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ORIGINAL ARTICLE

Smoke and pollens are precipitating factors for asthma exacerbation

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ABSTRACT

Background: Asthma is most common chronic inflammatory disease of bronchial airways which is characterized by asthma attacks. These attacks are triggered by a number of precipitating factors.

Objective: The objective of this study was to determine the precipitating factor of asthma in Islamabad/Rawalpindi, Pakistan.

Methodology: This study was a descriptive cross-sectional survey in which the major precipitating factors of asthmatic people (n=100) were measured. The study was conducted at National Institute of Health Islamabad and Federal General Hospital Islamabad in 6 months between June 2013 to November 2013.A structure questionnaire was designed by consensus from expert consultant pulmonologists and physical therapist working in pulmonary Krehabilitation. Data collected retrospectively i.e. symptoms during the last 2 weeks were asked.

Result: Precipitating factors such as smoke (18%), pollens (13%), working environment (12%),cold (12%), dust mites (10%), food (9%), perfumes (9%), exercise (8%),), cooking (5%), and animal allergy (4%) were found to be associated with occurrence of asthma attack

Conclusion: Smoke and pollens are found to be the most common precipitating factors in Islamabad and Rawalpindi, Pakistan.

Key words: Bronchialasthma, precipitating factors,

INTRODUCTION

Asthma is disease of bronchial airways that is characterized by chronic inflammation, reversible bronchoconstriction and excessive mucous production in the hypersensitive bronchial tubes of lungs that results in the obstruction of airway, causing variable and recurring symptoms likewheezing, chest tightness, shortness of breath and coughing.[5] Asthma was first named in 450 BC by Hippocrates with a Greek word meaning panting.During the 1930-1950 it was considered as one of the psychosomatic illness, the cure of which was considered in treating depression. Psychiatrists considered the child wheeze, as suppressed cry of a child for her mother.[3]

Asthma is a widespread disease affecting more than 235 million individuals globally with everyday increase in its number.[4] In United States of America 25 million people are affected by asthma.[8] Although exact epidemiological figures are unknown about the prevalence of asthma in Pakistan, it is estimated that more than 10 million people are suffering from this disease.[9]and its prevalence is increasing 5% annually. In Pakistan, prevalence of adult asthma was 10.8 % according to a research done in leather tannery workers in Karachi in 2006.[10] Asthma and allergy prevalence in Islamabad children was 31.58% in 2009.[11]

Asthma is a chronic disease of respiratory airway in which there is reversible airflow limitation and persistent airway hyper-responsiveness. The pathophysiology of asthma is multifactorial. Genetic and environmental factor specially childhood infections play major role in etiology.Asthma affects bronchi and bronchioles not the alveoli. Triggers like respiratory allergens, infections; smoking, cold air and dust mites cause the bronchial provocation. The predominant and symptom causing clinical feature is bronchoconstriction i.e., narrowing of bronchi and bronchioles. This happens by the constriction of smooth muscles around the bronchial walls and is enhanced by edema and inflammation. Mucous secreting cells produce the excess mucous in the lumen that leads to the formation of mucous plugs due to malfunction of cilia cells. Epithelial cells loses their ability to expel the sputum out. The inner walls also become coarse and irregular to further limit the airflow to great extent. This attack is usually reversed after some time either spontaneously or by medication. The

symptoms of asthma are completely resolved and patient becomes normal in between the attacks. In some individuals, attack is not fully reversed and leads to permanent structural changes of airways due to which asthma attacks become more severe with the passage of time.[2]

Sign and symptoms of asthma are recurrent episodes of wheezing (whistling sound that comes usually during expiration), chest tightness, coughing, shortness of breath (gasping for air), Sputum is hardly produced or it is difficult to cough it out.Symptoms are usually worse at night or in early morning. Risk factors of asthma are the factors that are responsible for increasing the possibility and risk of asthma in an individual. Some of these factors are modifiable and some are non-modifiable. These non-modifiable risk factors are family history[12], genetic[8] and pre-natal influences.[14, 15, 16, 17] Modifiable factors are cigarette smoking[18], indoor and outdoor pollutions[20], obesity[23], childhood infections[22] and physical inactivity.[25]

Asthma can basically be classified in two stages. One is Asthma attack and other is inter- critical state. [6]Asthma attack is a term that describes the condition when the symptoms of asthma flare up. This can happen suddenly in response to any allergen, or can occur gradually as a result of infections. Trigger is any change that is responsible to cause inflammation and initiate an asthma attack. These triggers are the precipitating factors that are responsible for the exacerbation of asthma. It can be environmental factor or allergic factor or infections especially rhinovirus.[7]These factors are airborne pollens, smoke, dust, animal dander, pillow feathers, cold and environmental toxins, some drugs and pollens.

METHODOLOGY

Descriptive cross-sectional survey was done to determine the major precipitating factors for asthma exacerbations in Islamabad/Rawalpindi.

All the available patients with asthma that report to outdoor and indoor Departments of Allergy center N.I.H Islamabad, federal general hospital Islamabad, holy family hospital during the study period was screened .After finding their suitability as per the inclusion and exclusion criteria, they were requested to participate in the study. 100 patients with asthma between the ages 15 to 40 years were selected by purposive sampling and interviewed. Written informed consent will be taken from them. Study was completed in 6 months between June 2013 to November 2013.

A structure questionnaire was designed by consensus from expert consultant pulmonologists and physical therapist working in pulmonary rehabilitation. Data collected retrospectively i.e.; symptoms during the last 2 weeks were asked. Inclusive criteriawas age 15-40 years, patients diagnosed with asthma from at least 6 months, having received at-least one anti-asthmatic treatment, patients should be residents of Islamabad and Rawalpindi. Exclusive criteria were SOB due to cardiac or pulmonary cause or due to any trauma, patient undergoing surgery, any skin disease.

RESULTS

Out of 100 patients 21were males and 79 were females. 78% were married and 22% patients were unmarried. Out of 100 patients 13 patients' fall between the age group 15-20 years, 15% fall between 21-25 years, 9% between 26-30 years, 26 fall between 31-35 years, 37 % patients fall in the age group 36-40 years. In response to question asked about occupation, 45 patients were house wives doing brooming and moping at home, 13 patients were either student or teachers, 15 patients were doing office jobs, 12 patients were maid or doing cleaning jobs with chemicals, 8 patients were tailor, 4 males were electricians and 3 females were having their parlors.

The precipitating factors are measured by cross tabulating it with the residence of the patient whether they belong to Rawalpindi or Islamabad. Risk factor is the factors that are responsible for the presence of a disease in an individual. Major risk factor in this study was family history; about 50% patients were having their first relative affected by either asthma or other allergies. Next risk factor was air pollution affecting 27% people. This

includes pollens in the individuals who got asthma after migration to the twin cities. 2nd factor in air pollution was Environmental Tobacco Smoke. Occupation affects 7% of patients, measles causes

Table 1: Cross tabulation of Precipitating factors and Residence

	Precipitating factors	Islamabad	Rawalpindi	total
1	smoke	8	10	18
2	Pollens	9	4	13
3	Working environment	9	3	12
4	cold	8	4	12
5	Dust/dust mites	6	4	10
6	Soap /perfumes/ paint	4	5	9
7	Food allergy	4	5	9
8	Exercise	4	4	8
9	Cooking	4	1	5
10	Animal allergy	2	2	4
	Total	58	42	100

Table 1 shows that smoke and pollens are found to be the highest precipitating factors in asthma exacerbations.

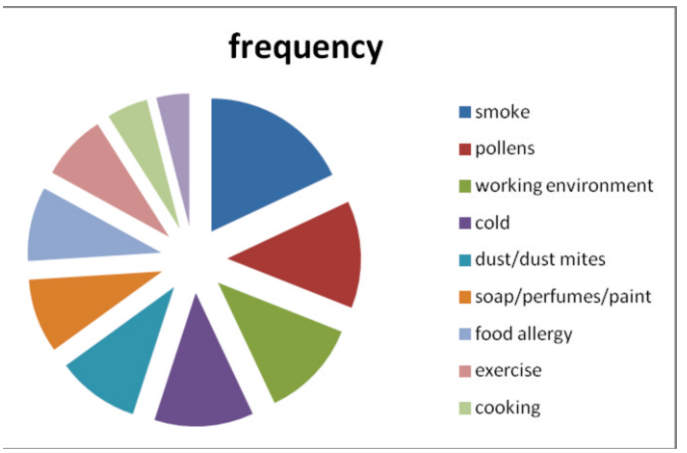

Figure 1: Frequency distribution

asthma in 6% patients, after cesarean section in 4% females, and 3% in obese patients and 2% do not know the reason of asthma. Occupational risk factor was more common in industrial cities like Karachi(Pakistan).[10] Islamabad is green city almost free from industries, so the occupational factor is very low.

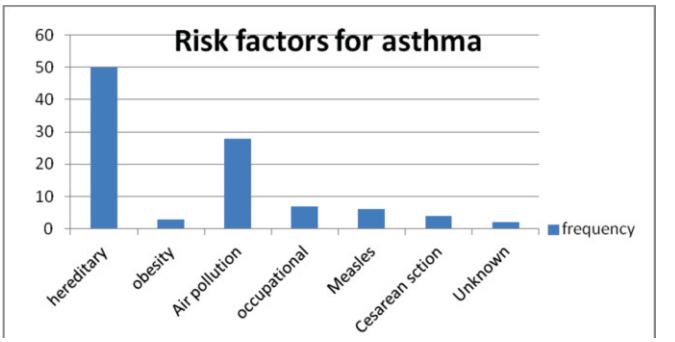

Figure 2: Risk factors for asthma

DISCUSSION

Asthma is a chronic disease and like all chronic diseases it affects the physical, psychological and social life of an individual. It not only affects the individuals from its physical perspective as having disease but also affects his mental health, his attitude towards the triggers that are otherwise normal things. Activities of daily living are also affected including the attendance from school and work and also increase hospitalization. In some countries asthma is still a stigma for a person including our own country, Pakistan. This study has been done mainly to find out how much the quality of life is disturbed by asthma and what are the most common precipitating factors in the capital city Islamabad and its twin Rawalpindi.

Asthma prevalence was high in females. In this study, 21% were males and 79% were females. Asthma is dominated in malesfrom childhood up to 18 years but after that females dominates shown by several studies.[26] Estrogen hormone is said to be responsible for it.[27] Occupation was the next influential variable, almost half 45% were house wives. This finding correlates with previous studies in which house wives are among the most affected group by asthmatics.[28-30] 28% were either students or doing white collar jobs.[30] But there were some occupations that were specially considered causing asthma. They included 12% were cleaning workers affected either by dust as in housemaids also found in previous studies[30] or chemicals[31], 8% were

tailor, 4 males were electricians and 3 females were having their parlors. Risk factors are the factors that are responsible for the presence of a disease in an individual. Major risk factor in this study was family history; about 50% patients were having their first relative affected by either asthma or other allergies. Many studies all over the world shows strong association between the family history and asthma including Sweden[32], Taiwan[33], Scotland[34] and Australia(35). Next risk factor was air pollution affecting 27% people. This includes pollens in the individuals who got asthma after migration to the twin cities. 2nd factor in air pollution was Environmental Tobacco Smoke. Occupation affects 7% of patients, measles causes asthma in 6% patients, after cesarean section in 4% females, and 3% in obese patients and 2% do not know the reason of asthma. Occupational risk factor was more common in industrial cities like Karachi(Pakistan).[10] Islamabad is green city with very few industries, so the occupational factor is very low. Precipitating factors are the factors that are responsible for the initiation of an asthma attack. The highest precipitating factors in Islamabad/Rawalpindi are smoke 18% which is due to increase in the number of vehicles in city. Pollens affect 13% patients in Twin cities. Paper Mulberry is considered to be the highest pollen producing tree in twin cities which was brought in 1960 for the decoration of the capital. [36] Previously a study done in France shows a 54% increase in the incidence of an asthma attack in the pollen season especially due to poaceae (Grass pollens).[37] Pakistan Medical and Research Council published a Survey in 1999, according to which 45% population of Islamabad and Rawalpindi was sensitive to pollens of Paper Mulberry.[38] In this study pollen sensitivity is a bit low because the data collection was in summer season.12% are affected by cold weather, as winter in Islamabad/Rawalpindi is bit severe due to the approximation of hilly areas. 12% are affected due to the working environment including electrician, parlors and house maids. Next precipitating factor was dust affecting 10% of people. Soap perfumes and paints are the next precipitating factor affecting 9% of people. Exercise induces asthma in 8% of people due to sedentary life style and lack of knowledge of how much exercises are needed for the asthmatic people. Food allergy affects 9% of people. This allergy was from cold, oily and sour things. Rice was also a big reason for the initiation of asthma attack in some individuals. Animal allergy affects just 4% of people. A study done in Paris showed flour affecting 23% patients the highest followed by isocyanates 19%, followed by 8% affected by house dust.[39] In Islamabad and Rawalpindi we found smoke, pollens and dust to be the major precipitating factors.

CONCLUSION

In Islamabad and Rawalpindi it was found smoke, pollens and dust to be the major precipitating factors.

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