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Depression, anxiety, and hopelessness in a sample of Egyptian children diagnosed with cystic fibrosis

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Abstract

Background Even though current therapeutic approaches have significantly increased the longevity and standard of living for children suffering from cystic fibrosis (CF), the crucial psychological components of this illness have not received the same level of attention as other chronic illnesses. The aim of the research was to assess depression, anxiety, and hopelessness in cystic fibrosis-affected children and their relation to the duration of illness. In this study, we compared 40 healthy control children between the ages of 7 and 12 with 40 cystic fibrosis children who were matched for age and sex. All patients had detailed clinical and psychometric evaluations using the Children's Depression Inventory (CDI), the Anxiety Scale for Children (ASC), and the Hopelessness Scale for Children (HSC).

Results The CDI, ASC, and HSC revealed a significant difference between both groups. Positive correlations between depression, anxiety, and hopelessness and disease duration were found.

Conclusions Patients with CF experienced significantly increased depression, anxiety, and hopelessness, and there is an association between these symptoms and the duration of the illness. We advise making psychiatric screening a standard part of evaluating and monitoring CF patients.

Keywords Depression, Anxiety, Hopelessness, Cystic fibrosis

Background

Cystic fibrosis (CF) is a hereditary disease that mostly impacts the respiratory system but can also affect the kidneys, liver, pancreas, and intestinal tract. It results from mutations that are present in both copies of the CFTR protein gene. Long-term problems include having trouble breathing and mucus coughing due to recurrent lung infections [1, 2]. Respiratory failure continues to be the main cause of death, despite impacting other organs [3].

CF is one of the most difficult chronic illnesses to manage, despite recent improvements in its detection and treatment that have increased life expectancy [4]. A childhood CF diagnosis places a heavy strain on the impacted child and the entire family structure, particularly the parents and guardians [5].

Patients' physical and psychological health, as well as numerous other areas of their lives, is significantly affected by the illness. Patients and their parents frequently experience co-occurring mental health conditions like depression and anxiety [6].

In CF patients and their careers, the psychological burden can lead to worse outcomes, such as lowered respiratory function, a reduction in body mass index, and an increase in hospitalizations. It can also lead to higher health care expenses and less adherence to recommended

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therapy [7–9]. So, the health-related quality of life (HRQOL) of CF patients can be adversely affected if their mental wellness is not taken into consideration [10].

This study aimed to assess anxiety, depressive symptoms, and hopelessness in children with CF and their correlation with disease duration.

Methods

Study design and setting

The fibrosis clinic, a division of the allergy and pulmonary unit at Cairo University's specialized children's hospital, conducted this cross-sectional comparative study. The Cairo University Faculty of Medicine's research ethics committee has given its approval for this work.

Participants

Patients with CF were diagnosed by sweat chloride tests; all were gathered from the cystic fibrosis clinic of the allergy and pulmonology unit of the University Children's Hospital at their follow-up appointment through the systematic random sampling technique, in which a sample was obtained from each third clinic participant after a random starting point was chosen from the population. Forty children with cystic fibrosis (CF) and another 40 healthy controls were recruited, and both groups were similar in terms of age and gender. Inclusion criteria included age from 7 to 12 years, not being on steroid treatment, or having a known cognitive dysfunction. They were clinically stable, recruited on a consecutive basis every Monday clinic at the end of their follow-up visit, and assessed in their preferred location. *Healthy controls* were selected from the siblings of other patients who attended outpatient clinics. For all participants, verbal consent was taken from caregivers and approval from children before enrollment.

Sample size

The G*Power 3 programme was used to calculate the sample size [11]. To identify an effect size of 0.4 and 0.6 in the prevalence of depression and anxiety, via an error possibility of 0.05 and 80% power, an estimated minimum sample size of 80 children between the ages of 7 and 17 years in a 1:1 case–control design (40 children with a confirmed diagnosis of CF via sweat chloride test and 40 age- and sex-matched control) was required [12].

Measures

For all participants, demographic data were collected: age, gender, parents' education level, residence, and socioeconomic status, which was assessed using the AL Shakhs Arabic Familial Socioeconomic Status Scale. It contributed to the identification of the Egyptian family's socioeconomic status. It mostly depended on each family member's monthly income, the jobs held by the mother and father, and their level of education [13]. Clinical data obtained for patients consisted of age at onset of cystic fibrosis, duration of cystic fibrosis, frequency of symptoms, and severity of attacks. A psychometric evaluation was conducted using the Children's Depression Inventory (CDI), Anxiety Scale for Children (ASC), and Hopelessness Scale for Children (HSC).

CDI [14]: It is a brief self-report psychological evaluation that measures the degree of severity of depression symptoms in young patients. The best sentence out of a group of three that described each respondent over the last 2 weeks was asked of them. It consists of 27 groups of statements that cover the following topics: sadness, pessimism, self-deprecation, anhedonia, misconduct, negative worrying, self-hatred, self-blame, suicidal thoughts, crying spells, irritability, reduced social interest, indecision, undesirable body image, difficulty with school work, sleep issues, tiredness, decreased appetite, somatic problems, feeling alone, dislike of school, lack of friends, decline in academic performance, self-deprecation (by peer comparison), a sense of unlove, disobedience, and fights.

ASC [15]: It measures children's anxiety through self-reporting. It has 52 items; 11 of them are tailored specifically to test validity (the lying scale), while the remaining items are tailored specifically to anxiety. When a youngster responds to statements on a scale by saying "yes" or "no," one degree will be added for the "yes" response and zero for the "no" response.

HSC [16]: This 17-item questionnaire assesses cognitions of helplessness, a concept related to depressive disorders and suicidal thoughts. Scores of 4 or below are termed low hopelessness, while those of 7 or more are considered excessive hopelessness. Negative expectations about oneself and the future are referred to as hopelessness. Scores on the HSC have been linked to the intensity of depression, and when hopelessness is adequately controlled, suicidal intent is reduced. The assessment was translated into Arabic.

Statistical analysis

The data were examined using SPSS Version 15 and Statistics Version 23. Quantitative information is displayed as the mean, range, median, inter-quartile range, and standard deviation (SD). Categorical variables are displayed as percentages and frequency. The Shapiro–Wilk test was utilized to examine the normality of continuous variables. The median differences between groups were

tested for continuous variables using the Mann–Whitney U test. Univariate correlations between the duration of the illness and depression/anxiety/hopelessness scale scores were estimated using Spearman's rank correlation. P-values were deemed significantly different if they were less than 0.05.

Results

Forty children with cystic fibrosis who were diagnosed by sweat chloride testing and were between the ages of 7 and 12 were enrolled. We matched 40 of these cases with 40 healthy control children.

The patients' mean age was 9.05 ± 1.74 years. The mean age of the healthy controls was 9.35 ± 1.8 years. Both the CF group and the control group had 62.5% male participants. A low socioeconomic level was shared by around 75% of the cases and 85% of the study's control individuals. Regarding where they lived, 65% of patients and 77.5% of controls were from metropolitan regions, respectively (Table 1). The duration of cystic fibrosis had a mean ± SD of 7.00 ± 1.75, while the number of exacerbations per year had a mean ± SD of 1.99 ± 1.02.

In the cystic fibrosis group, the overall incidence of depression was 60% ($n=24$), 55% reported having anxiety ($n=22$), and hopelessness was 100% ($n=40$) (Table 2).

According to CDI, the depression levels in the two groups differed significantly ($p<0.01$). The group with cystic fibrosis was more impacted than the control group (Table 3).

The cystic fibrosis group scored considerably higher than the other one on the ASC ($p<0.01$) (Table 4).

Table 5 shows there was a significant statistical distinction between both groups on HSC, where cystic fibrosis patients had more hopelessness ($p<0.01$).

A strong positive association was found between depression, anxiety, hopelessness, and disease duration ($p<0.05$). The longer the disease persisted, the more severe the depression, anxiety, and hopelessness became (Table 6).

Discussion

This study aimed to assess children with CF for depression, anxiety, and hopelessness, as well as the correlation between these symptoms and the length of the disease. The study had 40 children with cystic fibrosis who were matched in age and sex with 40 healthy children to serve as the control group.

In the current study, 10% of the CF patients were found to have severe depression, 15% to have moderate depression, and 35% to have mild depression. These findings align with those of Smith et al. [17] who evaluated depression in children with cystic fibrosis and found that 33% of them experienced moderate or severe depression.

Table 1 Demographics and clinical data for both groups

Variables	Cystic fibrosis group No. = 40	Control group No. = 40
Age (years)		
Mean ± SD	9.05 ± 1.74	9.35 ± 1.83
	Number (%)	**Number (%)**
Sex		
Male	25 (62.5%)	25 (62.5%)
Female	15 (37.5%)	15 (37.5%)
Residence		
Urban	26 (65%)	31 (77.5%)
Rural	14 (35%)	9 (22.5%)
Father's education		
Illiterate	12 (30%)	15 (37.5%)
Primary and preparatory	6 (15%)	9 (22.5%)
Secondary	14 (35%)	13 (32.5%)
Higher education	8 (20%)	3 (7.5%)
Mother's education		
Illiterate	11 (27.5%)	16 (40%)
Primary and preparatory	8 (20%)	11 (27.5%)
Secondary	16 (40%)	12 (30%)
Higher education	5 (12.5%)	1 (2.5%)
Socioeconomic level		
Low	30 (75%)	34 (85%)
Moderate	10 (25%)	6 (15%)
High	0	0
Duration of disease (years)		
Mean ± SD	7.00 ± 1.75	
Number of exacerbations per year		
Mean ± SD	1.99 ± 1.02	

Table 2 Depression, anxiety, and hopelessness in the patient group

Variable		Number (%)
Depression	**Minimal or no depression**	16 (40%)
	Mild depression	14 (35%)
	Moderate depression	6 (15%)
	Severe depression	4 (10%)
Anxiety	**No anxiety**	18 (45%)
	Mild anxiety	6 (15%)
	Moderate anxiety	8 (20%)
	Severe anxiety	8 (20%)
Hopelessness	**Low hopelessness**	8 (20%)
	Moderate hopelessness	19 (47.5%)
	High hopelessness	13 (32.5%)

Table 3 Comparison between both groups regarding Children's Depression Inventory (CDI)

Variables	Cystic fibrosis group No. = 40	Control group No. = 40	*P*-value
CDI			
Median (IQR)	9 (6–13.5)	5 (3–8.5)	< 0.01
Range	0–26	0–15	

IQR interquartile range

Table 4 Comparison between both groups regarding Anxiety Scale for Children (ASC)

Variables	Cystic fibrosis group No. = 40	Control group No. = 40	*P*-value
ASC			
Median (IQR)	16 (9.5–27)	7 (4.5–11)	< 0.01
Range	2–39	2–33	

IQR interquartile range

Table 5 Comparison between the two groups regarding Hopelessness Scale for Children (HSC)

Variables	Cystic fibrosis group No. = 40	Control group No. = 40	*P*-value
HSC			
Median (IQR)	7 (5–9)	5 (3–7)	< 0.01
Range	3–15	1–12	

IQR interquartile range

Table 6 Correlation between patient's depression, anxiety, hopelessness, and cystic fibrosis duration

Variables	Duration (years)	
	Rho	***P*-value**
Depression	0.332	< 0.05
Anxiety	0.379	< 0.05
Hopelessness scale for children	0.319	< 0.05

Rho Spearman correlation coefficient

This was linked to deteriorated social interactions and quality of life, severe respiratory symptoms, poor lung function, and hospital readmissions.

The findings revealed that 20% of the people under study had severe anxiety, 20% had moderate anxiety, and 60% had either mild or no anxiety. This was supported by Pop-Jordanova and Demerdzieva's [18] assessment of cognition, anxiety symptoms, and behaviour in children with CF, which revealed that these patients had high anxiety scores.

This study showed that of the CF patients tested, 32.5% experienced high levels of hopelessness, 47.5% experienced moderate levels of hopelessness, and 20% experienced low levels of hopelessness. Furthermore, the HSC showed a difference with statistical significance ($p < 0.01$) between the two groups, with the sick group's median score being 7 and the control group's being 5. This is consistent with Bekir et al.'s [19] explanation of hopelessness in sick children, which was based on their knowledge of the progression and complications of individuals with the same diagnosis.

With a median score of 9 in the sick group and 5 in the control group, we detected a statistically significant difference ($p < 0.01$) in CDI scores between the two groups. This aligns with the results of Olson et al. [20] who discovered that kids with chronic medical issues are more susceptible to internalizing issues like depression than to externalizing issues. The most frequent cause for a psychiatric referral from the child's doctor among hospitalized children is a suspicion of depression or suicidal ideation. David [21] observed that young people with CF do not seem to be significantly more likely to experience depression, which contrasts with our conclusion. Kvist et al.'s [22] research showed that kids who comprehend their illness better have lower levels of depression, which may help explain this.

Regarding ASC scores, we discovered a statistically significant distinction ($p < 0.01$) between both groups, with a median score of 16 in the diseased group and 7 in the healthy group. This outcome could be explained by increased physical morbidity and mortality, variable physical manifestations, decreased quality of life, less adherence to treatment, increased healthcare expenses, inadequate disease control, and a greater likelihood of hospitalization.

In our study, the duration of cystic fibrosis was found to have a strong positive relationship with depression, anxiety, and hopelessness ($p < 0.05$). Depression, anxiety, and hopelessness significantly increased as the disease's duration became longer. David [21] observed that as chronic diseases progress, the prevalence of depression increases, which supports this finding. This is also consistent with Feride and Demir [23], who examined QOL and hopelessness in patients with chronic illnesses and discovered that hopelessness increased as the condition persisted.

Recommendations

It is suggested that children with CF undergo both initial and follow-up psychiatric evaluations. Psychological counselling, social support, and rehabilitation programmes should be implemented for children with psychological issues to ensure that they receive the best care possible. This team needs to include mental health

professionals. Future research is required to determine the effects of treating depression and anxiety disorders on the daily life outcomes of children with CF as well as to identify any additional co-morbid psychiatric disorders related to the disease.

Conclusion

Depression, anxiety, and hopelessness were substantially more prevalent among cystic fibrosis patients, and there is a correlation between these manifestations and the length of the disease. We propose that the evaluation and follow-up of cystic fibrosis patients should include routine psychological assessment.

Abbreviations

CF	Cystic fibrosis
CDI	Children's Depression Inventory
ASC	Anxiety Scale for Children
HSC	Hopelessness Scale for Children
HRQOL	Health-related quality of life
IQR	Interquartile range

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Authors' contributions

The research's design, writing, methodology, collection of data, and interpretation were all contributed to by the authors. The authors have revised and approved the final work.

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Availability of data and materials

Upon request.

Declarations

Ethics approval and consent to participate

The research was approved by the Faculty of Medicine's Research Ethics Committee at Cairo University. The consent was obtained in writing from the subjects' guardians and the children before enrollment.

Consent for publication

Not applicable.

Competing interests

The authors declare that they have no competing interests.

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