

## Byssinosis in Karachi Cotton Mills

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**Objective:** To assess the prevalence of byssinosis in Karachi cotton mills.

**Methodology:** One hundred and thirty workers from morning shifts only were randomly selected. Each worker was examined and interviewed thoroughly using a structured, pretested questionnaire. FEV<sub>1</sub>, and FVC were done in all subjects.

**Results:** Mean age of card room, spinning room and blow room workers were 29.9, 25.3 and 25.4 years respectively. The mean age of all workers included in the study is 24.4 years. The workers distribution according to the duration of work was 30 from 1-5 years, 45 from 6-10 years; 20 from 11-20 year while 5 were working for more than 21 years. The symptoms, amongst the mill workers, in order of frequency, were sputum 50%, cough

and breathlessness 46%, tightness of chest 22% and chest pain 10%.

Prevalence of byssinosis was 8%. 75 % of byssinotics were up to 40 years of age while 25 % were more than 40 years. 87.5% Byssinotics were working from less than 20 years while 12.5% were working for more than 20 years.

**Conclusion:** Byssinosis was found to be 8% among the workers studied. Exposure to cotton dust caused significant reduction in FEV<sub>1</sub> and FVC in all groups of cotton workers. Smokers were more prone to byssinosis than non-smokers or ex-smokers. (Rawal Med J 2013;38: 230-233).

**Key words:** Byssinosis, cotton dust, pulmonary function test.

### INTRODUCTION

More than 62 million people globally are textile mill workers. Several studies have identified relationship between cotton dust exposure and the development of byssinosis in textile workers. Pakistan is a cotton grower country and Karachi being an industrial city has 64 cotton mills working at present, where more than 60,000 workers are exposed to a very high concentration of cotton dust. Without adequate protection to prevent its inhalation and many are susceptible to develop byssinosis, which is a preventable disease by environmental control and simple measures like use of face mask by workers during work.<sup>1</sup> A preliminary survey of some textile mills of Karachi revealed that the workers were either not provided with face mask or ignorant to use these. This study was undertaken to assess the prevalence of Byssinosis in Karachi cotton mills.

### METHODOLOGY

130 workers from morning shifts only were randomly selected. 25 were not included as they

were either absent, sick or refused to cooperate, and 5 workers, who repeatedly failed to perform spirometry in practice session, were excluded from the study. For inclusion in the study, a subject must have worked for at least one year in the mill. In addition to the above requirement each participant must have been off work for at least 24 hours and must have worked for 5 hours after weekend, before being examined. A questionnaire was designed which included specific questions on cough, smoking habits, sputum, breathlessness, chest tightness and its relation to work environment. Each worker was examined and interviewed thoroughly and questionnaire filled. Pulmonary function test of each worker included in the study was done namely FEV<sub>1</sub>, and FVC. At least 3 forced exhalations were recorded on each graph and the best result was selected.

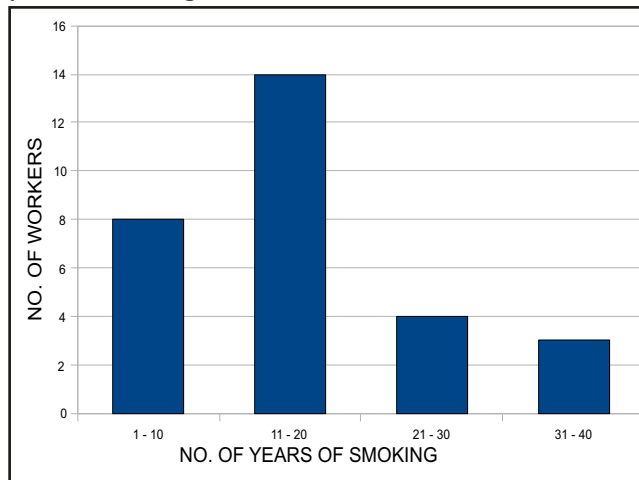
Severity of byssinosis was graded clinically according to schilling's classification<sup>2</sup>; Grade 0-No symptom .Grade ½- Occasional chest tightness or difficulty in breathing on the first day of work shift. Grade 1- Chest tightness or difficulty in breathing

on the first day of every work shift. Grade-2- Chest tightness or difficulty in breathing on the first day and other days of the work shift. Grade 3 -short of breath when walking at own pace on the level and Grade 4 - The patient is unable to walk more than about 100 yards on the level before dyspnoea makes him to stop.

**RESULTS**

Of the total of 100 subjects, 44 were examined from card room. They had a mean age of 29.9 years. 24 workers were examined from spinning room having a mean age of 25.3 years. The mean age of workers in the blow room was 25.4 years and they were 32 in number. The mean age of all workers included in the study is 24.4 years. The workers distribution according to the duration of work was 30 from 1-5 years, 45 from 6-10 years; 20 from 11-20 year while 5 were working for more than 21 years. The symptoms, in order of frequency, were sputum 50%, cough and breathlessness 46%, tightness of chest 22% and chest pain 10%. 29 percent workers were smoker;17 smoked 1-10 cigarettes/day while 8 smoked 11-20 cigarettes/day and 4 smoked 21-30 cigarettes/day. 8% were smoking from 1-10 years, 14% from 11-20 years, 4% from 21-30 years while 3% were smoking from 31-40 years (Fig 1).

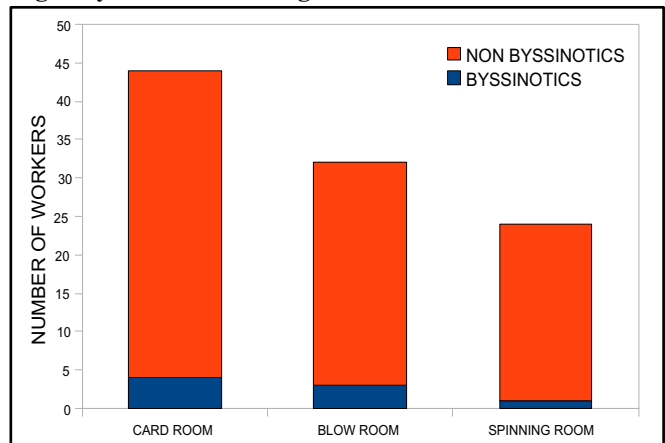
**Fig 1: Distribution of workers according to number of years of smoking.**



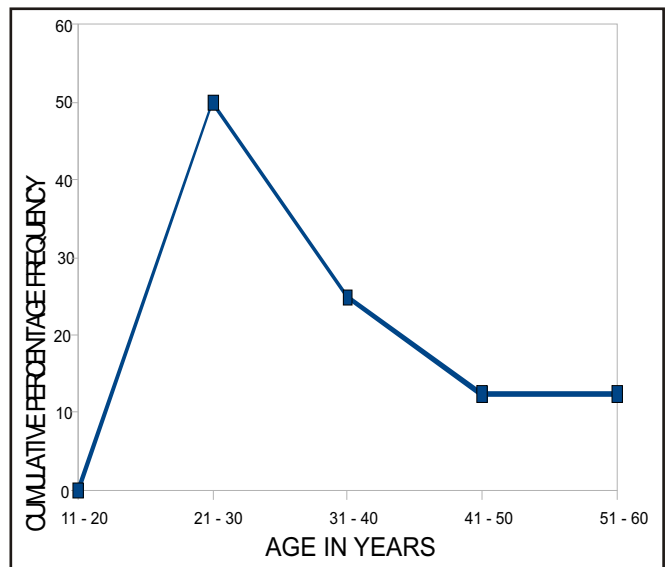
Prevalence of byssinosis was 8%. Among the workers suffering from byssinosis, 4 worked from 1-10 years, 3 from 11-20 years while 1 for 26 years.

4 were from card room (9.1%) 3 were from blow room (9.4%) and 1 from spinning room (4.17%) (Fig 2). 75 % were up to 40 years of age while 25 % were more than 40 years. 87.5% worked from less than 20 years while 12.5% worked for more than 20 years (Fig 3).

**Fig 2: Byssinosis according to location of work**



**Fig 3: Percentage of Byssinosis in different age group.**



62.5% were smokers in byssinotic group while 26% were smokers in non byssinotics. Among the workers suffering from byssinosis 5 were grade ½; two in grade 1 and one in grade 2 while none in grade 3. FVC and FEV<sub>1</sub> were reduced in all the Byssinotics, none of them had FVC above 3 litres except one. FVC was divided into 3 groups: 1) 1.4-2.0 litres, 2), 1-2.5 litres, and 3) 2.6-3.0 litres. In

group 1 the percentage of byssinotics was 37.5 % whereas in group 2 it was 50% and group 3 had 12.5 %. FEV<sub>1</sub> was also low in all of them and only one had FEV<sub>1</sub> of 78%, this being the highest recorded. The lowest figure was 40%.

FEV<sub>1</sub> was also divided in five groups as follows: 1) 31-40% ,2) 41-50% 3) 51-60% 4) 61-70% 5) 71-80%. FEV<sub>1</sub> was reduced in all of them. In group 3 it was 26.66%, 30% in group 4 and 36.66% in group 5.

## DISCUSSION

In our study, 8% subjects had typical chest tightness and reduced FEV<sub>1</sub> and FVC. Pravin et al reported prevalence of byssinosis in Indian textile mill workers to be 7.8%<sup>3</sup> while Murlidhar et.al found that in a Bombay Textile mill, 24% workers had byssinosis.<sup>4</sup> Osibogun et al reported that in a Nigerian textile mill only 6.36% were byssinotics.<sup>5</sup> In Pakistan, Farooque et al reported prevalence of byssinosis to be 19.28% in cotton mill workers of Karachi,<sup>6</sup> while Memon et.al found 35.6% byssinotics in textile workers of Karachi.<sup>7</sup> The most recent study by Nafees et al reported prevalence of 10.5% in Karachi cotton mills<sup>8</sup> which is near to our finding which may be due to improved environmental protection steps and increased awareness about use of masks in workers. Prevalence in our study was of 8% leads to very important conclusion that prevalence of byssinosis has decreased in Karachi cotton mills. Interestingly, in this study, the incidence of byssinosis was found to be lower in workers with a longer duration of exposure to cotton dust (7.4%) than those with a shorter duration of exposure 8.5%. This is undoubtedly due to self selection, great proportions of reactors among older workers having left the factory in the early phase of their employment.

In our study, persistent cough was found in 80.3% byssinotics while 25.6% in non-byssinotics. Scharg and Gullet reported 71% Carders, 91% weavers and 43% spinners had cough and 57% carders, 82% weavers, 71% spinners had persistent sputum.<sup>9</sup> In our study, 41% byssinotics and 21% non-byssinotics had persistent sputum.

The prevalence of respiratory symptoms was found to be higher in byssinotics exposed to cotton dust for

a longer period of time. As this group of workers was at the same time older, one could argue that these findings might be due to more advanced age. However, this is unlikely since the prevalence of respiratory symptoms was the same as in the non-byssinotics, in spite of the great difference in mean age between the two group of workers. The probability of developing the symptom increases with the length of exposure to cotton dust.

The presence or absence of byssinosis was not independent of respiratory symptoms ( $P < 0.05$ ). In our study, age group 21-30 years was more prone to byssinosis or else the chronic patient might have left the job because of incapacitation. This finding is consistent with a previous study.<sup>9</sup> The workers who had an average age of 36 years were 1.33 times more likely to suffer from byssinosis than the worker with an average age of 27 years. Those workers who, on the average, had exposure of 16 years of cotton dust were 3.2 times more likely to suffer from byssinosis.

## CONCLUSION

In Karachi Cotton Mills, byssinosis was found to be 8%. Exposure to cotton dust caused significant reduction in FEV<sub>1</sub> and FVC in all groups of cotton workers. The reduction of ventilatory capacity was considerably greater in subjects with longer than those with shorter exposure. Prevalence was low in spinning department while it was higher in Card room and blow room workers. Smokers were more prone to byssinosis than non-smokers or ex-smokers.

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Conflict of Interest: None declared.

Rec. Date: May 30, 2013 Accepted Date: July 5, 2013

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