression, Anxiety, and Stress Scale (DASS-42).¹⁹

The statistical analysis for the current study was done using IBM SPSS version 22. Mean, standard deviations, frequency and percentage were computed. Automated data normality tests showed that the data were non-parametric and hence used the Spearman correlation test for correlation analyses and linear regression for predictability analyses.

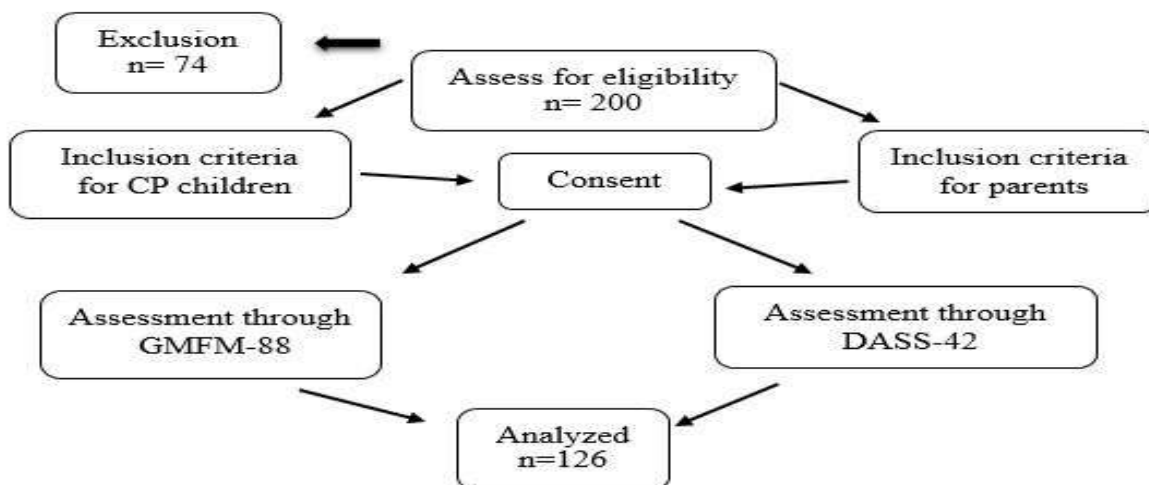


Fig 1: Consot diagram

RESULTS

TABLE 1: Descriptive statistics for demographic data

Variables	Mean ± SD
Age of Child (years)	6.76 ± 3.93
Age of Parents (years)	33.21 ± 7.06
GMFM Total Score	38.68 ± 24.67
Depression Scale	16.50 ± 9.28

Table 1 shows descriptive statistics of 126 cerebral palsy children and 126 parents included in the study mean age of children and parents was 6.76 ± 3.93 and 33.21 ± 7.06 years respectively. The average Gross Motor Function Measure (GMFM) score was 38.68 ± 24.67, and parental depression scores averaged 16.50 ± 9.28.

TABLE 2: Correlation between GMFM and parental depression

Variables	Correlation (r)	p-value (2-tailed)
GMFM vs. Depression Score	-0.249	0.005

Table 2 shows that Spearman's correlation analysis revealed a significant negative correlation between parental depression scores and GMFM scores (r = -0.249, p = 0.005), indicating that higher levels of parental depression were

associated with lower gross motor function in children with CP.

TABLE 3: Regression analysis of GMFM and depression

Variable	B	R ²	F	p-value
Depression	-0.629	0.056	7.347	0.008

Table 3 shows that Linear regression analysis further demonstrated that parental depression was a significant predictor of GMFM scores (β = -0.629, R² = 0.056, p = 0.008), suggesting that a one-unit increase in parental depression scores was associated with a 0.629-unit decrease in GMFM scores.

TABLE 4: Impact of gender on depression and GMFM Scores

Gender of parent	Male	Female
GMFM Score [Median (IQR)]	46 (35-55)	33.7 (20-45)
Depression Score [Median (IQR)]	8 (1.5-16.5)	17 (9-23)

Table 4 shows subgroup analysis based on parental gender revealed that male parents had lower depression scores (median = 8, IQR = 1.5-16.5) and their children had higher GMFM scores (median = 46, IQR = 35-55) compared to female parents (depression score median = 17, IQR = 9-23; GMFM score median = 33.7, IQR = 20-45).

The findings shown here indicate the large and negative effect that parental depression has on gross motor function of children with cerebral palsy. Poorer gross motor outcomes in affected children are associated with greater levels of parental depression, an indication of the need for parental mental health to be addressed in the comprehensive management of cerebral palsy. The fact that the gender differences in depression scores and GMFM outcomes that we observed warrant tailored interventions considering the special aspects parents to children with CP.

DISCUSSION

The objective of the present study was to find out the impact of gross motor function and level of depression in parents of cerebral palsy children.

This study found the mean age to children is 6.76 ± 3.9 , $n=79$ males (62.7%) and $n=47$ (37.3) females. The mean age of the parental was 33.21 ± 7.1 of which 113 were mothers (89.7%) and 13 were fathers (10.3%) and 113 were spastic type of CP (89.7%), 1 was ataxic type of CP (0.8%), and 12 were athetoid type of CP (9.5%). According to Palisano et al. in 2000, $n=430$ children were of spastic type of CP with a percentage of 78%, $n=53$ children were of mixed type of CP with a percentage of 10%, $n=34$ children were of dystonic and athetoid CP with a percentage of 6%, $n=23$ children were hypotonic with a percentage of 4% and $n=12$ were ataxic with 2%.²⁰ Both present and past study shows that most of the children present with spastic type of CP.

They were 5.6% $n=7$ children in GMFM level I, 18.3% $n=23$ children in level II, 29.4% $n=37$ children in level III and IV and 17.5% $n=22$ children in level V. Past studies, however, show most of the children in level I while this study's study most of the children were in level III and level IV. In 2000 Palisano et al. reported that $n=166$ were in level I with a percentage of 28.3%, $n=74$ $n=121$ in level IV with a percentage of 20.6%, and $n=115$ in level V with a percentage of 19.6%.²⁰ Differences between both of these studies is that in this study most of the children were in level III and level IV and past studies show mostly children in level I.

In the present study, GMFM levels with depression scores show that the severity of gross motor function may increase the level of depression in their parents. A previous study by Yoo (2016) also reported that the GMFM scores of children with CP were statistically significantly related to caregivers' WHOQOL-BREF TR and BDI scores.²¹

This study found significant correlation between the value of depression score and GMFM score of the children of CP and with p value of .008 which is $<.05$. In 2021 Khan et al. reported a non-significant correlation between depression and gross motor functions $p=0.155$.²²

The present study shows a significant relation between a score of depression with gross motor function whereas the past study showed a non-significant relation with the level of depression. In 2021 Baloach et al. reported severe depression in cerebral palsy children's parents with a frequency and percentage of 19 (33.9 percent) and p -value of $(p 0.001)$ ²³ and Gugala et al. in 2018 reported that depression was significantly greater in parents of children with cerebral palsy which was 4.7 and 3.7 in experimental and control group, respectively.²⁴

The present study found that female parents have higher rates of depression than male parents. In their 2018 publication, B. Gugala et al. state that there are no significant differences ($p > 0.05$) in Zarit-CBS, BDI, or BAI scores between the genders of patient, which means no correlation according to gender.²⁴ Another article published by Sajedi et al. in 2009 reports that there was significant differences in the mean depression scores ($P=0.003$) between the two groups. Cerebral palsy children was increase the risk of developing depression in mothers as much as 2.26 times.²⁵

CONCLUSION

In this study, we investigated the possible link between the levels of parental depression and gross motor function in children with cerebral palsy. A strong correlation was found between degrees of gross motor function and greater parental depression. Significant interaction emerged in regression analysis and potential impact of parental depression on the ability of

gross motor function was observed. The study also found that female parents were more likely to have depression than were male parents. What the findings point to is the need for a comprehensive approach to CP children and their parents that addresses physical challenges as well as emotional issues. Such holistic strategies to help implement could actually improve the overall quality of life for children with cerebral palsy as well as their caregivers.

ACKNOWLEDGMENTS

The authors are sincerely grateful to their friends. They also thank all the participating patients and their parents for their sincere cooperation.

Conflicts of interest: No conflicts of interest.

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