

A Retrospective Study on Epidemiology of Asthma and Chronic Obstructive Pulmonary Disease

Janga Akhila¹, Sree Keerthi MV² and Vatipelli Mahender^{1*}

¹St. Peter's Institute of Pharmaceutical Sciences, Telangana, India

²Vennela Chest Clinic, Telangana, India

Abstract

Chronic respiratory disease which majorly includes Asthma and Chronic Obstructive pulmonary disease that may account for an estimated burden of about 100 million individuals in India. There were only few studies from India on the field of epidemiology of Asthma and COPD. The prevalence rates for both disorders reported in different studies have widely varied. In phase-I of the observational study on epidemiology of Asthma and COPD was conducted at a chest clinic. Population prevalence of Asthma and COPD in all age groups was reported and analyzed. In phase-II of observational study a standardized and validated questionnaire was used employing uniform methodology in all patients. The main objective of this project is to find differences in the epidemiology of asthma and chronic obstructive pulmonary disease, including in the prevalence rates and other casual variables (age, gender, residence, occupation), if any, in different places in a Chest Clinic. And also to assess the influence of exposure to tobacco smoking, ETS (Environmental tobacco smoke) and other risk factors, on the prevalence of both Asthma and COPD.

Keywords: Asthma; Chronic obstructive pulmonary disease; Risk factors; Epidemiology

Abbreviations: COPD: Chronic Obstructive Pulmonary Disease; ETS: Environmental Tobacco Smoke; PMHx: Past Medical History; FHx: Family history; SHx: Social History

Introduction

India is a country with vast economical, racial and religious differences. Chronic respiratory disease includes majorly Asthma and COPD. These diseases account for 100 million individuals in India. Both are the inflammatory disorders of airways.

Asthma

Asthma is a chronic inflammatory disorder characterized by airway hyper-responsiveness to a variety of stimuli. It results from a complex interaction among inflammatory cells, mediators and airways. For practical purposes, asthma may be defined as a disorder of the airways characterized by the following:

- Paroxysmal and/or persistent symptoms such as dyspnea, chest tightness, wheezing and cough, with or without mucus production.
- Variable airflow limitation demonstrated by chest auscultation and/or repeated measurements of peak expiratory flow (PEF) or other spirometric indices.
- Airway hyper-responsiveness to a variety of specific and nonspecific inhalational stimuli.

Severity of obstruction is variable and believed to be as a result of bronchoconstriction airway wall edema, mucus plug formation [1]. It reduces the ventilation to some lung regions which causes a perfusion imbalance that leads to hypoxemia. According to 2001 census, in India prevalence of Asthma is 2.03% -men, 1.87%-women total 1.95% [1].

COPD

Chronic obstructive pulmonary disease is also an inflammatory disorder of the airways which is a major cause of disability and death all over the world, including in India. Unlike asthma, COPD is primarily a disease of adults and runs a progressive downhill course [2]. It includes the clinical conditions of chronic bronchitis and emphysema where chronic bronchitis is defined as the presence of cough and mucous

expectoration for at least 3 months in a year continuously for two or more years and Emphysema is a clinical condition causing permanent damage to the alveoli. In this respiratory tissue inflammation occurs which results in vasodilation, congestion, mucosal edema, goblet cell hypertrophy. These events trigger goblet cells to produce excess amount of mucous. In severe condition, clusters of alveoli merge further leading to diminishing the number of alveoli finally resulting in increased space available for air trapping. According to 2001 census in India, prevalence of COPD observed as men-4.18%, women-2.74% and total-3.48% [1].

Due to no particular differentiation of asthma and COPD symptoms, the prevalence rates greatly vary in different conditions and different studies.

This variation may also due to place of residence, socio-economic status. Smoking and tobacco chewing also shows significant difference. Thus epidemiological studies are required to assess the respiratory burden of particular area with respect to the exposure history and risk factors. This study was carried out in a district named Jagityal, with a geographical area of 3,043.23 km² and a population of 1,03,930 (2001 census). It is located in Telangana state, India. The population of this district consists predominantly of backward classes and people belonging to the lower rung of the social ladder. Agriculture and beedi workers are the two main occupations of this region which are found to be main reasons for the progression of diseases asthma and COPD.

Aim and Objective of the Study

Aim

To study the epidemiology of both the diseases that includes Asthma and Chronic Obstructive Pulmonary Disease.

***Corresponding author:** Vatipelli Mahender, Professor, St. Peter's Institute of Pharmaceutical Sciences, Hanamkonda, Warangal-506001, Telangana, India, Tel: +918702567303; E-mail: mahendra.v@stpeters.in

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Objective

- To find out the differences in the epidemiological aspects of asthma and chronic obstructive pulmonary disease including the prevalence rates and other casual variables (age, gender, residence, occupation) in different places of study site.
- To assess the influence of exposure to tobacco smoking, ETS (Environmental tobacco smoke) and other risk factors on the prevalence of both Asthma and COPD.

Methodology

Study site

The proposed study was carried out at Vennela Chest Clinic, Jagityal. During the study period; a total number of 175 patients were enrolled into the study. Out of them, 60 asthma patients and 50 COPD patients were considered. Vennela Hospital is a secondary health care hospital setup in Jagityal dist. This was the private center with the aim to provide effective service to the people of Jagityal and surrounding areas. Pulmonology is the major department. It provides all the facilities along with the adequate laboratory needs (it is equipped with facilities for spirometry, bronchoscope, Respiratory critical care unit and emergency requirements)

Study design

A retrospective observational study: A retrospective observational study looks backwards and examines exposures to suspected risk or protection factors in relation to an outcome that is established at the start of the study, to determine how these factors affects the rates of a certain outcome [2].

Study period: The Study period is 45 days (May 2016-June 2016)

Study inclusion criteria:

- Patients who are diagnosed with asthma and chronic obstructive pulmonary disease.
- Symptoms and family history showing evidence of both the diseases.
- Patients of either sex.
- All age groups (mostly from 0 years-85 years).

Study exclusion criteria:

- Patients with serious life threatening conditions.
- Patients with Tuberculosis.
- Patients with uncontrolled infections.

Study materials: All the relevant and necessary data was collected in the data collection form which includes Interviewing patients or patient care takers, health care professionals, prescriptions, patient case sheet and any other relevant sources [3].

The data collected include: Demographic details, chief complaints, past medical history, past medication history, family history, social history, general examination, information about sensitivity towards occupational and environmental triggering factors, social habits like smoking and tobacco usage, diagnosis and Medication chart [4].

Study procedure: Patients visiting Vennela chest clinic were reviewed on a daily basis. The patients who met the study criteria were enrolled into the study and the following information was collected: patient demographics, chief complaints, PMHx, FHx, SHx, sensitivity

towards occupational and environmental factors, smoking and tobacco usage and current medication. The patients with positive diagnosis towards asthma and chronic obstructive pulmonary disease were included. The data collected manually was reviewed and entered into Microsoft Excel database and then analyzed statistically.

Results

The roles of several factors were assessed in the study to help clinicians in decision making.

Gender

The percentage of allergy is greater in women than in men. In this study, the significant occurrence of Asthma and COPD was strongly associated with female population with ($P=0.58$) and the percentage of female population are higher when compared to males with frequencies of 64 (58%) and 46 (42%) respectively. The ratio of females- males (F/M) is 1.38:1. The p values of males was found to be $P=0.316$ in and $P=0.68$ in females in Asthma, whereas in COPD $P=0.540$ in males and $P=0.460$ in females (Table 1).

Age

Asthma is more among the individuals of young age 10-25 years, were as COPD was more between the age group of 60-70 years. Study population, the percentage of asthma is higher in the age group of 0-25 years (40%), followed by 26-40 years (33.3%), 41-60 years (21.66%), 61 and above (5%), and among COPD higher number of patients were in age group of 61-70 years (38%), 51-60 years (24%), then 40-50 years (20%), 71-80 years (12%) 81 and above (4%), 35-40 years (2%) age groups patients (Table 2).

Other risk factors (smoking and tobacco chewing)

Significant occurrence of Asthma and COPD was found in relation with the risk factor tobacco chewing, predominantly in females [5].

Male patients (5%) diagnosed with asthma who having habit of smoking, were as male patients (38%) with COPD were smokers. In tobacco chewing in asthma ($n=7$) patients (11.66%) were observed, among them ($n=2$) male patients 3.33% female patients ($n=5$) 8.33% and in COPD ($n=22$) patients 44% were observed, among them male patients ($n=5$) 10% and female patients ($n=17$) 34% were observed [6]. The p value of COPD for smoking was found to be 0.380 in males and $p=0.440$ in females in case of tobacco chewing and it is the predominant (Table 3).

Gender	Total	Asthma	COPD
Male	42%	31%	54%
Female	58%	68.33%	46%

Table 1: Gender wise distribution.

AGE (IN YEARS)	PERCENTAGE
0-25	42%
26-40	32%
35-40	2%
40-50	20%
41-60	22%
51-60	24%
61-70	38%
71-80	12%
61 and above	4%
81 and above	4%

Table 2: Age wise distribution.

	ASTHMA			COPD		
	TOTAL	MALE	FEMALE	TOTAL	MALE	FEMALE
Smoking history	5%	5%	-	38%	38%	-
Tobacco chewing	11.66%	3.33%	8.33%	44%	10%	34%

Table 3: Occurrence of asthma and COPD in relation with smoking and tobacco chewing.

Total	25%
Male	10%
Female	15%

Table 4: Assessment of family history.

Occupation	Asthma	COPD
Beedi worker	20%	8%
Farmer	21.66%	68%
Unskilled worker	16.66%	22%
House wife	10%	2%
Student	26.66%	-
Others	5%	-

Table 5: Assessment of occupation.

Family history

The family history of the Asthma patients was taken during the patient interview. In this study population, family history of asthma was found to be significant with current asthmatic patients and it was found to be 25% (n=15 and P=0.240). There is no evidence of genetic predisposition in COPD patients (Table 4).

Occupation

In both the diseases asthma and COPD, farmers occupy a major number of total populations followed by beedi workers. More number of students also observed in case of asthma (Table 5) [7].

Discussion

Epidemiology is the study of the occurrence, distribution and determinants of health conditions in populations, and the application of this knowledge to control health problems. It is fundamental to improving public health. Chronic respiratory disease which includes Asthma and Chronic Obstructive pulmonary disease, may account for an estimated burden India [8]. There were only few studies from India on the field of epidemiology of Asthma and COPD. The prevalence rates for both disorders reported in different studies have widely varied. According to 2001 census, in India prevalence of Asthma is 2.03% -men, 1.87% - women, total 1.95%, whereas for COPD men-4.18%,women-2.74%,total-3.48%. Based on the study ,it was found that, the prevalence rate of Asthma was found to be 0.35% and COPD of 0.27% (approximately). In this study, the percentage of female population was higher when compared to males [9]. The percentage of asthma is higher in the age group of 10-25 years which indicates the genetic predisposition, and among COPD higher number of patients were in age group of 61-70 years, as COPD is a chronic disease and is progressed as age increases [10]. Among asthma patients 75% were allergic to occupational and environmental triggers, were as in COPD 74% were allergic as most of the population are beedi workers and farmers which are the main risk factors. Among COPD 38% were smokers [11].

The tobacco chewing was found to be 44% in COPD. Family history of asthma was found to be more, and it is observed to have 25% of total asthma patients. There is no evidence of genetic predisposition in COPD patients. In the study population in both the diseases asthma and COPD farmers occupy a major number of total populations

followed by beedi workers. More number of students is also observed in case of asthma [12].

Conclusion

The strong environmental and occupational triggering factor that contributes for the development of COPD was observed with air pollution.

Genetic predisposition plays a major risk factor causing Asthma in addition to air pollution Apart from these risk factors, occupation contributes to the progression of disease. Its alarming time to bring out significant monitoring in the respiratory disease prone areas considering their risk factors and exposure history. Different patient counseling strategies should be adopted in such areas and awareness among the population considering the risk factors and triggers that could have a strong significant relation with Asthma and COPD.

This plays a vital role in decreasing the prevalence and incidence rates. Further understanding of risk factors in relation to pathophysiology could improve management in this vulnerable population.

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