Evaluation of depression, anxiety, and stress in mothers of children with asthma

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ABSTRACT

Objective: For disease management of the asthmatic children, the evaluation of the mental status of the mothers is necessary. We aimed to evaluate the depression, anxiety, and stress of mothers of children with asthma.

Material and Methods: The descriptive type study was conducted with the mothers of asthmatic children aged 4–18 years. Sociodemographics, Childhood Asthma Control Test (C-ACT), Asthma Control Test (ACT), and Depression Anxiety Stress Scale-21 (DASS-21) were asked to mothers. Higher C-ACT and ACT scores indicate better control of asthma. Higher scores for DASS-21 indicate higher levels of stress, anxiety, and depression.

Results: The data of 102 asthmatic children and their mothers were evaluated. The median values of DASS-21 stress, anxiety, and depression scores were 3.0 (0–12.0), 4.0 (0–17.0), and 2.0 (0–12.0), respectively. The percentages of mothers being stressed, anxious, and depressed were 38.2%, 51.0%, and 8.8%, respectively. There was a statistically significant negative correlation between the children's C-ACT score and DASS-21 total, stress, anxiety, and depression scores (p<0.05). According to the multivariate analysis, the lower C-ACT score was a risk for anxiety and stress.

Conclusion: In our study, the risks of anxiety and stress were lower in mothers of children with better controlled asthma. There is a need for detailed evaluation of the other factors with population-based studies.

Keywords: Anxiety; asthma; children; depression; mothers; stress.

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Astım hastası çocukların annelerinde depresyon, anksiyete ve stresin değerlendirilmesi

ÖZET

Amaç: Astım hastası çocukların hastalık yönetimi için annelerin ruhsal durumlarının değerlendirilmesi gereklidir. Bu çalışmada, astım hastası çocuğu olan annelerin depresyon, anksiyete ve stres durumlarının değerlendirilmesi amaçlandı.

Gereç ve Yöntemler: Tanımlayıcı tipteki çalışma, 4-18 yaş arası astım hastası çocukların anneleri ile yürütüldü. Annelere sosyodemografik bilgiler, Çocukluk Çağı Astım Kontrol Testi (Ç-AKT), Astım Kontrol Testi (AKT) ve Depresyon Anksiyete Stres Ölçeği-21 (DASS-21) ölçeğini içeren anket yöneltildi. Daha yüksek Ç-AKT ve AKT skorları, astımın daha iyi kontrol edildiğini göstermektedir. DASS-21 için daha yüksek puanlar, daha yüksek stres, kaygı ve depresyon düzeylerini göstermektedir.

Bulgular: Yüz iki astım hastası çocuk ve annelerinin verileri değerlendirildi. DASS-21 stres, anksiyete, depresyon puanlarının medyan değerleri sırasıyla 3,0 (0–12,0), 4,0 (0–17,0), 2,0 (0–12,0) idi. Annelerin stresli, anksiyeteli ve depresif olma oranları sırasıyla %38,2, %51,0 ve %8,8 idi. Çocukların Ç-AKT puanı ile DASS-21 toplam, stres, anksiyete, depresyon puanları arasında istatistiksel olarak anlamlı negatif bir korelasyon vardı (p<0.05). Çok değişkenli analize göre, düşük Ç-AKT puanı kaygı ve stres için bir risk oluşturdu.

Tartışma: Çalışmamızda astımı daha iyi kontrol edilen çocukların annelerinin anksiyete ve stres riskleri daha düşüktü. Toplum temelli çalışmalarla diğer faktörlerin ayrıntılı değerlendirilmesine ihtiyaç vardır.

Anahtar Kelimeler: Astım; çocuklar; anneler; depresyon; anksiyete; stres.

INTRODUCTION

Asthma, with inflammation and narrowing of the small airways, causes clinical findings such as cough, wheezing, chest pain, and shortness of breath (1). Clinical findings generally begin in the childhood age group (2). Asthma is one of the most common chronic diseases of childhood (1). According to the Centers for Disease Control and Prevention data, there are more than 4 million pediatric patients with asthma (3). Asthma causes recurrent hospital and emergency admissions in children and may negatively affect quality of life and school attendance (1). In asthma patients, the ability to participate in normal daily activities such as sports and outdoor activities may be severely limited (4). For these reasons, disease control of children with asthma is extremely important.

In addition to the physical disease burden caused by asthma, children with asthma are also affected psychologically. In the literature, increased anxiety levels have been reported in individuals with chronic diseases (5). Similarly, studies have reported an increased risk of anxiety in children with asthma (6). In a study conducted in children with asthma, the frequency of depression was reported as 13.1% and anxiety was seen in 8% of the children. In the same study, the frequency of coexistence of anxiety and depression was 16.5% (7). Thus, in the follow-up of children with asthma, it is important that physicians make the necessary evaluations in terms of common mental illnesses in children, as well as treating the disease.

As well as the mental health of children with asthma, the mental health of their parents can also be adversely affected. It has been reported that psychiatric disorders such as anxiety, depression, and stress are more common in mothers of children with asthma (8, 9). In a study in the literature, the frequency of depression in mothers of children with asthma was reported to be approximately 2.5 times that of mothers of children without asthma. In the same study, the frequency of depression was reported to be higher in mothers of children with persistent asthma compared to mothers of children with intermittent asthma (10). In a study conducted in our country, the depression and anxiety levels of mothers of children with asthma were reported to be higher than the control group (11).

Although studies evaluating mental health in individuals with chronic diseases are frequently encountered, studies conducted in caregivers of these patients are more limited. The role of the social environment and caregivers, especially the mother, is important in the management of asthma in children. For disease management, it is necessary to evaluate the mental status of the mothers. In this context, our study aimed to evaluate the depression, anxiety, and stress of mothers of children with asthma and the factors associated with these conditions.

MATERIALS AND METHODS

Study Design, Type and Sample

The descriptive type of the study was conducted prospectively with the mothers of pediatric patients aged 4–18 years, diagnosed with asthma and admitted to our Pediatric Allergy and Immunology Clinic. The mothers were informed about the study after the child was examined in the outpatient clinic. A questionnaire was applied to the mothers who agreed to participate after informed consent was obtained. For the calculation of the sample size, the incidence of severe depression, anxiety, and stress in mothers of children with asthma was accepted as 6.7% (12). The margin of error and the confidence level were accepted as 5%, and 95%, respectively. Thus, sample size was calculated as 97. Data of the study were collected between February 2023 and May 2023.

Measures

Sociodemographic characteristics of the patients, such as age and gender, Childhood Asthma Control Test (C-ACT), Asthma Control Test (ACT), and Depression Anxiety Stress Scale-21 (DASS-21) were administered as a questionnaire for mothers. A psychiatrist was recommended to mothers whose stress, anxiety, and depression were not within normal limits according to the DASS-21 scale.

C-ACT and ACT

C-ACT and ACT are questionnaires used to measure asthma control and quality of life of asthma patients. Day/night symptoms, activity restrictions, sleep patterns, need to use rescue medication, loss of school and work force, and exposure to triggers are questioned in these questionnaires (13). ACT consists of five questions and is used for children over 12 years old. C-ACT consists of seven questions and is used for children aged 4–12 years. Evaluation of the ACT and C-ACT scales is that the higher the score, the better the asthma clinic and control of the patients.

DASS-21

In the original form of DASS-21 developed by Lovibond and Lovibond (14), there are 42 questions in total. The Turkish adaptation, validity, and reliability studies of the scale, which was converted into a 21-question short form by Henry and Crawford (15), were performed by Yılmaz et al. (16) The scale, which consists of 21 items in total, has 3 sub-dimensions. These sub-dimensions are defined as depression, anxiety, and stress. The 4-point Likert-type scale is scored between 0 (never) and 3 (always) (16). The total scores ranging from 0 to 21 can be obtained for each sub-dimension. Higher scores indicate higher levels of stress, anxiety, and depression. In the depression subscale, 0–4 points are defined as normal, 5–6 points mild, 7–10 points moderate, 11–13 points severe, and ≥14 points extremely severe. In the anxiety subscale, 0–3 points indicate normal, 4–5 points mild, 6–7 points moderate, 8–9 points severe, ≥10 points extremely severe anxiety. In the stress subscale, 0–7 points are defined as normal, 8–9 points indicate mild stress, 10–12 points indicate moderate stress, 13–16 points are defined as severe stress, and 17 points and above indicate extremely severe stress.

Statistical Analysis

Statistical Package for the Social Sciences for Windows 25.0 program was used for the analysis and the recording of data. Descriptive data were presented with median, minimum, maximum values, numbers (n), and percentages (%). Normal distribution was investigated with histogram and probability charts as visual methods and with Kolmogorov–Smirnov and Shapiro–Wilk tests as analytical methods. For the comparison of continuous variables that non-normally distributed; Mann–Whitney U test was used. Spearman correlation test was used to analyze the correlation of two non-normally distributed numerical

Table 1. Sociodemographic characteristics of children with asthma and their mothers

	n	%	Median (Min–Max)
Asthma patients			
Gender			
Female	36	35.3	
Male	66	64.7	
Age (years)			7.0 (2.0–17.0)
Mothers			
Age (years)			37 (24.0–49.0)
Presence of chronic disease	24	23.5	
Presence of asthma	19	18.6	
Educational status			
Illiterate	2	2.0	
Primary school	31	30.4	
Middle school	7	6.9	
High school	39	38.2	
University	23	22.5	

Min: Minimum; Max: Maximum.

variables. In the multivariate analysis of the factors that may be associated with the development of stress and anxiety in mothers, logistic regression models were created for each. The statistical significance level was accepted as p<0.05.

Ethics

Ethics committee approval was obtained from the Ethics Committee of relevant hospital on January 26, 2023, with decision number 418.

RESULTS

The data of 102 children with asthma and their mothers were evaluated in the study. Of the children 35.3% (n=36) were females, 64.7% (n=66) were males. The median age of the children was 7.0 years (2.0–17.0). The median age of the mothers was 37 years (24.0–49.0). Of the mothers 23.5% (n=24) had chronic disease and 18.6% (n=19) had asthma. The majority of the mothers (n=39, 38.2%) were high school graduates (Table 1).

The median duration of asthma diagnosis of the children was 3.0 years (0.2–14.0). The median values of C-ACT score and ACT score were 17.0 (4.0–26.0) and 16.0 (7.0–25.0), respectively. House dust mite allergy was positive in 51.0% (n=52) of the children. The percentage of children with cat, pollen, and nut allergies was 23.5% (n=24), 16.7% (n=17) and 1% (n=1), respectively. There was no child with milk and egg allergy. The percentage of children with multiple allergen sensitivity was 25.5% (n=26) (Table 2).

Table 2. Clinical features and allergy test positivity of asthma patients

	n	%	Median (Min–Max)
Clinical features			
Duration of asthma diagnosis (years)			3.0 (0.2–14.0)
C-ACT score (aged 4–12 years)			17.0 (4.0–26.0)
ACT score (aged 12 years and above)			16.0 (7.0–25.0)
Allergy test positivity			
Hose dust mite	52	51.0	
Cat	24	23.5	
Pollen	17	16.7	
Nuts	1	1.0	
Cow's milk	0	0	
Egg	0	0	
Multiple allergen positivity	26	25.5	

Min: Minimum; Max: Maximum; C-ACT: Childhood Asthma Control Test; ACT: Asthma Control Test.

The mothers' DASS-21 total scores and stress, anxiety, and depression scores were evaluated. The median values of DASS-21 stress, anxiety, and depression scores were 3.0 (0–12.0), 4.0 (0–17.0), 2.0 (0–12.0), respectively. The DASS-21 total score was 9.0 (0–35.0). When the scores from the DASS-21 scale were evaluated according to the cutoff points, 61.8% (n=63) of the mothers were normal in terms of stress, 13.7% (n=14) were mildly stressed, and 22.5% (n=23) were moderately stressed, and 2% (n=2) were severely stressed. There was no mother who was extremely stressed. Of the mothers 49.0% (n=50) were nor-mal in terms of anxiety, 19.6% (n=20) had mild anxiety, 16.7% (n=17) had moderate anxiety, 4.9% (n=5) were severely anxious, and 9.8% (n=10) were extremely anxious. When mothers were evaluated in terms of depression; 91.2% (n=93) of them were normal, 4.9% (n=5) were mildly depressed, and 3.9% (n=4) were moderately depressed. There was no mother with severe or extremely severe depression (Table 3).

Factors associated with mothers' DASS-21 scores were evaluated. According to Spearman correlation analysis, no significant effect was found on the child's age, duration of asthma diagnosis, ACT scores, and maternal age on DASS-21 total score, stress, anxiety, and depression scores (p>0.05). A significant negative correlation was found between the children's C-ACT score and DASS-21 total score, stress, anxiety, and depression scores (respectively: r=-0.385, p<0.001; r=-0.331; p=0.002; r=-0.419, p<0.001; r=-0.292, p=0.006) (Table 4).

The relationship between mothers' DASS-21 scores and education level, presence of chronic disease, presence of asthma, and multiple allergen sensitivity in children was evaluated. There was no significant relationship between DASS-21 scores of the presence of chronic disease in the mother and the presence of multiple allergens in children (p>0.05). The depression score of mothers with less than high school education was 3.0 (0–12.0), while it was 2.0 (0–12.0) at high school and above. The relationship between education level and depression scores was at the statistical significance level (p=0.050). There was no statistically significant effect of education level on stress, anxiety, and total DASS-21 score (p>0.05). The anxiety scores of the mothers with asthma diagnosis of 5.0 (1.0–14.0) were statistically significantly higher than those without asthma as 3.0 (0–17.0) (p=0.029). There was no statistically significant effect of maternal asthma diagnosis on stress, depression, and total DASS-21 score (p>0.05) (Table 5).

A logistic regression model was created as a multivariate analysis to examine the factors associated with the presence of stress and anxiety according to the mothers' DASS-21 scores.

Table 3. DASS-21 stress, anxiety, depression, and total scores of mothers

	Median	Minimum	Maximum
DASS-21 stress	3.0	0	12.0
DASS-21 anxiety	4.0	0	17.0
DASS-21 depression	2.0	0	12.0
DASS-21 total	9.0	0	35.0
	Stress, n (%)	Anxiety, n (%)	Depression, n (%)
Normal/Not within the normal range	63 (61.8)/39 (38.2)	50 (49.0)/52 (51.0)	93 (91.2)/9 (8.8)
Mild	14 (13.7)	20 (19.6)	5 (4.9)
Moderate	23 (22.5)	17 (16.7)	4 (3.9)
Severe	2 (2)	5 (4.9)	0 (0)
Extremely severe	0 (0)	10 (9.8)	0 (0)

DASS-21: Depression Anxiety Stress Scale-21.

Table 4. Relationship between DASS-21 scores of mothers and child's age, duration of diagnosis, clinical severity, and maternal age

DASS-21 scores

	Stress	Anxiety	Depression	Total
Age (years)				
r	-0.010	0.081	0.051	0.041
p	0.920	0.418	0.612	0.679
n	102	102	102	102
Duration of asthma diagnosis (years)				
r	-0.057	0.014	-0.034	-0.026
p	0.567	0.888	0.737	0.792
n	102	102	102	102
C-ACT				
r	-0.331	-0.419	-0.292	-0.385
p	0.002	<0.001	0.006	<0.001
n	86	86	86	86
ACT				
r	-0.002	0.079	0.015	0.019
p	0.993	0.771	0.956	0.946
n	16	16	16	16
Maternal age (years)				
r	-0.010	0.078	0.000	0.023
p	0.921	0.435	1.000	0.820
n	102	102	102	102

C-ACT is calculated for children aged between 4 and 12 years. ACT is calculated for children aged above 12 years. C-ACT: Childhood Asthma Control Test; ACT: Asthma Control Test.

The presence of anxiety was taken as the dependent variable. The mothers were divided into two groups as those with normal anxiety scores and mild-moderate-severe-extremely severe anxiety. Independent variables were mother's education level, mother's asthma, child's C-ACT score, and multiple allergen sensitivity, which were significant and close to the level of significance in univariate analysis. According to logistic regression analysis, C-ACT score and presence of anxiety were found to be statistically significantly correlated (p=0.009, OR: 0.877). As the C-ACT score increased, the risk of developing anxiety in mothers decreased. In other words, the risk of anxiety was lower in mothers of children with better asthma control. According to the logistic regression analysis, no statistically significant relationship was found between the mother's education level, the presence of asthma in the mother, and the development of multiple allergen sensitivity (p>0.05) (Table 6).

Similarly, the presence of stress was accepted as the dependent variable according to the DASS-21 score of the mothers, and a logistic regression model was created as the independent variables of the mother's education level, the presence of asthma in the mother, the child's C-ACT score, and multiple allergen sen-

sitivity. According to the logistic regression analysis, the C-ACT score and the presence of stress were found to be statistically significantly correlated (p=0.009, OR: 0.887). As the C-ACT score increased, the risk of developing stress in mothers decreased. According to the logistic regression analysis, no statistically significant relationship was found between the mother's education level, the presence of asthma in the mother, and the development of multiple allergen sensitivity (p>0.05) (Table 6).

DISCUSSION

According to the results of our study, the median values of the mothers' DASS-21 stress, anxiety, and depression scores were 3.0 (0–12.0), 4.0 (0–17.0), and 2.0 (0–12.0), respectively. In a study conducted in our country, anxiety and depression in mothers of children with asthma were evaluated with the Hospital Anxiety and Depression Scale. Similar to our study, mothers' anxiety scores (8.4±4.3) were found to be higher than depression scores (6.5±3.9) (17).

A systematic review reported that parents of children with chronic diseases have worse mental health, especially in terms of anxiety and depression, than parents of healthy children (18).

Table 5. The relationship between mothers' DASS-21 scores and education level, presence of chronic disease, presence of asthma, and multiple allergen sensitivity in children

	DASS-21 Scores			
	Stress	**Anxiety**	**Depression**	**Total**
	Median (Min–Max)	**Median (Min–Max)**	**Median (Min–Max)**	**Median (Min–Max)**
Education level of mothers				
<High school	2.5 (0–12.0)	4.0 (0–17.0)	3.0 (0–12.0)	8.0 (1.0–33.0)
≥High school	4.0 (0–12.0)	3.0 (0–11.0)	2.0 (0–12.0)	9.5 (0–35.0)
p-value	0.860	0.131	0.050	0.287
Presence of chronic disease in mother				
No	4.0 (0–12.0)	3.0 (0–12.0)	2.0 (0–12.0)	9.5 (0–35.0)
Yes	2.5 (0–12.0)	5.0 (0–17.0)	2.5 (0–12.0)	8.0 (0–33.0)
p-value	0.541	0.238	0.820	0.696
Presence of asthma in mother				
No	3.0 (0–12.0)	3.0 (0–17.0)	2.0 (0–12.0)	8.0 (0–35.0)
Yes	4.0 (0–12.0)	5.0 (1.0–14.0)	2.0 (0–10.0)	10.0 (0–33.0)
p-value	0.382	0.029	0.705	0.167
Multiple allergen sensitivity in children				
No	3.5 (0–12.0)	4.0 (0–17.0)	2.0 (0–12.0)	10.0 (0–35.0)
Yes	3.0 (0–10.0)	2.5 (0–9.0)	2.0 (0–10.0)	8.0 (0–28.0)
p-value	0.482	0.170	0.674	0.325

DASS-21: Depression Anxiety Stress Scale-21; Min: Minimum; Max: Maximum.

Table 6. Logistic regression analysis for the presence of anxiety and stress in mothers

	p	OR	95% CI for OR	
			Lower	**Upper**
Presence of anxiety				
Maternal education level	0.397	1.556	0.559	4.331
Presence of maternal asthma	0.147	0.361	0.091	1.431
Multiple allergen sensitivity in children	0.602	1.344	0.443	4.079
C-ACT score	0.009	0.877	0.794	0.968
Presence of stress				
Maternal education level	0.835	1.106	0.426	2.874
Presence of maternal asthma	0.512	0.641	0.169	2.422
Multiple allergen sensitivity in children	0.534	0.702	0.230	2.141
C-ACT score	0.009	0.887	0.810	0.970

CI: Confidence interval; OR: Odd ratios; C-ACT: Childhood Asthma Control Test.

In a study in the literature, the scores of mothers of children with asthma on the DASS-21 scale were reported to be higher than those of mothers of children without asthma, although there was no statistical significance (19). In our study, 38.2% of mothers were stressed, 51.0% were anxious, and 8.8% were depressed. In another study, anxiety was reported at a percentage of 17.0% in mothers of children with asthma (20). According to a similar study, the prevalence of depression in mothers of children with asthma was reported as 43.8%. In the same study, the frequency of depression was reported as 17.5% in mothers of children

without asthma (10). The variability of the frequency according to the studies may be due to the use of different questionnaires evaluating the mental health and the differences between the other factors that may affect the mental health of the mothers in studies. To determine the prevalence of anxiety, depression, and stress in mothers of children with asthma, highly representative, population-based studies with large samples are needed.

According to our study results, the anxiety scores of mothers with asthma were statistically significantly higher than those without asthma. Since the prevalence of anxiety is reported to be high in asthma patients according to the literature (21), the higher anxiety scores of mothers with asthma in our study are a finding consistent with the literature. In our study, mothers with less than high school education also had higher depression scores and were at the level of statistical significance. In one of the studies in the literature, the rates of anxiety and depression in mothers of children with asthma and cystic fibrosis were reported as 37.2% and 29.1%, respectively. In the same study, it was reported that depression and anxiety were observed in more than half of the mothers who had an education level below high school (22). Since it has been reported in the literature that high education levels have a protective effect against anxiety and depression (23), these results, which we also found in mothers of children with asthma, are consistent with the literature.

In our study, the risks of anxiety and stress were lower in mothers of children with better asthma clinical status. There was no significant relationship between maternal education level, presence of asthma in the mother, and multiple allergen sensitivity, which are other examined variables, with the development of anxiety and stress. In a study in the literature, severe anxiety was reported more frequently in mothers of children with poorly controlled asthma compared to mothers of children with partially controlled asthma, similarly (24).

Limitations and Strengths

The fact that our study was conducted in a single center creates a limitation in terms of the generalizability of the study results. Since the number of mothers with depression is low according to the DASS-21 scale, the inability to perform multivariate analysis of the factors that may cause depression is another limitation. In the literature, the number of studies evaluating stress, anxiety, and depression in mothers of children with asthma is limited. The strength of our study is that it makes a significant contribution to the literature in this respect.

CONCLUSIONS

In our study, which we aimed to evaluate the stress, anxiety, and depression in mothers of children with asthma, the percentages of mothers being stressed and anxious were quite high (38.2% and 51.0%, respectively). The percentage of mothers with depression (8.8%) was lower than the percentages of stress and anxiety. According to our findings of multivariate analysis, the risks of anxiety and stress were lower in mothers of children with better controlled asthma symptoms.

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