Original Article

Respiratory Diseases with cement

Pattern of Respiratory Diseases & Associated Socio-Demographic Factors among Workers of Zeal Pak Cement Factory, site area, Hyderabad

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ABSTRACT

Background: The occupational dust leads to various respiratory diseases. It is a major health problem among factory workers & is under reported in everyday scene of medical practice.

Objectives: To assess the frequency of occupation related lung diseases among study population. To seek association of socio-demographic characteristics with occurrence of lung diseases among study population.

Study design: Descriptive cross sectional study

Place and Duration of Study: This study was conducted in the Zeal Pak Cement factory, site area, Hyderabad for a period of one year.

Materials and Methods: Data was collected by filling a questionnaire; subjects were selected by convenience sampling. Frequencies were computed, chi-square test was applied to see any statistical analysis of various categorical variables.

Results: Among 100 subjects examined, the frequency of respiratory diseases was found among 83% workers. 70% subjects belonged to labour class who were closely exposed to occupational dusts. 58% of the subjects were earning < rs:4000 /month; however no association of socio-economic status was seen with occurrence of respiratory diseases (p=0.06). 63% workers belonged to age group 31-40 years. Chronic bronchitis was the most commonly presenting respiratory disease i.e. 37%, while cor pulmonale reported in 4% of the workers. Silicosis along with tuberculosis was reported among workers of age group 40-50 (p=0.01).

Conclusion: The high frequency of occupation dust related respiratory diseases warrants further research in order to design preventive strategies against them.

Key Words: Respiratory diseases, cement, factory workers, socio demographic factors.

INTRODUCTION

The history of occupational lung diseases is as old as mankind. This is because the lungs are in direct contact with the external environment like our skin. In 1556 Geogins, Agricola mentioned the danger of suffocation underground due to toxic fumes and pointed out that breathlessness due to inhalation of dust resulted in the premature death of many miners[1]. First attention was given by Ramazzine in 1713 the father of occupational lung diseases, who mentioned breathlessness among the handlers of grain[2]. A specific black pigmentation of lung was seen in Scottish coal miners[3]. The Bureau of Labour-Statistic state health department select committee on occupational illness and injuries carried out a study on hospital discharge record to identify cases of occupational disease. They identified the cases of pneumoconiosis, extrinsic allergic alveolitis, and respiratory conditions due to chemical fumes and vapours[4].

The inclusion of industry and occupation on the hospital discharge record help in the diagnosis of occupational diseases[5]. This study was conducted in Zeal Pak Cement Factory workers in period of one year from. It is one of largest cement factory in Pakistan.

The purpose of this study was to determine the respiratory disease risk factors so as to give suggestions on how to strengthen the pre-employment /periodical examination in the factory in future.

MATERIALS AND METHODS

It was a factory based descriptive cross sectional study conducted in Zeal Pak Cement Factory, Hyderabad. The duration of the study was one year. The factory has a dispensary along with services of medical officers as well as women medical officers. The factory had also facility to admit the patients in different hospital under different consultant on expense of factory. Therefore diagnosing the patients & classifying their illnesses was not a problem.

Study Population & Sample Size: We selected one hundred subjects belonging to all cadres in the factory; all subjects were males. The sample was collected by convenience technique of sampling. The workers who were older than sixty years, were smokers, were already

suffering from previous chronic illness including chronic lung disease, pulmonary tuberculosis or were asthmatics, all were excluded from the study.

Data Collection and Analysis: The investigators collected the data on a pre-formed close ended questionnaire including few open ended questions & a check list of the medicines taken by responders. The variables of interest included age, type of work i.e. job cadre, socio-economic status, duration of occupational exposure & type of respiratory diseases .A detailed history was taken which includes all aspect of family history,socio-economic history,previous hospitalization and drug history. The symptoms such as cough, dyspnoea , wheeze, hemoptysis, tightness in chest and any active disease. The frequencies of various socio-demographic variables were calculated in percentages. Chi-sqaure test was applied to observe associations. The p-values of ≤ 0.05 were taken as the level of significance.

RESULTS

In a series of six experiments for each group, histamine and insulin produced a dose dependent reversible contraction of tracheal chain of guinea pig. Maximum mean amplitudes of contraction with histamine, insulin and insulin pretreated with montelukast were 92.5 ±1.20 mm, 35 ± 1.13mm and 34.5 ± 1.024 mm respectively (Table 1 & 2). Maximum insulin induced contraction was 38 percent of histamine mediated contraction. The percentage responses for all the three groups were also calculated and compared (Table1 &2).

Table No.1:Socio-Demographic Features of Subjects

Demographic Characteristics	%age
Age	
21-30 years	22%
31-40 years	63%
41-50 years	11%
51-60 years	4%
Nature of Work	
Officer	10%
Working as support persons	20%
Laborers	70%
Monthly Income	
<Rs: 4000	58%
Rs: 4000-6000	27%
>Rs 6000	15%
Duration of Occupational Exposure to Dust	
<5 years	3%
5 – 10 years	25%
10-15 years	38%
>15 years	34%

The shape of cumulative concentration response curve and amplitude of contraction remained almost the same for both groups so monteleukast did not significantly attenuate insulin induced hyper-reactivity.

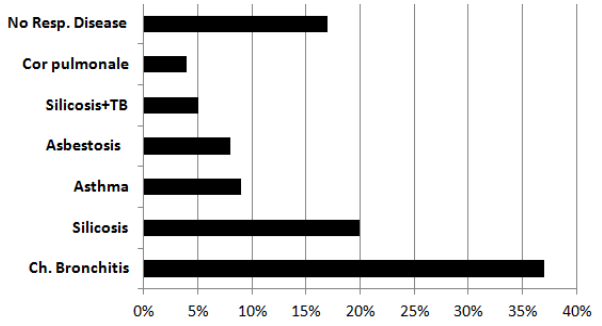

Chart No. 1: Respiratory Disease Distribution Among Factory Workers

The mean amplitude of responses, percent responses and percent deviations produced by each dose of histamine and insulin when compared between group I and 2 was found to be statistically significant (Table 1), while the percent responses and percent deviations produced by insulin and insulin pretreated with montelukast when compared between group 2 & 3 were found to be statistically insignificant (Table 2).

Table No.2: Duration of occupational exposure among patients of chronic bronchitis

S.No.	No. of Years of Exposure	No. of Patients (%)
1	5-10 years	22 (59.45%)
2	10-15 years	12 (32.43%)
3	>15 years	3 (8.2%)

Among one hundred workers examined during the study, the workers were classified into three groups according to nature of job. The results revealed that 10% were officers, 20% were office workers and remaining 70% were the laborer. All workers were male. All workers were classified into three groups according to their income. The workers who were earning monthly income below Rs: 4000 were 58% of the subjects, those earning between Rs: 4000-6000 were 27% of the total subjects while the remaining 15% were earning more than Rs: 6000 per month (Table 1). The age wise distribution of the workers revealed that 22% belonged to age group 21-30 years, 63% workers belonged to age group 31-40 years, 11% workers belonged to age group 41-50 years while 4% were those belonging to age 51-60 years (Table No:I). Regarding respiratory symptoms and signs, out of 100 workers, 58% workers presented with cough, 69% workers presented with Dysnponea, 33% workers presented with tightness of chest especially at work place, 3(3%) workers presented with haemtopysis, 5% workers presented with weight loss. Chronic bronchitis was the most commonly presenting respiratory disease i.e. 37% among the workers, while cor pulmonale was present among 4% of the workers (Chart No: I). Chronic bronchitis was seen more frequently among workers who were exposed to the occupational dust for 5-10 years & were belonging to age groups more than 40

years, however age did not revealed statistical association to occurrence of chronic bronchitis (p= 0.1). Silicosis along with tuberculosis was reported among workers of age group 40-50 (p=0.01). No association of socio-economic status was seen with occurrence of respiratory diseases among workers (p=0.06).

DISCUSSION

Occupation always exerts its effect on the health of the people. It has already been documented in developed countries that cement dust causes lung function impairment, chronic obstructive lung disease, restrictive lung disease, pneumoconiosis and carcinoma of the lungs, stomach and colon[6]. Other studies have shown that cement dust may enter into the systemic circulation and thereby reach the essentially all the organs of body and affects the different tissues including heart, liver, spleen, bone, muscles and hairs and ultimately affecting their micro-structure and physiological performance[7]. A history of dysponea, pleuritic chest pain, fatigue, weight loss and pleural effusion in a cement factory worker is suggestive of mesothelima[8]. It has been therefore thought by the researchers to search the effects of exposure to hazardous dust particles to which cement factory workers are exposed. Our study showed the frequency of respiratory diseases among factory workers to be 83%. World Health Organization (WHO) reported prevalence of pulmonary diseases associated with cement /silicon dust as 55% in sub-continent Indo-Pak[9]; it revealed that 70% of the affected subjects who were suffering from respiratory ailments were belonging to labour class. A research conducted on this issue observed that the silica dust, which is ubiquitous in the atmosphere, still outnumbers the other types of dust, thus making silicosis the most frequently occurring pneumoconiosis[10]. Our findings were also endorsed by a report published in Times of India which highlighted silicosis as the major occupationally acquired disease[11]. The socio-economic status has always been found to be associated with occurrence of occupation dust related respiratory diseases. In our study, we found 58% of the subjects belonging to the group that was earning less than rs:4000/month. Contrasting to it, Meredith S was of the opinion that occupationally acquired diseases were equally prevalent among all the socio-economic strata of populations[12]. Low socio economic status was associated with occurrence of pneumoconiosis as was also researched by Smithers WJ [13].However, our study showed no association of socio-economic status with the occurrence of respiratory diseases among factory workers (p=0.06).

Regarding age wise distribution of the respiratory diseases among factory workers, we found that majority (63%) workers belonged to age group 31-40 years. This is an optimum productive age & if the workers get disease during this age, there are more chances that the diseases progress rapid towards a stage of irreversibility. We observed in our study that 4% of the workers developed cor-pulmonale. Some of the studies also endorsed our finding[14,15]. Some studies with similar objectives revealed that the diagnosis of occupational bronchitis initially related to history of working place and exposure to specific air born dust, gases, vapors or fumes ; later on chronic lung disease was confirmed by objective means through different steps in these studies such as history, monitoring of peak expiratory flows and supported by other specific investigations[16]. These findings were also endorsed by another research wherein prolonged exposure to silicon dust lead to impose bad prognostic effects on the respiratory system especially on pulmonary function eventually leading to cor pulmonale[17].

A case of occupational bronchitis threatening workers continuation of employment was diagnosed by serial measurement of peak expiratory flow at home and work place. When specific agent was removed it led to improvement in bronchitis[18].

Hyers-IM cited Westerfield BT showing that there is a latency period of ten to forty years from the first exposure of occupational dust and significant lung disease[19.] The current study reported chronic bronchitis as being more frequently occurring among workers who were exposed to the occupational dust for 5-10 years & were belonging to age groups more than 40 years, however age did not revealed statistical association to occurrence of chronic bronchitis (p= 0.1). Silicosis along with tuberculosis was reported among workers of age group 40-50 in our study p=0.01); similar was finding by Merchant JA et al, too [20].

CONCLUSION

The respiratory ailments among cement factory workers are alarmingly high, although they are under reported. This base line study highlights various socio-demographic factors variably associated with occurrence of these diseases. The study invites more operational research in this field; this will help in forming preventive strategies against such diseases among factory workers.

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