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The effects of anxiety and depression on asthma control and their association with strategies for coping with stress and social acceptance



L'effet de l'anxiété et de la dépression sur le contrôle de l'asthme et leurs associations avec les stratégies de gestion du stress et l'acceptation sociale

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ABSTRACT

Aim. – Chronically ill patients may be preoccupied with health issues such as anxiety and depression that can heighten emotional difficulties, and previous studies have reported an association between asthma and depression and anxiety. The literature contains limited data about the relationship between negative psychological state and control in asthma patients. We aimed to evaluate psychiatric comorbidities such as anxiety and depression in addition to coping strategies in terms of stress management and social desirability in asthma patients, and sought to investigate their impact on asthma control.

Study design and method. – A total of 88 adult asthma patients were included in the study. They underwent physical examination, as well as pulmonary function testing and an asthma control test: (ACT), and their body mass index (BMI) was determined. All participants completed the following questionnaires: the Hospital Anxiety and Depression Scale (HADS), the Coping Strategies with Stress Inventory-Short Form (COPE), and the Marlowe Crowne Social Desirability Scale-Short Form (MCSD).

Results. – Anxiety was found in 55% and depression was found in 62% of asthmatic patients. Compared to men (32%), a significantly higher proportion of women (61%) had anxiety ($P=0.023$). ACT scores were significantly lower for patients with anxiety and depression than for patients without [18 (15–21) vs. 19 (17–23), $P=0.028$] and [18 (15–21) vs. 21 (17–23), $P=0.003$, respectively]. “Turning to religion and Planning” were the leading coping strategies in all asthmatics. 41% of patients had controlled asthma while 59% had uncontrolled asthma. “Seeking Social Support for Instrumental Reasons” was more common in patients with uncontrolled asthma than in those with controlled asthma ($P=0.029$). The coping strategies of “Behavioral Disengagement” ($P=0.02$, $P=0.011$, respectively) and “Self-Accusation” ($P=0.018$ and $P=0.016$, respectively) were more prevalent among patients with anxiety and depression, while non-depressive asthma patients most frequently used “Positive Reinterpretation, Acceptance, Humor and Seeking of Emotional Social Support” as ways of coping with stress compared to subjects with depression ($P=0.002$, $P=0.034$, $P=0.01$, $P=0.006$, respectively). There was no statistically significant difference between social desirability indexes for the controlled and uncontrolled asthma groups.

Conclusions. – It is known that psychiatric disorders may affect the clinical course of asthma. This real-life study suggested the importance of assessing depression and anxiety symptoms in addition to strategies for coping with stress and achieving social approval to improve asthma control in clinical practice. Knowledge of the approach adopted by individuals to cope with stressful conditions may help in determining treatment targets and monitoring therapeutic efficacy.

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1. Introduction

Asthma is a chronic inflammatory disease of the airways with marked personal and social impact. Increasing prevalence of psychiatric conditions such as depression, social phobia, panic disorders and anxiety has been reported in society at large and also in relation to chronic diseases such as asthma [1,2]. Sudden unexpected asthma attacks may result in anxiety, and conversely, ongoing anxiety may increase the frequency of asthma attacks, potentially resulting in unnecessary overuse of asthma medication. Anxiety is a psychological state involving cognitive, behavioral, physical and emotional components triggered by emotions such as boredom, worry and fear. As with all chronic diseases, factors such as constant use of medication and hospital-dependency may increase future anxiety and impair mental state in asthma patients. Depression is a common psychiatric disorder that affects an individual's usual mood [3,4]. Previous studies have reported increased levels of anxiety and depression among asthma patients [5]. Recent studies have also indicated that the symptoms of anxiety and depression contribute to asthma attacks, with higher rates of anxiety and depression being present in asthma patients than in healthy controls [6]. Achieving optimal asthma control is the aim of clinicians, and this is dependent on several factors such as self-monitoring, adherence, avoiding triggers, and especially mood state.

Chronic asthma can be a life-long source of stress, which in turn constitutes a trigger for asthma attacks. Such ongoing stress may be experienced physically and emotionally, as well as socially, and stress management is thus essential to maintain disease control. In one study, patients with long-standing asthma were shown to have less psychological distress than those with short-standing asthma, which suggests that learning is critical to cope with the illness. To date, numerous studies have evaluated strategies for coping with stress in asthma, while a recent study has reported frequent use of avoidance styles [7]. Additionally, avoidance and other emotional coping styles have been shown to influence the frequency of emergency-room visits [8]. Recently, Gonzalez-Freire et al. found a repressive coping style in 25% of 75 asthmatic patients and a higher prevalence of denial (an emotion-focused coping style) in severe asthmatics categorized according to the GINA guidelines, and a relationship was demonstrated between denial and higher frequency of emergency-room visits during the 12 month follow-up period [9]. A case-control study reported a higher prevalence of anxiety, openness to experience, neuroticism and conscientiousness as personality traits in asthmatics, with active coping, planning, and behavioral disengagement being used more frequently than among healthy subjects [10]. However, the relative impact on asthma control of negative mood states and different coping styles have not been explored in previous studies, and the effect of depression and anxiety on coping styles in the asthmatic population continues to remain unclear.

In previous studies, defensiveness was measured using the Marlowe-Crowne Social Desirability (MCSD) scale, which shows the tendency of people to present themselves in a socially desirable manner, and 25% of asthmatics were found to be defensive [11]. Defensive individuals may have worse asthma control. However, the studies did not evaluate the correlation between social approval measured on the MCSD scale and asthma control in these subjects.

The main aim of this study was to assess the prevalence of depression and anxiety in a sample of adult asthmatics and to evaluate the relative impact of mood state and coping styles on asthma control. A secondary aim was to analyze social approval and its effects on asthma control.

2. Materials and methods

2.1. Study population

Asthma patients referred to pulmonology outpatient clinics between April and June 2015 were evaluated. All patients were screened on the day of their asthma clinic visit to verify eligibility. Patients with physician-diagnosed asthma for more than one year and documented bronchodilator reversibility testing were included in the study. Patients were excluded on the grounds of pregnancy, exacerbations and hospitalization for asthma during the previous four weeks. All patients provided a detailed history, underwent a physical examination and pulmonary function tests, and completed an asthma control test (ACT). Body Mass Index (BMI) was determined for all patients. All participants completed the questionnaires described below. Patients were classified according to ACT results into two groups: controlled (completely or partially) or uncontrolled [12].

The study protocol was approved by the institutional review board and all patients provided written informed consent before taking part.

2.2. Pulmonary Function Testing

All patients underwent standard pulmonary function testing according to ATS guidelines using a spirometer (MIR Spirolab II; Italy). Rescue medication was withheld for at least 4 h.

2.3. Asthma Control Test (ACT)

This test comprises five questions designed to evaluate daytime and nighttime symptoms of asthma, frequency of beta-2-agonist use as rescue medication, and restrictions on daily activity. A score of 25 points indicates “completely controlled” asthma scores of 20–24 points indicate “somewhat controlled” asthma and scores of < 20 points are considered to show “uncontrolled” asthma [12].

2.4. Questionnaires

2.4.1. Hospital Anxiety and Depression Scale (HADS)

HADS is a four-point Likert scale consisting of 14 questions. It was initially developed to determine the risk of anxiety and depression in patients with physical disease and to measure levels of and changes in the severity of anxiety and depression. Odd numbers are used for anxiety and even numbers for depression [13]. The validity and reliability of the Turkish HAD scale have been established, and the cut-off points for the Turkish HAD scale are 10 for the anxiety sub-scale and 7 for the depression sub-scale [14]. This scale is routinely used by both hospitals and primary healthcare services. Knowing the cut-off points for both sub-scales is advantageous in use [15].

2.4.2. COPE (Coping Orientation to Problems Experienced)

The COPE scale assesses how people respond to complicated and overwhelming events in their daily lives. A brief inventory was developed based on the extended version of the Carver (1997) Coping Styles Inventory [16]. The short form consists of 14 factors, each comprising two items. Patients answer the questionnaire describing their usual way of coping with stressful situations. They select the frequency of use of each strategy on a four-point Likert-type scale (1 = not at all, 2 = a little bit, 3 = a medium amount, and 4 = a lot), while COPE assesses the following sub-items: “Active Coping” (“I take direct action to get around the problem”), “Planning” (“I make a plan of action”), “Positive Reframing/Reinterpretation” (“I look for something good in what is happening”), “Acceptance”

("I learn to live with it"), "Humor" ("I joke about the situation"), "Turning to religion" ("I seek God's help"), "Seeking of Emotional Social Support" ("I talk to someone about how I feel"), "Seeking of Instrumental Emotional Support" ("I talk to someone who could do something concrete about the problem"), "Self-Distraction" ("I go to movies or watch TV to think about it less"), "Denial" ("I act as though it hasn't even happened"), "Focus on and Venting of Emotions" ("I get upset and let my emotions out"), "Substance Use" ("I use alcohol or drugs to get over the situation"), "Behavioral Disengagement" ("I give up trying to deal with it"), and "Self-Accusation" ("I have been blaming myself for things that happened"). Each sub-item is assessed separately. Low scores indicate that the given dimension is less used, and high scores show that the given dimension is used more often. The validity and reliability of the Turkish scale have been demonstrated [17].

2.4.3. Marlowe-Crowne Social Desirability (MCSD) Scale

The tendency of individuals to respond in a way designed to get social approval rather than reflecting the facts through self-reported measurement tools has been investigated in various studies [18]. The Crowne and Marlowe Defined Social Desirability scale measures the tendency "to give culturally-convenient and well-accepted responses to the measurement tool in order to satisfy the need for social approval" [19]. It is a 13-item true-false scale that is commonly used to measure defensiveness [18]. It examines common negative traits (e.g. jealousy) and positive characteristics of exceptional levels of responsibility and general virtue. The items were deliberately chosen as being unrelated to psychopathology.

2.5. Statistical analysis

Statistical analyses were performed by a biostatistician using SPSS Statistics version 16.0 (IBM). Visual methods (histograms and probability graphs) and analytical methods (Kolmogorov-Smirnov/Shapiro-Wilk tests) were used to examine the distribution of continuous variables. Descriptive statistics were presented in terms of either means and standard deviations or medians and quartiles for normally distributed and non-normally distributed data, respectively. Pearson's χ^2 test (χ^2) and Fisher's exact test were used to compare nominal variables. The Mann-Whitney U test (Z) and the Kruskal-Wallis (KW) analysis of variance were used to evaluate the relationship between ACT scores, COPE scales, and independent variables. All *P*-values were 2-sided and statistical significance was set at *P* < 0.05.

3. Results

A total of 88 asthma patients made up of 69 women (78.4%) and 19 men (21.6%) were included in this study. Mean patient age was 41 ± 11 years. The pulmonary function test results are shown in Table 1. 63 (72%) asthma patients were at risk of anxiety and/or depression. A total of 48 (55%) patients met the diagnostic criteria for risk of anxiety, 55 (62%) for risk of depression, and 40 (46%) for both (Table 1). Based on their ACT scores, 41% of patients (*n* = 36) were controlled, either completely (*n* = 6) or partially (*n* = 30), and 59% were uncontrolled (*n* = 52). Table 1 shows the patients' demographic characteristics.

The most common comorbidities were allergic rhinitis (61.4%) and gastroesophageal reflux (GER) (40.9%). GER symptoms were significantly more common in the group with anxiety compared to the non-anxiety group (*P* = 0.001). GER and rhinitis symptoms were also more frequent in the depressive group compared to the non-depressive group (*P* = 0.018 and *P* = 0.004, respectively). Compared to men (32%), a significantly higher proportion of women (61%) were at risk for anxiety (*P* = 0.023). Depression was also more

Table 1
Demographic characteristics of patients.

Age (yrs)	41 ± 11
Gender	
Women	69 (78.4%)
Men	19 (21.6%)
Duration of disease (yrs)	15.4 ± 4.6
FEV ₁ predicted (%)	85.8 ± 17.2
FEV ₁ (L)	2.6 ± 0.7
MMEF predicted (%)	67.0 ± 27.6
MMEF (L)	3.9 ± 1.2
FEV ₁ /FVC ratio (%)	79.5 ± 10.8
Asthma control test score	
Controlled (36)	22 (20–25)
Uncontrolled (52)	17 (4–19)
Anxiety risk	48 (54.5%)
Depression risk	55 (62.5%)
Coexistence of anxiety and depression	40 (46%)
BMI (kg/m ²)	26.7 ± 4.3
Comorbidities	
Allergic rhinitis	54 (61.4%)
GER	36 (40.9%)

FEV₁: forced expiratory volume in one second; FVC: forced vital capacity; MMEF: maximum mid-expiratory flow; BMI: body mass index. Data are expressed as mean ± standard deviation, median (25th–75th percentile) or percentage.

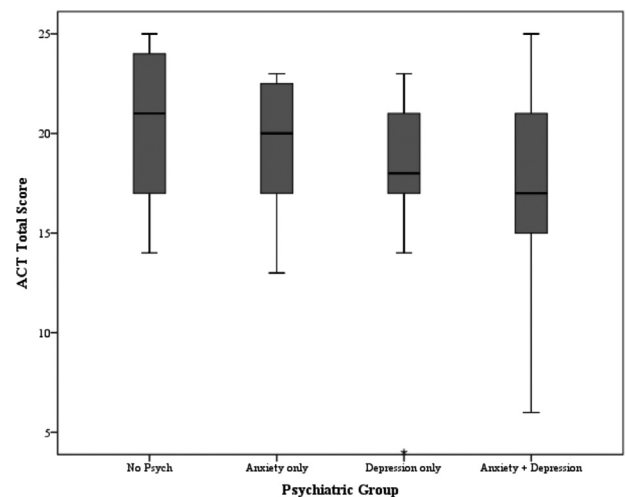


Fig. 1. ACT scores (mean ± SD) based on psychological state.

common among women, but the difference compared to men was not statistically significant (*P* = 0.07).

In the patients with anxiety, ACT scores were significantly lower when compared with the non-anxiety group [18 (15–21); 19 (17–23), *P* = 0.028]. In patients with depression, ACT scores were also significantly lower compared with the non-depressive group [18 (15–21) vs. 21 (17–23), (*P* = 0.003)] (Fig. 1). Both anxiety and depression were more common in the group with uncontrolled asthma (51.9%) compared to the controlled asthma group (36.1%), but the difference was not statistically significant (*P* = 0.24).

Among the 88 asthma patients, the leading coping strategies were "Turning to Religion and Planning". In order to assess strategies for coping with stress, the groups with depression, anxiety, and controlled and uncontrolled asthma were analyzed separately. The responses of patients with uncontrolled asthma showed that they more frequently used "Seeking Social Support for Instrumental Reasons" compared to patients with controlled asthma [5 (4–7) vs. 4 (3–6); *P* = 0.029] (Table 2). "Behavioral Disengagement" [4 (2–5) vs. 3 (2–4); *P* = 0.02] and "Self-Accusation" [6 (4–8) vs. 5 (4–6); *P* = 0.018] were more commonly used by the group of asthma patients with anxiety compared with the non-anxiety group. "Behavioral Disengagement" [4 (2–5) vs. 3 (2–4); *P* = 0.011]

Table 2
Comparison of strategies for coping with stress in the controlled and uncontrolled asthma groups.

Coping strategy	Uncontrolled asthma	Controlled asthma	P
	Median (IQR)	Median (IQR)	
Active coping	6 (5–7)	6 (5–7)	0.829
Planning	7 (6–8)	6 (5–8)	0.162
Positive reframing	6 (5–7)	6 (4–8)	0.965
Acceptance	6 (5–8)	6 (5–8)	0.522
Humor	5 (3–6)	4 (3–6)	0.612
Religion	7 (5–8)	7 (5–8)	0.972
Emotional support	5 (4–6)	5 (3–6)	0.146
Instrumental support	5 (4–7)	4 (3–6)	0.029
Self distraction	6 (4–8)	5 (4–8)	0.714
Denial	4 (3–6)	4 (3–5)	0.263
Venting of emotions	5 (4–6)	5 (4–7)	0.177
Substance use	2 (2–2)	2 (2–2)	0.944
Behavioral disengagement	3 (2–5)	4 (2–5)	0.275
Self-accusation	5 (4–7)	5 (4–6)	0.343

IQR: interquartile range (25th–75th percentile).

Table 3
Comparison of strategies for coping with stress in the anxiety, non-anxiety, depressive and non-depressive groups.

Coping strategy	No Psych	Anxiety only	Depression only	Anxiety & Depression	P
	Median (IQR)	Median (IQR)	Median (IQR)	Median (IQR)	
Active coping	6 (5–7)	6 (6–8)	5 (4–6)	6 (5–7)	0.690
Planning	6 (6–7)	8 (5–8)	6 (4–8)	7 (6–8)	0.558
Positive reframing	6 (6–8)	7 (6–8)	5 (5–6)	5 (4–7)	0.024
Acceptance	7 (6–8)	8 (6–8)	7 (5–8)	6 (4–8)	0.080
Humor	6 (4–7)	6 (4–8)	3 (2–6)	3 (2–5)	0.005
Religion	6 (4–7)	8 (6–8)	7 (4–8)	8 (5–8)	0.201
Emotional support	6 (5–7)	5 (4–7)	4 (3–6)	4 (3–6)	0.046
Instrumental support	5 (4–6)	5 (3–6)	5 (4–7)	5 (4–7)	0.528
Self distraction	6 (4–8)	8 (5–8)	5 (4–8)	6 (4–7)	0.408
Denial	4 (3–5)	5 (4–5)	4 (2–5)	4 (3–6)	0.421
Venting of emotions	5 (4–6)	6 (4–8)	5 (4–5)	5 (4–6)	0.686
Substance use	2 (2–3)	2 (2–4)	2 (2–2)	2 (2–2)	0.831
Behavioral disengagement	3 (2–4)	2 (2–4)	3 (2–4)	5 (3–5)	0.018
Self-accusation	4 (3–5)	5 (4–6)	5 (4–6)	6 (4–8)	0.051

IQR: interquartile range (25–75 percentile).

and “Self-Accusation” [5 (4–7) vs. 4 (3–5); $P=0.016$] were also more commonly used by the group of asthma patients with depression, while non-depressive asthma patients more frequently used “Positive Reinterpretation” [6 (6–8) vs. 5 (4–7); $P=0.002$], “Acceptance” [7 (6–8) vs. 6 (4–8); $P=0.034$], “Humor” [6 (4–7) vs. 3 (2–5); $P=0.01$] and “Seeking of Emotional Social Support” [5 (5–7) vs. 4 (3–5); $P=0.006$] as a way of coping with stress (Table 3).

The scores on the social desirability scale did not differ significantly between the controlled asthma group [9 (7–10)] and the uncontrolled asthma group [8 (7–9); $P=0.094$].

4. Discussion

Asthma is a chronic disease that is potentially a long-life source of stress, so it is particularly important for physicians to understand the negative mood states and coping strategy patterns of asthmatic patients. To our knowledge, this is the first study to evaluate the psychological state, coping strategies and social approval approaches of asthmatics taken together, as well as their relative impact on asthma control assessed by the ACT test. The present study indicates that 72% of all asthma patients are at risk of anxiety and/or depression. In our study, ACT score was lower in patients with anxiety or depression vs. a group of asthmatics without them. A significantly higher proportion of women were at risk for anxiety compared with male asthmatics. Using individual coping strategies to minimize or eliminate the adverse effects of stressful events or factors is a universal behavior. In the present study, “Turning to Religion and Planning” were the most commonly used coping

strategies in all asthmatics. However, patients with uncontrolled asthma used Seeking Social Support for Instrumental Reasons more frequently to cope with stress when compared with controlled asthma groups.

As demonstrated by the present study, psychiatric abnormalities, particularly anxiety and depression, have been reported as common among asthmatics and related to uncontrolled asthma [2,20]. After previous studies reporting increased rates of anxiety and depression among asthma patients [21,22], a relationship between uncontrolled asthma and psychiatric disorders was reported [23,24]. Negative mood states such as depression are known to be able to impair treatment compliance, and self-monitoring and self-administration were found to result in the development of uncontrolled asthma [25,26]. Moreover, decreased energy and fatigue result in loss of ability to achieve optimal asthma control. Like all other chronic diseases, uncontrolled asthma reduces patients' quality of life. Studies showing that anxiety was highly frequent and severe in asthma patients also reported decreased quality of life in this patient group, and the severity of anxiety was even greater among those already presenting limitations to their social lives [27]. Many symptoms of anxiety overlap with numerous symptoms related to asthma. In a study reporting a very high incidence of anxiety in asthma patients, anxiety decreased patient compliance to treatment while triggering asthma attacks, and the authors recommended the implementation of specific behavioral therapy programs for these asthmatic patients [28]. In a Turkish population, Bulcun et al. found that asthma patients display relatively greater inactivity, anergia,

guilt, pessimism, nonspecific physical complaints, irrational fears, and introversion [29]. Another study by Lavoie reported that 31% of patients met the diagnostic criteria for one or more psychiatric disorders, and that depression had an independent effect on asthma control as evaluated by ACQ scores [23]. In our study, both groups of asthmatics with depression and anxiety showed lower ACT scores, and in uncontrolled asthma group, anxiety and depression were more common. In previous studies, the ACQ questionnaire was used to evaluate asthma control, but it contains a question on predicted FEV₁, a parameter that cannot always be measured in daily practice. In the present study, the ACT test was used, which is unrelated to FEV₁ and was intended to be used routinely in clinical studies. In a study that recorded a high prevalence of psychiatric disorders among asthma patients, while there were no differences in pulmonary function tests between patients with and without mental disorders, while worse ACQ and AQLQ scores were noted, as well as greater bronchodilator use, regardless of age, gender or asthma severity [20]. Similarly, we did not find any relationship between pulmonary function test results and psychiatric comorbidities.

Numerous studies have investigated the effect of gender on asthma control. Uncontrolled asthma was found significantly more often in female patients [30]. In addition, psychiatric comorbidities in asthma patients result in a higher incidence of emotional disturbances in women than in men [31,32]. Similarly, in our study we noted that women were at significantly greater risk of anxiety than men. Moreover, BMI was found to be significantly higher in the depressive group compared to the non-depressive group in this study. Further, depressive disorders are associated with high BMI in Japanese asthmatics [33]. According to Boudreau et al. depression and upper body mass index are associated with poorly controlled asthma as an independent factor [34].

In the present study, symptoms of GER and allergic rhinitis were significantly more common among patients at risk for anxiety and depression. Similarly, previous studies also reported a relationship between increased risk of GER and anxiety and depression [35]. Moreover, allergic subjects were found to be at increased risk for depression and anxiety. Asthma and allergic rhinitis frequently coexist, and these conditions are influenced by psychological factors [36].

Asthma patients may find it difficult to cope with symptoms during their daily lives. Coping can be defined as the complete set of cognitive, emotional and behavioral responses by an individual to tolerate stressful events or factors. Additionally, it is considered that personality types within different cultures play a role in the varied choice of coping styles. In previous studies, it has been reported that the approaches of individuals to coping with such events may vary depending on numerous factors, including age, gender, culture, and type of disease, and that these attitudes are substantially intrinsic [17,37]. To the best of our knowledge, no previous studies have focused explicitly on asthma control and coping strategies in the Turkish population. In the present study, the most common approaches were found to be Turning to Religion and Planning in the entire asthmatic group. To assess patients' different approaches to coping with stress, the groups with controlled and uncontrolled asthma were analyzed separately in this study. A previous study of asthma patients showed "Denial" to be the most common response among asthmatics referred to emergency units [9]. However, our study showed that patients with uncontrolled asthma more frequently benefited from "Seeking of Instrumental Social Support". Gonzalez-Freire et al. found the most common coping strategy to be "Seeking of Emotional Social Support" in 75 adult asthmatics, and patients perceiving their asthma as severe reported wider use of emotion-focused coping (i.e. "Seeking of Emotional Social Support, Positive Reinterpretation, Acceptance, Denial, Turning to Religion") than those who judged their condition as mild or moderate [9]. However, Panek et al. found no difference between

severe and non-severe asthma patients in terms of mean values of coping style [38].

In our study, "Self-Accusation" and "Behavioral Disengagement" were more commonly used by patients at risk for anxiety. Tabala et al. found anxiety to be more prevalent in asthmatics, as well as more frequent use of "Active Coping, Planning, and Behavioral Disengagement" in asthmatics compared with healthy subjects, with "Behavioral Disengagement" alone being the most commonly used coping strategy, as in our study [10]. In the present study, "Behavioral Disengagement" and "Self-Accusation" were also the most commonly used approaches in the group of asthma patients with depression, while non-depressive asthma patients more frequently used "Positive Reinterpretation, Acceptance, Humor and Seeking Social Support for Emotional Reasons" to cope with their stress.

Defensiveness is a coping approach in which people tend to present themselves in a socially desirable way by avoiding threatening stimuli. These people usually prefer self-deception and impression management [39]. This approach may cause exacerbation of stress-related illness. The findings of a study by JM Feldman showed that defensive participants with asthma, as diagnosed on the MCSD scale displayed a decline in lung function test parameters compared with non-defensive asthmatics; however, these were unrelated to asthma control. We compared MCSD scores between the controlled and uncontrolled asthma groups and we found no significant differences between them in our study.

The absence of a control group and reliance on a questionnaire without any psychiatric diagnosis to evaluate participants constituted limitations on our study. A further limitation was our inability to evaluate the socio-economic and socio-cultural differences between patients. However, we assessed asthmatic patients comprehensively using three different questionnaires and the effects of their approaches on control of their asthma. Self-report measurement tools are widely used in the literature since they provide simultaneous access to a large number of individuals and are easy to use. Additionally, individuals are self-biased in responding to items concerning their attitudes, beliefs, opinions and personality traits. However, apart from their advantages, self-report measurement tools are also associated with a limitation, namely the tendency to seek social desirability. The questionnaire was designed to measure the tendency of subjects to respond to questions in a socially desirable way. The findings of an earlier study are consistent with this point and revealed that self-deception and impression management played a role in the social desirability scale [40]. The findings of the present study highlight the marked prevalence of depression and anxiety among adult asthmatics as well as the potential impact of negative mood state on asthma control. Knowledge of the approaches adopted by individuals to cope with stressful conditions may help in determining treatment targets and in monitoring therapeutic efficacy. The concept of coping strategies used by asthmatics may be critical to developing appropriate procedures for the control of asthmatic symptoms by strengthening the adaptive approach. Treatments that address psychiatric disorders and improve asthma control are needed in this field. This real-life study highlights the importance of assessing depression and anxiety symptoms in addition to strategies for coping with stress in order to improve control of asthma in clinical practice.

Disclosure of interest

The authors declare that they have no competing interest.

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