

TO DETERMINE THE CO-MORBIDITY ASSOCIATED WITH ASTHMA IN ADULT PATIENTS

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Abstract

Background: The Global initiative for Asthma (GINA) also promotes the timely identification and effective treatment of asthma and its associated medical conditions. The existence of co-morbidity amplifies both the occurrence and death rate associated with a particular condition. Effective therapy of asthma necessitates good control of associated comorbidities. Asthma is a prominent global contributor to illness and death. The health expense for uncontrolled asthma is significant. **Aim:** To determine the co-morbidity associated with asthma in adult patients. **Material & Methods:** 120 asthma patients who were diagnosed using spirometry and bronchodilator reversibility testing were included in this study. The age range of participants in this research ranged from 20 to 70 years. The patients had a comprehensive history assessment. Following the acquisition of the patient's medical history, a comprehensive physical examination, including both general and systemic assessments, was conducted. Prior materials were examined for important contributions. The spirometry test with reversibility was seen. After confirming the diagnosis of asthma, a comprehensive effort was undertaken to identify any concomitant diseases. In order to verify the presence of comorbidity, patients were sent to other relevant specialists for evaluation. **Results:** The average age of the patients was 40.25±2.99 years. Sinusitis was present in 67 (55.83%) patients, obesity in 50 (41.67%) patients, GERD in 56 (47.67%) patients, psychological disturbances in 30 (25%) patients, vocal cord dysfunction in 25 (20.83%) patients, bronchiectasis in 6 (5%) patients, atopic dermatitis in 11 (9.17%) patients, and recurrent respiratory infection in 17 (14.17%) patients. **Conclusion:** Co-morbidities have a negative impact on the treatment of asthma. Accurate diagnosis and effective care are essential for achieving optimal control of asthma.

INTRODUCTION

Bronchial asthma is a prevalent, long-term lung condition that is distinguished by inflammation, blockage, and heightened sensitivity of the bronchial tree. The illness of asthma is often mild to severe in the majority of people and is managed in general practice.^[1] Asthma is a significant contributor to chronic illness and death worldwide, resulting in substantial economic and societal consequences. It affects individuals of all ages, genders, and ethnic backgrounds. The worldwide incidence of asthma varies from 1 to 18% across several research studies.^[2] Asthma is a condition that is not given enough attention in Africa. It is believed that around 12% of the population has asthma, with figures

varying from 2% to 53% among those aged less than 2 to 64 years old.^[3] The occurrence of asthma varies across Africa, with a rate of 6.9% in Kinshasa, 1.5% in Nigeria, 29.6% at Debre Berhan Referral Hospital in Ethiopia, and 1.5% in Zewditu Memorial Hospital in Ethiopia.^[4] The distinguishing symptoms include wheezing, difficulty breathing, chest tightness, and a persistent cough, along with restricted airflow, particularly during nighttime and early morning hours. The symptoms and degree of airflow restriction in asthma fluctuate over time, often worsening due to factors such as physical activity, exposure to allergens and irritants, changes in weather, and respiratory infections.^[5] While asthma is not curable, exacerbations may be averted via sufficient patient counselling and appropriate care.^[6]

Given its chronic nature, patients are required to use drugs, comply with treatment guidelines, and stick to the established plan for self-management of asthma. The key elements used in the management of individuals with asthma are evaluation, surveillance, health instruction, regulation of environmental variables, and addressing co-existing conditions that contribute to allergens and the severity of the condition.^[7] The global prevalence of asthma is affected by several factors including age, gender, place of residence, employment status, presence of other medical conditions, smoking history, and family history of diseases.^[8,9] Asthma is a significant contributor to the worldwide economic burden, including both direct and indirect expenses. Since asthma is incurable but may be managed, efforts to decrease expenses should prioritise improved illness treatment. This method regularly correlates with a substantial decrease in expenses related to asthma. Accurate assessment of the severity of asthma, enhanced availability of medical treatment, particularly for controller (preventer) treatments, and increased adherence to these therapies may greatly decrease the financial impact of asthma, leading to better management of the condition and improved quality of life.^[10,11]

Multiple research have thoroughly shown that the occurrence of asthma varies.

MATERIALS AND METHODS

The research was carried out at a tertiary care hospital. The research was conducted in an institution-based setting and used a cross-sectional, observational design. Obtained prior authorization from the institutional ethics committee. The research population consisted of individuals who presented to the hospital with complaints of asthma. The research has a sample size of 120. The patient provided written permission. Only the patients who provided permission were included in the trial, while those who declined were eliminated. The eligibility criteria consisted of asthma patients who were diagnosed using spirometry and bronchodilator reversibility testing. We eliminated individuals who had COPD, an active case of TB, or active hemoptysis. The age range of participants in this research ranged from 20

to 70 years. The patients had a comprehensive history assessment. Following the acquisition of the patient's medical history, a comprehensive physical examination, including both general and systemic assessments, was conducted. Prior materials were examined for important contributions. The spirometry test with bronchodilator reversibility was done. After confirming the diagnosis of asthma, a comprehensive effort was undertaken to identify any concomitant diseases. In order to verify the presence of comorbidity, patients were sent to other relevant specialists for evaluation. Upon identifying the comorbid illness, efforts were undertaken to address and manage the associated ailments as well. The data obtained from patients were systematically collated for future use in the research. The prevalence of comorbidity among patients was reported as a percentage.

RESULTS

A total of 120 patients were included in our investigation. The number of male patients was 78, accounting for 65% of the total, while the number of female patients was 42, accounting for 35%. The majority of patients, 51 (42.5%), belonged to the age range of 20-30 years, while the smallest number of patients, 11 (9.17%), were from the age group over 60 years. The average age of the patients was 40.25±2.99 years. Sinusitis was present in 67 (55.83%) patients, obesity in 50 (41.67%) patients, GERD in 56 (47.67%) patients, psychological disturbances in 30 (25%) patients, vocal cord dysfunction in 25 (20.83%) patients, bronchiectasis in 6 (5%) patients, atopic dermatitis in 11 (9.17%) patients, and recurrent respiratory infection in 17 (14.17%) patients. Table 3 presents a multinomial analysis of the parameters linked to the co-morbidity of asthma. The age of patients was shown to have a positive correlation with the occurrence of asthma comorbidity, with an increase of 3.58 times (95% CI: 2.74–4.11, $p < 0.05$). The location of one's domicile impacts the likelihood of experiencing comorbidities related to asthma. This implies that those living in urban areas have a lower likelihood of having many medical conditions compared to those living in rural areas. [Table 1]

Table 1: Basic profile of the participants

Profile	Number	Percentage	P value
Gender			0.12
Male	78	65	
Female	42	35	
Age			0.14
20-30	51	42.5	
30-40	25	20.83	
40-50	19	15.83	
50-60	14	11.67	
Above 60	11	9.17	
Mean Age	40.25±2.99		
Area			0.23
Urban	75	62.5	
rural	45	37.5	
Employment			0.17

Private	24	20	
government	15	12.5	
Others	55	45.83	
Unemployed	26	21.67	
Smoking status			
Yes	90	75	
No	30	25	

Table 2: Co-morbidities among asthma patients

Diseases	No. of patients =120	Percentage (%)
Sinusitis	67	55.83
Obesity	50	41.67
GERD	56	47.67
Psychiatric	30	25
Vocal cord dysfunction	25	20.83
Bronchiectasis	6	5
Atopic dermatitis	11	9.17
Respiratory infection	17	14.17

Table 3: Multinomial analysis of factors associated with Co-morbidities among asthma patients

	OR	(95%CI)	P value
Gender	1.94	1.04-2.77	0.01
Age	3.58	2.74-4.11	0.03
Residence	0.44	0.21-0.82	0.04
Employment	0.58	0.39-1.05	0.04
Smoking status	4.85	3.98-5.69	0.01
Co-morbidity	3.66	3.07-4.79	0.01

DISCUSSION

Our investigation revealed that 55.83% of the patients had sinusitis. Bresciani et al. conducted a research which revealed that 75% of patients were diagnosed with sinusitis.^[12] Togias et al. conducted a research which revealed that the occurrence of sinusitis in individuals with asthma ranges from 6 to 95%.^[13] Therefore, it can be inferred that the occurrence of rhinitis in individuals with asthma differs across various research, although it continues to be a significant causative element in the management of challenging asthma cases.

GERD is more prevalent in individuals with asthma. The process may be attributed to vagal tone, reduction in lower esophageal sphincter function, microaspiration of stomach acid, and irritation of the laryngeal or respiratory mucosa. Frequent complaints of heartburn are common among the patients. When the tone of the gastro-oesophageal junction decreases, stomach acid may flow into the larynx and throat. Patients present with symptoms such as vocal hoarseness, frequent throat clearing, chest constriction, and heartburn. The symptoms of GERD can resemble those of asthma. Patients often have excessive diagnosis of asthma and then get inhaler treatment. The acidic nature of stomach acid causes irritation to the mucosa of both the upper and lower respiratory tract, thereby exacerbating asthma symptoms. It is important to inquire about any symptoms of GERD from patients. Upon receiving a diagnosis, it is essential to initiate treatment for GERD in order to achieve optimal management.

Several studies have demonstrated that managing GERD with PPIs may decrease asthma symptoms and improve quality of life.^[14] However, some trials

did not succeed in showing a distinct improvement in the management of asthma. Conversely, asthma medicine such as oral corticosteroids and theophylline may lead to GERD as a negative side effect, and can exacerbate asthma symptoms. It is important to get a thorough and detailed medical history from patients, and during subsequent visits, it is necessary to monitor and assess any negative effects caused by the medications.

Our investigation revealed that 47.67% of the patients had symptoms of GERD. A separate research conducted by Havemann et al. revealed that 58% of patients were diagnosed with GERD. A separate research revealed that GERD symptoms were reported by 50-80% of patients.^[15,16] The incidence of GERD exhibits variation across various research and geographical regions. However, it is undeniable that GERD occurs in people with asthma. Once recognised, the condition should be treated with appropriate medicine in conjunction with adjustments to one's lifestyle.

Obesity is a significant comorbid disease that further complicates the treatment of asthma. The precise method by which fat hampers the functioning of asthma remains unclear. Obesity rates varied among nations. The frequency also differs across various age cohorts. Obesity poses challenges for both children and adults. Obese individuals often have symptoms such as difficulty breathing after physical activity, a feeling of pressure in the chest, loud breathing during sleep, and a whistling sound while breathing. This set of symptoms closely resembles asthma. Patients are often misdiagnosed with non-asthmatic conditions, while being labelled as having asthma. The association between obesity and asthma remains uncertain; it is believed to be attributable to a shared

inflammatory mechanism inside the body. Obesity has a direct and indirect impact on the management of asthma.^[17] When diagnosing asthma, it is important to take notice of the existence of obesity. Asthma and fat have an intricate relationship. Corticosteroids, a kind of asthma treatment, may lead to weight gain, which in turn can result in inadequate symptom management. Patients should be recommended to undergo weight reduction. Several studies have shown that weight loss is linked to improved symptom management, fewer exacerbations, and enhanced quality of life.^[18] Obesity is a contributing factor to the development of sleep apnea. Sleep apnea exacerbates respiratory function, resulting in nocturnal desaturation and cardiac problems. Our investigation revealed that 41.67% of the patients had obesity. Prior research has shown that a significant proportion of individuals diagnosed with asthma, ranging from 21% to 48%, also exhibit obesity.^[19] A research conducted by Taylor B et al. in The National Asthma Survey, 2008 found that obese individuals had persistent symptoms, relied more on inhaled beta agonists and corticosteroids, had more work absences, and had less control over their asthma.^[20] The incidence of obesity exhibits variability across various research and geographical regions; yet, the association between obesity and asthma in individuals is undeniable. Once detected, efforts should be taken to reduce weight, encourage physical exercise, and modify lifestyle. Decreasing body weight has a beneficial impact on managing asthma symptoms and enhancing one's self-confidence.

Asthma sufferers can feel significant levels of stress as a result of the complicated array of symptoms they encounter. Anxiety and sadness are often seen. Significant randomised studies have been conducted to determine the frequency of mental disorders among individuals with asthma. The incidence of mental comorbidities is much greater in asthma patients compared to the general population.^[18] In a research conducted by P.J. Vuillermin et al., it was shown that individuals with anxiety have a higher prevalence of asthmatic symptoms compared to the general population.^[21] A study conducted by the World Health Organisation examined the occurrence of mental comorbid illnesses in 85,000 asthma patients. The study used a standardised and structured psychiatric interview conducted by professional interviewers. The findings revealed an estimated incidence of severe depression ranging from 2% to 26%.^[22] Psychiatric people are at a higher risk of having asthma. The relationship between asthma and mental disorder is intricate. Patients afflicted with anxiety and depression exhibit poor adherence to medication. Consequently, they have heightened exacerbation frequency, inadequate management of asthma symptoms, diminished quality of life, and increased morbidity and death. On a global scale, the incidence of depression is rising, and as a result, so is the prevalence of asthma.

The patient with a psychological disorder as a comorbid condition should be handled with greatest care. It is necessary to have a designated carer to guarantee strict compliance with asthma treatments. Effective asthma management usually entails addressing comorbid conditions as well. Only a limited number of research have been undertaken to investigate the impact of administering anti-psychotic medication on asthma control. However, these studies did not provide conclusive evidence of improved management of asthma symptoms. A separate research demonstrated that addressing the underlying psychological problem resulted in a positive impact on asthma outcomes.

Our investigation revealed that 24.4% of the individuals had mental disorder. Scott et al. conducted a separate research which revealed that 1-9% of individuals with asthma also had psychological disorders.^[22] A further research conducted by Dennis K Ledford et al. revealed that anxiety and sadness were seen in 16-52% of asthma patients.^[18] Fasmer et al. conducted a recent assessment on the frequency of medicine use for treating asthma and mental comorbidity. They validated the existence of psychological disorders in patients with asthma.^[23] Goodwin et al. conducted a study examining the correlation between asthma and mental disorders, as well as the effects of asthma and mental disorders in Canada. The study found that asthma was strongly linked to a higher probability of various mental illnesses in adults.^[24] The prevalence of mental disease exhibits variation across various research and geographical regions. However, it is well documented that psychiatric illness often coexists with asthma. After receiving a diagnosis, it is important to make an effort to address the underlying psychological disorder in order to improve the treatment of asthma.

Vocal cord dysfunction (VCD) is a frequently occurring condition in people with asthma, which complicates the treatment of asthma. The patient with vocal cord dysfunction is experiencing aberrant inward movement of the vocal cord during both inhalation and exhalation. The process might be attributed to atypical vagal activation. Patients present with symptoms such as wheezing or stridor, coughing, and difficulty breathing. The symptom of VCD imitates asthma in patients who do not have asthma.^[18] The symptomatology is almost same for both disorders. This results in a state of clinical perplexity for the attending physician. Both of these disorders might manifest concurrently in a single patient or can present in distinct clinical contexts. When diagnosing asthma, the clinician should investigate for vocal cord dysfunction (VCD) using either a direct laryngoscopy or a CT scan.

Our investigation revealed that 20.83% of the patients had Vocal cord impairment. The incidence of VCD exhibits variation across various studies and geographical regions. However, the presence of VCD in patients with asthma is well documented in literature. Upon diagnosis, it is imperative to make an

effort to address the root cause of VCD. It is well recognised that the prevalence of VCD in individuals with asthma is correlated with suboptimal asthma management, diminished quality of life, and increased frequency of hospitalisations. The treatment of VCD may be commenced by behavioural therapy or by using CPAP in conjunction with the standard asthma drugs. Speech therapy is the fundamental basis of treatment.^[25]

bronchiectasis is a frequently occurring condition that may coexist with asthma. The manifestations of bronchiectasis are dyspnea, wheezing, recurrent respiratory infections, persistent cough, and abundant sputum production. This symptom closely resembles asthma. Oftentimes, a patient with bronchiectasis is prescribed asthma medicine due to an incorrect diagnosis. A spirometry test with bronchodilator reversibility may be performed to distinguish between these clinical situations. In the same vein, individuals with bronchiectasis may experience the development of ABPA, which may exacerbate the result of asthma. A thorough investigation for ABPA should be conducted in a challenging-to-manage asthma patient who does not show improvement with standard therapy. Performing a thoracic CT scan and immunologic testing may assist in accurately diagnosing bronchiectasis and ABPA. Similarly, when dealing with a confirmed case of bronchiectasis, it is advisable to do a thorough investigation for the presence of asthma. To achieve optimal management of asthma, it is crucial to identify and treat underlying comorbidities concurrently. This will result in effective management of asthma and enhance the overall quality of life.

Our investigation revealed that bronchiectasis was present in 5% of the patients. In his work, Dennis K. Ledford et al. identified bronchiectasis as a comorbidity of asthma.^[18] The incidence of bronchiectasis exhibits variation across various studies and geographical regions. However, the presence of bronchiectasis in individuals with asthma is well-documented in the literature. After receiving a diagnosis, it is crucial to make an effort to cure the root cause of bronchiectasis.

Recurrent respiratory infections often occur with asthma as a comorbid disease. Recurrent respiratory infection is seen in both paediatric and adult patients. This is a frequent occurrence throughout the winter season. The primary cause is often a viral infection, but bacterial involvement may also contribute to the worsening of symptoms. Recurrent respiratory infection results in a rise in both illness and death rates. Recurring infections will result in longer hospital stays and an increased weight of medication. The extended time of hospitalisation would be further compounded by the loss of daily income. Consequently, the cost of controlling asthma significantly multiplies when also addressing its comorbid illnesses. A comprehensive multicenter research shown that asthma patients with several comorbidities incur higher healthcare expenditures.

The illnesses burden is significant. Asthma patients with inadequate control are at an elevated risk of being admitted to the intensive care unit (ICU) and experiencing death. Each infection will have a detrimental impact on the lung and result in a decline in lung function.

Several studies with a substantial sample size have shown that there is a heightened risk of acquiring pneumonia associated with the use of asthma medicine, such as inhaled corticosteroids. Therefore, it is appropriate to utilise inhaled or oral corticosteroids judiciously. Our research revealed that 14.17% of the patients had recurring chest infections. According to Mirabelli et al., asthmatics often have recurring respiratory infections.^[26] The frequency of recurring illness differs across various research and geographical regions. However, it is well acknowledged in literature that asthma patients are prone to experiencing repeated infections. Upon diagnosis, it is essential to endeavour to address the root cause of the illness.

Atopic dermatitis is a condition that affects only a small number of individuals with asthma. The process may be attributed to the presence of inflammatory markers. Atopic dermatitis may be linked to dietary allergies. Patients may exhibit symptoms such as pruritus, edoema, erythema, and in more severe cases, dyspnea. It is important to address the underlying co-morbidities in order to achieve better management of asthma. Our research revealed a prevalence of 9.17% for atopic dermatitis among the patients. A research conducted by Illi et al. revealed a correlation between asthma patients and the presence of atopic dermatitis.^[31]

CONCLUSION

Co-morbidities are linked to inadequate management of asthma. While the distribution of their occurrence may change across various geographic areas, it is important for the attending physician to identify and assess the existence of comorbidities. Comorbidities have a negative impact on the treatment of asthma. Accurate diagnosis and effective care are essential for achieving optimal control of asthma.

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