

Original Article:

Functional Status of the Children with Cerebral Palsy And Their Mothers' Psychological Status: A Cross-sectional Study

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Abstract

Objective: The aims of this study were to assess the demographic characteristics and functional status of children with cerebral palsy (CP) and to evaluate the psychological status of their mothers. **Materials and Methods:** Demographic characteristics, CP type, Gross Motor Functional Classification System (GMFCS) levels, Functional Independence Measure for Children (WeeFIM) scores were recorded. Mothers were asked to fill Symptom Check List 90 Revised (SCL -90-R). **Results:** A total of 101 patients were included in the study (%57,4% boys, %42,6% girls). Their mean age was 6,79±4,48 (1,5-18) years. Mothers' mean age was 33,31±7,72 (20-53) years. The neurologic classification were as follows: diplegia 27,7%, tetraplegia 45,5%, hemiplegia 19,8%, dyskinetic or ataxic 6,9%. The GMFCS levels were as follows: level 1 11,9%, level 2 14,9%, level 3 17,8%, level 4 25,7%, level 5 29,7%. SCL-90-R outcomes were as follows: 38,6% somatization, 18,8% anxiety, 37,6% obsessive-compulsive, 36,6% depression, 32,7% interpersonal-sensitivity, 21,8% eating-sleeping disorder. We didn't detect any significant correlation between the GMFCS levels of children and mothers' psychological status. Childrens' low WeeFIM scores were related with anxiety, obsessive-compulsive, depression, interpersonal-sensitivity, paranoid ideation and eating-sleeping disorder. (p=0,009, p=0,017, p=0,009, P=0,0001, p=0,021, p=0,001 respectively). The presence of chronic disease was related with somatization, anxiety and depression (p=0,001, p=0,024, p=0,008 respectively). The presence of pain was related with somatization (p=0,0001). **Conclusion:** Lower WeeFIM scores of children with CP and chronic disease and pain presence in their mothers were detected as the factors that negatively affect psychological status of mothers.

Keywords: Cerebral Palsy, Mother, Caregiver, Symptom Check List 90 Revised, weeFIM

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Introduction

Cerebral Palsy (CP) is a permanent impairment of motor function which develops as a result of a non-progressive lesion in the developing brain. Although the lesion is static, activity limitation may change with age.^{1,2} Motor disorders are often associated with cognitive, communication, behavior and seizure disorders with secondary musculoskeletal problems.^{1,2} Due to musculoskeletal and accompanying problems, functional independence of children

with CP is adversely affected.³ Therefore, these children need a constant caregiver in their daily life activities so mothers are naturally caregivers.⁴ Caring for children with physical disabilities can be overwhelming usually because this role is full time as they depend on the caregiver for most of their daily living activities.^{4,5} This situation brings with it many difficulties for the caregiver in daily life activities that negatively affects their psychological state.^{6,7} Caring for a child with a chronic condition may be more stressful than

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caring for a child without a disability.^{8,9} The aim of this study was to evaluate the relationship between the functional status of children with CP and the psychological status of their mothers.

Materials and Methods

This study was carried out at a tertiary hospital and 3 special education centers, after obtaining the approval of the hospital's ethics committee. It was performed by the principles stated in the Declaration of Helsinki. A total of 101 children who were previously diagnosed with CP and their mothers, who applied to our outpatient clinic and received physiotherapy in special education centers, participated in the study. Written informed consent were obtained from the mothers. Demographic data of patients and their families were recorded. The cases were classified according to Gross Motor Function Classification System (GMFCS) and CP types. Functional independence scores were recorded by evaluating the Pediatric Functional Independence Measure (WeeFIM). The mothers were given a symptom screening list (SCL90 R) form and asked to fill it out in a room where they could be alone.

Inclusion criteria: All children aged between 1.5 and 18 years who were diagnosed with CP and their mothers were included.

Exclusion criteria: Mothers being illiterate

The Symptom Checklist 90R (SCL90R) was used to assess the psychiatric morbidity. The questionnaire consists of 90 items dealing with an individual's symptom distress in the previous three months. The rating is made on a Likert-type scale (0-not at all, 4- severe). The scale consists of 9 dimensions (somatization, obsessiveness-compulsiveness, interpersonal sensitivity, depression, anxiety, hostility, phobic anxiety, paranoid ideation, psychoticism). In addition to these results this scale also offers Global Severity Index (GSI) which was used as indicator of the current level or the depth of the disorder.¹⁰

Gross Motor Function Classification System (GMFCS) was used to classify functional level compatible with age of individuals with CP. Children with cerebral palsy are the least dependent on level 1 and the most dependent on level 5 in motor functions.¹¹

The Functional Independence Measure for Children (WeeFIM) was used for the functional independence assessment of children. The WeeFIM consists of 18 items in 6 domains:

self-care, sphincter control, transfers, mobility, communication, and social cognition. Scoring is done between 1 (fully dependent) and 7 (fully independent) points. The lowest possible score is 18 and the highest score is 126.¹²

Statistical analyses were performed using IBM SPSS Statistics version 25 (SPSS Inc., Chicago, IL, USA). Categorical data were presented as numbers and percentages, while continuous data were reported as means $\pm$ SD. Kolmogorov-Smirnov and Shapiro-Wilk tests were used to examine the normal distribution, data were normally distributed so means for continuous variables were compared using independent t-tests. Pearson correlation was used to find the correlation between SCL-90R and WeeFIM, GMFCS, child age, mother age. The results were evaluated bilaterally at 95% confidence interval, significance level at $p < 0.05$ and $p < 0.01$.

Results

Of the 101 children with CP included in the study, 57.4% (n=58) were boys and 42.6% (n=43) were girls. The mean age of the cases was 6.79 ± 4.48 (1.5-18) years. The mean age of the mothers was 33.32 ± 7.72 (20-53) years.

According to their neurological classifications, 45.5% of the cases were tetraplegics (n:46), 27.7% were diplegics (n:28), According to GMFCS, 11.9% of them were level 1, 29.7% were level 5. The children's WeeFIM mean was 60.62 ± 30.96 .

27.7% of the mothers had a chronic disease, 67,3% described pain, the majority of them was low back pain with 47%.

When those with a Scl 90 R score exceeding 1 are considered positive, 43.6% of mothers have somatization, 22.8% anxiety, 41.6% obsession, 39.6% depression, and interpersonal sensitivity in 36.6%, psychosis in 7.9%, paranoid thoughts in 24.8%, anger in 24.8%, phobic anxiety in 15.8%, additional scale in 31.7% (eating, sleep disorders), the general symptom index was found above 1 in 25.7% (Table 1).

It was found that the GMFCS levels did not affect the psychological state of the mothers except interpersonal sensitivity (Table 2) Low functional status of children was found to be associated with mothers' anxiety, obsessions, depression, interpersonal sensitivity, psychosis, paranoid thoughts, phobic anxiety additional scale, and increased GBO ($p=0.002$, $p=0.034$, $p=0.003$, $p<0.001$, $p=0.005$ $p=0.017$, $p=0.016$, $p=0.001$

and $p=0.001$ respectively). Older maternal age was found to be associated with somatization ($p=0.037$) (Table 2).

The presence of chronic disease in mothers was associated with somatization, anxiety, depression,

psychosis, paranoid thought, phobic anxiety, additional score and general symptom elevation (respectively: $p=0.001$, $p=0.024$, $p=0.008$, $p=0.049$, $p=0.015$, $p=0.041$, $p=0.043$, $p=0.013$) (Table 3). The presence of pain in mothers was

associated with somatization ($p<0.001$) (Table 3).

Table 1: Demographic and clinical variables of the participants

		N / mean $\pm$ SD	% / (min-max)
Mother age		33.32 $\pm$ 7.72	(20-53)
Mother education	Primary school Secondary school University	77 18 6	76.3 17.8 5.9
Child number	1 2 3 4 and over	30 40 21 17	29.7 39.6 20.8 9.9
Chronic disease presence		28	27.7%
Pain presence		68	67.3
Child age		6.79 $\pm$ 4.48	1.5-18
Child gender	Female Male	58 43	57.4 42.6
Cerebral palsy type	Tetraplegia Diplegia Hemiplegia Others	46 28 20 7	45.5 27.7 19.8 6.9
GMFCS	1 2 3 4 5	12 15 18 26 30	11.9 14.9 17.8 25.7 29.7
WeeFIM score		60.62 $\pm$ 30.96	18-122
Scl90R Domains Scores>1	Somatization Anxiety Obsessive-Compulsive Depression Interpersonal Sensitivity Psychoticism Paranoid Ideation Hostility Phobic Anxiety Additional items Global Severity Index	44 23 42 40 37 8 25 25 16 32 26	43.6 22.8 41.6 39.6 36.6 7.9 24.8 24.8 15.8 31.7 25.7

GMFCS: Gross Motor Function Classification System

SCL90R: The Symptom Checklist 90 Revised

WeeFIM: The Functional Independence Measure for Children

Table 2: Correlations between the variables

Scl90R Domains Scores>1		Mother age	Child age	Weefim	GMFCS
Somatization	Pearson	.208*	0.031	-0.158	0.159
	P	0.037	0.761	0.114	0.113

Scl90R Domains Scores>1		Mother age	Child age	Weefim	GMFCS
Anxiety	Pearson	-0.041	-0.101	-0.305**	0.195
	P	0.681	0.314	0.002	0.051
Obsessive-Compulsive	Pearson	-0.037	-0.124	-0.211*	0.012
	P	0.717	0.216	0.034	0.902
Depression	Pearson	0.005	-0.120	-0.291**	0.103
	P	0.962	0.233	0.003	0.305
Interpersonal Sensitivity	Pearson	-0.038	-0.144	-0.368**	0.274**
	P	0.704	0.152	0.000	0.006
Psychoticism	Pearson	-0.030	-0.117	-0.279**	0.106
	P	0.768	0.245	0.005	0.291
Paranoid Ideation	Pearson	0.049	-0.132	-0.237*	0.084
	P	0.626	0.187	0.017	0.404
Hostility	Pearson	-0.113	-0.151	-0.140	0.065
	P	0.261	0.132	0.163	0.516
Phobic Anxiety	Pearson	0.034	-0.055	-0.239*	0.147
	P	0.739	0.584	0.016	0.142
Additional items	Pearson	-0.160	-0.317**	-0.330**	0.089
	P	0.109	0.001	0.001	0.378
Global Severity Index	Pearson	0.003	-0.143	-0.317**	0.153
	P	0.978	0.155	0.001	0.127

** Correlation is significant at the 0.01 level (2-tailed)

*Correlation is significant at the 0.05 level (2-tailed)
 GMFCS: Gross Motor Function Classification System.
 SCL90R: The Symptom Checklist 90 Revised
 WeeFIM: The Functional Independence Measure for Children. CP: cerebral palsy

Table 3: The relation between weeFIM. Scl90R scores and chronic disease presence

	Chronic Disease		P*
	Absent (n:73)	Present (n:28)	
WeeFIM	61.49±31.51	58.36±29.96	0.651
Somatization	0.81±0.53	1.22±0.58	0.001
Anxiety	0.61±0.58	0.91±0.59	0.024
Obsessive-Compulsive	0.83±0.49	1.03±0.61	0.085
Depression	0.86±0.59	1.25±0.76	0.008
Interpersonal Sensitivity	0.78±0.59	1.03±0.73	0.070
Psychoticism	0.29±0.36	0.48±0.52	0.049
Paranoid Ideation	0.58±0.48	0.88±0.68	0.015

Hostility	0.62±0.53	0.83±0.75	0.110
Phobic Anxiety	0.36±0.48	0.59±0.54	0.041
Additional items	0.68±0.47	0.97±0.66	0.043
Global Severity Index	0.67±0.39	0.95±0.52	0.013

*student t test , WeeFIM: The Functional Independence Measure for Children

Table 4: The relation between weeFIM. Scl90R scores and pain presence

	Pain		P*
	Absent (n:68)	Present (n:33)	
WeeFIM	57.18±33.92	62.29±29.55	0.439
Somatization	0.64±0.44	1.07±0.57	0.000
Anxiety	0.65±0.62	0.72±0.59	0.628
Obsessive-Compulsive	0.84±0.55	0.91±0.52	0.550
Depression	0.95±0.77	0.98±0.60	0.815
Interpersonal Sensitivity	0.74±0.62	0.90±0.65	0.257
Psychoticism	0.33±0.48	0.35±0.39	0.786
Paranoid Ideation	0.64±0.59	0.67±0.54	0.769

Hostility	0.62±0.68	0.71±0.56	0.491
Phobic Anxiety	0.32±0.45	0.48±0.53	0.140
Additional items	0.82±0.63	0.74±0.50	0.487
Global Severity Index	0.67±0.48	0.78±0.43	0.235

*student t test, WeeFIM: The Functional Independence Measure for Children

Discussion

We examined the effects of the functional status of children with CP on the psychological status of their mothers. Among mothers 43,6% of them had somatization (pains in the chest or heart region, headaches, stomach-related disorders...), 39,6% had depression, and 31,7% had additional scale (eating, sleep disorders).

Half of our CP patients had a level of 4-5 according to GMFCS, and their average WeeFIM score was low. We found that lower WeeFIM scores were associated with anxiety, obsession, depression, interpersonal sensitivity, paranoid thinking, phobic anxiety and additional scale in the mother. It was determined that the GMFCS levels did not affect the psychological state of the mothers except interpersonal sensitivity.

Mobarek et al. found that 41.8% of mothers of children with CP were at risk for psychiatric disease.¹³ In another study significant psychopathology was found in 90% of mothers¹⁴ Depression, anxiety, somatization and obsessive-compulsive disorders were the most detected problems.^{14,15}

It was found that depression and anxiety were higher in mothers of children with CP when compared with healthy children's mothers.^{16,17} The depression levels of the mothers were positively correlated with the child's GMFCS score and negatively correlated with the WeeFIM score of child with CP.¹⁶ We also found that low WeeFIM scores negatively affected the psychological state of the mother. Similar to our findings, GMFCS levels of CP children were not found to be associated with depression, anxiety and stress in mothers.¹⁷⁻¹⁹ There are also studies that found that children's GMFCS levels were correlated with mothers' physical and mental health.^{6,20}

Not only the functional status of the child but behavioral problems due to inability of being independent in daily living activities, sleep problems, and incontinence can cause stress in mothers.^{13,21,22} In a study the child's behavioral problems were found as the single most influential factor on the mother's psychological

state.²³ Families of children with disabilities have to cope with greater financial stress, deterioration of family relationships, and reduced social activity outside the family.^{20,22} Mother's work outside the home affected their mental health in a good way.²² Since almost all of the mothers were housewives in our study, we could not evaluate the effect of working outside on their psychological state.

In a study examining the mothers of children with hemophilia, 83% of the mothers stated that they thought the disease limited their lives and affected their mental states.²⁴ Ozturk et al. found that mothers showed their strains by somatizing.²⁴ Primary caregivers of children with CP had more psychological and physical symptoms and the burden of caregiving increases stress and this manifests itself in different chronic conditions.²⁵ There was a strong relationship between comorbid factors and parental stress.¹⁸ Unsatisfying parental health status was associated with intensity of anxiety and depression in the parents of children with CP.²⁶

We found that the presence of chronic disease in mothers was associated with somatization, anxiety, depression, psychosis, paranoid thought, phobic anxiety, additional score and general symptom elevation.

Having children with CP deteriorated musculoskeletal health.¹⁹ Among caregivers of CP children it was found that approximately 65% of them had pain complaints.^{19,27} Children with CP are unable to manage themselves and they are dependent on their mothers, and the mothers experience more difficulties. Lifting and carrying the child can cause more physical strain and pain to the mother.^{19,27,28} It was found that the incidence of musculo-skeletal pain increased as the child's functional level deteriorated.^{28,29} We found that the presence of pain was 67,3% in mothers and this was associated with somatization.

The limitations of the present study are its cross-sectional nature and lack of healthy control group. Despite these shortcomings, we would like to draw attention to the psychological state of mothers. They may experience stress-related health problems, and this can impact the mother's relationship with the child and can be detrimental to the child's development and well-being.³⁰ Mothers with disabled children need psychosocial support more than other mothers. Therefore phsyologic status of these mothers should be closely monitored, emotional sharing

should be ensured and when needed psychological support should be provided.³¹

Conclusion

Lower WeeFIM scores of children with CP and chronic disease and pain presence in their mothers were detected as the factors that negatively affect psychological status of mothers. Reducing caregiving burden of the mothers' and increasing psychosocial supports may help improve the mother's physical and mental health.

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