Original Article

Frequency of Chronic Obstructive Pulmonary Disease in Sugarcane Mills Worker

COPD in Sugarcane Mills Worker

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ABSTRACT

Objective: To determine the frequency of COPD among workers of sugar mills in Pakistan.
Study Design: Observational/ cross sectional study.
Place and Duration of Study: This study was conducted at the Avicenna Medical and Dental College Lahore from March to August, 2020.
Materials and Methods: One hundred and twenty workers of any age were enrolled in this study. Detailed demographics including age, sex, residence, socio-economic status, education, smoking status and family history of respiratory diseases were recorded after taking informed written consent. COPD was diagnosed by spirometry using the GOLD criteria. Data was analyzed by SPSS 27.0.
Results: There were 100 (83.33%) males and 20 (16.67%) were females. Mean age of workers was 42.24±15.36 years. COPD was found in 32 (26.67%) workers. Smokers, low socio-economic status, rural residency, family history of respiratory disease and male gender were the significant risk factors associated with COPD with p-value <0.05.
Conclusion: Chronic obstructive pulmonary disease (COPD) was highly prevalent in workers of sugarcane mills.
Key Words: COPD, Sugarcane Workers, Socio-economic status, Residence, Smokers

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INTRODUCTION

Employment health should concentrate on the promotion and maintaining of the highest degree of physical, mental and social wellbeing of employees in all professions; shielding workers from risk factors adverse to health in employment; placing and maintaining the worker; and adapting their physiological and psychological facilities to their employment environment and summing up adaptation measures An industrial worker can be exposed to workplace hazards; physical, environmental, biological, mechanical and psychological hazards are hazards. Work-related diseases are diseases resulting from or during work. Job diseases may include dermatitis, cancer, liver, heart and psychological problems[1].

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The recurrent restriction of airflow assessed by pulmonary obstructive disease (COPD) is determined by lung function testing and a chronic bronchitis is a reference to a development of productive cough for at least 3 consecutive months each year for a minimum of 2 years[2]. Since they are two distinct disease entities and the existence of one does not exclude other entities, it is important to classify both separately[2] the burden of these diseases. COPD affects nearly 65 million people around the world and makes up 5% of the world's total deaths[3]. The prevalence of COPD continues to grow globally. By 2030, following ischemic heart and cerebrovascular disease, it is expected to become the third leading cause of death. Although assessment constraints are restricted by the implementation of variable methods and COPD definitions, a comprehensive evaluation based on data from 28 developed and developing countries has shown a combined global prevalence of 7.6%[4]. Outdoor predisposition, tobacco smoking, occupational dusts and fumes, indoor (use of bio-mass fuel, particularly for developing countries) and outdoor air pollutants, ageing, diseases, asymmetry and low socioeconomic status[5-6] are stated to be risk factors of COPD.

A number of harmful exposures, particularly bagassosis, are known to occur in the sugarcane industry which may lead to respiratory symptoms and disease, such as chronic bronchitis, byssinosis and impairment of the lung function[7-8]. Sugarcane is

Pakistan's fourth largest cash crop that contributes Rs. 48.292 million in the agricultural economy. The contribution to the broad industry is 18% and 1.9% of GDP. The contribution of the sugar industry to the federal excise tax exchange is 11.2 percent. The sugar cane average yield is 44 tonnes, compared to 60 tonnes per hectare on the world average.

Bagassosis, an extrinsic allergic alveolitis due to inhalation of high bagasse concentrations infected with actinomycetes is one of the most deleterious effects in sugar cane workers. The disorder is acute and persistent[9-10] in distinct phases. Ocular irritations and increased risk of eye infection were also associated with bagasse exposure[11]. The studying and evaluation of health effects in sugar cane workers, including quantitative exposure assessment, are usually restricted to tropical countries[12-13].

MATERIALS AND METHODS

This cross-sectional study was conducted at Avicenna Medical and Dental College Lahore for the duration of six months from 1st March to 31st August, 2020. Total 120 asymptomatic sugarcane mills workers of any age were enrolled in this study.Detailed demographics including age, sex, residence, socio-economic status, education, smoking status and family history of respiratory diseases were recorded after taking informed written consent. The workers who were found to be clinically positive for symptoms, were further subjected to laboratory investigations such as Haemoglobin estimation using Sahli's haemoglobinometer, Blood sugar estimation using Glucometer, Audiometry in a reasonably sound proof room using a pure tone audiometer (Advanced digital audiometerAD2100) and assessment of pulmonary function using computerised Spirometry (nddMedizintechnik AG Spirometer). A walk-through survey of the factory was done and possible hazards the workers were exposed to in the different sections was noted.

All the data was analyzed by SPSS 27.0. Chi square test was done to analyzed the risk factors such as age, gender, residence, socio-economic status, education and smoking status. P-value <0.05 was taken as significant.

RESULTS

Out of 120patients, 100 (83.33%) were male while 20 (16.67%) were females. 35 (29.17%) patients were in between 18 to 30 years of age, 40 (33.33%) patients were in between 31 to 40 years, 28 (23.33%) patients were in between 41 to 50 years,17 (14.17%) patients were between 51-60 years of age. Mean age of patients was 42.24±15.36 years. 70 (58.33%) patients were married while 50 (41.67%) were unmarried. 55 (45.83%) patients had low socio-economic status and 65 (54.17%) had middle socio-economic status. 60 (50%) patients had primary level education, 40 (33.33%) had high school and 20 (16.67%) had intermediate. Family history of respiratory disease was found in 25 (20.83%) patients. Disease due to smoking was found in 45 (37.5%). COPD was found in 32 (26.67%) workers. (table 1)

Table No.1: Baseline detailed demographics of patients

Characteristic	frequency n	%
Mean age (SD)	42.24±15.36	-
Age:		
18-30	35	29.17
31-40	40	33.33
41-50	28	23.33
51-60	17	14.7
Marital Status		
Married	70	58.33
Unmarried	50	41.67
Gender		
Male	100	83.33
Female	20	16.67
Socio-economic Status		
Low	55	45.83
Middle	65	54.17
Education		
Literate primary	60	50
High school	40	33.33
Intermediate	20	16.67
Family History of respiratory		
Yes	25	20.83
No	95	79.67
Smoking status		
Yes	45	37.5
No	75	62.5
Status of COPD		
Yes	32	26.67
No	88	73.33

After the detailed examination of the enrolled patients we found that, smokers, low socio-economic status, rural residency, family history of respiratory disease and male gender were the significant risk factors associated with COPD with p-value <0.05. (table 2).

Table No.2: Factors associated with COPD

Characteristic	Frequency	COPD Yes	COPD No	P-value
Gender				0.026
Male	100	30 (30%)	70 (70%)	
Female	20	2 (10%)	18 (90%)	
Socio-economic Status				0.001
Low	55	27 (49.09%)	28 (50.91)	
Middle	65	5 (7.7)	60 (92.3)	
Education				0.01
Literate primary	60	20 (33.33)	40 (62.67)	
High school	40	10 (25)	30 (75)	
Intermediate	20	2 (10)	13 (90)	
Family History respiratory Disease				0.001
Yes	25	20 (80)	5 (20)	
No	95	5 (5.3)	90 (94.7)	
Smoking Status				0.0001
Yes	45	28 (62.22)	17 (37.78)	
No	75	4 (5.33)	71(94.67)	

DISCUSSION

The PFT test is a fundamental test for diagnosis, evaluation of pulmonary dysfunction, pulmonary disorders and treatment results. Pulmonary function is an important test. It is understood that the physical characteristics of the lung functions differ, including age, height, body weight and height (hypoxia or low ambient pressure). Bagasse is an organic powder that contains high concentrations of bioaerosols such as bacteria, actinomyces, and plant and animal fungi. Bagasse is a byproduct of sugarcane crushing. The dimensions range from 0.5 to 3 microns, known as respirable dust, which is exposed by sugar workers because of their occupations.[14]

In this study we concluded that chronic obstructive pulmonary disease (COPD) was highly prevalent in workers of sugarcane mills. Total 120 patients of both genders were included in this study and mostly were males. Mean age of the patients were 42.24±15.36 years. COPD was found in 32 (26.67%) workers. Smokers, low socio-economic status, rural residency, family history of respiratory disease and male gender were the significant risk factors associated with COPD with p-value <0.05. These results were comparable to the previous studies conducted by Khade YS et al and Gascon M et al.[15,16]

In sub-professional classes, especially bagase staff (26.19 percent) and manufacturing employees (22.55percent)[17], the bronchial obstruction was the main cause of pulmonary abnormalities. Spirometric analysis[18] found that obstructive ventilatory defects prevailed in some 28,5 percent of the workforce surveyed, followed by limitative defects of approximately 19,6 percent of workers during particle-board manufacture, while a combined defect affected approximately 6 percent of the workforce. Symptoms and symptoms include cough, sputum expectoration, hemoptysis, fever, dyspnea, wheeze, chest pain, speech heartbeat and weight loss.[19]

The management of COPD is controlled by trained facilities workers by the BODE index before and after the intervention (Body mass index, airway obstruction, dyspnea, and ability for exercise) after 6 months.[19,21] These findings have been comparable to previous studies by Manikandan S, et al in our analysis of 37,5% of patients with disease induced by habitual smoking[22]. Bhattacharjee A, et al presented in their study that healthcare programmes are needed for this population in order to improve the function of the lung and hence the quality of life of obese people.[23]

CONCLUSION

Chronic obstructive pulmonary disease (COPD) was highly prevalent in workers of sugarcane mills.

Author's Contribution:

Concept & Design of Study:	Shamshad Ali
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Data Analysis:	M. Afnan Hanif, Muhammad Shahzad Aslam, Farhan Saeed
Revisiting Critically:	Shamshad Ali, Zaheer Ahmed
Final Approval of version:	Shamshad Ali

Conflict of Interest: The study has no conflict of interest to declare by any author.

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