



Prevalence and determinants of Asthma in adults in Khyber Pakhtunkhwa, Pakistan

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Abstract

Asthma is a chronic inflammatory respiratory disease that is caused by biological and environmental factors. These factors can be in the form of dust, chemicals, smoke, allergens, and viruses. Approximately, 315 million people are affected with asthma worldwide. This study is designed to determine the prevalence of asthma in adults of different ages and its symptoms and main determinants in the Mardan and Peshawar districts of Khyber Pakhtunkhwa. A cross-sectional survey was conducted at Hayatabad Medical Complex Peshawar and Bacha Khan Medical Complex Mardan from May 2020 to March 2021. Data were collected from 1,400 individuals, and the prevalence of asthma was reported to be 22.57% (n=316). Asthma prevalence was reported to be more in men (55.7%) compared to women (44.3%) in Khyber Pakhtunkhwa, Pakistan. Asthma was most common between people aged 18-27 years (31%). The majority of asthma patients were obese (53.8%) compared to non-obese (46.2%) patients. The most common symptoms of asthma were respiratory infections including the common cold, flu and pneumonia (89.87%), followed by chest pain, dyspnea (88.6%) and wheezing (83.54%). Risk factors for asthma include allergens exposure to dust mites, pollen, animal dander and cold air, family history of the disease, smoking, consumption of food containing sulphites and preservatives and use of certain medications including beta-blockers and aspirin in the KPK province of Pakistan. The government should conduct awareness campaigns in various cities, where proper lung function tests and other drugs using corticosteroids should be used to control the spread of the disease.

Keywords: Asthma, Adults, Prevalence, Determinants, Khyber Pakhtunkhwa, Pakistan

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1. INTRODUCTION

Asthma is a chronic inflammatory respiratory disease that is caused by biological and environmental factors. These factors can be in the form of dust, chemicals, smoke, allergens, and viruses ¹. Approximately, 315 million people are affected with asthma worldwide ². Approximately, 5-10% of asthma patients have a severe form of the disease and are usually treated with high doses of inhaled bronchodilators and glucocorticoids ². Asthma is a very complex and mixed disease that includes a different kind of “phenotypic disorders sharing a common pathway of airway obstruction from bronchial smooth muscle constriction and inflammation of airway mucosa”. This clearly states that this disease can be easily transformed from generation to generation especially from parents to children. The disease is mostly generated by having an issue of respiratory symptoms such as “wheeze, shortness of breath, chest tightness and cough that vary over time and in intensity, together with evidence of variable expiratory airflow limitation. This disease begins at a very early age like childhood, but symptom and issue arise over time and it has multifaceted which is caused by both environmental and genetic factors including transform from mother to children and smoking and dust ³.

Asthma attack integrated airway hyper responsiveness, which is an overreaction of bronchi or bronchioles through different environmental and functional stimuli known as triggers. Common asthma triggers include allergies to dust mites, mould spores, pet dander and cockroach waste or pollen for instance, pollution, cold air and smoke, physical activity (exercise induced asthma). However, the most common cause of asthma attacks is small or lightweight particles transported through the air and inhaled into the lungs and pass into the airway which is caused by environmental triggers response to the airway walls causing an attack ⁴.

Approximately, 38% of adult asthma patients are overweight in the United States. Obesity is a risk factor for the development of asthma. The higher the utilization of healthcare, the higher the incidence and frequency of these reports. It is reported that severe asthma affects men and women of various races, with approximately 330,000 adults of all ages ⁵. Coronavirus (COVID-19) is also a respiratory virus that emerged in China and infects thousands of people in China and other countries⁶. The virus mainly infects people with weak immunity, and the symptoms are similar to those of asthma such as dry cough, malaise, dyspnea, and chest pain fever ⁷. The virus can damage the respiratory tract and also increases the risk of COVID19 infection in asthmatics ⁸.

Bronchial stenosis can also begin with exercise. Symptoms of asthma begin within 20 to 30 minutes of starting exercise but can last for more than an hour if left untreated. Most cases of exercise-induced asthma have been reported, but in rare cases even seizures and even patient deaths have been reported ⁹. The usual treatment for asthma is to use an inhaler containing the beta-2 agonists such as methyl and galantamine after the therapeutic dose. Respiratory gas treatment is measured as an important treatment for respiratory disease due to its positive effects and minimal side effects, and regular inhalation is used to treat chronic obstructive pulmonary disease (COPD) ^{10, 11}.

This study was designed to determine the prevalence of asthma in different age groups of adults and its symptoms and main determinants in the Mardan and Peshawar districts of Khyber Pakhtunkhwa.

2. MATERIALS AND METHODS

2.1 Sample area and duration

Cross-sectional studies were conducted from May 2020 to March 2021 at the Hayatabad Medical Complex in district Peshawar and Bacha Khan Medical Complex in district Mardan of Khyber Pakhtunkhwa, Pakistan.

2.2 Study population

Participants in the study were patients who visited the Hayatabad Medical Complex Peshawar and the Bacha Khan Medical Complex Mardan, from which data were collected through face-to-face communication. Prior to data collection, the purpose of the study was discussed, and written consent was obtained from the patients enrolled in the study.

2.3 Diagnosis and sampling technique

All the patients were diagnosed with Allergy blood test, Spirometry, Peak flow rate, Sputum eosinophils and Methacholine challenge test. Data were collected using non-probability sampling methods, using adapted methods from previously published studies ^{12, 13}.

2.4 Study design and Sample size

Data were collected from 1400 participants, including paediatric patients with asthma and healthy controls, through a quantitative research design. A paper-based questionnaire survey was used to collect data. The questionnaire was divided into three sections which contained closed questions including 1) Demographic data on gender, age, obesity, and severity of asthma 2) Symptoms such as respiratory infections, chest pain, dyspnea or difficulty breathing, wheezing and nocturnal awakening 3) risk factors associated with asthma in adult population. The questionnaire was completed according to the respondents' responses without any influence from the researcher.

2.5 Ethical Considerations

The research compiled with all national regulations and local ethical approval was obtained from the Department of Zoology, Shaheed Benazir Bhutto Women University, Peshawar.

2.6 Data Analysis

The data was collected and entered using Microsoft Excel software. Percentages are calculated as needed. The results are presented in the form of tables and graphs.

3. RESULTS AND DISCUSSIONS

A total of 1400 participants were involved in the study. Overall, 316 participants were found to have asthma. The overall prevalence of asthma was found to be 22.57% (n=316) in adult population in Mardan and Peshawar districts of Khyber Pakhtunkhwa, Pakistan. Amongst asthmatic cases, 176 (55.7%) were males and 140 (44.3%) were females. The prevalence of asthma was found to be higher between 18-27 years (31%) compared to other age groups. Overall, most asthma patients were obese (53.8%) compared to non-obese (46.2%) patients. The most common symptoms of asthma were respiratory infections including common cold, flu and pneumonia (89.87%), followed by chest pain and dyspnea (88.6%) and wheezing (83.54%; Table 1).

Table 1. Socio-demographic characteristics and symptoms of asthmatics in Khyber Pakhtunkhwa, Pakistan (n=316).

Variables	Frequency (N)	Percentage (%)
Gender		
Male	176	55.7
Female	140	44.3
Age in years		
18-27	98	31
28-37	62	19.7
38-47	54	17
48-57	74	23.4
57-66	21	6.7
67+	7	2.2
Obesity		
Yes	170	53.8
No	146	46.2
Symptoms		
Respiratory infections including common cold, flu and pneumonia	284	89.87
Chest pain	280	88.6
Dyspnea	280	88.6
Wheezing	264	83.54
Nocturnal awakening	239	75.63

A discrepancy was identified between the severity based on the symptoms of asthma. Of all patients, 30.7% had severe persistent symptoms, 25% had moderate persistent symptoms, 23.4% had mild persistent symptoms, and 20.9% had mild intermittent symptoms (Fig 1). The majority of asthma patients were allergic to dust mites, pollen, animal dander and cold air with 94.31% of male patients and 77.14% of female patients. Family history of asthma (56.42%), foods containing sulphites and preservatives (38.57%), and the use of certain medications such as beta-blockers and aspirin were the most common factors associated with asthma in female patients, whereas smoking (39.77%) was found to occur more frequently in male patients than in females (Table 2).

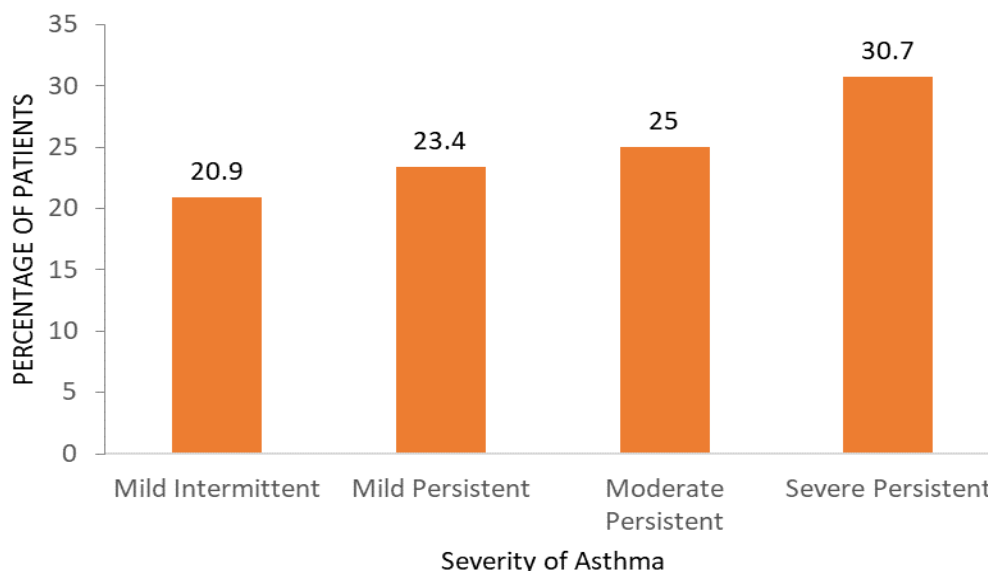


Fig.1. Distribution of patients in each group stratified by asthma severity in Khyber Pakhtunkhwa, Pakistan

Table 2. Risk Factors associated with asthma in both genders in Khyber Pakhtunkhwa, Pakistan.

Risk Factors	Frequency and Percentage (%) of Male Patients	Frequency and Percentage (%) of Female patients
Allergens including dust mites, pollen, animal dander and cold air	166 (94.31)	108 (77.14)
Family history	51 (28.97)	79 (56.42)
Smoking	70 (39.77)	15 (10.71)
Consumption of foods with sulphites and preservatives	39 (22.15)	54 (38.57)
Use of certain medications including beta-blockers and aspirin	44 (25)	68 (48.57)

Globally, asthma is one of the major chronic diseases¹⁴, its prevalence is steadily increasing¹⁵, especially in low- and middle-income countries¹⁶. Approximately, the annual death rate due to asthma is reported to be 180,000 worldwide¹⁷. This study gives an indication on the prevalence of asthma in the Peshawar and Mardan districts of Khyber Pakhtunkhwa, Pakistan. The asthma prevalence (22.57%) in this study was comparable to the other study conducted in the Mardan district of Pakistan, reporting an asthma prevalence of 54%¹⁸. However, the results differ from other previously published studies conducted in Karachi, Pakistan. In the first study 4% self-reported asthma and 2% physician diagnosed asthma were

reported¹⁹. Another study reported 10.2% prevalence of asthma between 3-17 years children population²⁰. This difference might be due to variation in the study area and study population.

According to our study, asthma is more common in men (55.7%) than women (44.3%), which is similar to a study conducted in Tertiary Care Hospital in Lahore, Pakistan, and the analysis found that asthma was reported more frequently in males (56%) in comparison to females (44%)²¹. Our results show a higher incidence of asthma in patients aged 18-27 years (31%), which is consistent with the results of a previously published study conducted in Bangladesh which found asthma to be more common in patients aged 18-30 years (41.46%)²². In addition, our results indicate correlation between obesity and asthma, in which the percentage of obese patients is higher (53.8%) compared to non-obese patients (46.2%). This finding is in agreement with previous medical records from inner-city academic asthma center amongst 143 adults, 72% of whom were obese²³.

The prevalence of dyspnea in this study was 88.6%, in contrast to the results of another Pakistani study which reported that the prevalence of shortness of breath was 25%²⁴. The prevalence of wheezing in this study was 83.54% respectively, while in a previously published study in Pakistan, rates of acute and chronic wheezing were 10% and 8%²⁴. However, a study from India reported that the prevalence of wheezing was 2.6%²⁵. The incidence of respiratory symptoms including common cold, flu and pneumonia was 89.87% in the current study, while Indian study reported respiratory symptoms in 8.5% of asthma patients²⁵. The present study reported 88.6% chest pain in adults with asthma, while a previous Egyptian study reported a 48.5% prevalence of chest pain in the adult population²⁶.

The majority of patients in this study were suffering from severe persistent asthma (30.7%). This finding contrasts with a study conducted amongst Danish adults, which reported that 8.1% of patients had severe persistent asthma²⁷. In addition, another Pakistani study reported that 68% of patients had mild intermittent asthma, 29% had mild persistent and 3% had moderate persistent asthma, but no patients had severe persistent asthma²¹. This difference might be due to variation in the study areas and sample size.

Our study found that allergens, including dust mites, pollen, animal dander and cold air were the main risk factor for asthma in both genders. A previous study found that asthmatics were exposed to higher levels of mite allergens, while allergen levels of cats and dogs were lower in children with asthma in Ghana²⁸. Moreover, previous research conducted in China showed that individuals with allergic rhinitis, eczema and gastroesophageal reflux disease had a higher incidence of asthma than people without these conditions, suggesting that the above diseases may be a risk factor for developing asthma²⁹. Current research also reported an association between family history and asthma. This agrees with those of Wickens et al., 2001 who conducted a study on the risk factors for asthma amongst children in New Zealand, and reported that the prevalence of asthma increased by 3.36 and 2.67 folds higher among children whose parents had asthma, than children whose parents did not have asthma³⁰.

Our results showed that 39.77% of male asthmatics and 10.71% of female asthmatics were smokers. A previous study conducted to determine the prevalence of active and passive smoking in asthmatics, found that out of a total of 100 subjects, 47 were non-smokers and 53 were smokers, and concluded that the prevalence of exposure to smoking was high in patients with asthma³¹. The current study provides evidence that consumption of food containing sulphites and preservatives is a risk factor for asthma affecting 38.57% of women and 22.15% of men. These results are supported by previously published studies which indicate that occupational asthma was reported in a worker who sprinkled metabisulphite dry powder on potatoes³², and three cases of occupational asthma linked with exposure to metabisulphite were reported in France³³. An increase in asthma mortality has also been reported in sulphite pulp mill workers, possibly due to exposure to peak sulphur dioxide (SO₂) concentrations³⁴. The exact prevalence of asthmatic response to sulphites is uncertain, although it is generally agreed that 3-10% of adult asthmatic patients may respond negatively to sulphite excess, the number of which is fatal^{35,36}. The use of certain medications including beta-blockers and aspirin is also a risk factor for asthma, affecting 48.57% of women and 25% of men. Previous research suggested that 2% to 25% of adults with asthma are sensitive to aspirin³⁷. Furthermore, Oral beta-blockers medications are reported to be a risk factor for thunderstorm asthma³⁸.

4. CONCLUSIONS

It is concluded from present study that asthma is a prevalent respiratory problem of the adult population in the two districts of Khyber Pakhtunkhwa, Pakistan. It is reported to be more common in males as compared to females. Risk factors for asthma include allergens exposure to dust mites, pollen, animal dander and cold air, family history of disease, smoking, consumption of food containing sulphites and preservatives and the use of certain medication including beta-blockers and aspirin in the KPK province of Pakistan. Getting proper knowledge and spreading awareness is necessary to control the spread of the disease.

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CONFLICT OF INTEREST

The authors declare no conflict of interest.

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