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The Psychological Burden of the COVID-19 Pandemic on Children with Chronic Lung Disease: Anxiety and Depression in Bronchiolitis Obliterans: Prospective Cross-Sectional Research

Kronik Akciğer Hastalığı Olan Çocuklarda COVID-19 Pandemisinin Psikolojik Yükü: Bronchiolitis Obliterans'ta Anksiyete ve Depresyon: Prospektif Kesitsel Çalışma

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ABSTRACT Objective: Bronchiolitis obliterans (BO) is a rare, irreversible chronic lung disease. The COVID-19 pandemic, especially through isolation and social restrictions, significantly impacted mental health, particularly in individuals with chronic conditions. This study aimed to evaluate anxiety and depression levels in children diagnosed with BO and their parents, comparing them with healthy controls. **Material and Methods:** Children diagnosed with BO between 2008 and 2020 and their parents were assessed through telehealth interviews. Sociodemographic data were collected. Psychological symptoms in parents were evaluated using the Brief Symptom Inventory (BSI), while children's quality of life was assessed via the Pediatric Quality of Life Inventory (PedsQL). Depression and anxiety in children were measured using the Childhood Depression Inventory (CDI) and the Screen for Child Anxiety Related Emotional Disorders (SCARED), both validated for the Turkish population. Control groups included children of healthcare workers and non-healthcare workers. **Results:** The study included 34 children with BO, 34 children of healthcare workers, and 34 of non-healthcare workers. Anxiety levels were significantly higher in BO patients and children of healthcare workers, while depressive symptoms were particularly elevated in the latter. Children with BO reported significantly lower physical quality of life. A positive correlation was found between child anxiety, decreased quality of life, and parental psychological distress. **Conclusion:** Children with BO and those of healthcare workers are at higher risk for anxiety and depression during pandemics, likely due to illness-related stress and parental occupational strain. Psychological support should be prioritized for these vulnerable groups in future outbreaks.

Keywords: Anxiety; bronchiolitis obliterans; child; depression; pandemic

ÖZET Amaç: Bronşiolitis obliterans (BO), nadir görülen, geri dönüşümsüz kronik bir akciğer hastalığıdır. COVID-19 pandemisi, özellikle izolasyon ve sosyal kısıtlamalar yoluyla, kronik hastalığı olan bireylerde ruh sağlığını önemli ölçüde etkilemiştir. Bu çalışmada, BO tanısı almış çocuklar ve ebeveynlerinde anksiyete ve depresyon düzeylerinin değerlendirilmesi ve sağlıklı kontrol gruplarıyla karşılaştırılması amaçlanmıştır. **Gereç ve Yöntemler:** 2008-2020 yılları arasında BO tanısı alan çocuklar ve ebeveynleri, tele-sağlık görüşmeleri ile değerlendirildi. Sosyodemografik veriler hasta dosyalarından toplandı. Ebeveynlerin psikolojik belirtileri Brief Symptom Inventory (BSI) ile, çocukların yaşam kalitesi ise Pediatric Quality of Life Inventory (PedsQL) ile değerlendirildi. Çocuklarda depresyon ve anksiyete düzeyleri, Türk toplumuna uyarlanmış Childhood Depression Inventory (CDI) ve Screen for Child Anxiety Related Emotional Disorders (SCARED) ölçekleri ile ölçüldü. Kontrol grupları, sağlık çalışanı ebeveynlerin çocukları ve sağlık çalışanı olmayan ebeveynlerin çocuklarından oluşmaktaydı. **Bulgular:** Çalışmaya 34 BO tanılı çocuk, 34 sağlık çalışanı çocuğu ve 34 sağlık çalışanı olmayan çocuğu dahil edildi. Anksiyete düzeyleri BO hastalarında ve sağlık çalışanlarının çocuklarında anlamlı şekilde yüksek bulundu; depresyon ise özellikle sağlık çalışanlarının çocuklarında yüksekti. BO'lu çocuklar fiziksel yaşam kalitesinde belirgin düşüş bildirdi. Çocuk anksiyetesi ile azalan yaşam kalitesi ve ebeveyn psikolojik sıkıntısı arasında pozitif korelasyon gözlendi. **Sonuç:** Pandemi dönemlerinde BO'lu çocuklar ve sağlık çalışanlarının çocukları anksiyete ve depresyon açısından artmış risk altındadır. Bu durum, hastalığa bağlı stres ve ebeveynlerin mesleki yüklerine bağlanabilir. Gelecek salgınlarda bu savunmasız gruplara yönelik psikolojik destek öncelikli olmalıdır.

Anahtar Kelimeler: Anksiyete; bronşiyolit obliterans; çocuk; depresyon; pandemi

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Bronchiolitis obliterans (BO) is a rare, non-progressive, irreversible chronic lung disease caused by obliteration of the lower respiratory tract. It can occur after bone marrow or hematopoietic stem cell transplantation, lung transplantation, and following viral infections.[1,2] Despite having different etiological causes, it is thought that the histopathological features of the disease are similar.[2] Initially, the disease mimics viral bronchiolitis. Symptoms such as respiratory issues like cough and wheezing, along with physical examination findings (e.g., rales, rhonchi) persisting for 6-8 weeks, mosaic pattern and ground-glass opacities on chest computerized tomography, peribronchial thickening, and central bronchiectasis in advanced stages all contribute to the diagnosis.[3] However, lung biopsy remains the gold standard for diagnosing bronchiolitis obliterans.[2,4] In children, the most common cause of BO is post-infectious bronchiolitis obliterans (PIBO).[4] Since PIBO is a chronic, irreversible obstructive lung disease, its treatment options remain unclear, and various therapeutic strategies have been proposed. Generally, the management of PIBO should focus on inhibiting lymphocyte proliferation and activation, in conjunction with anti-inflammatory therapies, given that inflammation is a key factor in the development of PIBO.[5]

Coronaviruses are RNA viruses that are enveloped, single-stranded, and zoonotic. Severe acute respiratory syndrome-coronavirus-2 (SARS-CoV-2), a novel form of coronavirus. At the end of 2019, it was first identified in Wuhan and it rapidly spread across the world and was declared a global pandemic, causing ongoing severe acute respiratory syndrome.[6] The disease quickly spread to many countries worldwide. While it can be asymptomatic, in moderate to severe cases, it may cause serious respiratory symptoms such as shortness of breath, oxygenation impairment, and tachypnea, which can result in severe pneumonia and the development of acute respiratory failure, and death.[7,8] Although coronavirus disease-2019 (COVID-19) is less common in children and often presents with milder symptoms, studies have found that the risk of mortality increases in children with underlying chronic conditions and high infection parameters.[9] During the COVID-19 pandemic, various quarantine measures were enforced globally to curb the transmission of the virus.[10] In Türkiye, the initial case of COVID-19 was detected in March 2020, followed by nationwide school closures and isolation measures. These measures are believed to have potentially negative effects on children's mental health. Additionally, it is known that the presence of parents who are negatively affected both physically and mentally can increase the risk of depression and anxiety in children.[11] Recent research has reported various negative impacts on children's mental health during the pandemic, including anxiety, depression, insomnia, worry, irritability, anger, and even post-traumatic stress disorder.[12] Furthermore, children were found to be less physically active, develop irregular eating habits, and have increased screen exposure during school closures.[13,14] Lower quality of life in children with chronic lung diseases is also known to be associated with decreased lung function.[12] The COVID-19 pandemic can be a significant source of psychological stress, especially in children with chronic respiratory diseases, due to concerns about severe pneumonia and respiratory failure. Therefore, it is expected that children with PIBO will have higher levels of anxiety and depression.

The aim of this study is to assess the levels of anxiety and depression experienced by children with one of the chronic lung diseases PIBO and their parents. Additionally, 2 age-matched healthy control groups were included to examine potential differences in anxiety levels: children of healthcare workers and children of non-healthcare worker parents.

MATERIAL AND METHODS

STUDY SAMPLE

This study follows a forward-looking design, cross-sectional study conducted at Necmettin Erbakan University, Department of Pediatric Pulmonology, involving patients diagnosed with bronchiolitis obliterans (BO) between 2008 and 2020. Anxiety and depression levels were assessed using teleconference methods. After obtaining verbal informed consent from patients aged 2-12 years and/or their families, sociodemographic data forms were completed by the researchers. Interviews were conducted separately

with both the parents and children. As the control group, healthy children of similar age without any psychiatric, physical, or neurological diagnosis were included. The control group was divided into 2 subgroups based on whether their parents were healthcare workers. The study used teleconference methods by the same healthcare personnel to administer questionnaires assessing quality of life, anxiety screening, the childhood depression scale for children, and the Brief Symptom Inventory for parents' psychological symptoms. Sociodemographic forms included age, gender, which parent answered the questions (mother or father), age at diagnosis, weight, height percentile, and regularly used medications. The study was carried out following the principles outlined in the Declaration of Helsinki. Our research was approved by the ethics committee of Necmettin Erbakan University Faculty of Medicine (2020/2959).

BRIEF SYMPTOM INVENTORY (BSI)

BSI is a self-report tool designed to assess a range of psychological symptoms. Originally created by Derogatis in 1992, the BSI is a condensed version of the Symptom Check List-90-Revised (SCL-90-R), a widely recognized comprehensive psychological assessment instrument. The BSI comprises 53 items, which were selected based on their high factor loadings from the 90-item SCL-90-R, and these items are distributed across the 9 subscales of the original inventory. Administration of the BSI takes approximately 5 to 10 minutes, and it includes the 9 subscales, additional items, and a global severity index. Respondents rate each item on a 5-point Likert scale, assessing from "not at all" to "extremely" with greater scores indicating a higher frequency of symptoms. There is no defined cut-off score for the BSI. Consistency and accuracy studies of the Turkish version were carried out in 1994 utilizing a sample with an average age of 21.02 years and its validity for adolescent populations was confirmed in a 2002 study involving 597 participants aged 13 to 17 years.[15]

PEDIATRIC QUALITY OF LIFE INVENTORY (PEDSQL)

PedsQL is a general health-related living standards scale designed to assess both physical and psychosocial functioning in children aged 8 to 18. The scale is available in 2 versions: one for children aged 8 to 12, and another for adolescents aged 13 to 18. The scale yields three scores: the total score, the physical health score, and the psychosocial health score, which assesses social and school functioning. The scale contains 23 items, each scored from 0 to 100. Responses are scored as follows: "never"=100, "almost never"=75, "sometimes"=50, "often"=25, and "almost always"=0. The reliability and validity of both forms of the scale for Turkish children were established by Memik et al.[16]

CHILDHOOD DEPRESSION INVENTORY (CDI)

CDI is a subjective reporting tool developed by Kovacs to assess depressive symptoms in children aged 6 to 17.[17] The questionnaire includes of 27 items, each presenting 3 statements from which the child selects the one that best reflects their feelings over the past 2 weeks. Responses are scored on a range from 0 to 2, with higher scores reflect greater severity of signs of depression. The maximum possible rate is 54, and a cut-off rate of 19 is typically used to identify severe depression. The CDI was adapted into Turkish by Öy et al.

CHILDHOOD ANXIETY DISORDERS SELF-REPORT SCALE-CHILD FORM

Improved by Birmaher et al., the child form of this scale consists of 41 items.[18] Children are asked to choose the most appropriate option for each item. Each item is scored between 0 and 2 points, with greater total rates indicating higher anxiety levels The consistency and accuracy of the Turkish type of the CDI were assessed in a study conducted by Çakmakçı in 2004.

STATISTICAL ANALYSIS

Statistical analyses were conducted using IBM SPSS Statistics Version 22.0 for Windows (IBM Corp., Armonk, NY, USA). Categorical data were presented as frequencies and percentages, while continuous variables were described as means with standard deviations for normally distributed data and medians with interquartile ranges for non-normally distributed data. The chi-square test was utilized for comparing categorical variables, while the Kruskal-Wallis H test

was employed for comparisons of non-normally distributed continuous data, and the one-way analysis of variance test was applied to normally distributed continuous data. When performing multiple comparisons, the Tukey test was used for those showing homogeneous distribution, while the Games-Howell test was used for those showing non-homogeneous distribution. A p value of less than 0.05 was regarded statistically significant.

RESULTS

The study included 34 children diagnosed with BO, 34 children whose parents were healthcare workers, and 34 children whose parents were not healthcare professionals. There was no notable difference between the 3 groups regarding age and gender (Table 1).

Age at diagnosis, distribution of medications used, and other clinical characteristics of children diagnosed with BO are given in Table 2.

Depression scores of children in the healthcare worker group were found to be significantly higher than those in the patient and non-health worker groups. However, the depression scores of children in all 3 groups were high and above the cut-off point. No meaningful difference in anxiety scores was observed between the groups. Alternatively, anxiety scores were higher in the patient and healthcare worker groups.

According to child reports, physical quality of life sub-scores in the patient group were statistically significantly lower than in both groups. Again, according to children's reports, no meaningful difference was observed between the groups in terms of psychosocial and overall scale scores. On the other hand, it was observed that the children in the patient group had lower scores on these 2 scales. According to parental reports, the psychosocial and scale total scores of the quality of life scale were determined to be statistically significantly lower in the patient group compared to the non-healthcare group. No statistically significant difference was detected between the groups in terms of the physical subscore of the scale. On the other hand, the physical subscore of the patient group was lower. CDI and Screen for Child Anxiety Related Disorders (SCARED) scale were filled in by 17 patients over 8 years of age. The comparison of CDI, SCARED, and PedsQL child-parent scores comparing the groups is show in Table 3.

The groups showed no statistically significant variation in parents' personality characteristics based on the BSI. The comparison of BSI between the groups is presented in Table 4.

PedsQL-E total score and age at diagnosis were found to be positively correlated (r: 0.344, p: 0.46). Child anxiety score was found to be negatively correlated with PedsQL-E total health score (r: -0.551, p: 0.022), PedsQL-E physical health score, PedsQL-E psychosocial health score (r: -0.518, p: 0.033). A positive association was identified between the parents depression characteristics and the child's anxiety rates (r: -0.498, p: 0.42), and an inverse correlation with the PedsQL-E psychosocial health score. A comparative analysis between the PedsQL, the SCARED, the CDI for both parents and children, and the subscales of the Short Symptom Inventory (depression, anxiety, somatization, and hospitalization) is provided in Table 5.

TABLE 1: Clinical characteristics of the children in the groups

	Patient (n=34)	Healthcare worker's healthy child control (n=34)	Non-healthcare worker's healthy child control (n=34)	p value	Statistics
Age (months) median (minimum-maximum)	87.21 (5.1-169.2)	87.29 (5.9-168.6)	87.18 (5.1-169.1)	0.99	0.002
Gender M/F	20/14	22/12	18/16	0.61	0.971
Parents preferance (Mother)	9.67 (2.71)	14.88 (0.68)	14.14 (2.16)		
Parents preferance (Father)	10.05 (2.94)	15.35 (0.77)	14.55 (1.50)		

Analysis of variance test; chi-square test; M: Male; F: Female

TABLE 2: Clinical features of children diagnosed with BO

	Patient (n=34)
Age at diagnosis, median (minimum-maximum)	21.41 (0-72)
Weight z score	-0.55 (-1.28-0.98)
Height z score	-0.72 (-1.88-1.28)
Drugs used, n (%)	
Azithromycin	6 (17.6)
Inhaler steroid	12 (35.3)
Inhaler salbutamol	12 (35.3)
TMP-SMX	2 (5.9)
IVIG	2 (5.9)
History of atopy in the family n (%)	
Yes	8 (23.5)
No	26 (76.5)
Consanguinity	
Yes	9 (26.5)
No	25 (73.5)

Analysis of variance test; TMP-STX: Trimethoprim-sulfamethoxazole; IVIG: Intravenous immunoglobulin

DISCUSSION

This study aims to investigate the psychological conditions and life quality experienced by children with BO and their parents. We also investigated the possible effects of the covid period by comparing it with 2 different matched healthy control groups (healthcare worker parents and their children, and non-healthcare worker parents and their children). Based on available information, this is one of the first studies in the literature examining the psychological characteristics and quality of life of children with BO during the COVID-19 pandemic. In this study, the depression rate of children in the group whose parents were healthcare workers was found to be high. There was no statistically significant difference between the groups in terms of anxiety scores. Based on child reports, physical quality of life was found to be low in the patient group. According to parental reports, psychosocial and total quality of life were found to be low in the patient group.

Chronic diseases can bring along some psychological problems in addition to medical difficulties for children. Besides that, it is well established that COVID-19 is more sensitive and riskier for these children.[19,20] Survey studies on child and adolescent mental health during the COVID-19 period have

TABLE 3: Comparation of CDI-SCARED-PedsQL Scale Scores of Children in the Group

	Patient (n=17)	Healthcare worker's healthy child control (n=17)	Non-healthcare worker's healthy child control (n=17)	Statistics t or F	p value
CDI	52.24 (2.51)	52.94 (2.16)	49.71 (1.92)	10,026	<0.001
		1 to 2	**2 to 3**		
		0.005	**<0.001**		
SCARED	32.82 (20.08)	32.06 (12.35)	23.00 (13.66)	2,051	0.14
PedsQL-Child					
Physically	78.30 (12.62)	86.02 (14.06)	87.31 (5.99)	8,003	0.018
		1 to 2	**1 to 3**		
		0.033	**0.006**		
Psychosocial	80.49 (14.37)	86.86 (7.04)	86.76 (10.14)	1,541	0.46
Total	79.73 (12.47)	86.57 (6.71)	86.95 (8.10)	11,358	0.103
PedsQL-Parent					
Physically	71.59 (23.79)	80.60 (14.40)	80.60 (15.49)	2,272	0.32
Psychosocial	73.84 (17.22)	79.09 (12.35)	82.13 (12.87)	4,481	0.10
			1 to 3		
			0.044		
Total	73.22 (18.35)	79.79 (11.66)	81.65 (12.63)	5,031	0.081
			1 to 3		
			0.031		

Analysis of variance test; "post hoc" test (Tukey test); CDI: Child Depression Inventory; SCARED: The Screen for Child Anxiety Related Disorders; PedsQL: Pediatric Quality of Life Inventory

TABLE 4: Comparision of BSI Scale Scores of Children in the Group

	Patient (n=34)	Healthcare worker's healthy child control (n=34)	Non-healthcare worker's child control (n=34)	Statistics chi-square	p value
BSI					
Depression	9.21 (7.10)	8.35 (4.96)	7.91 (6.82)	1,138	0.56
Anxiety	8.53 (8.34)	8.44 (6.42)	5.82 (5.39)	3,429	0.18
Negative	6.76 (5.46)	6.35 (5.11)	5.67 (5.24)	1,697	0.42
Somatization	5.12 (5.83)	4.03 (3.07)	3.27 (2.76)	1,375	0.50
Hostility	5.91 (3.26)	6.21 (4.61)	4.39 (2.73)	4,732	0.09

Analysis of variance test; "post hoc" test (Tukey test); BSI: Brief Symptom Inventory

TABLE 5: Comparative analysis between the Pediatric Quality of Life Inventory Scale, The Screen for Child Anxiety Related Disorders Scale, Child Depression Inventory Scale (for both parents and children) and the subscales of the Short Symptom Inventory (depression, anxiety, somatization, and hospitalization)

r value p value	CDI	SCARED	Dep	Anxiety	Negative	Somat	Hostility
Age (month)	-0.173	0.091	0.06	-0.074	0.019	0.029	-0.064
	0.22		10.53	0.46	0.85	0.77	0.52
Age at diagnosis (month)	0.227	-0.365	-0.307	-0.221	**-0.351***	-0.277	-0.218
	0.19	0.14	0.07	0.21	**0.42**	0.11	0.21
CDI	one	-0.117	-0.020	0.269	0.036	0.237	0.059
		0.41	0.88	0.05	0.80	0.09	0.67
SCARED	-0.117	one	0.088	-0.038	-0.027	.076	.164
	0.41		0.53	0.79	0.85	0.59	0.25
P-PedsQL-Ph	-0.029	**-0.449****	-0.090	-0.002	0.159	-0.069	-0.081
	0.83	**0.001**	0.36	0.98	0.11	0.49	0.42
P-PedsQL-Ps	-0.045	**-0.407****	-0.131	-0.123	0.040	-0.128	-0.157
	0.75	**0.003**	0.18	0.21	0.69	0.20	0.11
P-PedsQOL-T	-0.009	**-0.470****	-0.167	-0.142	0.063	-0.143	**-0.205***
	0.94	**0.001**	0.09	0.15	0.53	0.15	**0.04**
C-PedsQL-Ph	-0.187	-0.139	-0.043	-0.125	0.033	0.037	0.025
	0.19	0.33	0.76	0.38	0.81	0.79	0.86
C-PedsQL-Ps	0.072	**-0.563****	0.027	0.172	.223	-0.057	0.043
	0.61	**<0.001**	0.85	0.22	0.11	0.69	0.76
C-PedsQL-T	-0.060	**-0.414****	-0.027	0.109	0.104	-0.064	0.020
	0.67	**0.002**	0.85	0.44	0.46	0.65	0.89

Analysis of variance test; Pots-hoc (Tukey test); CDI: Child Depression Inventory; SCARED: The Screen for Child Anxiety Related Disorders; PedsQL: Pediatric Quality of Life Inventory (Ph: Physically Ps: Psychosocial T: Total) P: Parents; C: Child; Subscales of the Short Symptom Inventory (Dep: Depression; Anxiety; Somat: Somatization; Hostility: Hospitalization)

shown that anxiety, depression, loneliness, stress, and tension are the most observed symptoms.[7] A research project evaluating the anxiety responses of children with cystic fibrosis (CF), a chronic lung disease, during the COVID-19 pandemic. It was observed that children diagnosed with CF were less worried about family members at risk of COVID-19, less upset about school closures, and less anxious about the COVID-19 pandemic.[1] In a study investigating children with chronic kidney disease and healthy controls, it was shown that symptoms of depression and anxiety increased in both sick and healthy children during the COVID-19 period.[21] In our study, although the depression score of the children in the group

whose parents were healthcare workers was found to be high, the depression symptom levels of the children in all 3 groups were above the threshold level. Even though there was no distinction between the groups in terms of anxiety levels, the anxiety scores of the children in the group whose patients and parents were healthcare professionals were higher. This result shows that children with BO and children whose parents are healthcare workers are more impaired during the COVID-19 process and that all children can exhibit psychological symptoms during the pandemic period.

The effects and possible complications of the COVID-19 pandemic on health problems may cause children to feel feelings of restlessness, lack of control, and helplessness. These emotions can affect vital activities by bringing more control and restrictions. Since COVID-19 is a disease that has a particular impact on the respiratory system, children with chronic lung diseases such as asthma and CF faced a higher risk of infection. Children's respiratory tract, immune systems and general health conditions created difficulties in combating the disease. On the other hand, social distancing, isolation and quarantine measures taken during the pandemic also negatively affected the psychological health of these children. Since children had to stay at home, they faced emotional challenges such as loneliness and social isolation combined with the physical limitations of their illness. Psychological symptoms such as anxiety, depression and stress increased their worries about their illness, and the uncertainties of the pandemic exacerbated this situation. Many studies are showing that children's quality of life is affected by the COVID-19 pandemic.[21-24] In a study conducted during the covid period, it was reported that COVID-19 negatively affected the quality of life in young people.[25] A study reported that the quality of life of adolescents diagnosed with asthma during the pandemic period was low.[26] In our study, consistent with the literature, it was found that the physical quality of life decreased in the patient group according to child reports, and the psychosocial and total quality of life decreased in the patient group according to parental reports. However, the physical, psychosocial and total quality of life levels of the children in the patient group were lower than the children in the other group. These results show that children diagnosed with BO had a low quality of life during the pandemic period. It shows that children with chronic diseases are affected by the new conditions and restrictions during the pandemic period. It can also be said that the quality of life of children whose parents are healthy workers is not affected much. In this regard, it can be said that individual differences rather than external factors may be more decisive for the possible effects of the pandemic.

The psychology of parents can affect children's temperament and emotional reactions. Studies have shown that children of anxious parents are also anxious. However, parents with children with chronic diseases were reported to be anxious during the pandemic period.[13] Again, during the COVID-19 pandemic, high stress, anxiety and depression, along with insomnia, have been reported in caregivers of children with kidney disease.[27] In our research, there were no differences between the groups regarding the psychological traits of the parents. On the other hand, in the patient group, a positive relationship was observed between the parents depression characteristics and the child's anxiety rates. This can be interpreted as the parent's being unhappy and depressed making the child anxious, or, on the contrary, the child's health problems increasing the parents unhappiness.

The elevated depression scores across all groups may be linked to the restrictions on socialization and the isolation measures in place. The dedication and resilience of healthcare workers during the pandemic has been crucial in managing the crisis and protecting public health during these challenging times. During pandemics, the increased workload for healthcare workers often results in families spending more time apart, with healthcare workers also facing higher risks of infectious disease exposure. The elevated depression scores observed in the control group of children with healthcare worker parents suggest that these children were significantly impacted by the acute phase of the pandemic. These findings may offer valuable insights into the psychological well-being of children with chronic illnesses during future outbreaks.

It is important to investigate the psychological problems of a special group of children diagnosed

with BO, a rare non-progressive, irreversible chronic lung disease, during the pandemic period. Conducting the study in a short period is one of the strengths of the study to avoid confounding the variable effects of the pandemic. It was important to include the children of parents who were and were not healthcare workers in this study, as well as the patient group so that we could better distinguish the effects of the pandemic. We can identify several weaknesses in this study. One limitation is that depression and anxiety symptoms were not assessed by a child psychiatrist. Additionally, the age range of participants varied between preschool and post-school children, which may have affected the results. Another limitation is that no pre-pandemic evaluations were conducted using these questionnaires, making it difficult to assess any changes in symptoms due to the pandemic.

CONCLUSION

The results of this study indicate that children diagnosed with BO experienced significant psychosocial distress during the pandemic, with those suffering from chronic illnesses displaying heightened vulnerability. However, it is clear that the pandemic affected all children to some extent, leading to increased anxiety, fear, and unhappiness across the board. Given these findings, it is crucial to assess children more thoroughly from a psychosocial standpoint in the event of future pandemics or similar crises. While children with chronic lung conditions may already face an elevated risk of anxiety and depression, the pandemic period has intensified these emotional challenges, highlighting the need for targeted mental health support during such times.

Source of Finance

During this study, no financial or spiritual support was received neither from any pharmaceutical company that has a direct connection with the research subject, nor from a company that provides or produces medical instruments and materials which may negatively affect the evaluation process of this study.

Conflict of Interest

No conflicts of interest between the authors and / or family members of the scientific and medical committee members or members of the potential conflicts of interest, counseling, expertise, working conditions, share holding and similar situations in any firm.

Authorship Contributions

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