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Health Care Use and Quality of Life Among Patients with Asthma and Panic Disorder

Jonathan M. Feldman, Ph.D.[1,2,*], **Paul M. Lehrer, Ph.D.**[3], **Soo Borson, M.D.**[4], **Teal S. Hallstrand, M.D., M.P.H.**[5], and **Mahmood I. Siddique, D.O.**[6,7]

1 *Ferkauf Graduate School of Psychology, Yeshiva University, Bronx, New York, USA*

2 *Department of Psychiatry, Division of Child and Adolescent Psychiatry, Rhode Island Hospital/Brown Medical School, Providence, Rhode Island, USA*

3 *Department of Psychiatry, University of Medicine and Dentistry of New Jersey, Robert Wood Johnson Medical School, Piscataway, New Jersey, USA*

4 *Department of Psychiatry and Behavioral Sciences, University of Washington School of Medicine, Seattle, Washington, USA*

5 *Department of Medicine, Division of Pulmonary and Critical Care Medicine, University of Washington School of Medicine, Seattle, Washington, USA*

6 *Department of Medicine, Division of Pulmonary and Critical Care Medicine, University of Medicine and Dentistry of New Jersey, Robert Wood Johnson Medical School, Piscataway, New Jersey, USA*

7 *Robert Wood Johnson University Hospital at Hamilton, Hamilton, New Jersey, USA*

Abstract

The purpose of this study was to assess the associations between panic disorder (PD) and health services use, health-related quality of life, and use of short-acting β_2-agonists among individuals with asthma. We studied 21 adults with comorbid asthma and panic disorder (asthma-PD) and 27 asthma patients without PD (asthma-only). Participants attended a single session at a laboratory to complete the study. A retrospective chart review was conducted to assess use of health care resources for asthma treatment during the past 12 months. Patients completed the Asthma Quality of Life Questionnaire and lung function testing. Asthma-only and asthma-PD patients displayed no differences on asthma severity, as measured by spirometry and asthma medication class. Asthma-PD patients had more visits to their primary care physicians for asthma ($p < 0.01$) and reported a lower quality of life related to asthma ($p < 0.01$) and greater use of short-acting β_2-agonists ($p < 0.05$) than asthma-only patients. These findings were independent of pulmonary function, asthma medication class, and sociodemographic status. These data show that coexistence of PD in asthma is associated with increased use of primary care health resources and greater perceived impairment from asthma, independent of asthma severity. These findings indicate a need to develop interventions to improve quality of life and self-management of asthma among PD patients.

Keywords

asthma; panic disorder; quality of life; health care-seeking behavior

*Corresponding author: Jonathan M. Feldman, Ph.D., Ferkauf Graduate School of Psychology and Albert Einstein College of Medicine, Yeshiva University, Rousso Building, 1300 Morris Park Ave., Bronx, NY 10461, USA; Fax: (718) 430-3960; E-mail: JFeldman@aecom.yu.edu.

Introduction

Panic disorder (PD) is the most frequently diagnosed anxiety disorder associated with medical illnesses (1). Recent population-based studies have shown that adults with asthma are more likely to have PD (2) and panic attacks (3) than adults without asthma. The prevalence rate of PD among patients with asthma has been estimated to range between 6.5 and 24%, depending on the sample studied (4–8). In contrast, the 1-year prevalence rate of PD is between 1 and 2% among the general population in the United States (9,10).

PD is characterized by recurrent unexpected panic attacks accompanied by anxious apprehension over their recurrence, anxiety about the implications of these attacks, or a behavior change in response to the episodes (11). Symptoms characteristic of panic attacks, such as dyspnea, overlap with symptoms of asthma; therefore, PD may contribute to asthma morbidity. Asthma and PD may work synergistically to increase the severity of both. Symptoms of panic may be mistaken for symptoms of asthma or exaggerate sensations of breathlessness in the presence of bronchospasm. This may lead to increased use of β_2-agonists, which can result in further increases in sympathetic arousal and panic symptoms (12,13). Oral corticosteroids (14) and theophylline-based medications (15) may also contribute to anxiety symptoms.

Conversely, panic may exacerbate asthma by interfering with proper self-management strategies. Generalized panic-fear, a personality construct that reflects anxiety extending beyond asthma symptoms, has been identified as a maladaptive trait for self-management of asthma. Patients with asthma who have high levels of generalized panic-fear have been shown to overuse β_2-agonist medication (16), receive more intensive corticosteroid regimens (17), have longer hospitalizations (18), and more frequent hospital readmissions for asthma (19). These effects have all been independent of objective pulmonary function measurements. More recent studies have shown that patients with asthma and comorbid psychological symptoms also have high rates of health services use for asthma (20) and low asthma-related quality of life (21). However, these previous studies have relied on self-report measures of depressive or anxiety symptoms, as opposed to clinical diagnostic interviews to assess psychological disorders.

Patients with PD in the general population use primary care services and endorse somatic complaints at very high rates (22,23). However, there has been very limited research on whether similar risks apply to asthma patients with PD. Compared with asthma patients without PD (asthma-only), individuals with coexistent asthma and PD (asthma-PD) reported greater levels of dyspnea with the same reduction in lung function during histamine challenge (24). A case series of asthma-PD patients reported overmedication, extreme symptom vigilance, and excessive use of medical resources (25).

To clarify the role of PD in asthma, we compared asthma patients with and without a formal diagnosis of PD on health services use, health-related quality of life, and use of short-acting β_2-agonists. It was hypothesized that asthma-PD patients would use primary care services for asthma at a higher rate and report lower asthma-related quality of life and greater use of short-acting β_2-agonists than asthma-only patients.

Methods

Subjects

Patients were recruited from primary care and specialized asthma clinics affiliated with two university medical centers. The Autonomic Nervous System Questionnaire (26) and the Patient Health Questionnaire (27) were administered by nurses in the clinics as an initial screen for

PD. Research personnel contacted patients who completed these forms to set up the testing session for potential asthma-only and asthma-PD participants. Subjects were recruited from central New Jersey from 2000 to 2002 and from Seattle, Washington, during 2001–2002. All subjects in the asthma-only condition and 8 of the asthma-PD patients were recruited from central New Jersey, whereas 13 asthma-PD patients were recruited from the greater Seattle area.

All participants had physician-diagnosed asthma of 12 months or more duration *and* evidence within the past 12 months of 1) a bronchodilator response of 12% or more with an absolute increase in FEV_1 of 200 cc or more *or* 2) a positive methacholine challenge test (i.e., PC_{20} < 8 mg/mL), *or* 3) clinical improvement in asthma symptoms after initiation of anti-inflammatory medication, as documented in progress notes from medical records. Clinical improvement was defined as a decline in at least two of the National Heart Lung and Blood Institute's (NHLBI) (28) criteria for symptom class (e.g., lower use of short-acting β_2-agonists and lower frequency of asthma symptoms). This criterion for asthma diagnosis allowed for inclusion of patients whose asthma treatment may have resulted in improved lung function and bronchial hyperresponsiveness. Most patients met criteria for the study by demonstrating bronchodilator responsiveness (Table 1).

Group membership (asthma-only vs. asthma-PD) was determined by administering the Anxiety Disorders Inter-view Schedule for DSM-IV, which is a semistructured diagnostic interview (29). Advanced graduate students, who received supervision from licensed clinical psychologists or psychiatrists, assessed PD and other psychiatric diseases for both groups using DSM-IV criteria. Asthma-PD patients were required to have an onset of PD at least 12 months prior to the testing session.

Exclusion criteria for both groups were 1) a history of emphysema or non-asthma respiratory disease, heart disease, stroke, neurological disorder, cancer, or organ transplant; 2) major depressive disorder that was clinician-rated as more severe than PD within the prior 12 months; 3) bipolar disorder, alcohol or substance dependence, or psychosis; 4) mental retardation; 5) inability to read English; and 6) pregnancy.

Procedure

Participants gave verbal and written informed consent. A single testing session was conducted in a laboratory and included spirometry and completion of questionnaires followed by clinical interviews. Bronchodilator responsiveness was assessed by spirometry in patients without a documented chart history of reversibility. Subjects received $25 for participation. The institutional review board of both institutions approved the study.

Measures

Health care use was assessed by a review of medical records from participants' primary care providers and any asthma specialists visited during the past 12 months. The research staff was able to obtain all records. Chart review was conducted by one research assistant, who was blind to group membership (asthma-PD or asthma-only) and the study's hypotheses. Progress notes that documented discussion of respiratory complaints (e.g., shortness of breath), decisions on asthma medications, or pulmonary function testing were coded as asthma visits. These three domains correspond to NHLBI recommendations concerning assessment of asthma severity (28). The primary measure of health care use was primary care office visits for asthma within the past 12 months. Secondary measures included tertiary care visits, emergency room (ER) visits, and hospitalizations for asthma.

The Asthma Quality of Life Questionnaire (AQLQ) is a 32-item scale that was used to measure subjects' perceived quality of life impairments related to asthma during the previous week (30).

Self-report data were collected on sociodemographic measures, including age, gender, race, health insurance, and marital status. Participants also reported the average number of days requiring use of short-acting β_2-agonist medication during a typical week, cigarette smoking status during the past year, and age of onset for asthma and panic.

Asthma severity was classified according to NHLBI guidelines (28). Symptom severity was based on patients' self-report of asthma symptoms and use of short-acting β_2-agonists. In accordance with the guidelines, patients were placed into the most severe symptom category in which at least one criterion was met. Pulmonary function severity was based on percent predicted FEV_1 collected on the day of the study. Spirometry testing was conducted in accordance with the American Thoracic Society's guidelines (31). Participants were instructed not to use any asthma medications, caffeine or alcohol for 12 hours prior to spirometry. Medication class was determined by participants' report of current medications that they were taking. The categories of ''mild intermittent'' and ''mild persistent'' were merged into a single class across the three domains of asthma severity (symptoms, pulmonary function and medications).

The Panic Disorder Severity Scale (PDSS) was administered to assess the severity of PD during the previous week (32).

Statistical Analysis

Differences between asthma-PD and asthma-only patients were tested by the use of Student's *t*-tests or chi-square analyses. Analysis of covariance and logistic regression were used to control for cigarette smoking due to the trend for a higher percentage of smokers among the asthma-PD group (Table 2). Because of non-normality of the distribution, a median split was performed on the health care use variables as follows: 0 or 1 vs. 2 or more for primary care visits and presence/absence of tertiary care visits, ER visits and hospitalizations. An alpha level of 0.05 was used for all analyses.

Results

Patient Characteristics

Forty-eight adult outpatients with asthma (32 female and 16 male) participated in the study. The mean age was 39.2 ± 13.8 years (range = 18–79). Twenty-one participants were in the asthma-PD group and 27 participants were in the asthma-only group. Race was categorized into Caucasian and Ethnic Minority due to the smaller number of African American (n = 8), Asian (n = 3), and Latino (n = 2) patients vs. Caucasian patients (n = 35).

No significant differences were found between asthma-PD patients and asthma-only patients on any of the sociodemographic variables (Table 2). In addition, asthma-PD patients from the two sites were compared to assess for selection differences. These two subgroups displayed similar characteristics on all sociodemographic and dependent measures except gender (92% women vs. 50%; $p < 0.05$). However, no significant associations were found between gender and any of the dependent measures.

Self-report data showed that it was more common for asthma to precede the development of panic attacks. Asthma-PD patients reported a younger average age for onset of their asthma (mean = 23.4 ± 16.3) vs. onset of their panic attacks (mean = 28.7 ± 13.8; $p < 0.05$).

Asthma Severity

Both groups tended to have mild asthma severity, according to pulmonary function and medication class. Figure 1 depicts asthma severity across the three dimensions defined by NHLBI (28). There was a trend for higher levels on $\%FEV_1$ among asthma-PD patients vs. asthma-only patients ($p = 0.11$). The two groups did not differ significantly on severity for symptom class or medication class. Although asthma-PD patients were equally distributed across the levels of symptom class, pulmonary function classification showed that 57% of these individuals were mild and only 10% were severe.

Health Care Use

Asthma-PD patients visited their primary care provider for asthma at a higher rate than asthma-only patients. Sixty-five percent of the asthma-PD patients visited their primary care provider two or more times during the past year vs. only 22% of the asthma-only patients (crude OR=6.5; 95% CI=1.8–23.6; $p < 0.01$). After adjustment for cigarette smoking, asthma-PD patients still had an increased odds ratio (adjusted OR= 6.3; 95% CI=1.7–23.8; $p < 0.01$) in comparison with asthma-only patients.

Secondary analyses focusing on tertiary care visits, ER visits, and hospitalizations for asthma during the previous year showed no significant between-group differences. However, 40% of the asthma-PD patients made an ER visit for asthma, compared to only 22% for the asthma-only group ($p = 0.19$). Similarly, 15% of the asthma-PD patients were hospitalized for asthma vs. only 4% of the asthma-only patients ($p = 0.17$).

Quality of Life

Asthma-PD patients reported a lower quality of life due to asthma than asthma-only patients on the total score of the AQLQ [t (46) = 2.72; $p < 0.01$]. Table 3 displays the mean values for both groups on the AQLQ subscales. After statistically controlling for cigarette smoking, the effect of PD on quality of life was still significant [F (1, 45) = 7.62; $p < 0.01$].

Secondary analyses were conducted to examine the individual subscales of the AQLQ. Asthma-PD patients reported greater restriction of activities due to asthma than asthma-only patients [t (46)=3.37; $p < 0.01$]. This effect remained significant after adjustment for cigarette smoking [F (1,45) = 12.64; $p = 0.001$]. Asthma-PD patients also reported greater emotional difficulties caused by asthma [t (46)=2.25; $p < 0.05$], and a trend was present for greater report of asthma symptoms [t (46) = 1.86; $p = 0.07$] by asthma-PD patients. No significant effect of PD was found for symptoms that occur in response to environmental triggers.

Use of Short-Acting β_2-Agonists

Asthma-PD patients reported greater use of short-acting β_2-agonists (mean = 4.6 ± 2.8 days/week) during a typical week vs. asthma-only patients [mean = 2.8 ± 2.8; t (40) = 2.17; $p < 0.05$]. This effect was slightly weakened when controlling for cigarette smoking [F (1,39) = 3.36; $p = 0.07$].

Psychiatric Morbidity

Asthma-PD patients had higher prevalence rates for lifetime (71.4% vs. 14.8%; $p < 0.001$) and current major depressive disorder (28.6% vs. 7.4%; $p < 0.05$). Furthermore, 90% of asthma-PD patients met criteria for PD with agoraphobia (i.e., fear of situations where escape may be difficult or embarrassing). The severity of PD in this sample was moderate, as defined by the PDSS (mean=1.9 ± 0.7). More than half (57%) of the asthma-PD patients reported receiving some type of treatment for panic during the previous 12 months. Among the asthma-PD group, 48% reported receiving pharmacotherapy, and 29% reported participating in psychotherapy

that targeted anxiety. Among all asthma-PD patients, 38% reported using benzodiazepines to treat their anxiety and 33% reported taking antidepressants.

Discussion

This study provides evidence that PD is associated with patients' health care behavior and subjective experience associated with asthma. Despite no differences in asthma severity, as defined by medication class and pulmonary function on the day of testing, patients with asthma and PD had more asthma-related visits to primary care physicians during the previous year than asthma-only patients. Furthermore, asthma-PD patients reported an overall lower quality of life associated with asthma and more frequent use of short-acting β_2-agonists. These results were independent of sociodemographic measures.

These data extend previous findings linking psychopathology and health care use among severe asthma patients (20) to a sample of patients with milder asthma. These findings may reflect confusion between asthma and panic symptoms or poor control over asthma. Differentiating between asthma and panic symptoms may be difficult for providers as well as patients. Measuring pulmonary function at the time of respiratory complaints would be useful for disentangling symptoms. However, when this information is not available, clinicians may be prone to overestimate asthma severity among asthma-PD patients due to greater health care use and reductions in asthma-related quality of life. The present study demonstrates the importance of incorporating pulmonary function and asthma medication class into assessment of disease severity. These two dimensions have been shown to be better markers for asthma severity than symptom report (33). This point may be particularly salient to asthma-PD patients. Both groups of patients were using equivalent levels of controller asthma medications, and asthma-PD patients had slightly higher levels on $\%FEV_1$. However, asthma-PD patients reported greater use of short-acting β_2-agonist medication. In addition, asthma-PD patients reported greater emotional disturbance connected with asthma, and they had a high rate of comorbid depression, which may contribute to magnification of asthma symptoms (21,34).

Mild asthma severity and power limitations due to the small sample size may both explain the absence of between-group differences on tertiary care visits, ER visits, and hospitalizations. Health care use rates in this sample were relatively low. Nevertheless, despite the relatively small sample size, these data provide support for the hypothesis that PD is associated with health care behavior in asthma.

Coexistence of PD with asthma was associated with reductions in quality of life related to greater avoidance behavior and emotional distress attributed to asthma. Patients with PD reported restricting their activities and experiencing emotional disturbance due to asthma between ''some of the time'' and ''a good bit of the time'' during the previous week. On the other hand, asthma-only patients reported restricting their activities only ''a little of the time'' on the AQLQ. Even mild asthma can reduce health-related quality of life (35), and this finding appears to apply to asthma-PD patients as well.

Although the AQLQ is designed to measure asthma-related quality of life, these data provide evidence that participants' perceived impairment due to asthma may be amplified by features of PD. Asthma-PD patients have been shown to report higher levels of anxiety sensitivity (i.e., worry about the consequences of anxiety symptoms) and fear of bodily sensations than asthma-only patients (4). These frightening cognitions may lead the individual to avoid situations due to a fear of having panic, asthma, or both. Phobic avoidance of situations has been commonly reported in both PD (36) and asthma (37). The findings from this study showed that a very high rate (90%) of agoraphobia was found among asthma-PD patients. This rate is substantially higher than rates (33–58%) reported in community samples of PD patients (38). The overlap

and confusion between symptoms of asthma and PD may place these patients at even greater risk for restriction of activities that extends well beyond adaptive avoidance of asthma triggers.

These data also have important implications for the treatment of PD among patients with asthma. PD may be a marker for similar risk factors that have been previously identified with generalized panic-fear, including increased health care use and β_2-agonist consumption among asthma patients (39). Although formal interventions for asthma patients with high generalized panic-fear have not been well defined, empirically validated treatments for PD are available (40). Furthermore, the findings from this study suggest that interventions for this population may need to be tailored to address asthma-related quality of life, phobic avoidance, and subjective vs. objective measurement of pulmonary function.

Certain limitations should be considered when interpreting the results of this study. Asthma-PD participants were recruited from two separate sites, whereas asthma-only participants were recruited from one site. However, the absence of differences between the asthma-PD patients from both sites minimizes the likelihood of bias in sample selection. The small sample size may have contributed to limitations in power for the study's secondary analyses (e.g., ER visits) and sampling was nonrandom and not population based. Replication in larger, representative samples with a greater range of severity in both asthma and PD is an important next step. Furthermore, future research should include asthma patients with primary psychiatric diseases other than PD, as well as PD patients with other medical conditions to determine if these findings are unique to asthma-PD patients. Patients with PD and other chronic diseases may show similar characteristics. Finally, use of short-acting β_2-agonists was measured retrospectively by a self-report question, which may be influenced by recall bias.

In conclusion, asthma-PD patients may be more likely than other asthma patients to visit primary care providers for asthma-related complaints, report lower asthma-related quality of life, and rely on short-acting bronchodilators. These results suggest a need to identify PD in patients with asthma so that measures can be instituted to improve self-management of asthma and quality of life, and ensure proper treatment of PD. Optimal management of patients with asthma and PD may require a multidisciplinary approach to reduce the severity of PD and the perceived limitations from asthma.

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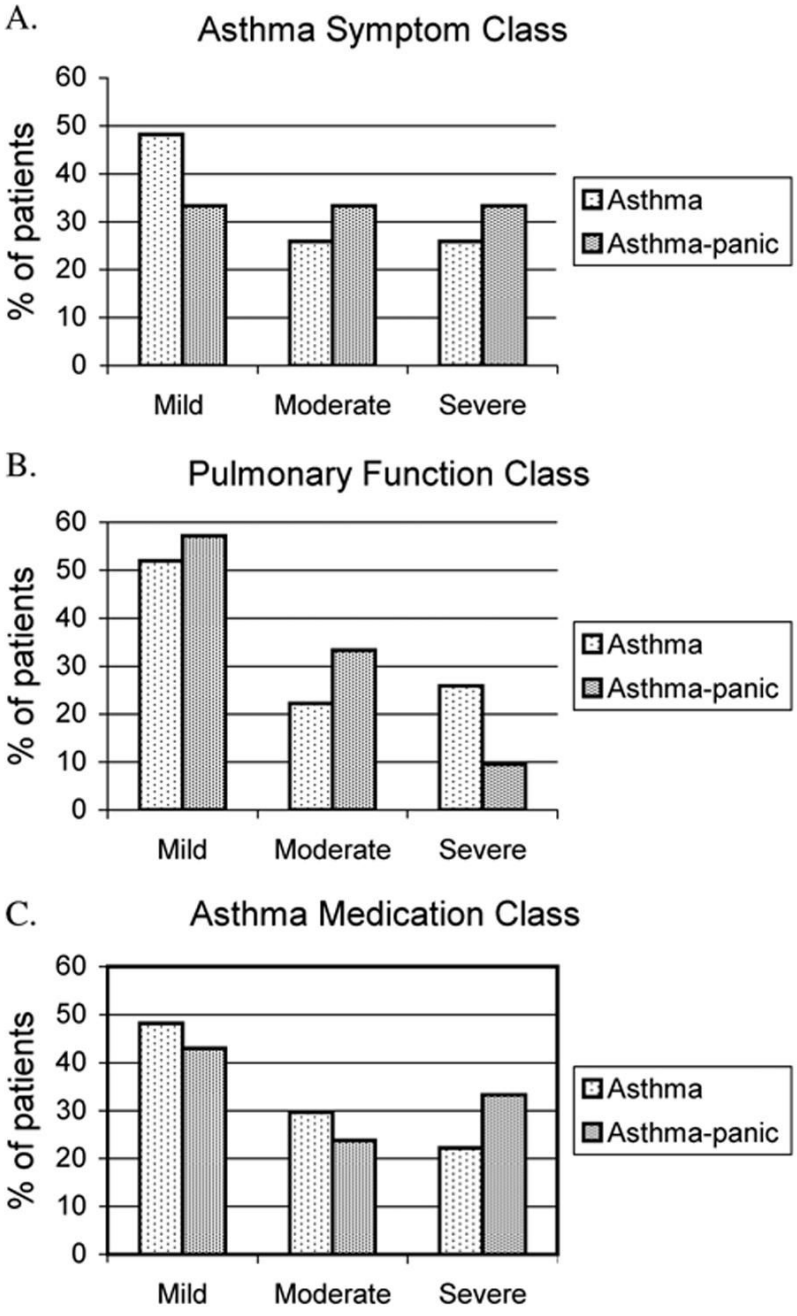

Figure 1.
Asthma severity using NHLBI guidelines for asthma-only and asthma-PD patients.

Table 1

Criteria for asthma diagnosis.

	Asthma-only (%)	Asthma-PD (%)
Bronchodilator response	66.7	66.7
MCT[a]	3.7	4.7
Clinical improvement[b]	29.6	28.6

[a] MCT: methacholine challenge test.

[b] Clinical improvement in response to anti-inflammatory medication.

Table 2

Participants' characteristics.

	Asthma-only (*n* = 27)	**Asthma-PD (*n* = 21)**	***p***
Age, yr (mean ± SD)	37.7 ± 13.4	41.1 ± 14.3	0.41
Gender, % female	59	76	0.22
Race, % caucasian	78	67	0.39
FEV_1, % predicted	74.7 ± 23.3	85.0 ± 19.4	0.11
FEV_1/FVC, % predicted	0.72 ± 0.15	0.76 ± 0.10	0.28
$FEF_{25–75}$, % predicted	60.5 ± 34.0	65.2 ± 25.5	0.60
Age at onset of asthma, yr	14.5 ± 16.1	23.4 ± 16.3	0.07
Asthma duration, yr	23.2 ± 13.5	17.7 ± 11.1	0.14
Insurance			
No insurance, %	11	5	0.46
Private, %	70	57	
Medicaid, %	11	24	
Medicare, %	8	14	
Smoker, %	4	19	0.08
Married, %	44	29	0.26

Table 3

Subscales of the Asthma Quality of Life Questionnaire.[a]

	Asthma-only	Asthma-PD	*p*
Total score (mean ± SD)	5.0 ± 1.1	4.2 ± 1.0	0.009
Activity limitations	5.0 ± 1.3	3.7 ± 1.3	0.002
Emotional disturbance	4.7 ± 1.4	3.7 ± 1.4	0.03
Symptoms	5.0 ± 1.0	4.5 ± 1.1	0.07
Environmental trigger exposure	5.3 ± 1.3	4.8 ± 1.5	0.23

[a] Lower scores indicate greater impairment.