The depression and anxiety levels and temperament characteristics of the mothers of children with asthma

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Abstract

In our study, we planned to compare the depression, anxiety levels, and dominant temperament characteristics of mothers of children with asthma with mothers of healthy children. The mothers of a total of 114 children who had asthma and mothers of 100 healthy children were included in the present study. The Sociodemographic Data Form, Beck Depression Inventory (BDI), Beck Anxiety Inventory (BAI), and TEMPS-A (Temperament Evaluation of Memphis, Pisa, Paris, San Diego Auto Questionnaire) were applied to the participants. The Asthma Quality of Life Questionnaire (PAQLQ) and Asthma Control Test (AKT) were also performed to have information on the disease for children with asthma. No significant differences were detected between the mean age of the children included in the study and their mothers (p>0.05). The participants' marital status, education status, income status, employment status, number of children, and the number of people living at home were similar (p>0.05). Although the smoking rate of the mothers of children who had asthma was 28.1%, the rate of smoking of the mothers in the control group was 12% (p<0.05). Irritable temperament, anxious temperament traits, and BAI scores were significantly higher in mothers of children with asthma (p<0.05). BAI scores were higher in mothers of children with multiple inhalant allergies and using high-level drugs according to the GINA (Global Initiative for Asthma) guideline (p<0.05). In our study, we found that irritable temperament, anxious temperament characteristics, and anxiety scores increased in mothers of children with asthma. Therefore, in addition to the asthma treatment of children, the application of psychological support programs to mothers should be considered.

Keywords: asthma, mother, depression, anxiety, temperament

1. Introduction

Asthma is a chronic respiratory disease that is very common worldwide, affecting people of all ages as one of the most common chronic inflammatory diseases in childhood, with a prevalence of 1-18%. According to the International Childhood Asthma and Allergy (ISAAC) study, its 12-month prevalence was reported to be between 1.6% and 36.8% (1). The rate of children and adolescents diagnosed with asthma varies between 0.7 and 17.8% in our country (2). In a previous study that was conducted by Topal et al. in Malatya in 2017, the prevalence of asthma was reported as 9% (3). Asthma is a chronic inflammatory disease causing reversible narrowing of the airway diameter. There are also personal and environmental risk factors in this regard. Although personal risk factors are genetics, epigenetics, atopy, gender, and obesity, environmental risk factors are allergens, microorganisms, air pollution, and exposure to cigarette smoke (2). Childhood asthma usually shows symptoms in the first years of life, with the most common symptoms being cough, wheezing, and shortness of breath. Sleep disturbance because

of nighttime symptoms and poor school performance may also be observed. Also, in some patients, airway obstruction is partially reversible and may cause permanent lung damage. For this reason, it is important to follow up with the patients from the moment of the first symptoms and to diagnose them early. As well as family history and physical examination findings showing airway narrowing, allergy skin tests, respiratory function tests, radiological imaging, total or specific IgE measurement, and bronchial provocation tests are also used in the diagnosis (4).

The treatment is long-term because asthma is a chronic disease. The purpose of the treatment is to control bronchospasm during asthma attacks and to reduce mortality. Inhaled steroids, combinations of inhaled steroids and long-acting beta 2-agonists, leukotriene antagonists, long-acting anticholinergic (antimuscarinic) drugs, and oral beta 2-agonists are used. Among these, inhaled steroids are the most effective anti-inflammatory drugs (4). Informing the child about the

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characteristics of the disease, triggers, and ways of prevention in line with the family and age increases treatment compliance (5). Severe asthma in children also causes psychiatric morbidity, such as serious anxiety and difficulty coping with their disease. Increasing anxiety causes drug non-compliance and difficulty controlling the disease (6).

The management of this chronic disease, which progresses with attacks and has triggers, is very challenging, and especially the parents of asthmatic children are burdened with lifestyle changes to maintain treatment. Mothers take active roles in the care of their children and may even give up their favorite activities or jobs for this. For this reason, it was shown that they are under more stress with a higher risk of depression and anxiety when compared to fathers (7, 8). Although it is already known that mental diseases are more common in children with chronic diseases and their mothers, there are limited studies on this subject. This study aimed to evaluate depression and anxiety levels and dominant affective temperament characteristics in mothers of children with asthma. To develop a holistic approach to children with asthma, We think that together with the child's treatment, the data we will obtain in the study will provide useful information for psychiatric disorders that may develop in mothers over time.

2. Materials and Methods
2.1. Inclusion and exclusion criteria of the study
One hundred fourteen children with asthma aged 5-18 who applied to Fırat University Faculty of Medicine, Department of Pediatric Allergy-Immunology, and their mothers were included in the study. Children with asthma who were followed up in our clinic and regularly followed up with their mothers were included in the study. The diagnosis of asthma was made according to the Asthma Diagnostic Criteria in The Global Initiative for Asthma (GINA) Guideline (9) based on the severity and treatment of asthma (4). Children and mothers diagnosed with asthma at least one year ago, using regular prophylactic treatment according to the guidelines and followed in our clinic for at least one year, were included in the current study. The parents were informed about the study. One hundred healthy children were between the ages of 5-18, and their mothers were also included in the study as the control group.

The study did not include mothers with any chronic disease, psychiatric disease, drug use, inability to understand psychological scales, to answer survey questions, or to communicate.

2.2. The procedure
The pre-designed questionnaires were filled in with face-to-face interviews after the clinical examinations of the patients who met the inclusion criteria. The questionnaires of asthmatic patients were conducted face-to-face during routine follow-ups. The demographic characteristics of the patients, such as age, gender, asthma control status, presence of atopy, family income, education levels of the parents, asthma medications, and their use, were recorded in the study form. The pulmonary functions of the patients were measured by using a standard spirometer device (ZAN 100 Spiromed, Flow Handy, Germany), and FEV1, FVC, FEV1/FVC, PEF, and MEF 25-75 parameters were measured by making the patients fast and forceful expiration following rapid and forced inspiration. Also, standard allergen extracts of Alergopharma (Allergopharma JG Company) were used for skin prick testing with inhaled and food allergens in asthma patients.

2.3. Data collection tools
The demographic data of the children who had asthma were recorded during their examinations, and the Asthma Quality of Life Questionnaire (PAQLQ) and Asthma Control Test were filled in face-to-face interviews. Then, mothers were informed about the study, and those who agreed to participate were directed to the same psychiatrist. The same psychiatrist assessed mothers with asthmatic children and mothers with healthy children. The Sociodemographic Data Form, Beck Depression Inventory (BDI), Beck Anxiety Inventory (BAI), and TEMPS-A (Temperament Evaluation of Memphis, Pisa, Paris, San Diego Auto Questionnaire) Scale were applied to the participants.

Sociodemographic and Clinical Data Form
The Sociodemographic and Clinical Data Form that was prepared by the researchers in line with the clinical experience and information obtained from the scanned sources and considering the purposes of the study was used in the cases. This semi-structured form included data such as the number of treatments and allergy types, sociodemographic information of the mother, such as age, gender, marital status, educational status, occupation, place of residence, economic status, family structure, and clinical data such as psychiatric support, and the child's age, gender, age of complaint onset, duration of diagnosis, status in the emergency department and intensive care unit, the status in the last one year in the clinic.

Asthma Quality of Life Questionnaire (PAQLQ)
The Asthma Quality of Life Questionnaire (PAQLQ), which was developed by Juniper et al. and translated into Turkish by Yüksel et al. to measure physical, mental, and social disorders, was used for the asthmatic patients who were included in the current study. The scale consists of 3 sub-units, including symptoms, activity limitation, and emotional functioning in 23 questions. Each question on the scale has equal weight. The recorded scores were analyzed directly, and the results were calculated as the total quality of life and the "mean score per question" for each dimension. The scoring varies between 1-7 for each item ("1: Always or extremely disturbed, 7: Never disturbed". The total quality of life score is calculated from the mean score of the questions. The total score is obtained by summing the three subscales. Although scores between 23 and 161 can be obtained from the scale, higher scores mean that the quality of life is good and less affected. There is no cut-off

score for the scale (10, 11).

Asthma Control Test

The 4-11-year-old childhood asthma control test, which was shown to be valid and reliable in Turkish for children who had asthma aged 5-12 years, was used in the study. This questionnaire consists of 7 questions, and the first four questions are made easier for children to understand by using shapes, and the child answers them himself (the child answers the questions using the answer scale ranging from a sad face to a smiling face). The last three questions consist of Likert-type questions answered by the parent. The responses to items range from 1 to 5, the responses to questions range from 0 to 3 points in children, and 0 to 5 points in parents. Low scores are consistent with poor asthma control. As the total score increases, it indicates better asthma control; ≤19 points suggest that asthma is not under adequate control, and 27-20 points suggest good asthma control (12,13).

The Asthma Control Test, developed by Juniper et al. and whose validity and reliability were demonstrated in Turkish by Uysal et al., was used for children aged ≥12 years. The test consists of 7 questions, and 5 of the questions are about asthma symptoms during the previous week, 1 is about inhaled bronchodilator use, and one is about forced expiratory volume (FEV1) level in 1 second. The highest point is 25, and the lowest is 5 points. A score between 25-20 is considered complete control, 16-19 is considered partial control, and ≤15 is considered uncontrolled (14, 15, 16).

The Clinical Version of the Structured Clinical Interview Scale for DSM-5 Disorders (SCID-5- CV)

The clinical version of SCID-5, adapted to Turkish and studied for reliability by Elbir et al., was used to determine clinical diagnoses (17).

Beck Depression Inventory (BDI)

Beck developed it in 1961 to measure the risk of depression in adults, the change in severity, and the level of depressive symptoms (18). Hisli conducted the Turkish validity and reliability study in 1989 (19). The cut-off point of the scale was found to be 17. It is frequently used in depression studies as a 21-item Likert-type self-assessment scale. Each item relates to a behavioral trait associated with depression. Items are scored between 0 and 3 according to the severity of depression. The total score ranges from 0 to 63. If the score is between 0 and 9, there are no depressive symptoms; 10-16 points indicate mild, 17-24 points moderate, and 25 and above indicate severe depressive symptoms.

Beck Anxiety Inventory (BAI)

It was developed by Beck et al. (20) as a self-assessment scale to determine the frequency of anxiety symptoms experienced by individuals. It consists of 21 items as a Likert-type scale scored between 0-3. Its validity and reliability for Turkey were performed by Ulusoy et al. (21).

TEMPS-A Scale (Temperament Evaluation of Memphis, Pisa, Paris, San Diego Auto Questionnaire)

It was designed to assess the dominant affective temperament. The original scale was 109 items for men and 110 items for women. The version adapted to Turkish consists of 99 items to determine depressive, hyperthymic, irritable, cyclothymic, and anxious temperaments. If the score obtained from each subtype is above the cut-off point calculated for that subtype, it is assumed that the person has that temperament dominantly. When more than one temperament cut-off point is exceeded, more than one dominant temperament is mentioned. The test-retest reliability of the Turkish translation was established (22). All tests were administered to the patients by the same doctor.

2.4. Statistical Analysis

Statistical analyses were performed in the "SPSS (Statistical Package For Social Sciences) 22.0 for Windows" statistical analysis package program. Descriptive statistics were expressed as numbers and percentages for categorical variables, as mean ± standard deviation value for continuous variables. The Independent Group t-test was used for the comparisons between the groups, the Mann-Whitney U Test was used when non-parametric conditions were met, the ANOVA was used when more than two groups were compared, the Kruskal-Wallis Test was used when non-parametric conditions were met, and the chi-square test was used for the comparisons of ratios between groups. $P < 0.05$ was considered statistically significant in the study.

3. Results

The study included 114 children who had asthma, 114 mothers of children who had asthma, 100 healthy children, and mothers of 100 healthy children. The mean age of children with asthma was 11.12±3.74 years, and the mean age of healthy children was 9.68±3.05. The mean age of the mothers of children with asthma was 38.42±7.78 years, and the mean age of healthy children was 36.44±5.85. The age, marital status, educational status, income status, employment status, number of children, and number of people living at home were similar in both groups (p>0.05). The gender distribution of the children in the groups was similar (p>0.05). Although the smoking rate of the mothers of children who had asthma was 28.1%, the mothers' smoking rate was 12% in the control group (p<0.05). The sociodemographic characteristics of the participants are given in Table 1.

No significant differences between the two groups were detected regarding depressive temperament, cyclothymic temperament, hyperthymic temperament sub-scores, and BDI scores (p>0.05). Irritable temperament, Anxious temperament, and BAI scores were found to be significantly higher in mothers of children who had asthma (p<0.05) (Table 2). No significant differences were detected between the scales with seasonal or year-round persistence of asthma symptoms (p>0.05). No significant differences were detected between the scales with food allergy (p>0.05). A significant difference was

detected between multiple allergies and only BAI (p<0.024), and BAI was significantly higher in those with multiple inhaler allergies (p>0.045) (Fig. 1).
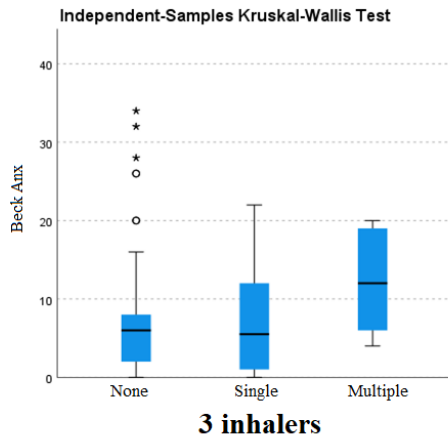
Fig. 1. The relationship between multiple inhaler use and anxiety levels

Depressive temperament scores were positively correlated with Cyclothymic temperament, Irritable temperament, Anxious temperament, BDI, BAI scores, and FEV1/FVC (p=0.000, p=0.000, p=0.000, p=0.001, p=0.031). Depressive temperament score was negatively correlated with FVC, FEV1, GINA guideline score, and Asthma QLS score (p=0.031, p=0.042, p=0.047, p=0.036). Cyclothymic temperament score was correlated negatively with Irritable temperament, Anxious temperament, BDI, and BAI scores and positively with FEV1/FVC (p=0.000, p=0.000, p=0.000, p=0.001), and GINA guideline score and Asthma QLS score (p=0.000, p=0.014). Hyperthymic temperament score was correlated positively with the duration of diagnosis and the number of visits to the clinic in the last year (p=0.037, p=0.009) and negatively with the Asthma QLS score (p=0.015). Irritable temperament scores were correlated positively with Depressive temperament, Cyclothymic temperament, BDI, BAI scores (p=0.000, p=0.000, p=0.000, p=0.009), and PEF and asthma were correlated negatively with QLS (p=0.029, p=0.026). Anxious temperament and Depressive temperament, Cyclothymic temperament, Irritable temperament, BDI, BAI, number of treatments in the intensive care unit in the last year, and FEV1/FVC ratio were positively correlated (p=0.000, p=0.000, p=0.021, p=0.024). A positive correlation was detected between BDI and Depressive temperament, Cyclothymic temperament, Irritable temperament, Anxious temperament, BAI scores, duration of diagnosis, and the number of treatments in the intensive care unit in the last year (p=0.000, p=0.000, p=0.000, p=0.000, p= 0.000, p=0.019, p=0.027). A negative correlation was detected with the number of emergency treatments in the last year (p=0.022). BAI and Depressive temperament, Cyclothymic temperament, Irritable temperament, Anxious temperament, and BDI scores were correlated positively (p=0.001, p=0.000, p=0.009, p=0.000, p=0.000), and the number of hospitalizations in the last year was correlated negatively (p=0.031). The age of onset of the complaints, the duration of diagnosis, and the number of patients treated in the emergency department, outpatient clinic, normal service, and intensive care unit for the last year were correlated negatively (p=0.012, p=0.038, p=0.001, p=0.009, p=0.002). MEF and FEV1/FVC were correlated positively with the age of onset of the complaints (p=0.019, p=0.030) (Table 3).

Table 1. The comparison of the sociodemographic characteristics of the participants

Features	Asthma	Control	Total	P value
Child's age (years)	11.12±3.74*	9.68±3.05		0.675
Mother age (years)	38.42±7.78	36.44±5.85		0.786
Marital status, n (%)				
Married	100 (87.7%)	90 (90%)	190 (88.8%)	
Divorced/Widowed	12 (10.5%)	10 (10.0%)	22 (10.35)	0.845
Living Separately	2 (1.8%)	0 (0%)	2 (0.9%)	
Educational Status, n (%)				
Primary school	42 (36.8%)	32 (32%)	74 (34.6%)	
Middle School	30 (26.3%)	0 (0%)	30 (14.0%)	
High school	28 (24.6%)	8 (8.0%)	36 (16.8%)	0.921
University	14 (12.3%)	58 (58.0%)	72 (33.6%)	
Still studying	0 (0%)	2 (2.0%)	2 (0.9%)	
Working status, n (%)				
Not working	52 (45.6%)	44 (44.0%)	96 (44.9%)	0.812
Working	62 (54.4%)	56 (56.0%)	118 (55.1%)	
Smoking, n (%)				
Yes	32 (28.1%)	12 (12.0%)	44 (20.6%)	
No	80 (70.2%)	88 (88.0%)	168 (78.5%)	0.03
Quit	2 (1.8%)	0 (0%)	2 (0.9%)	

*=mean±standard deviation

Table 2. The comparison of the psychiatric scales used

	Asthma	Control	Total	P value
Depressive temperament	5.21±3.657*	4.56±2.794	4.91±3.290	0.354
Cyclothymic temperament	6.93±4.323	6.46±3.888	6.71±4.123	0.564
Hyperthymic temperament	9.35±3.958	9.46±3.500	9.40±3.743	0.692
Irritable temperament	3.23±3.226	2.38±2.940	2.83±3.117	0.006
Anxious temperament	6.25±4.633	4.94±4.112	5.64±4.435	0.021
BDI	9.18±10.812	5.68±5.239	7.54±8.822	0.257
BAI	8.32±8.467	6.98±10.317	7.69±9.378	0.010

Abbreviations in the table: The first five rows of the table are TEMPS-a temperament characteristics; BDI: Beck Depression Inventory, BAI: Beck Anxiety Inventory. *P<0.05. *=mean±standard deviation

Table 3. The correlation analysis results of the mothers who had asthmatic children

Features	Depressive temperament	Cyclothymic temperament	Hyperthymic temperament	Irritable temperament	Anxious temperament	BDI	BAI
Depressive temperament		r= 0.636 ** P< 0.0001	r= 0.051 P= 0.593	r= 0.363 ** P<0.0001	r= 0.560** P<0.0001	r= 0.423** P<0.0001	r= 0.320 ** P<0.0001
Cyclothymic temperament	r= 0.636 ** P<0.0001		r= -0.055 P= 0.564	r= 0.565 ** P<0.0001	r= 0.562** P<0.0001	r= 0.555 ** P<0.0001	r= 0.429 ** P<0.0001
Hyperthymic temperament	r= 0.051 P= 0.593	r= -0.055 P= 0.564		r= -0.053 P= 0.575	r= 0.046 P= 0.501	r= -0.080 P= 0.400	r= -0.068 P= 0.474
Irritable temperament	r= 0.363** P<0.0001	r= 0.565** P<0.0001	r= -0.053 P= 0.575		r= 0.370** P<0.0001	r= 0.349** P<0.0001	r= 0.244** P= 0.009
Anxious temperament	r= 0.560** P<0.0001	r= 0.562** P<0.0001	r= 0.046 P= 0.501	r= 0.370** P<0.0001		r= 0.473** P<0.0001	r= 0.387** P<0.0001
BDI	r= 0.423** P<0.0001	r= 0.555** P<0.0001	r= -0.080 P= 0.400	r= -0.349** P<0.0001	r= 0.473** P<0.0001		r= 0.497** P<0.0001
BAI	r= 0.320** P= 0.001	r= 0.429** P<0.0001	r= -0.068 P= 0.474	r= 0.244** P= 0.009	r= 0.387** P<0.0001	r= 0.497** P<0.0001	
Age of onset of complaints	r= 0.114 P= 0.227	r= 0.077 P= 0.416	r= 0.142 P= 0.132	r= 0.043 P= 0.647	r= 0.037 P= 0.697	r= 0.163 P= 0.083	r= 0.067 P= 0.480
Diagnosis time	r= 0.087 P= 0.357	r= 0.098 P= 0.300	r= 0.196* P= 0.037	r= 0.010 P= 0.917	r= 0.044 P= 0.641	r= 0.220* P= 0.019	r= 0.181 P= 0.054
In the last year treatment	r= 0.141 P= 0.134	r= 0.149 P= 0.114	r= 0.036 P= 0.706	r= 0.071 P= 0.452	r= 0.023 P= 0.811	r= 0.215* P= 0.022	r= 0.202* P= 0.031
Outpatient treatment in the last year	r= 0.076 P= 0.420	r= 0.090 P= 0.342	r= 0.243* P= 0.009	r= 0.074 P= 0.434	r= 0.181 P= 0.054	r= 0.124 P= 0.189	r= 0.004 P= 0.967
Last year hospitalized treatment	r= 0.063 P= 0.505	r= 0.027 P= 0.774	r= 0.009 P= 0.925	r= 0.090 P= 0.341	r= 0.131 P= 0.165	r= 0.050 P= 0.600	r= 0.156 P= 0.098
Last year ICU treatment	r= 0.029 P= 0.761	r= 0.062 P= 0.511	r= 0.098 P= 0.297	r= 0.087 P= 0.356	r= 0.216* P= 0.021	r= 0.207* P= 0.027	r= 0.091 P= 0.335
FVC	r= 0.202* P= 0.031	r= 0.007 P= 0.939	r= 0.071 P= 0.451	r= 0.007 P= 0.944	r= 0.098 P= 0.299	r= 0.079 P= 0.404	r= 0.103 P= 0.275
FEV1	r= 0.191* P= 0.042	r= 0.035 P= 0.713	r= 0.173 P= 0.065	r= 0.048 P= 0.609	r= 0.075* P= 0.429	r= 0.036 P= 0.705	r= 0.005 P= 0.957
FEV1/FVC	r= 0.202* P= 0.031	r= 0.311** P= 0.001	r= 0.058 P= 0.540	r= 0.020 P= 0.833	r= 0.211* P= 0.024	r= 0.102 P= 0.281	r= 0.179 P= 0.057
PEF	r= 0.001 P= 0.988	r= 0.001 P= 0.993	r= 0.034 P= 0.716	r= 0.204* P= 0.029	r= 0.019 P= 0.838	r= 0.013 P= 0.888	r= 0.098 P= 0.300
MEF25-75	r= 0.097 P= 0.305	r= 0.080 P= 0.398	r= 0.164 P= 0.081	r= 0.118 P= 0.212	r= 0.045 P= 0.631	r= 0.004 P= 0.966	r= 0.091 P= 0.334
GINA Directory	r= 0.186* P= 0.047	r= 0.417** P<0.0001	r= 0.061 P= 0.518	r= 0.062 P= 0.514	r= 0.019 P= 0.838	r= 0.061 P= 0.516	r= 0.038 P= 0.691
Asthma quality of life score	r= 0.197* P= 0.036	r= 0.229* P= 0.014	r= 0.228* P= 0.015	r= 0.208* P= 0.026	r= 0.135 P= 0.153	r= 0.065 P= 0.495	r= 0.064 P= 0.499
Asthma control test (5-12 years)	r= 0.152 P= 0.106	r= 0.009 P= 0.927	r= 0.025 P= 0.788	r= 0.183 P= 0.052	r= 0.007 P= 0.944	r= 0.161 P= 0.087	r= 0.008 P= 0.936
Asthma control test (≥12years)	r= 0.118 P= 0.211	r= 0.012 P= 0.898	r= 0.007 P= 0.937	r= 0.158 P= 0.093	r= 0.010 P= 0.918	r= 0.177 P= 0.060	r= 0.019 P= 0.840

**=Correlation is significant at the 0.01 level (2-tailed), *= Correlation is significant at the 0.05 level (2-tailed).
BAI= Beck Anxiety Inventory, BDI= Beck Depression Inventory, ICU= Intensive care units

4. Discussion

In the present study, the depression and anxiety levels and dominant temperament characteristics of the mothers of children with chronic diseases such as asthma and those of the mothers with healthy children were compared. In the results, anxiety scores and irritable temperament characteristics of the mothers with asthmatic children were higher than the other group. Also, mothers of asthmatic children had changes in the anxiety, depression levels, and dominant temperament characteristics of the children with the disease status. Although the temperament characteristics of the mothers whose children used multiple inhalers and had multiple allergies did not differ, their anxiety levels increased.

Asthma starts at an early age and progresses with attacks, and during some attacks, the patient must be brought to the emergency department or treated by an inpatient (2). Treatment is long-term in a chronic disease that progresses with attacks (4). Previous studies conducted with parents of children who had asthma in the literature showed that psychiatric complaints and sometimes mental diseases may occur (23-27). In a previous study conducted with a limited number of mothers (45 mothers) of asthmatic children, mothers had high levels of depression and anxiety (23). Another study conducted in our country in 2010 showed that the depression and anxiety levels of mothers with asthmatic children were higher than those of mothers with healthy children (28). It was reported in much older studies that the depression and anxiety levels of mothers with children who had asthma increased by 40% (29). A recent meta-analysis study reported that parents who had asthmatic children, not only mothers, had increased anxiety and depressive complaints. It was found that experiencing a serious fear of losing their children triggers the resulting anxiety and depressive complaints (24). In a compilation study, it was reported that the stress rate of families with children who had asthma was high, the increase in family stress increased the symptoms in the child, and the increase in the child's symptoms increased the anxiety of the family and created a vicious circle (30). In the present study, similar results were obtained from all these studies in the literature. Although the depression scores of the mothers with asthmatic children did not differ, their anxiety levels were higher than those of mothers with healthy children. Also, similar to the literature data, it was found that the anxiety levels of the group whose children used multiple drugs and had multiple allergies increased. As the management of the disease becomes more difficult, the need to use more drugs and pay attention to the situation can cause more allergies with multiple allergens, and it is considered an expected situation that the mothers' stress increases.

The dominant temperamental characteristics of the mothers with asthmatic children were not assessed in any previous study in the literature review. Our results found that the anxious and irritable temperament characteristics of these mothers were dominant. In the literature, studies conducted on personality traits were conducted with mothers of children/adolescents with psychiatric disorders. In the results, the existing mental disease of the child was associated with the personality structure of the mother (31-33). The mother's depressive temperament affected many areas, from language skills to school success (31). Similarly, it was reported that the temperament characteristics of the mothers of children with autism spectrum disorder may affect the severity of the symptoms in the child (32). In a previous study, the current situation in children with separation anxiety was associated with the mother's personality traits (34). In another study, the effect of the personality traits of the mothers of children with attention deficit and hyperactivity disorder on the occurrence and severity of symptoms was reported (35). Personality traits were not investigated in mothers of children with chronic diseases such as asthma that progressed with exacerbations. Although the mother's personality may not be effective in the formation of the disease in such chronic diseases, it is considered that it will be important in the child's anxiety management and intervention during the attacks.

In the results, the demographic data of the two groups (mothers with asthmatic children and mothers with healthy children) were similar in many respects. No difference was detected between demographic data such as mean age, marital status, educational status, economic level, and employment status of the mothers of the two groups. However, the smoking rate of the mothers of children who had asthma was calculated to be more than twice that of the other group (12% in one group, 28% in the other group). This difference was statistically significant. This result obtained was assessed in line with the literature data. In a previous study, parents with asthmatic children were divided into two groups: depressed and non-depressed. Smoking rates of depressed parents were found to be higher than the other group. Similarly, it was shown that asthma attacks are more common in the children of the depressed group (36). Another study found that the parents of asthmatic children have high rates of stressful life events, not only smoking but also alcohol/substance use (37). It was reported in a similar study that children who had asthma were exposed to more allergens and cigarette smoke (38). The smoking rate of the mothers of children with asthma was higher in our participants.

Finally, in the results of the correlation analysis, the duration of the children's asthma diagnosis and their depression scale scores were positively associated. Although the depression scores of the mothers were not different between the groups, a positive correlation was found with the duration of asthma diagnosis. Similarly, it was found that the higher the frequency of treatment in the intensive care unit, the higher the mother's depression scores, which was associated with the increase in the depressive complaints of the mothers as the duration of the child's disease prolonged or the deterioration in physiological functions such as sleep, appetite, and sexual functions, which the BDI questioned. Irritable temperament and anxious temperament characteristics of the mothers of

children who had asthma were found to be significant. In the correlation, it was found that as asthma quality of life scores of children decreased (quality of life decreased), irritability scores of the mothers increased as expected. This result is compatible with the literature data. In other words, it was found in the literature that the mothers' psychiatric symptoms increase as the children's limitations regarding the disease increase and the quality of life because of the disease becomes worse (37). Also, in line with the literature data, a similar result was obtained for the anxious temperament trait. It was found that the child's anxious temperament characteristics increased as the inpatient treatment in the intensive care unit increased in the last year. It was shown that as the caregiver's disease deteriorates or the symptoms of the disease progress, the anxiety and depression scores of the caregiver increase, and the burden of caregiving increases (39).

The present study must be assessed considering some limitations, the first of which was the relative inadequacy of the number of participants. Evaluation of only the mothers and not including the fathers, and finally, the evaluation of the participants with self-evaluation questionnaires can be considered, among other limitations. All these limitations prevent the generalization of the results. Large-scale studies involving both parents must be conducted in larger sample groups.

In conclusion, it was found that the anxiety scores of the mothers of children with chronic diseases such as asthma were higher than those of the mothers with healthy children, and irritable temperament characteristics were also dominant. The disease status, anxiety, depression levels, and dominant temperament characteristics also showed changes in the mothers of children with asthma. Although the temperament characteristics of the mothers whose children used multiple inhalers and who had multiple allergies did not differ, their anxiety levels increased. In light of all these findings, when examining and arranging the treatment of children with chronic diseases, it must be considered that their parents may also have psychiatric problems. It must also be kept in mind that the presence of psychiatric symptoms or diseases in the parents may also have possible negative effects on the treatment period of these children. It may also be recommended to provide routine psychiatric support to the parents of children with chronic diseases to provide psychiatric strengthening and well-being.

Conflict of interest

The authors report no conflicts of interest.

Ethical statement

Ethics committee approval was obtained by Fırat University Clinical Research Evaluation Committee with the decision number 2021/09-33 dated 16.09.2021.

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