

Original Article

Depression and Anxiety Among Siblings of Children with Cerebral Palsy

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Abstract

Background: Siblings of children with a chronic disease, such as cerebral palsy (CP), are considered a “population at risk to experience psychological difficulties”.

Objective(s): to estimate the occurrence of depression and anxiety among siblings of children with CP compared to siblings of apparently normal children.

Methods: The study was a comparative cross-sectional study. 130 children were recruited from the Outpatient Behaviour and Neurology Clinic. They were divided into two groups: Group I: Included 65 children aged between 7 – 17 years and lived in the same house with their siblings diagnosed with CP. Group II: Included 65 apparently normal children, matched for gender, age, and socioeconomic status with the first group, and having no siblings with CP or other chronic illness. Both groups were subjected to history taking for gender, age, socioeconomic status and psychometric assessment using Kovac Children’s Depression Inventory and Children’s Manifest Anxiety Scale. In addition to history of CP in siblings of group I.

Results: Depression was found in 33.8% and anxiety in 36.9% in siblings of CP children while depression was found in 16.9% and anxiety in 20% of the control group. There were statistically significant differences between the two groups regarding the occurrence of depression and anxiety ($p=0.0266$, $p=0.033$ respectively).

Conclusion: There is a high occurrence of depression and anxiety among siblings of children with CP compared to the control group.

It is recommended to raise the awareness of the pediatric neurologists and general pediatricians to catch early symptoms of depression and anxiety among siblings of children with neurological disability, to improve the quality of life of the whole family.

Keywords: Cerebral palsy, Gross Motor Function Classification System for Cerebral Palsy (GMFCS), Kovac Children’s Depression Inventory (CDI), Children’s Manifest Anxiety Scale (CMAS).

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INTRODUCTION

Cerebral palsy (CP) is a neuromotor disorder that affects the movement and posture. ^(1, 2) Sensory, perceptual, cognitive, communicative, and behavioural abnormalities, epilepsy, and/or secondary musculoskeletal illnesses are frequently associated with motor system disorders. ⁽³⁻⁵⁾ The underlying pathology of CP is an insult to the brain in the early life from conception until birth timeframe. ^(1, 2) Spastic CP is the most common type of CP, occurring in about 80% of cases. ⁽⁵⁾

The prevalence of CP is around 1-4 per 1,000 live births worldwide. ^(5, 6) In Quseir city in Egypt, the prevalence was about 3.6 per 1,000 live births. ⁽⁷⁾

Long-term treatment and care for children with CP affects all aspects of their families’ lives especially physical and social well-being and financial stability. It also creates an emotional stress on all family members. ⁽⁸⁾

Siblings of children with a chronic disease, as CP, are considered a “population at risk to experience psychological difficulties”. ⁽⁹⁾ They have increased risk of mental health problems than other children, ⁽¹⁰⁾ which may be due to daily stress experienced by the family, embarrassment of the healthy children due to their siblings ‘disability’ or jealousy regarding the amount of time and care parents spend with their siblings with CP. ⁽¹¹⁾

Mental health disorders are common among children and adolescents, with an estimated prevalence rate of 13.4%. ^(12, 13) National Institute of Health (NIH) defines a mental health disorder as “a combination of abnormal thoughts, perceptions, emotions, behavior and relationships with others”. ⁽¹⁴⁾

According to the Diagnostic and Statistical Manual of Mental Disorders (DSM-5), Depression: “is a mental state or chronic disorder characterized by feelings of sadness, loneliness, despair, low self-esteem, signs of psychomotor retardation, or less

frequently, agitation, withdrawal from social contact, change of appetite and insomnia".⁽¹⁵⁾ Pediatric depressive disorders are common and a leading cause of a psychiatric condition among children and adolescents. The prevalence of depression is about 1-3.5 % in pediatric age group.^(16, 17)

Anxiety is a biological alarming mechanism that causes excessive fear and prepares the person for an action. It is associated by physical symptoms caused by overstimulation of autonomic nervous system such as palpitation, sweating, and impaired perception. It should be discriminated from the physiological fear response to a known threat.⁽¹⁸⁾ Anxiety disorders are among the most common childhood emotional problems, with lifetime prevalence ranging from 7.1% to 27%.^(17, 18)

Many literatures studied the psychological effect of the presence of a child with CP on the caregivers; they also studied the prevalence of depression and anxiety among parents and caregivers of children with CP. To the best of our knowledge, no literature discussed depression and anxiety among siblings of children with CP.

The aim of the present study was to estimate the occurrence of depression and anxiety among siblings of children with CP compared to apparently normal children having no siblings with CP or other chronic illness.

METHODS

A comparative cross-sectional study was conducted at Alexandria University Children's Hospital (AUCH), Alexandria, Egypt.

130 children were recruited from the Outpatient Behaviour and Neurology Clinic. They were divided into two groups: Group I: Included 65 children aged between 7 – 17 years and live in the same house with their siblings diagnosed with CP. Group II: Included 65 apparently normal children, matched with the same gender, age, and socioeconomic status of children in group I, and having no siblings with CP or other chronic illness.

The studied children were subjected to the following:

A- History taking which included:

- 1- Gender, age and family history (parental marital status, parental consanguinity, and history of a mental illness).
- 2- The socioeconomic status (SES)⁽¹⁹⁾ using the questionnaire developed by El-Gilany *et al.* who updated the scale of Fahmy and El-Sherbini for measurement of socioeconomic status in health research in Egypt. The scale

includes 7 domains: Education and cultural background, occupation, family composition, family possessions, economic status, home sanitation and health care. With a total score of 84. SES was classified into very low, low, middle and high levels; depending on the quartiles of the calculated score.

- 3- History of CP in siblings of group I (etiology, type, degree of disability of CP according to Gross Motor Function Classification System for Cerebral Palsy (GMFCS) and associated disabilities).⁽²⁰⁾

B- Psychometric assessment using:

- 1- Kovac Children's Depression Inventory (CDI): The Arabic version of the test was translated by Ghareeb *et al.* in 1995⁽²¹⁾ from Kovac Children's Depression Inventory (CDI) (1992).⁽²²⁾ It has been validated for school aged children and adolescents of 7–18 years old. The CDI has sensitivity of 80% and specificity of 84% in identifying individuals as depressed or not depressed. It is a self-report scale (27-items), each has three responses for answering. The total score ranges from 0-54. The children were asked to select the response that best describes their feelings in the past 2 weeks.

The degree of depression was determined according to the following cutoff points:

- None = not depressed: 0-14 points.
- Mild depression: 15-22 points.
- Moderate depression: 23-29 points.
- Severe depression: ≥ 30 points.

- 2- Children's Manifest Anxiety Scale (CMAS).⁽²³⁾: The CMAS is a self-report measuring scale for anxiety in children 6–18 years of age. The scale was developed by Castaneda *et al.* in 1956⁽²³⁾ and translated to Arabic by Elpeblawy in 1986.⁽²⁴⁾ It consists of 42 items and another 11 items as Lie scale. Each item requires a yes or no answer. Lie Scale score above 3 is an indication of an inaccurate report and the child is excluded, it detects youth who are "faking good".

The anxiety in children was determined according to the following cutoff points:

- Low score (normal range = No anxiety): ≤ 18 points.
- Moderate anxiety score: 19-28 points.
- High anxiety score: ≥ 29 points.

Statistical analysis

Raw data were coded and entered a statistical package for social sciences (SPSS package version 24) which

was used for both data analysis and interpretation. Descriptive statistics including frequency, percentage, mean, standard deviation, minimum and maximum were used to describe different characteristics. Bivariate analyses including Chi-Square, Fisher's Exact and Monte Carlo tests were used to test the significance of results of categorical variables. The significance of the results was considered at 5% level of significance.

Ethical considerations

The study was conducted after approval of the Ethical Committee of Faculty of Medicine, Alexandria University. Written consent was taken from caregivers of all participants before their participation in the study. All data and information from the participants were kept confidential.

RESULTS

The study included 130 children: their age ranged between 7-17 years, with a mean age of 11.57 ± 3.61 years in group I and 11.08 ± 2.85 years in group II. 32 (49.2%) were males and 33 (50.8%) were females in group I, and 34 (52.3%) were males and 31 (47.7%) were females in group II with no statistically significant difference between the two groups regarding age and gender ($p=0.390$, $p=0.726$ respectively). There were no statistically significant differences between the two groups regarding socioeconomic status and family history of: parental marital status, parental consanguinity and history of mental illness. (0.736 , $p=0.763$, $p=0.592$, $p=0.365$ respectively). (Table 1)

Table (1): Comparison between the studied children according to socio-demographic data and family history

	Siblings of cerebral palsy Cases (group I) (n = 65)		Apparently normal children (group II) (n = 65)		Test of sig.	p
	No.	%	No.	%		
Gender						
Male	32	49.2	34	52.3	$\chi^2=0.123$	0.726
Female	33	50.8	31	47.7		
Age (years)						
Min. – Max.	7.0 – 17.0		7.0 – 17.0		t= 0.863	0.390
Mean \pm SD.	11.57 \pm 3.61		11.08 \pm 2.85			
Socioeconomic status:						
Very low	1	1.5	2	3.1	$\chi^2=0.848$	$MCp=0.736$
Low	51	78.5	53	81.5		
Moderate	13	20.0	10	15.4		
High	0	0.0	0	0.0		
Parental marital status:						
Intact Marriage	62	95.4	60	92.3	$\chi^2=0.710$	$MCp=0.763$
Divorced	2	3.1	3	4.6		
Widows	1	1.5	2	3.1		
Parental consanguinity:						
Positive	25	38.5	28	43.1	$\chi^2=0.287$	0.592
Negative	40	61.5	37	56.9		
Family history of mental illness:						
Positive	4	6.2	1	1.5	$\chi^2=1.872$	$FEp=0.365$
Negative	61	93.8	64	98.5		

χ^2 : Chi square test

FE: Fisher Exact, MC: Monte Carlo

t: student t test

Table 2 revealed statistically significant differences between the two groups regarding the occurrence of depression and anxiety ($p=0.010$, 0.033 respectively).

Assessment of depression, in group I children: 43 (66.1 %) had no depression, 22 (33.9%) had depression and subclassified according to severity to mild, moderate and severe. 8 (12.3%) had mild depression, 12 (18.4%) had moderate depression and 2 (3.07 %) had severe depression. In group II children: 54 (83.1 %) had no depression, 8 (12.3 %) had mild depression, 2 (3.1%) had moderate depression, and 1

(1.5 %) had severe depression. There was a statistically significant difference between the two studied groups regarding the occurrence of depression ($p=0.0266$). **Table 2**

Assessment of anxiety, in group I children: 41 (63.1%) had low scores (no anxiety), 16 (24.6%) had moderate score anxiety and 8 (12.3 %) had high score anxiety. Group II children: 52 (80 %) had no anxiety, 10 (15.4 %) had moderate anxiety, and 3 (4.6 %) had high anxiety. There was a statistically significant difference between the two studied groups regarding the occurrence of anxiety ($p=0.033$). **Table 2**

Table (2): Comparison between the occurrence of depression and anxiety among siblings of cerebral palsy cases and control group

	Siblings of cerebral palsy Cases (group I) (n = 65)		Apparently normal children (group II) (n = 65)		χ^2	p
	No.	%	No.	%		
Depression						
None (normal range)	43	66.1	54	83.1	4.9141	0.0266 *
Mild	8	12.3	8	12.3		
Moderate	12	18.4	2	3.1		
Severe	2	3.07	1	1.5		
Anxiety						
Low (normal range)	41	63.1	52	80.0	4.571	0.033*
Moderate	16	24.6	10	15.4		
High	8	12.3	3	4.6		

χ^2 : Chi square test *: Statistically significant p < 0.05

Relations between depression with gender, age, socioeconomic status and family history among sibling with CP of studied group I children and control group 2; are summarized in **Table 3**. All relations between depression and: gender, age, history of

socioeconomic status, parental marital status, parental consanguinity were statistically non-significant ($p=0.456$, $p=0.643$, $p=0.564$, $p=1.00$, $p= 0.622$, $p= 0.276$ respectively).

Table (3): Relationship between depression and socio-demographic characteristics and family history among siblings of cerebral palsy cases compared to control

	Depression				χ^2	p
	Apparently normal (n = 11)		Siblings of cerebral palsy (n = 22)			
	No.	%	No.	%		
Gender						
Male	3	27.3	10	45.5	1.015	^{FE} p= 0.456
Female	8	72.7	12	54.5		
Age						
≥12	10	90.9	18	81.8	0.471	^{FE} p= 0.643
<12	1	9.1	4	18.2		
Socioeconomic status						
Very low	1	9.1	1	4.5	1.168	^{MC} p= 0.564
Low	7	63.6	17	77.3		
Moderate	3	27.3	4	18.2		
High	0	0.0	0	0.0		
Parental Marital status						
Married	10	90.9	20	90.9	0.0	^{FE} p= 1.000
Divorced	1	9.1	2	9.1		
Widows	0	0.0	0	0.0		
Parental Consanguinity						
Negative	6	54.5	10	45.5	0.243	0.622
Positive	5	45.5	12	54.5		
Family History of mental illness						
Negative	11	100.0	18	81.8	2.276	^{FE} p= 0.276
Positive	0	0.0	4	18.2		

χ^2 : Chi square test MC: Monte Carlo FE: Fisher Exact

Relation between depression in group I children and: the type of CP, the degree of disability according to GMFCS of CP in their siblings and associated disabilities in their siblings with CP were statistically non-significant. **Table 4**

Relations between anxiety and gender, age, socioeconomic status and family history among sibling with CP of studied group I children and controls group 2; are summarized in **table (5)**. All the relations between anxiety and gender, age,

socioeconomic status, parental marital status, parental consanguinity, family history of mental illness, were statistically non-significant ($p=0.642$, $p=0.691$, $p=1.00$, $p=0.268$, $p=0.666$, $p=1.00$ respectively)

Table (4): Relationship between depression in siblings of cerebral palsy cases with the type and gross motor functional classification of cerebral palsy and associated disabilities

	Siblings of CP cases with no depression (n=43)		Siblings of CP cases with depression (n=22)		Total (n = 65)		χ^2	p
	No.	%	No.	%	No.	%		
Type								
Bilateral spastic	31	72	19	86.3	50	76.9	1.670	0.196
Dyskinetic	7	16.3	2	9.1	9	13.8	0.630	^{FE} p= 0.706
Spastic Hemiplegia	4	9.3	1	4.5	5	7.7	0.464	^{FE} p=0.655
Spastic diplegia	1	2.3	0	0.0	1	1.5	0.520	^{FE} p=1.000
Gross Motor Functional Classification								
I	5	11.6	1	4.5	6	9.2	2.850	^{MC} p= 0.619
II	3	7.0	1	4.5	4	6.2		
III	6	14.0	1	4.5	7	10.8		
IV	3	7.0	1	4.5	4	6.2		
V	26	60.5	18	81.8	44	67.7		
Associated disabilities								
None	2	4.7	0	0.0	2	3.1	1.056	^{FE} p=0.545
Intellectual disability	35	81.4	19	86.4	54	83.1	0.256	^{FE} p=0.737
Epilepsy	35	81.4	19	86.4	54	83.1	0.256	^{FE} p=0.737
Scoliosis	13	30.2	8	36.4	21	32.3	0.250	0.617
Hip dislocation	6	14.0	3	13.6	9	13.8	0.001	^{FE} p=1.000
SNHL**	6	14.0	4	18.2	10	15.4	0.200	^{FE} p=0.723
Visual impairment	8	18.6	8	36.4	16	24.6	2.474	0.116
Hydrocephalus and dysphasia	3	7.0	4	18.2	7	10.8	1.902	^{MC} p=0.111

χ^2 : Chi square test

MC: Monte Carlo

FE: Fisher Exact

Table (5): Relationship between anxiety and socio-demographic characteristics and family history among siblings of cerebral palsy cases compared to control

	Anxiety				χ^2	p
	Apparently normal (n = 13)		Siblings of cerebral palsy (n = 24)			
	No.	%	No.	%		
Gender						
Male	7	53.8	11	45.8	0.217	0.642
Female	6	46.2	13	54.2		
Age						
≥12	9	69.2	19	79.2	0.452	^{FE} p= 0.691
<12	4	30.8	5	20.8		
Socioeconomic status						
Very low	1	7.7	1	4.2	0.654	^{MC} p= 1.000
Low	9	69.2	18	75.0		
Moderate	3	23.1	5	20.8		
High	0	0.0	0	0.0		
Parental Marital status						
Married	12	92.3	22	91.7	2.416	^{MC} p= 0.268
Divorced	0	0.0	2	8.3		
Widows	1	7.7	0	0.0		
Parental Consanguinity						
Negative	8	61.5	13	54.2	0.187	0.666
Positive	5	38.5	11	45.8		
Family History of mental illness						
Negative	12	92.3	21	87.5	0.202	^{FE} p= 1.000
Positive	1	7.7	3	12.5		

χ^2 : Chi square test

MC: Monte Carlo

FE: Fisher Exact

Relation between anxiety in group I children and the type of CP, the degree of disability according to

GMFCS and the associated disabilities in their siblings with CP were statistically non-significant. **Table 6**

Table (6): Relationship between anxiety in siblings of cerebral palsy cases and the type and gross motor functional classification of cerebral palsy and associated disabilities

	Siblings of CP cases without anxiety (n = 41)		Siblings of CP cases with anxiety (n=24)		χ^2	<i>p</i>
	No.	%	No.	%		
Type						
Bilateral spastic	30	73.1	20	90.9	2.751	0.116
Dyskinetic	7	17.1	2	8.3	0.745	0.476
Spastic hemiplegia	3	7.3	2	8.3	0.062	1.000
Spastic diplegia	1	2.4	0	0.0	0.545	1.000
The degree of disability according to GMFC*						
I	5	12.2	1	4.2	4.565	<i>MCp</i> = 0.354
II	3	7.3	1	4.2		
III	5	12.2	2	8.3		
IV	4	9.8	0	0.0		
V	24	58.5	20	83.3		
Associated disabilities						
None	2	4.9	0	0.0	1.208	0.527
Intellectual disability	33	80.5	21	87.5	0.529	0.733
Epilepsy	33	80.5	21	87.5	0.529	0.733
Scoliosis	13	31.7	8	33.3	0.018	0.892
Hip dislocation	6	14.6	3	12.5	0.058	1.000
SNHL**	5	12.2	5	20.8	0.868	0.479
Visual impairment	8	19.5	8	33.3	1.828	0.176
Hydrocephalus & Dysphasia	4	9.7	3	12.5	0.152	1.000

χ^2 : Chi square test MC: Monte Carlo *GMFC: gross motor functional classification **SNHL: sensory neural hearing loss

Regarding depression, among group I children with their siblings with CP having two or less associated disabilities: 23 (82.1%) cases had no depression, 2 (7.1%) cases had mild depression, 3 (10.7%) cases had moderate depression and no case had severe depression. Among children who had siblings with CP having more than two disabilities associated with CP: 18 (48.6%) cases had no depression, 9 (24.3%) cases had mild depression, 8 (21.6%) cases had moderate depression, and 2 (5.4%) cases had severe depression. The relation between depression and the number of associated disabilities with CP in siblings of group I children was statistically significant ($p=0.040$).

Regarding anxiety: group I children with their siblings with CP having two or less disabilities associated with CP: 22 (78.6%) controls had no anxiety, 4 (14.3%) controls had moderate anxiety, and 2 (7.1%) controls had high anxiety. Among cases who had siblings with CP having more than two disabilities associated with CP: 19 (51.4%) had no anxiety, 12 (32.4%) had moderate anxiety, and 6 (16.2%) had high anxiety. The relation between anxiety and the number of associated disabilities with CP in siblings of group I children was statistically significant ($p=0.0122$).

Table (7): Relationship between depression and anxiety in siblings of CP cases and the number of associated disabilities

Associated disabilities with CP	Two or less disabilities (n = 28)		More than two disabilities (n = 37)		χ^2	<i>MCp</i>
	No.	%	No.	%		
Depression						
None	23	82.1	18	48.6	7.629	0.002*
Mild	2	7.2	9	24.4		
Moderate	3	10.7	8	21.6		
Severe	0	0.0	2	5.4		
Anxiety						
Low score (no anxiety)	22	78.6	19	51.4	5.0706	0.0122*
Moderate	4	14.3	12	32.4		
High	2	7.1	6	16.2		

χ^2 : Chi square test MC: Monte Carlo *: Statistically significant $p < 0.05$

DISCUSSION

The presence of a sibling with a chronic illness including intellectual disability and cerebral palsy have in general a varying degree of negative

psychological effect on their siblings.⁽²⁵⁾

Many researchers studied the psychological effect on parents and caregivers of children with cerebral palsy; specifically depression and anxiety. They also studied the psychological effect of presence of a child with chronic illness on their siblings. However, to the best of our knowledge, searching literature, no published research was found investigating depression and anxiety in siblings of children with CP, most researchers were investigating the psychological impact of having a child with CP on parents especially mothers, or the effect of a child with chronic illness in general on psychological well-being of their siblings.

So, we aimed in the present research to study the occurrence of depression and anxiety disorders among siblings of children with CP attending the Outpatient Neurology Clinic at AUCH; as a tertiary referral hospital.

Depression and anxiety were more prevalent in siblings of children with CP, compared to siblings of healthy children. This gives evidence that the presence of a child with CP in the family has a significant negative effect on the psychological well-being and the mental health of normal siblings. This negative effect may be due to: strain for parents, embarrassment of their siblings with CP, jealousy regarding amount of time and care parents spend with their siblings with CP, trying to make up for the deficits of their siblings with CP or concern over their role in future caregiving.⁽¹¹⁾

Sharpe and Rossiter⁽²⁵⁾ in a meta-analysis studying the effect of having a sibling with a chronic disorder on the psychological aspect; reported that there was a considerable unfavorable influence on normal siblings and specifically on psychological functioning. Also, Vermaes et al.⁽²⁶⁾ In another meta-analysis found a significant negative impact on psychological aspect of siblings of children with chronic illness.

In the current research, we studied different factors that could have relation with the depression and anxiety in siblings of children with CP compared to control group with anxiety and depression. We found that there was no statistically significant difference between both groups regarding their age and depression. In group 1 (sibling of CP) 81.8% of cases with depression was found in older age group (≥ 12 years) and 90% of group 2 (control) who had depression aged above 12 years. This could be due to that the peak age of depression in children is between 12-17 years.⁽²⁷⁻²⁸⁾

This is consistent with data from the "Substance Abuse and Mental Health Services Administration (SAMHSA)" indicating that the peak of depression is between 12 -17 years and the rate is rising dramatically for both sexes.^(27, 28) Moffitt et al⁽²⁹⁾ also reported that the prevalence of depression in pre-

pubertal children is lower than older children, with little difference between boys and girls, then the occurrence start to increase sharply in girls than boys around the teenage.

In the present study, there was increase in the occurrence of anxiety with increase in age in both groups. This could be explained by that anxiety disorders, in general, are more common in adolescents and older children than in young children.⁽¹⁵⁾ Also, by the more awareness and vulnerability of adolescent age group more than children.⁽¹³⁾

According to the findings of Legerstee et al.⁽³⁰⁾, the average age of onset for all anxiety disorders is 21.3 years; separation anxiety disorder, specific phobia, and social phobia all began before the age of 15 years, whereas agoraphobia, obsessive-compulsive disorder, posttraumatic stress disorder, panic disorder, and generalized anxiety disorder all began between 21.1 and 34.9 years.

In contrast to our results; Pollard et al.⁽³¹⁾ found no association between anxiety and the age of siblings who had siblings with autism or Down syndrome. This difference could be related to the difference in the type of illness of siblings and to a difference in culture and treatment facilities.

Although depression was more severe among females in the present study; the occurrence was only 54% in female siblings of CP. However, 72% with depression in control group were females. The worldwide prevalence of depressive disorder is more common in females than males. Data from (SAMHSA) indicates that sex differences in depression rates begins at the age of 12-17 years. Data also reported that girls aged 12-17 years are 3 times more affected than boys of the same age.⁽²⁸⁾

The relation between gender and anxiety was statistically non-significant. This matches with the data reported by the American Psychological Association: in childhood, the gender distribution of anxiety disorders tends to be equal for all genders. In the teenage, a female-to-male ratio increases.⁽³⁰⁾ Pollard et al.⁽³¹⁾ found no considerable relation between anxiety and gender of the siblings who had a brother or sister with autism or Down syndrome. On the other hand, Walton and Ingersoll⁽³²⁾ discovered that older male brothers of children with autism (average age 11 years) were more likely than female siblings to have behavioral/emotional adjustment issues. The difference in results may be due to the nature of the disease in the siblings or the engagement of siblings in carrying responsibilities and caring for their siblings with CP in the culture in our study.

In the present study, we found that the relations between depression and anxiety; and: parental marital status and consanguinity were statistically non-significant in both groups. This is in agreement with what had been reported by Hosseinpour et al.⁽³³⁾ that

there was no relationship between parental consanguineous marriage and mental health. Also, Giallo *et al.*⁽³⁴⁾ reported that a single parent family was not a significant predictor of self-reported sibling mental health.

Post *et al.*⁽³⁵⁾ reported that a positive family history of psychiatric illness is associated with increased incidence of multiple psychiatric illnesses in their offspring. However, in the present study, subjects from cases and control with no family history of mental illness had more depression than children with family history of mental illness.

We also found, in the present study, that the relations between depression and anxiety and socioeconomic status of subjects were statistically non-significant, which is in contrary to Park *et al.*⁽³⁶⁾ who stated that income and socioeconomic status have an impact on the well-being of children in general. This difference might be related to that most cases in the present study (98.5%) have low and moderate SES, minimal (1.5%) have very low SES, and no families have high socioeconomic status. So, selection bias limited studying the relation between depression and anxiety and socioeconomic status, as the sample is not a random sample from the community.

In the current study, the relation between depression and anxiety in cases of group I and: the degree of disability according to GMFCS⁽¹¹⁾ and the type of CP of their siblings with CP was statistically non-significant. This is consistent with Giallo *et al.*⁽³⁴⁾ who reported that the severity of the developmental disability was not a significant predictor of self-reported sibling mental health.

The most interesting results concerning the relations of depression and anxiety in the present study is the presence of a statistically non-significant relation between depression and anxiety in cases of group I and the associated disabilities in their siblings with CP, while the relation of depression and anxiety with the number of associated disabilities in their siblings with CP was statistically significant. There is increase in the occurrence of depression and anxiety in subjects with increased number of disabilities in their siblings with CP (more than two disabilities). A possible explanation could be that the increased number of disabilities in children with CP may lead to more psychological burden on their siblings. Petalas *et al.*⁽³⁷⁾ compared siblings of children with autism and an intellectual disability against siblings of children with only an intellectual disability. Siblings of children with autism and intellectual disability experienced more emotional problems than siblings of children with simply an intellectual disability. This suggests that having more difficulties as a kid is linked to having more severe mental health issues as a sibling.

This research is one of the few researches that give evidence of the psychological impact of having a child with CP on the family members and specifically the negative psychological effect on their siblings in the pediatric age group. As, our results indicate that the occurrence of depression and anxiety in siblings of children with CP were more than children with healthy siblings.

We highlighted the significance of studying the mental health of this group of children, which may influence their quality of life and if not managed can increase with age.⁽¹³⁾

CONCLUSION AND RECOMMENDATIONS

This research gives evidence of the higher occurrence of depression and anxiety among siblings of children with CP compared to the control group.

It is recommended to raise the awareness of the pediatric neurologists and general pediatricians to catch early symptoms of depression and anxiety among siblings of children with neurological disability, to improve the quality of life of the whole family.

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