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The asthma-anxiety connection: friends or foes?

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ABSTRACT

Objective: To analyze the relationship between anxiety and asthma.

Methods: We carried an English scientific literature search using electronic search engines (PubMed). We included articles published in peer-review journals from 2020 to December 2024. In order to perform the search for the most suitable and representative articles, keywords were selected (—asthma‖, and —anxiety‖). The evidence level was assessed according to the criteria of the Oxford Center For Evidence-Based Medicine.

Results: Across multiple studies, the prevalence of anxiety among patients with asthma ranged from 13.7% to 54.3%, consistently higher than in the general population. Anxiety was associated with poorer asthma control (lower ACQ/ACT scores), reduced quality of life (AQLQ) and, in some cases, impaired lung function and higher inflammatory markers (hs-CRP, NLR). Depression emerged as the strongest risk factor for anxiety (OR 26.00), while well-controlled asthma (ACT ≥ 20) and allergic asthma were associated with approximately 70% lower risk. Being female and asthma onset occurring between ages 40 and 59 were also linked to higher anxiety prevalence. Screening tools such as the mini-AQLQ, HADS, EQ-5D and PHQ-4 demonstrated potential utility in identifying anxiety in asthmatic populations. In specific subgroups, asthma-related anxiety was associated with increased symptom reporting and exacerbations, even without a deterioration in objective measurements for airway obstruction.

Conclusions: Anxiety is a common comorbidity among patients with asthma and it is associated with poorer disease control and a reduced quality of life.

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KEYWORDS
Asthma; anxiety; prevalence; disease control; quality of life

Introduction

Asthma is a disease characterized by chronic inflammation of the airways, associating variable obstruction with airflow and bronchial hyperresponsiveness (1). According to World Health Organization data, this disease affects more than 260 million people around the world (2). In addition, on many occasions it may coexist with other comorbidities like rhinosinusitis, nasal polyposis, gastroesophageal reflux, obstructive sleep apnea and mood disorders, among others (1).

It is widely documented in the literature that anxiety and depression are associated with asthma, outlining that anxiety disorders are at least twice as frequent in asthma sufferers as in the general population. On a similar note, anxiety is related with a decline in asthma control, an overestimation of symptomatology, a reduction in quality of life, worse adherence to prescribed medication, a higher rate of exacerbations, a significant impact on quality of life and higher resource expenditure (3,4). On occasions, anxiety leads to the hypervigilance of asthma-related symptoms, leading to the adoption of avoidance behavior for situations that could trigger symptoms associated with asthma and a false and exaggerated perception of respiratory symptoms (5,6).

Despite the negative aspects linked with this comorbidity, it is rare for symptoms of anxiety to be actively checked in pneumology appointments or for targeted treatment to be prescribed in daily clinical practice. In any case, there is little evidence regarding

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Table 1. Main characteristics of the articles.

Author, year	Study design	Population number included	Results (prevalence)	Evidence level
Li, 2000	Cross-sectional	256	13.7%	2b
Hussain, 2000	Cross-sectional	502641	N/A	2b
Robinson*, 2021	Cross-sectional	300	45.4%	2b
Bedolla-Barajas, 2021	Cross-sectional	164	54.3%	2b
Stubbs*, 2022	Cross-sectional	140	20.7%	2b
Simoes Cunha, 2023	Cross-sectional	614	36.0%	2b
Gibson-Scipio*, 2023	Cross-sectional	141	N/A	2b

Evidence level was rated according to the Oxford Center For Evidence-Based Medicine.
Abbreviations: N/A, no applicable.
*Severe asthma.

its handling, indicating that it is difficult to establish the prevalence of anxiety in asthma patients.

With this in mind, we have requested this medical check in order to analyze evidence for prevalence and the impact of symptoms of anxiety on asthma patients.

Methods

Electronic search engines (PubMed and EMBASE) were used to explore English-language peer-review journals from January 2020 to December 2024. In order to perform the search for the most suitable and representative articles, keywords were selected ("asthma" and "anxiety"). The main characteristics of the papers are in Table 1. The evidence level was assessed according to the criteria of the Oxford Center For Evidence-Based Medicine (7).

Articles were selected based on their relevance to the association between asthma and anxiety. Studies published in English between January 2020 and December 2024 were considered. Non-English publications, conference abstracts without full text availability, and non-empirical publications such as editorials, commentaries, or narrative opinions were excluded. Studies focusing exclusively on pediatric populations or on psychiatric disorders not directly related to anxiety were also excluded.

The final selection included studies that evaluated the prevalence of anxiety in asthma or explored its clinical impact on asthma control, quality of life, or related outcomes.

Results

Multiple cross-sectional studies have shown an association between asthma and anxiety, with an anxiety prevalence among asthma patients ranging from 13% to 55% (see Table 1). It was observed that the anxiety prevalence in asthmatics was greater than in the general population.

Li et al. investigated the anxiety prevalence in asthmatics in China with the Hospital Anxiety and Depression Scale (HADS), they observed that 13.7% of the patients had symptoms of anxiety, with a bidirectional relationship between both diseases. This was due to asthmatics with anxiety having worse control of asthma and a lower quality of life. Nonetheless, anxiety was more frequent in asthmatics with lower lung function and worse control of asthma (8).

In Mexico, Bedolla-Barajas et al. performed a study where they attempted to determine the frequency of anxiety in patients affected with asthma and identify factors associated, they reported an anxiety prevalence of 54.3% (95% CI: 46.6%-61.7%). Similar to the findings of Li et al.'s study, patients who did not show signs of anxiety had better asthma control ($p < 0.05$). Additionally, they noted that the frequency of anxiety was significantly higher in the patients that were also suffering from depression ($p < 0.0001$). Therefore, they established that among the factors associated with anxiety in asthma, depression was the most significant (OR 26.00, $p < 0.0001$) while good control of the disease or the allergic condition was associated with a 70% lower risk of having anxiety (9).

In 2023, based on the prospective observational studies that comprise the INSPIRERS project, Simoes-Cunha et al. evaluated the frequency of anxiety and depression on asthma patients with the HADS and the EQ-5D (European Quality of Life Five Dimension Questionnaire) scales. The HADS found that 36% of the participants had symptoms of anxiety while the EQ-5D scale found that 36.3% showed symptoms of anxiety or depression. The agreement between two questionnaires was moderated to assess anxiety ($k = 0.54$ (95% CI: 0.47–0.61)). In addition, female sex and adult age were identified as independent anxiety predictors for individuals with persistent asthma (10).

Regarding the impact of anxiety on patients with asthma, Stubbs et al. studied the characteristics associated with anxiety on severe asthma. Anxious symptomatology was assessed using the HADS scale. It was determined that the asthma sufferers with anxiety showed significantly higher levels of high sensitivity C-reactive protein (hs-CRP) than the patients who neither had anxiety nor depression (hs-CRP >3mg/L 70% vs 30.4% respectively; $p = 0.02$) (11).

On similar lines, Robinson et al. studied the correlation between specific questionnaires on asthma and questionnaires on anxiety and depression, they observed that most patients with a lower quality of

life (mini-AQLQ < 3) had at least moderate anxiety, identified with a score of higher than 10 on the GAD-7 questionnaire. These findings suggest that poorer asthma-related quality of life scores may be associated with higher levels of anxiety; however, the mini-AQLQ should not be considered a validated anxiety screening instrument, and dedicated tools are required for proper assessment (12).

Hussain et al. studied the association between asthma and anxiety-depressive disorder, measured by the PHQ-4 (Patient Health Questionnaire-4) scale. After a multiple-regression analysis and once the data for age, sex, ethnicity, BMI, smoking history and alcohol consumption had been adjusted, they observed that patients with asthma, on average, scored significantly higher in the PHQ-4 than those without asthma. Additionally, when the onset of asthma fell in the 40–59 age range, it was when the greatest level of anxiety could be seen, with a score of 0.54 on the PHQ-4 scale (95% CI: 0.48–0.59), higher than what was shown in other age ranges. Using the neutrophil-to-lymphocyte ratio (NLR) as a high inflammatory marker, it was observed that as the NLR increased, the PHQ-4 score was higher, which was indicative of anxiety being present or extremely prevalent/severe (13).

Gibson-Spicio et al. found that for urban African American young adults with poorly-controlled persistent asthma, asthma-related anxiety increased the frequency of reports of symptoms related with the disease (adjusted $\beta = 0.29$; 95% CI: 0.09–0.48; $p < 0.01$), asthma attacks were more frequent (adjusted $\beta = 0.30$; 95% CI: 0.14–0.46; $p < 0.01$) and they had less control of the disease when the ACT was employed (adjusted $\beta = -0.43$; 95% CI: 0.58–0.27; $p < 0.01$). However, this did not result in worse results for the objective measurements in airway obstruction. In multivariable models, anxiety related to asthma continued significantly associated with lower ACT score (adjusted $\beta = -0.40$; 95% CI: 0.58–0.23; $p < 0.01$) and a higher frequency of asthma attacks (adjusted $\beta = 0.29$; 95% CI: 0.10–0.43; $p < 0.01$) (14).

Discussion

In view of the above-mentioned results, an increase in the prevalence and/or severity of anxiety in asthmatics could be observed, with significant differences between the populations studied, which were substantially higher for asthmatics than for those of the general population. In spite of these studies offering little evidence, there did not seem to be an increase in anxiety in patients with the most severe cases of asthma.

As noted in the bodies of work cited above, different scales are valid to determine whether patients are suffering from anxiety, such as the HADS, PHQ-4, EQ-5D and GAD-7. In addition, although the mini-AQLQ may indirectly reflect emotional impairment, it should not be regarded as a validated screening tool for anxiety, and specific psychological assessment instruments remain necessary. In contrast, this implies that anxiety was not measured homogeneously in the studies. Only Simoes-Cunha et al. compared two types of scales to detect anxiety, namely the HADS and EQ-5D, with there being a moderate concordance between each of them (10). No other studies were found that compared the different scales used to determine anxiety in asthma patients.

Some factors have been identified that may be related to greater asthma prevalence and/or severity, such as depression, non-controlled asthma, female sex and the age at the onset of asthma (9,10,13). Regarding the latter, the start of the disease between the ages of 40 and 59 inclusive may well be associated with the onset of more severe asthma, also associated with a faster decline in lung function (13).

It is also important to distinguish between state anxiety, defined as a transient and situational emotional response, and trait anxiety, which represents a stable predisposition to experience anxiety across different contexts. Most of the studies included in this review did not clearly differentiate between these two constructs, as commonly used screening tools (e.g., HADS, PHQ-4, GAD-7) do not systematically distinguish them. This distinction may have relevant clinical implications, as state anxiety could be more closely linked to acute symptom perception or exacerbations, whereas trait anxiety may reflect a broader psychological vulnerability requiring long-term psychological intervention. Future research should aim to clarify whether different anxiety phenotypes influence asthma control and outcomes differently.

It has been suggested that some physiopathological mechanisms may cause emotional stress to influence asthma, like the increase in the production of cortisol and catecholamine, which in turn affect the production of cytokines responsible for converting T CD4+ lymphocytes. Besides this, depression is also related to an increase in cholinergic tone. Other aspects such as unhealthy lifestyle and lack of self-care or the difficulty for patients to explain their symptoms to their doctors may act as contributory factors (15).

Similarly, in some of the above-mentioned studies, it was shown that asthma patients with anxiety had more symptoms as well as a higher number of asthma attacks, which led to less control of the disease and

a lower quality of life. As Janssens T et al. had already stated, asthma patients have difficulty correctly perceiving the respiratory symptoms and those who suffer from anxiety have the added problem of not being able to tell asthma symptoms apart from other types of bodily sensations. As a consequence, they end up unnecessarily adopting avoidance behavior, taking excessing restrictions in their daily lives which reduce their quality of life (16). Other authors have suggested that anxiety may be a side effect of corticoids, which is why extra efforts are taken to avoid them whenever possible (17).

Nevertheless, the association between anxiety and poor lung function data is controversial. While Li et al. found that there was a greater frequency of anxiety in those with poor lung function, Spicio-Gibson et al. did not find any relationship between symptoms of anxiety and more severe lung obstruction (8,14).

After assessing the results, certain limitations were found. Firstly, there was a low degree of evidence in the studies included. A substantial degree of heterogeneity was observed across the included studies. As detailed in Table 1, sample sizes ranged from relatively small clinical cohorts (approximately 140 participants) to very large population-based datasets including more than 500,000 individuals. Moreover, the populations differed considerably, encompassing patients with severe asthma managed in specialist clinics, individuals with persistent asthma, and community-based or general population samples. These methodological differences may introduce several sources of bias, including selection bias related to recruitment settings and measurement bias derived from the use of different anxiety assessment instruments. These differences in recruitment settings and disease severity may partly explain the variability in reported anxiety prevalence (13–55%). In addition, anxiety was assessed using different instruments (HADS, PHQ-4, EQ-5D, GAD-7), each with distinct conceptual frameworks, scoring systems, and cutoff thresholds. The lack of standardization in assessment tools further limits direct comparability between studies and may contribute to discrepancies in prevalence estimates and reported associations. Given this methodological variability, a quantitative synthesis was not considered appropriate within the scope of this narrative review. All of the above resulted in the accuracy of the estimations being low. Given that most of the included studies had a cross-sectional design, the temporal relationship between asthma and anxiety cannot be clearly established. Consequently, it remains uncertain whether anxiety contributes to poorer asthma outcomes, whether poorly controlled asthma increases the likelihood of anxiety symptoms, or whether both conditions interact in a bidirectional manner. Longitudinal studies are therefore needed to better clarify the direction and mechanisms underlying this association.

Conclusions

Anxiety is a common comorbidity in asthma patients which seems to be related to poorer control of the disease and a lower quality of life, which is why it is recommended for this comorbidity to be routinely checked, at the very least, in patients with severe and difficult-to-control asthma.

AI statement

The ChatGPT tool (version GPT-5) was used to enhance the English translation of the document.

Author contributions

CRediT: **Angelica Tiotiu**: Writing – review & editing.

Disclosure statement

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