

# Mindfulness in the Relationship Between Perceived Stress and Quality of Life in Pediatric Asthma

## Pediyatrik Astımda Algılanan Stres ve Yaşam Kalitesi Arasındaki İlişkide Bilinçli Farkındalık

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### ABSTRACT

**Objective:** The purpose of this study is to analyze the possible mediator effect of mindfulness in the relationship between perceived stress and quality of life in pediatric asthma.

**Material and Method:** The sample of this study consisted of 100 asthmatic children aged between 9-12 years who applied to the outpatient clinic of Istanbul University, Istanbul Faculty of Medicine, Division of Pediatric Allergy. Sociodemographic information forms, Perceived Stress Scale in Children (8-11 years), Child and Adolescent Mindfulness Measure (CAMM), and Pediatric Asthma Quality of Life Questionnaire (PAQLQ) were used as data collection tools. Linear hierarchical regression analysis was used during the process of analyzing data.

**Results:** It has been identified that mindfulness has a partial mediator effect on the relationship between perceived stress and quality of life ( $p = 0.000$ ). The presence of a partial mediator effect of mindfulness has been determined in the relationship between perceived stress and symptoms which is the subscale of quality of life ( $p = 0.000$ ). Finally, it has been demonstrated that mindfulness has a partial mediator effect on the relationship between perceived stress and emotional function which is another subscale of quality of life ( $p = 0.000$ ). The mediating role of mindfulness in the relationship between perceived stress and activity limitations could not be analyzed due to the lack of a significant correlation between activity limitations which is the subscale of quality of life and mindfulness ( $p=0.178$ ).

**Conclusion:** It can be helpful to add psychotherapy interventions involving mindfulness practices to asthma treatment for better control of the disease in children.

**Keywords:** Asthma, Child, Mental Health, Mindfulness, Quality of Life

### ÖZ

**Amaç:** Bu çalışmanın amacı pediyatrik astımda algılanan stres düzeyi ile yaşam kalitesi arasındaki ilişkide bilinçli farkındalığın olası aracı etkisini analiz etmektir.

**Gereç ve Yöntem:** Bu çalışmanın örneklemini İstanbul Üniversitesi İstanbul Tıp Fakültesi Hastanesi "Çocuk Alerji Polikliniği"ne başvuran 9-12 yaş arası 100 astımlı çocuk oluşturdu. Veri toplama araçları olarak sosyodemografik bilgi formları, Çocuklarda Algılanan Stres Ölçeği (8-11 yaş) (ÇASÖ), Çocuk ve Ergen Bilinçli Farkındalık Ölçeği (ÇEBFÖ) ve Pediyatrik Astım Yaşam Kalitesi Ölçeği (PAYKÖ) kullanılmıştır. Verilerin analiz edilmesi sürecinde doğrusal hiyerarşik regresyon analizi kullanılmıştır.

**Bulgular:** Bilinçli farkındalığın, algılanan stres ile yaşam kalitesi arasındaki ilişkide kısmi medyatör etkisinin olduğu belirlenmiştir ( $p=0.000$ ). Algılanan stres ile yaşam kalitesinin alt boyutu olan semptomlar arasındaki ilişkide bilinçli farkındalığın kısmi medyatör etkisinin varlığı tespit edilmiştir ( $p=0.000$ ). Son olarak bilinçli farkındalığın, algılanan stres ile yaşam kalitesinin bir diğer alt boyutu olan duygusal işlev arasındaki ilişkide kısmi medyatör etkisinin olduğu gösterilmiştir ( $p=0.000$ ). Bilinçli farkındalık ve yaşam kalitesinin alt boyutlarından biri olan faaliyet kısıtlanması arasında korelatif ilişki bulunmadığı için bilinçli farkındalığın algılanan stres ve yaşam kalitesi arasındaki ilişkinin üzerindeki aracı etkisi analiz edilememiştir ( $p=0.178$ ).

**Sonuç:** Bilinçli farkındalık uygulamaları içeren psikoterapi uygulamalarının çocuklarda astım tedavisine eklenmesi hastalığın daha iyi kontrol altına alınmasına yardımcı olabilir.

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## 1. INTRODUCTION

Asthma, characterized as a chronic airway inflammation, is the most common chronic disease in childhood.<sup>1</sup> Asthma often starts in childhood although it could be observed in all stages of life. The disease often presents with typical symptoms such as wheezing, chest tightness, shortness of breath, and cough.<sup>2</sup> Although there are considerable differences in asthma prevalence between countries and regions, the prevalence of childhood asthma is approximately 9.4% worldwide<sup>3</sup> and 13.36% in Turkey.<sup>4</sup>

Childhood asthma attacks can be triggered by a variety of environmental factors. Recent studies have shown that psychological factors such as somatization, behavior problems, attention deficit and hyperactivity disorder (ADHD), depression, anxiety, and stress also are crucial in the development of asthma attacks.<sup>5-10</sup> Psychological triggers such as stress have a negative impact on children's quality of life.<sup>11</sup> For instance, facing difficulties in conducting physical and social activities can make children feel different and incompetent from their peers.<sup>12</sup>

Children's quality of life is also affected by asthma control and poor asthma control leads to more symptoms. Asthma control means minimizing symptoms that interfere with daily living such as coughing, shortness of breath after exercise or during the night, and preventing future asthma attacks.<sup>13</sup> Components such as mindfulness can be helpful in asthma control by reducing stress levels and thus can increase the quality of life of asthmatic children.

Mindfulness is the awareness arising from paying attention, intentionally, in the present moment without judgment. It has been found that there is a positive correlation between mindfulness and perceived health with physical well-being.<sup>14</sup> A study performed in adults also showed that as mindfulness rises, perceived stress on psychological well-being decreases.<sup>14</sup>

Even though there are several studies focusing on mindfulness and asthma in adults, there are limited studies performed on children with asthma. There are some studies that separately analyze the mindfulness, perceived stress, and quality of life of people with asthma, but as far as we know, there is no study investigating the effects of all these variables in children with asthma. The purpose of this study is to evaluate if mindfulness has a mediator effect on the relationship between perceived stress and quality of life in children with asthma.

## 2. MATERIAL AND METHOD

This research was created in a cross-sectional design. The data collection process was carried out in January, February, and March 2020. Children and parents/guardians read and signed the informed consent form to indicate that they voluntarily participated in the study.

### 2.1. Population and Sample

The participants who were followed-up patients of the outpatient clinic of İstanbul University, İstanbul Faculty of

Medicine, Division of Pediatric Allergy were enrolled in the study consecutively. Asthmatic children aged between 9-12 years were included. Patients who had concomitant psychiatric diagnoses according to DSM 5 and/or using psychiatric medicine and/or receiving psychological therapy were excluded from the study.

### 2.3. Measures

#### 2.3.1. Demographic Information Forms

Two demographic information forms were used in the study, one including participants' characteristics such as age, sex, and educational level, and the other including the parents'/ caregivers' characteristics.

#### 2.3.2. Determining Asthma Control Level of The Participants

The Level of asthma control of participants was evaluated by physicians according to the "Global Initiative for Asthma" (GINA) criteria. Asthma symptom control including daily symptoms, activity limitation, night symptoms, need for rescue therapy (bronchodilator) over the last 4 weeks and pulmonary function tests (PEF and FEV1) were assessed. In addition, the patient's past asthma attacks were asked about and evaluated.

#### 2.3.3. Perceived Stress Scale in Children (8-11 Years)

The scale was developed to assess children's perceived stress levels.<sup>15</sup> The scale's internal consistency reliability is 0.76 and the test-retest correlation is 0.79. The Turkish version of the scale's internal consistency reliability is 0.76 and the test-retest correlation is 0.71.<sup>16</sup> It consists of 9 questions whose answers are given on a 4-point Likert scale. The highest point means the highest perceived stress. The minimum and maximum points are 9 and 36, respectively. Although the "Perceived Stress Scale in Children" was developed for children aged between 8-11 years, it was applied to 12-year-old children in this study. The Cronbach alpha ( $\alpha$ ) internal consistency reliability of the scale in this study was found as 0.71.

#### 2.3.4. Child and Adolescent Mindfulness Measure (CAMM)

CAMM was developed to measure the acceptance and focus of the current moment without trying to change the emotions and thoughts in children aged above 9 years old.<sup>17</sup> The scale's Cronbach alpha ( $\alpha$ ) internal consistency coefficient is 0.80. The Turkish version of the scale was assessed in 211 adolescents aged between 14-18 years, and its internal consistency coefficient was found as 0.80.<sup>18</sup> The English and Turkish version of the scale consists of 10 questions whose answers are scored as 0 (never true), 1 (rarely true), 2 (sometimes true), 3 (often true) and 4 (always true). High scores indicate a high level of mindfulness. The minimum and maximum points are 0 and 40, respectively. The Cronbach alpha ( $\alpha$ ) coefficient was 0.68 in this study.

#### 2.3.5. Pediatric Asthma Quality of Life Questionnaire (PAQLQ)

The scale was developed to determine the level of educational, physical, social, and emotional difficulties experienced by

**Table 1: Sample characteristics according to asthma control**

| Characteristics                                  | Total         | Uncontrolled | Partially-controlled | Controlled |
|--|---------------|--------------|----------------------|------------|
|  | (n = 100) n % | (n=51) n %   | (n=36) n %           | (n=13) n % |
| <b>Sex</b>                                       |               |              |                      |            |
| Female   | 31 (31)       | 53.8 (7)     | 33.3 (12)            | 23.5 (12)  |
| Male   | 69 (69)       | 46.2 (6)     | 66.7 (24)            | 76.5 (39)  |
| <b>Age</b>                                       |               |              |                      |            |
| 9  | 42 (42)       | 53.8 (7)     | 38.9 (14)            | 41.2 (21)  |
| 10   | 28 (28)       | 23.1 (3)     | 30.6 (11)            | 27.5 (14)  |
| 11   | 9 (9)         | 7.7 (1)      | 11.1 (4)             | 7.8 (4)    |
| 12   | 21 (21)       | 15.4 (2)     | 19.4 (7)             | 23.5 (12)  |
| <b>Total number of siblings</b>                  |               |              |                      |            |
| 1  | 7 (7)         | 0            | 11.1 (4)             | 5.9 (1)    |
| 2  | 56 (56)       | 38.5 (5)     | 47.2 (17)            | 66.7 (34)  |
| 3  | 22 (22)       | 46.2 (6)     | 25 (9)               | 13.7 (7)   |
| 4  | 12 (12)       | 15.4 (2)     | 11.1 (4)             | 11.8 (6)   |
| 5  | 2 (2)         | 0            | 5.6 (2)              | 0          |
| 6  | 1 (1)         | 0            | 0                    | 2 (1)      |
| <b>Order of birth</b>                            |               |              |                      |            |
| 1  | 39 (39)       | 38.5 (5)     | 33.3 (12)            | 43.1 (22)  |
| 2  | 43 (43)       | 38.5 (5)     | 44.4 (16)            | 43.1 (22)  |
| 3  | 14 (14)       | 23.1 (3)     | 13.9 (5)             | 11.8 (6)   |
| 4  | 2 (2)         | 0            | 2.8 (1)              | 2 (1)      |
| 5  | 2 (2)         | 0            | 5.6 (2)              | 0          |
| <b>Education level of the child</b>              |               |              |                      |            |
| Primary school                                   | 46 (46)       | 53.8 (7)     | 44.4 (16)            | 45.1 (23)  |
| Middle school                                    | 54 (54)       | 46.2 (6)     | 55.6 (20)            | 54.9 (28)  |
| <b>Grade level</b>                               |               |              |                      |            |
| 3  | 20 (20)       | 15.4 (2)     | 19.4 (7)             | 21.6 (11)  |
| 4  | 25 (25)       | 38.5 (5)     | 25 (9)               | 21.6 (11)  |
| 5  | 15 (15)       | 7.7 (1)      | 13.9 (5)             | 17.6 (9)   |
| 6  | 19 (19)       | 23.1 (3)     | 19.4 (7)             | 17.6 (9)   |
| 7  | 21 (21)       | 15.4 (2)     | 22.2 (8)             | 21.6 (11)  |
| <b>School type</b>                               |               |              |                      |            |
| State  | 98 (98)       | 100 (13)     | 97.2 (35)            | 98 (50)    |
| Private  | 2 (2)         | 0            | 2.8 (1)              | 2 (1)      |
| <b>Place of residence</b>                        |               |              |                      |            |
| Istanbul   | 98 (98)       | 100 (13)     | 100 (36)             | 96.1 (49)  |
| Yalova   | 2 (2)         | 0            | 0                    | 3.9 (2)    |
| <b>Academic success</b>                          |               |              |                      |            |
| Very Low   | 1 (1)         | 2.8 (1)      | 0                    | 0          |
| Low  | 6 (6)         | 2.8 (1)      | 7.7 (1)              | 7.8 (4)    |
| Middle   | 25 (25)       | 25 (9)       | 23.1 (3)             | 25.5 (13)  |
| High   | 53 (53)       | 55.6 (20)    | 53.8 (7)             | 51 (26)    |
| Very High  | 15 (15)       | 13.9 (5)     | 15.4 (2)             | 15.7 (8)   |
| <b>Educational level (a parent/guardian)</b>     |               |              |                      |            |
| Illiterate                                       | 1 (1)         | 0            | 0                    | 2 (1)      |
| Literate   | 4 (4)         | 0            | 11.1 (4)             | 0          |
| Primary school                                   | 40 (40)       | 69.2 (9)     | 30.6 (11)            | 39.2 (20)  |
| Middle school                                    | 17 (17)       | 0            | 19.4 (7)             | 19.6 (10)  |
| High School                                      | 33 (33)       | 23.1 (3)     | 38.9 (14)            | 31.4 (16)  |
| Junior College                                   | 1 (1)         | 0            | 0                    | 2 (1)      |
| University                                       | 4 (4)         | 7.7 (1)      | 0                    | 5.9 (3)    |
| Master   | 0             | 0            | 0                    | 0          |
| <b>Educational level (other parent/guardian)</b> |               |              |                      |            |
| Illiterate                                       | 1 (1)         | 0            | 0                    | 2 (1)      |
| Literate   | 4 (4)         | 0            | 5.6 (2)              | 3.9 (2)    |
| Primary school                                   | 47 (47)       | 61.5 (8)     | 50 (18)              | 41.2 (21)  |
| Middle school                                    | 14 (14)       | 23.1 (3)     | 13.9 (5)             | 11.8 (6)   |

|                               |         |          |           |           |
|-------------------------------|---------|----------|-----------|-----------|
| High School                   | 26 (26) | 15.4 (2) | 22.2 (8)  | 31.4 (16) |
| Junior College                | 1 (1)   | 0        | 2.8 (1)   | 7.8 (4)   |
| University                    | 6 (6)   | 0        | 5.6 (2)   | 0         |
| Master                        | 1 (1)   | 0        | 0         | 2 (1)     |
| <b>Monthly Income</b>         |         |          |           |           |
| 0 -2500 TL                    | 39 (39) | 46.2 (6) | 38.9 (14) | 37.3 (19) |
| 2501-5000 TL                  | 54 (54) | 38.5 (5) | 58.3 (21) | 54.9 (28) |
| 5001-7500 TL                  | 2 (2)   | 0        | 2.8 (1)   | 3.9 (2)   |
| 7501-10000 TL                 | 5 (5)   | 15.4 (2) | 0         | 3.9 (2)   |
| <b>Perceived Income Level</b> |         |          |           |           |
| Very Low                      | 9 (9)   | 15.4 (2) | 13.9 (5)  | 3.9 (2)   |
| Low                           | 24 (24) | 46.2 (6) | 22.2 (8)  | 19.6 (10) |
| Middle                        | 64 (64) | 30.8 (4) | 63.9 (23) | 72.5 (37) |
| High                          | 3 (3)   | 7.7 (1)  | 0         | 3.9 (2)   |
| Very High                     | 0       | 0        | 0         | 0         |

**Table 2: Relationships between CAMM, perceived stress, PAQLQ, activity limitation, symptoms, emotional function according to Pearson correlation analysis (n = 100)**

| Scale                      | CAMM     | Perceived Stress | PAQLQ   | Activity Limitation | Symptoms | Emotional Function |
|----------------------------|----------|------------------|---------|---------------------|----------|--------------------|
| <b>CAMM</b>                | 1        |                  |         |                     |          |                    |
| <b>Perceived Stress</b>    | -0.501** | 1                |         |                     |          |                    |
| <b>PAQLQ</b>               | 0.307**  | -0.474**         | 1       |                     |          |                    |
| <b>Activity Limitation</b> | 0.136    | -0.321**         | 0.806** | 1                   |          |                    |
| <b>Symptoms</b>            | 0.256*   | -0.399**         | 0.94**  | 0.679**             | 1        |                    |
| <b>Emotional Function</b>  | 0.381**  | -0.514**         | 0.844** | 0.598**             | 0.65**   | 1                  |

Note: CAMM: Child and Adolescent Mindfulness Measure, PAQLQ: Pediatric Asthma Quality of Life Questionnaire, \*p<.05: statistically significant, \*\*p<.01: statistically significant

children aged 7-17 years with asthma in their daily life.<sup>19</sup> It consists of 23 items and some of them are answered on a 7-point Likert scale. The scale has 3 subscales consisting of activity limitation, symptoms, and emotional function. The scores range from 23 to 161. A high score shows a high level of life quality, whereas a low score indicates a low level of life quality. The Cronbach alpha ( $\alpha$ ) value of the quality of life scale was 0.89. Additionally, the Cronbach alpha ( $\alpha$ ) coefficient of activity limitation was 0.75, the Cronbach alpha ( $\alpha$ ) value of symptoms was 0.76 and finally, the Cronbach alpha ( $\alpha$ ) coefficient of emotional function subscale was 0.87. The Turkish validity and reliability study was conducted on 122 children between the ages of 7-16 years and the scale was found as valid and reliable.<sup>20</sup> The Turkish version of the scale's Cronbach alpha ( $\alpha$ ) internal consistency coefficient of the activity limitation subscale, symptoms subscale, and emotional function subscale was 0.80, 0.90, and 0.86, respectively.

#### 2.4. Ethics

Ethics Committee Approval was obtained from Işık University on 02.09.2019. Işık University Clinical Psychology Graduate Coordination Office has given permission to conduct the research at the outpatient clinic of İstanbul University, İstanbul Faculty of Medicine, Division of Pediatric Allergy.

#### 2.5. Statistical Analysis

Data were analyzed with SPSS version 23. Firstly, correlational relationships between variables were examined by Pearson correlation analysis. In the next step, regression analysis was conducted to control if there is a significant mediator effect in correlative relationships. The mediator variable analysis included four considerations.<sup>21</sup> These four considerations were as follows: the effect of the independent variable on the dependent variable

**Table 3: Assessment of mindfulness in relationship between perceived stress and quality of life by linear hierarchical regression analysis**

| Model  | B      | $\beta$ | R <sup>2</sup> | F      | p       |
|--|--------|---------|----------------|--------|---------|
| 1 The effect of PS on PAQLQ                        | -3.012 | -0.474  | 0.225          | 28.387 | 0.000** |
| 2 The effect of PS on CAMM                         | -0.651 | -0.501  | 0.251          | 32.813 | 0.000** |
| 3 The effect of CAMM on PAQLQ                      | 1.499  | 0.307   | 0.094          | 10.187 | 0.002*  |
| 4 When controlling CAMM, the effect of PS on PAQLQ | -2.717 | -0.427  | 0.231          | 14.573 | 0.000** |

Note: PS: Perceives Stress, CAMM: Child and Adolescent Mindfulness Measure, PAQLQ: Pediatric Asthma Quality of Life Questionnaire, \*p<.01: statistically significant, \*\*p<.001: statistically significant

**Table 4: Assessment of mindfulness in relationship between perceived stress and symptoms by linear hierarchical regression analysis**

| Model |  | B      | $\beta$ | R2    | F      | p       |
|-------|--|--------|---------|-------|--------|---------|
| 1     | The effect of PS on S                        | -1.454 | -0.399  | 0.159 | 18.572 | 0.000** |
| 2     | The effect of PS on CAMM                     | -0.651 | -0.501  | 0.251 | 32.813 | 0.000** |
| 3     | The effect of CAMM on S                      | 0.717  | 0.256   | 0.065 | 6.86   | 0.010*  |
| 4     | When controlling CAMM, the effect of PS on S | -1.318 | -0.362  | 0.163 | 9.479  | 0.000** |

Note: PS: Perceived Stress, S: Symptoms, CAMM: Child and Adolescent Mindfulness Measure, \*p<.05: statistically significant, \*\*p<.001: statistically significant

and the mediator variable should be significant; the effect of the mediator variable on the dependent variable should also be significant. Finally, while controlling the effect of the mediator variable, the significant effect of the independent variable on the dependent variable should disappear. These four aspects were checked, and all analyses were carried out following the linear hierarchical regression analysis steps.

In the last step, the relationship between perceived stress, mindfulness, and quality of life according to asthma control level was examined using 3 different one-way ANOVA analyses.

### 3. RESULTS

#### 3.1. Demographic data of asthmatic children and parents/caregivers

A total of 100 (31 female / 69 male) children with a mean age and SD of  $10 \pm 1,16$  years were included. Of the participants, 51% had controlled asthma according to GINA guidelines.

#### 3.2. The mediation analysis of CAMM in the relationship between perceived stress and PAQLQ

Correlational relationships between the variables were given in Table 2. The correlation between perceived stress and mindfulness ( $p<0.01$ ), quality of life and mindfulness ( $p<0.01$ ), quality of life and perceived stress ( $p<0.01$ ), activity limitation and perceived stress ( $p<0.01$ ), activity limitation and quality of life ( $p<0.01$ ), symptoms and mindfulness ( $p<0.05$ ), symptoms and perceived stress ( $p<0.01$ ), symptoms and quality of life ( $p<0.01$ ), symptoms and activity limitation ( $p<0.01$ ), emotional function and mindfulness ( $p<0.01$ ), emotional function and perceived stress ( $p<0.01$ ), emotional function and quality of life ( $p<0.01$ ), emotional function and activity limitation ( $p<0.01$ ) and finally emotional function and symptoms were significant.

In the first mediation analysis, Linear regression analysis showed that mindfulness did not have a full mediator effect on the relationship between perceived stress and quality of life (Table 3). However, according to Sobel Test analysis, mindfulness has a partial mediator effect on the relationship between perceived stress and quality of life (Sobel z-statistics=2.81; one-tailed=0.000; two-tailed=0.000).

#### 3.3. The mediation analysis of CAMM in the relationship between perceived stress and symptoms

In the second mediation analysis, Linear regression analysis determined that mindfulness did not have a full mediator effect on the relationship between perceived stress and symptoms (Table 4). However, Sobel Test analysis demonstrated that mindfulness had a partial mediator effect on the relationship between perceived stress and symptoms (Sobel z-statistics=-2.38; one-tailed=0.000; two-tailed=0.010).

#### 3.4. The mediation analysis of CAMM in the relationship between perceived stress and emotional function

In the final mediation analysis, Linear regression analysis determined that mindfulness did not have a full mediator effect on the relationship between perceived stress and emotional function (Table 5). However, Sobel Test analysis demonstrated that mindfulness had a partial mediator effect on the relationship between perceived stress and emotional function (Sobel z-statistics=-2.93; one-tailed=0.000; two-tailed=0.000).

#### 3.5. Relationship between asthma control level, perceived stress, CAMM and PAQLQ

One way-ANOVA analysis showed that quality of life significantly differed by asthma control levels ( $F_{(2,97)}=11.03$ ;  $p=0.000$ ) (Table 6). Post-Hoc test determined that quality of life significantly

**Table 5: Assessment of mindfulness in relationship between perceived stress and emotional function by linear hierarchical regression analysis**

| Model |   | B      | $\beta$ | R2    | F      | p      |
|-------|---|--------|---------|-------|--------|--------|
| 1     | The effect of PS on EF                        | -1.131 | -0.514  | 0.265 | 35.266 | 0.000* |
| 2     | The effect of PS on CAMM                      | -0.651 | -0.501  | 0.251 | 32.813 | 0.000* |
| 3     | The effect of CAMM on EF                      | 0.644  | 0.381   | 0.145 | 16.650 | 0.000* |
| 4     | When controlling CAMM, the effect of PS on EF | -0.949 | -0.432  | 0.285 | 19.329 | 0.000* |

Note: PS: Perceived Stress, EF: Emotional Function, CAMM: Child and Adolescent Mindfulness Measure, \*p<.001: statistically significant

**Table 6: Comparison of perceived stress, CAMM and PAQLQ according to asthma control level**

| Scale | Uncontrolled Group<br>(n=13) |       | Partially-Controlled Group<br>(n=36) |       | Controlled Group<br>(n=51) |       | p       |
|-------|------------------------------|-------|--------------------------------------|-------|----------------------------|-------|---------|
|       | Mean                         | SD    | Mean                                 | SD    | Mean                       | SD    |         |
| PS    | 18.85                        | 3.63  | 16.78                                | 5.13  | 15.55                      | 4.52  | 0.068   |
| CAMM  | 26.08                        | 6.44  | 25.56                                | 5.72  | 28.18                      | 6.16  | 0.127   |
| PAQLQ | 85.31                        | 24.58 | 112.33                               | 25.17 | 124.8                      | 30.1  | 0.000** |
| AL    | 15.54                        | 5.01  | 21.31                                | 4.82  | 23.53                      | 6.57  | 0.000** |
| S     | 31.69                        | 14.77 | 47.86                                | 12.70 | 53.90                      | 17.92 | 0.000** |
| EF    | 38.08                        | 10.43 | 43.17                                | 10.63 | 47.37                      | 9.43  | 0.008*  |

Note: PS: Perceived Stress, CAMM: Child and Adolescent Mindfulness Measure, PAQLQ: Pediatric Asthma Quality of Life Questionnaire, AL: Activity Limitation, S: Symptoms, EF: Emotional Function, \*p<.05: statistically significant, \*\*p<.01: statistically significant

differed between the uncontrolled group and partially controlled group ( $p=0.003$ ), between the uncontrolled group and controlled group ( $p=0.000$ ), and between the partially controlled group and controlled group ( $p=0.039$ ).

There was a significant relationship between asthma control level and activity limitation which is a subscale of quality of life ( $F_{(2,97)}=9.94$ ;  $p=0.000$ ) (Table 6). According to Post-Hoc analysis, this significance was raised from the relationship between the uncontrolled group and the partially controlled group ( $p=0.003$ ) and the relationship between the uncontrolled group and the controlled group ( $p=0.000$ ).

Symptoms also significantly differed by asthma control level ( $F_{(2,97)}=10.3$ ;  $p=0.000$ ) (Table 6). The relationship between the uncontrolled group and the partially controlled group ( $p=0.002$ ) and the relationship between the uncontrolled group and the controlled group ( $p=0.000$ ) made this difference (Table 6).

There was a significant relationship between asthma control level and emotional function ( $F_{(2,97)}=5.09$ ;  $p=0.008$ ) (Table 6). According to Post-Hoc analysis, the difference occurred because of the relationship between the uncontrolled group and the controlled group ( $p=0.004$ ).

#### 4. DISCUSSION

In this study, the authors determined that mindfulness had a partial mediator effect on the relationship between perceived stress and the quality of life, on the relationship between perceived stress and activity limitation, and on the relationship between perceived stress and emotional function. However, there was no significant correlational relationship between mindfulness and symptoms, which is a subscale of the quality of life.

Mindfulness-based practices improve the psychological and physiological health of children and adolescents.<sup>22</sup> Mindfulness positively affects health by reducing the stress of chronic diseases.<sup>23</sup> In a study conducted on college students with a mean age of 18.3 years, it was demonstrated that people with a higher level of mindfulness are less likely to have had an asthma diagnosis and less likely to have the symptoms of persistent dry cough and wheezing.<sup>24</sup> Besides, a randomized control trial

held in asthmatic adults showed that an 8-week mindfulness-based stress reduction (MBSR) group training program, which has a specific impact on emotional functionality improved the quality of life of patients.<sup>25</sup> Another MBSR program, when used as supplementary to routine medical treatments, improved the quality of life of patients with asthma.<sup>26</sup> Mindfulness practices regulate physiological stimulations via regulating breathing and slowing heartbeats, hence having a positive impact on the management of the disease.<sup>27, 28</sup> The reduction in perceived stress, which is associated with mindfulness correlates with the increase in the quality of life of patients with asthma.<sup>8</sup>

Although a significant relationship between mindfulness and activity limitation was shown in some studies<sup>25</sup>, we could not find such a significant correlation between mindfulness and activity limitation. In our study group, half of the children (51%) had controlled asthma, nearly one-third (36%) had partially controlled asthma, and only 13% of children had uncontrolled asthma. The majority of our patients not having activity limitations may partly explain this discrepancy. Furthermore, the effects of seasonal variations on children's physical activity might be a confounding factor. There are studies showing that asthma control levels improve due to the low activity rates of people with asthma in winter. For example, adults with asthma may think that their asthma control levels are better in winter because they restrict their activities in winter compared to the summer seasons.<sup>29</sup> The data collection process of our study coincided with the months of January, February and March. As our participant group attends to school during the winter months, school time coincided with most daily activities.

Asthma symptoms positively correlate with the stress level of asthmatic people.<sup>30</sup> There is an inverse relationship between asthma symptoms and mindfulness. Asthma symptoms decrease in parallel with increased mindfulness.<sup>24</sup> In our study, it was shown that mindfulness in pediatric asthma had a partial effect on the relationship between perceived stress and symptoms.

People with asthma decrease their emotional functionality due to inefficient coping with stress.<sup>31</sup> Conversely, it has been observed that the increase in mindfulness levels affects emotional functionality.<sup>32</sup> In our study, it was determined that

mindfulness had a partial effect on the relationship between perceived stress and emotional function.

Demographic characteristics of the sample according to asthma control were given in Table 1. In our study, we observed that the perceived stress does not differ according to the asthma control levels, but the perceived stress level decreases hierarchically with the increase of the asthma control level. Literature has shown that the level of stress varies according to asthma control and, consistent with our research, low asthma control, and excessive stress are associated.<sup>33, 34</sup> In a study, perceived stress increased in direct proportion with both the incidence of asthma and asthma severity.<sup>35</sup>

Mindfulness level did not change according to asthma control level. Similarly, it has been observed that asthma control has no effect on mindfulness scores in adolescents.<sup>33</sup>

Quality of life, activity limitation, symptoms, and emotional function differed according to asthma control. When the level of asthma control increase, the quality of life and emotional function also increase; besides, activity limitation, symptoms scores decreased. A similar study found that when asthma control decreases, quality of life decreases as well.<sup>36</sup> People with uncontrolled asthma had a higher activity limitation.<sup>37</sup> According to GINA criteria, there is a negative correlation between asthma control and asthma symptoms.<sup>38</sup> Moreover, aggression, which is one of the emotional factors known that influence emotional functionality, has been found to decrease with increasing asthma control.<sup>39</sup>

Our research has some limitations. Compared to other studies, the number of participants was limited, and 70% of the sample was 9 or 10 years old. The study design was cross-sectional. Therefore, mindfulness may not have a full mediator effect on the relationships in question. Although perceived stress decreases when asthma control increases, this model was not significant. It may also be related to the low number of participants. Thus, further research might investigate the same relationships with a higher number of participants and the design might be longitudinal. Moreover, studying activity limitation via equally asthma control group subclasses might occur crucial consequences. It may also be advisable to add a control group to the study to make the results more reliable on a scientific scale.

## CONCLUSION

In conclusion, our study found that there is a relationship between perceived stress, mindfulness and the quality of life in pediatric asthma. Our results suggest that mindfulness has a partial mediator impact on the relationship between perceived stress, and quality of life, on the relationship between perceived stress and activity limitation which is the subscale of quality of life, and on the relationship between perceived stress and emotional function which is the quality of life's subscale. Adding mindfulness-based practices to the current medical treatments might reduce perceived stress and increase the quality of life via reducing activity limitation, and increasing emotional function.

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