Pak. J. Chest Med. 2021;27(04)

Original Article

journal homepage: https:/www.pjcm.net/

Pakistan Journal of Chest Medicine

Official journal of Pakistan Chest Society

The Impact of Anxiety and Depression on Asthma Control: Exploring the Connection Between Mental Health and Respiratory Health

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Article History:

Received:	Sep 20, 2021
Revised:	Nov 10, 2021
Accepted:	Nov 22, 2021
Available Online:	Dec 02, 2021

Author Contributions:
NR conceived idea, NR MAKJ drafted the study, NR MMK collected data, HS RN did statistical analysis and interpretation data, FS NR MMK did critical reviewed manuscript. All approved final version to be published.

Declaration of conflicting interests:
All authors declare that they have no conflict of interest.

How to cite this article:
Rahman N, Ahmad T, Khan R, Khan K, Ahmad Z, Swati MAA, Khalid Khan. Pulmonary Embolism amongst Trauma and Orthopedic Patients: A retrospective study to determine their incidence and Outcome. Pak J Chest Med. 2021;27 (04):304-309.

A B S T R A C T

Background: It has been examined that asthma has been associated to a rise in mental disorders and psychiatric symptoms. Controlling asthma may be more challenging as a result of this relationship.

Objective: To investigate as Anxiety and depression are independent risks factors for difficult to control Asthma.

Methodology: This cross-sectional study was done at the Department of Pulmonology, Mardan Medical Complex, Mardan from January 2020 to November 2020. People over 18 years old who have been diagnosed with asthma and have undergone regular outpatient treatment for at least 6 months were eligible for inclusion. Spirometry data was collected both before and after the inhalation of a short-acting β2 agonist, followed by another spirometry test. Furthermore, patients completed the Hospital Anxiety and Depression Scale (HADS), the Asthma Quality of Life Questionnaire (ACQL), and the Asthma Control Test (ACT). Data was analyzed through statistical freeware R, version (2.10.1).

Results: A total of 80 individuals participated in the study. Based on their ACT scores (< 20), approximately 50(62.5%) of the individuals had uncontrolled asthma. There was no difference in the quality-of-life scores between individuals who had controlled and uncontrolled asthma**.** We detected a strong correlation between uncontrolled asthma and HADS scores that were both diagnostic for anxiety along with the ones that were diagnostic for depression plus anxiety.

Conclusion: We concluded that compared to individuals with controlled asthma, those with uncontrolled asthma had a greater prevalence of anxiety and depression. Feelings of depression and anxiety are two important independent risk factors for poor quality of life and uncontrolled asthma.

Keywords: Asthma; Anxiety; Depression; Risk Factors

Introduction

One of the most common chronic diseases in the world is asthma. The current revisions to the Global Initiative for Asthma (GINA) recommendations give the most thorough explanation for managing asthma. This idea includes step-up or step-down management of the pharmaceutical therapy, asthma education, and the intensity of the asthma attack. For the majority of individuals, asthma may be successfully managed with access to adequate therapy.[1,2] Uncontrolled asthma can be extremely dangerous and significantly restrict routine activities[1] Even though there have been substantial advances in treatment of asthma over the past ten years, an enormous number of individuals still have poorly controlled asthma.[3] One of the measures designed for assessing the state of asthma control is the Asthma Control Test (ACT). The purpose of the ACT is to evaluate the multidimensional characteristics of asthma.[4]There are several factors that lead to insufficient control. Psychiatric diseases have been researched as a potential modulator of uncontrolled asthma.[5]

A number of studies have clearly shown that individuals with asthma have an elevated risk of psychiatric disorders, primarily anxiety and depression in addition to posttraumatic stress disorder.[6-8] Surprisingly, a survey conducted in seventeen nations in the "Americas, Europe, Middle East, Asia, and South Pacific", involving patients with significantly different cultural backgrounds, languages, and socioeconomic development levels, also showed the link between asthma and psychiatric disorders.[9] Children and adolescents with asthma had a two-fold increased chance of at least developing a depressive or anxiety condition, according to another research.[10] Certain authors assumed that the stress linked to long-term illness heightens the probability of experiencing anxiety and depressive symptoms. Particularly, research has shown that individuals with asthma are more likely to experience anxiety and depression compared to individuals with other long-term illnesses, such as chronic hepatitis, which has an impact on how well patients manage their condition on a day-to-day basis.[11] In addition, it has been noted that an elevated incidence of undetected psychiatric morbidity, specifically depression, exists among individuals with difficult asthma.[12] This can lead to asthmatic patients being more susceptible to near-fatal or fatal episodes of asthma due to psychological factors like anxiety, depressive disorders, and/or personality disorders.[13]

Asthma and psychiatric conditions, including anxiety and depression, have been associated.[9] Both patients with anxiety and those with asthma display defensive behavior. The former may be less able to recognize their symptoms due to their repressive coping mechanism, which makes it difficult for them to follow a personal asthma action plan, while the latter may be more aware of their symptoms.[14] Therefore, the findings of a "self-administered multidimensional questionnaire" like the ACT may be affected by the existence of anxiety or depression. The current study was conducted to find out that feelings of depression and anxiety are two important independent risk factors for uncontrolled asthma.

Objective

To investigate as Anxiety and depression are independent risks factors for difficult to control Asthma.

Methodology

This cross-sectional study was done at the department of Pulmonology Bacha Khan medical college, Mardan medical complex, Mardan from January 2020 to November 2020. Individuals diagnosed with severe or moderate asthma, aged 18 or above eighteen years old and having had follow-up outpatient treatment for over 6 months were included. A total of 80 individuals participated in the study. We collected clinical (maintenance medicine used for more than one month), demographic (age and gender), and Collecting data on spirometry (FEV1, FVC, and FEV1/FVC ratio) both before and after administering a short-acting β2 agonist that is inhaled and then spirometry was done.

In addition, the patients completed out the hospital anxiety and depression scale (HADS), asthma quality of life questionnaire (ACQL), and the ACT, respectively. The degree of asthma control was determined utilizing the asthma control test. This self-managed questionnaire has been effective in assessing asthma control and is safe to use. The purpose of this questionnaire was to evaluate the control of asthma, and it showed good discriminative and evaluative characteristics.[4] it has five questions that relate to the four weeks that preceded the test. The questions include several aspects of control, such as breathlessness episodes, nighttime awakenings, restrictions in daily activities, self-rating asthma management and relief medication requirement. The total score may range from 5 to 25 as each question is given a score of six, with 0 denoting good control and 5 denoting poor control. Controlled asthma is characterized as an ACT score of ≥20.

In compliance with the 2006 GINA recommendations, the severity of asthma has been divided into 5 levels.[1] The first level entail the use of only painkillers; the second level entail the use of inhaled steroid drugs at low doses (200 to 400 microgram per day of budesonide); the third level includes the exploitation of inhaled glucocorticosteroids at medium concentrations (400 to 800 microgram per day of budesonide); the fourth level includes the exploitation of inhaled glucocorticosteroids in combination with a long-acting inhaled β2 agonist or montelukast/ theophylline; and the fifth level includes the exploitation of

Table 1. Features, control test scores of asthma, and asthma quality of life questionnaire scores, employing status of asthma control

Characters	N= 80	Asthma control status		p - value
		Control (n=30)	Uncontrolled (n=50)	
Mean age in years	47.4 ± 13.2	48.2 ± 13.8	48.3 ± 13.5	0.36
Female percentage	66.3	30.9	69.3	0.10
Global Initiative for Asthma level percentage				
2	8.5	59	41	0.02
3	11.4	24	76	
4	64.8	50	50	
5	15.6	8	92	
Asthma control test (median range)	17.0 (5-25	23.5 (20-25)	11.0 (5-19)	
Asthma quality of life questionnaire (interquartile range)				
Activity restriction	45.5 (25.7)	50.0 (18.1)	45.6 (29.5)	0.22
Signs	45.8 (66.6)	66.7 (66.6)	33.4 (66.6)	0.43
Ecological stimuli	50.0 (31.7)	55.6 (39.7)	45.56 (26.1)	0.11
Emotional function	55.7 (35.6)	39.3 (44.5)	35.8 (35.7)	0.90

high doses of inhaled steroid drugs plus a long-acting inhaled β2 agonist plus a third prescription drugs or an oral corticosteroid". Clinical research may make advantage of the validated disease-specific AQLQ as a means of evaluating quality of life. There are 32 questions in all, divided into four categories: symptoms, emotional function, activity limitation, and environmental stimulation. Every item has a seven-point rating system, where 1 denotes a severe impairment and 7 denotes no impairment.[15] HADS was used to measure depression and anxiety.[16] It has 14 questions total, Seven for anxiety and Seven for depression. Each question has a score between 0 and 3, with a maximum of 21 for either. More symptoms are indicated by higher ratings. Anxiety scores of ≥8 was considered diagnostic of anxiety, while HADS depression index scores of ≥9 were considered indicative of depression. Data was analyzed through statistical freeware R, version 2.10.1. Both the Fisher's exact test and the chi-square test were used to compare categorical variables. Continuous variables were compared using either the Mann-Whitney test or the unpaired t-test, depending on the distribution. $P < 0.05$ values were regarded as statistically significant. The findings are presented as medians and interquartile ranges or as means and standard deviations.

For study purpose ethical approval was taken from Mardan medical complex, Mardan.

Results

As expected, the majority of the samples were from women (65.7%) while there was definitely not a statistically significant distinction in the status of asthma control between the sexes. Based on their ACT scores (< 20), approximately 50 (62.5%) of the individuals had uncontrolled asthma. Even when the final three were combined, uncontrolled asthma was substantially more likely in individuals whose asthma severity was defined as level 5 compared to those whose asthma severity was defined as level 2, 3, or 4. No difference was seen in the quality-of-life ratings between those with uncontrolled and controlled asthma (Table 1).

Table 2. Spirometry outcomes (percentage of expected values), by asthma control status Values expressed as mean ± SD

Features	Total n=80	Asthma control status		p - value
		Controlled n=30	Controlled n=30	
Pre bronchodilator				
Forced expiratory volume$_1$	72.4 ± 19.7	77.3 ± 9.8	68.9 ± 19.1	0.08
Forced Vital Capacity	88.8 ± 17.2	92.1 ± 18.4	86.5 ± 16.2	0.18
Forced expiratory volume/ Forced Vital Capacity	80.6 ± 13.0	82.5 ± 12.3	78.8 ± 13.7	0.25
Post bronchodilator				
Forced expiratory volume$_1$	77.1 ± 19.9	78.9 ± 21.7	75.8 ± 18.6	0.52
Forced Vital Capacity	93.1 ± 16.4	95.7 ± 17.6	91.4 ± 15.5	0.29
Forced expiratory volume/ Forced Vital Capacity	84.4 ± 13.3	85.4 ± 12.2	83.7 ± 13.9	0.60
Bronchodilator percentage	10.4 ± 11.8	9.7 ± 9.9	10.9 ± 12.2	0.66

Moreover, there was no change in the spirometric values of the groups with controlled and uncontrolled asthma before and after bronchodilator use (Table 2)**.**

We detected a strong correlation between uncontrolled asthma and HADS scores that were both diagnostic for anxiety along with the ones that were diagnostic for depression plus anxiety. Among individuals who had uncontrolled asthma, there was a statistically significant increase in the occurrence of mental health issues (Table 3).

Discussion

Asthma is one of the most prevalent chronic illnesses worldwide. A number of studies have clearly shown that individuals with asthma have an elevated risk of psychiatric disorders, primarily anxiety and depression in addition to posttraumatic stress disorder.[6-8] Of the individuals assessed in the current research, 53.7% reported depression, anxiety, or depression plus anxiety. This is consistent with the results of several research that

Table 3. Incidence of anxiety and depression symptoms, as find out by the hospital anxiety and depression scale, by status of asthma control = 80

Anxiety or depression symptoms	N (%)	Asthma control status		Chi-square test or Fisher's exact test (P)
		Controlled N=30(%)	Un Controlled n=50 (%)	
None	37 (46.25)	20	17	0.002
Anxiety	24 (30)	6	18	0.040
Depression	10 (12.5)	4	6	0.720
Anxiety + depression	9 (11.5)	0	9	0.020

indicate an increased prevalence of anxiety and depression disorders among people with asthma.[17,18] In our study, uncontrolled asthma was present in a large number of participants along with the anxiety profile 50 (62.5%). Furthermore, the ACT reported that none of people with controlled asthma showed anxiety plus depression. There is a significant correlation between uncontrolled asthma and psychological diseases, according to studies.[19,20,21] On the one hand, those who have uncontrolled asthma may perceive their symptoms more severely due to the increased incidence of anxiety, which might lead to mood problems. This would decrease the patients' view of their ability to control their asthma.[9,22] On the other hand, because some symptoms associated with anxiety (shortness of breathing and fast heart rate) and depression (fatigue and sleeplessness) can be associated with those of asthma, breathing problems that are subsequent to mood disorders may make it more difficult to evaluate treatment for asthma. We employed the HADS often employed in healthcare settings and has been verified as an indicator for anxiety and depressive disorder, to minimize his possible bias.[23,24] Enhancing the description of the status of asthma linked with a particular mental profile required the collection of clinical data, including spirometry findings, and also data on medication usage and quality of life. The primary feature of asthma, a long-term inflammatory disease, is the extreme diversity of its clinical manifestation. All people with asthma must cope with two main issues even once their condition is under control: the possibility of recurrent flare-ups and the reduction of lung function. These characteristics might result in a persistently stressful scenario. Constant psychological stress has been proposed as the source of a pervasive pro-inflammatory state.[24] Two studies that shown that stress is linked to elevated level of lymphocyte production of pro-inflammatory superoxide and cytokines provide evidence in support of this idea.[25,26] There is a strong correlation between mental disorders and the challenge of controlling asthma. When evaluating individuals with asthma, a multifaceted, integrated approach to healthcare should be taken into account.[23] Physicians need to understand that depression and anxiety disorders raise the possibility of patients not adhering to recommended asthma treatment plans. Despite the well-established relationship between psychological discomfort and illness severity, little is still known about whether psychological distress is a cause of the disease or if it interferes with disease control in some other manner.[6] Previous study has demonstrated that individuals experiencing psychological distress often report worsening symptoms, even in cases when objective measurements do not support this.[27] This might account for the lack of significant differences in the quality of life ratings, spirometry data, and self-report questionnaire used in the current investigation to identify the degree of asthma control between the "controlled" and "uncontrolled" groups. Regarding demographic information, spirometry findings, and quality of life score, we could not find any statistically significant variations between the groups under study consisting of patients with uncontrolled asthma compared to those with controlled asthma. Although women comprised a significant portion of the research population, their distribution according to asthma control level was proportionate. Additionally, there was no gender difference in the scores for anxiety or depression, despite reports that women with asthma are more likely than males to have worry and sleeplessness.[28] It is important to take into account the distinct influence of depressive mood states while evaluating controlling asthma and overall quality of life.[24]

Conclusion

We concluded that compared to individuals with controlled asthma, those with uncontrolled asthma had a greater prevalence of anxiety and depression. Feelings of depression and anxiety.

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