

Respiratory Morbidities among Workers Employed in Cotton Industries in Surendranagar City

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Abstract :

Introduction : According to a publication in 1986 by the World Health Organization (WHO) on Pneumoconiosis and Smoking, workers in cotton processing industries have the risk of developing obstructive respiratory conditions such as Bysinosis and Occupational Asthma, due to prolonged exposure to inhalable cotton dust particles, bracts and pericarps as well as to bacteria and fungi that may grow on cotton products. **Objectives:** To identify the presence of Respiratory symptoms among those exposed to cotton dust and To associate the findings with the duration of exposure of cotton dust. **Methods :** The study carried out was cross sectional and in 3 cotton industries in Surendranagar city. A total of 144 workers who consented for the study were selected and were interviewed and examined for respiratory signs. **Results :** Nearly 78% of the subjects had respiratory complaints. Most of the workers had had a more than 10 year exposure to cotton dust. Majority of symptoms were dyspnoea and expectorations. Nearly 95% of the subjects had the habit of consumption of smokeless tobacco. **Conclusion:** It can be concluded from the study, that the risk factors for Respiratory diseases are highly prevalent among workers employed in industrial set ups involving respirable dusts. More than 80% of the workers had 10 yrs or more years of exposure to cotton dust and the association of the exposure with the respiratory problems was proved statistically significant.

Keywords : Cotton industry, Periodic medical examination, Respiratory, Tobacco

Introduction :

Occupational Respiratory disease is a lung condition that develops due to worker inhaling harmful substances at his or her place of work. These diseases are a major public health problem all over the world that account for up to 30% of all registered work related Respiratory diseases and 10–20% of deaths are caused by respiratory problems.^[1]

Occupational lung diseases are the most common work - related illness but fortunately many of the Respiratory diseases are preventable or controllable with proper treatment.^[2]

Cotton dust is produced by processing cotton with the use of machines in order to develop textile, fabrics, and final products such as clothes. Exposure of workers to cotton dust at their workplace has been

associated with development of several respiratory symptoms and diseases.^[3]

According to a publication by the World Health Organization (WHO) in 1986, on Pneumoconiosis and Smoking, workers in cotton processing industries have the risk of developing obstructive respiratory conditions such as Bysinosis and Occupational Asthma, due to prolonged exposure to inhalable cotton dust particles, bracts, and pericarps as well as to bacteria and fungi that may grow on cotton products.^[4-5] Exposure to the cotton dust led to respiratory problems, such as cough, phlegm, wheezing, shortness of breath, chest tightness, chronic bronchitis, and byssinosis and has also profound effect on pulmonary function.^[6-8] As Gujarat is known as “Textile State of India” and “Manchester of the East” and “Denim Capital of India” and it

contributes 25% to the country's manufacturing sector.^[9] Because of which, it attracts numerous work forces and the workers are largely exposed to the risk of these diseases. The present study was carried out to establish the quantum of such morbidities and identify the risk the workers are exposed to.

Objective :

1. To identify the presence of Respiratory symptoms among those exposed to cotton dust
2. To associate the findings with the duration of exposure of cotton dust

Method :

The present study was carried out in an industrial setting in Surendranagar city. Out of a total of 24 small and large scale cotton industries in Surendranagar city, a total of 3 industries were selected using simple random sampling using the table of random numbers. A prior permission was sought before the start of the study from the management of the factories who agreed to be a part of the research design. Permission from the Institutional Ethics Committee of C.U Shah Medical College in Surendranagar and oral and written consents from the workers were sought before the start of the study. The total subjects studied were 144 from 3 industries of Surendranagar city. The study carried out was cross sectional and the data was collected by directly questioning the subjects about their socio demographic details and also their physical examination for the presence of respiratory findings in them.

Data Analysis :

The data was analyzed using SPSS Microsoft excel 2007 and the relevant statistics were calculated.

Results :

Table 1 shows the basic socio-demographic profile of the subjects. It can be seen that majority of the subjects were young adults in the age group 20-40 yrs (56.25%) and all the subjects were males. In terms of education, majority of the subjects were educated upto primary (33.33%) followed by those

educated upto secondary (16.66%). Nearly 92% of the subjects were Hindus and 58% were married.

As most of the workers were laborers, majority of them were from social class 4&5. Nearly 82% of the subjects were from joint families, clearly showing the predominance of joint family system still existent in India.

Table 2 shows that majority of the subjects had an exposure of at least 10 years or more showing an increased risk of developing respiratory illnesses.

Figure 1 shows the prevalence of various respiratory symptoms and it can be seen that dyspnea was the most common symptom followed by productive & dry cough (43.2 & 29.5% respectively).

Table 3 shows the positive association of respiratory symptoms with the duration of exposure to cotton dust showing increased prevalence among those exposed for more duration. The association was proved statistically significant using chi squared test. ($p < 0.01$)

Mean duration of intake of tobacco was 14.33 yrs ($SD \pm 9.72$ yrs). Mean frequency of intake of tobacco was 15.5 times a day ($SD \pm 6.78$ yrs). It can be seen that majority of the subjects had the habit of consumption of chewing Tobacco & Guthkha. This habit being predominantly found in this part of the state is clearly reflected in this study too.

*Includes raw tobacco, guthkha, pan masala, bajar

**Includes Cigarettes & Bidi smoking

#Multiple response variable

Discussion :

The present study was carried out in an industrial setting. In the present study, the prevalence of respiratory symptoms was: Cough (29.5%), Expectoration (43.2%), Dyspnea (62.3%), Tightness in chest (25.6%) and Respiratory discomfort (14%). These findings were similar to Ghasemkhani M et al who studied the prevalence of respiratory symptoms among different industries by comparing them (viz. Food, drink & tobacco, Textile, Chemical,

Table 1: Distribution of the subjects as per their Socio-demographic characteristics (n=144)

| Variable | Frequency | Percentage |
|-----------------------|-----------|------------|
| Age (in years) | | |
| 20-40 | 81 | 56.25 |
| 40-60 | 63 | 43.75 |
| Sex | | |
| Males | 144 | 100 |
| Females | 0 | 0 |
| Education | | |
| Illiterate | 12 | 8.33 |
| Primary | 48 | 33.33 |
| Secondary | 24 | 16.66 |
| Higher Secondary | 36 | 25 |
| Graduate | 12 | 8.33 |
| Post Graduate | 12 | 8.33 |
| Religion | | |
| Hindu | 132 | 91.66 |
| Muslim | 12 | 8.34 |
| Marital Status | | |
| Married | 84 | 58.34 |
| Unmarried | 60 | 41.66 |
| Type of Family | | |
| Nuclear | 27 | 18.75 |
| Joint | 117 | 81.25 |
| Social Class* | | |
| Class 1 | 0 | 0 |
| Class 2 | 0 | 0 |
| Class 3 | 33 | 22.91 |
| Class 4 | 51 | 35.41 |
| Class 5 | 60 | 41.66 |

* Social class as per modified Prasad`s classification of 2009

Table 2 : Duration of dust exposure to cotton among the workers (n=144)

| Duration of Exposure | NO. | % |
|----------------------|-----|-------|
| <10 years | 21 | 14.58 |
| 10-20 years | 69 | 47.91 |
| >20 years | 54 | 37.5 |
| Total | 144 | 100 |

Table 3: Association between duration of exposure with the prevalence of respiratory symptoms among the workers (n=144)

| Duration of Exposure | Respiratory Symptoms | | |
|----------------------|----------------------|-------------|-------------|
| | Present | Absent | Total |
| <10 years | 6 (5.40%) | 15 (45.45%) | 21 (14.58%) |
| 10-20 years | 57 (51.35%) | 12 (36.36%) | 69 (47.91%) |
| >20 years | 48 (43.24%) | 6 (18.18%) | 54 (37.5%) |
| Total | 111 | 33 | 144 |

χ^2 test = 33.43, DF = 2, P<0.01

Table 4 : Forms of tobacco consumed by the subjects (n=144)

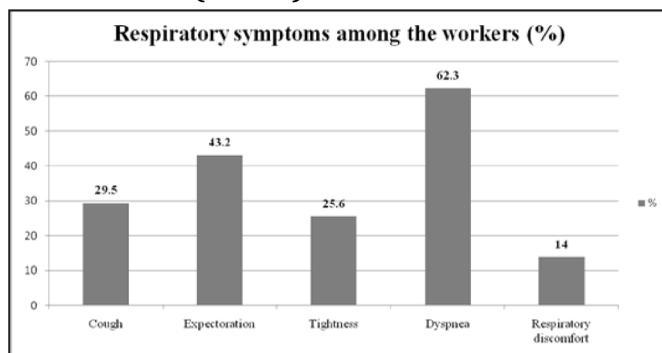
| FORM OF TOBACCO # | No. | % |
|---------------------------------------|-----|-------|
| Smokeless Tobacco (Chewing tobacco) * | 138 | 95.83 |
| Smoky Tobacco ** | 76 | 52.77 |

* Includes raw tobacco, guthkha, pan masala, bajar

** Includes Cigarettes & Bidi smoking

Multiple response variable

Figure 1: Prevalence of Respiratory symptoms among the workers exposed to cotton dust (n=144) #



Multiple response variable

Construction, Metal & other miscellaneous industries).^[10]In a similar study by Al-Neaimi et al of respiratory symptoms among workers in cement factory in a rapidly developing country reported recurrent cough (30%), Phlegm (25%) & dyspnea (21%).^[11]

In the present study, those with longer duration of exposure with dust had higher respiratory symptoms compared with those with duration of exposure lesser than 10 yrs. A similar study conducted by Baser S et al found that there was no such significant association of the symptoms with the duration of exposure of dust particles.^[12] Gasemkhani M et al found similar findings as the

present study showing significant association of duration of exposure and prevalence of respiratory symptoms.

In the present study large number of subjects had a habit of tobacco consumption. Nearly half of them also had a habit of consuming smoky tobacco (Cigarettes, Bidi, Hukka etc.). This could be because of the prevailing practice in this part of the country of more consumption of chewing (smokeless) tobacco as compared to smoky tobacco. In a study conducted by Arumugam et al, 27% of the males had a habit of tobacco consumption.^[13] Shah B et al reported 50-80% subjects as noncurrent smokers.^[14]

Conclusion:

It can be therefore concluded from the study, that the risk factors for Respiratory diseases are highly prevalent among workers employed in industrial set ups involving respirable dusts. More than 80% of the workers had 10 yrs or more years of exposure to cotton dust and the association of the exposure with the respiratory problems was proved statistically significant.

Recommendation:

1. Prevalence studies of similar types to be replicated in areas predominantly having textile and cotton industries.
2. Periodic screening of respiratory illness among the workers employed in these industries should be carried out at regular intervals to ensure workers' safety and health.
3. Early diagnosis and initiation of prompt treatment of the affected remains the corner stone of the control measures.
4. Engineering methods to ensure lesser exposure to the workers employed in these industries by designing research and innovation is the mainstay for prevention of occupational lung diseases.

Declaration:

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Conflict of Interest: Nil

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Corrigendum

In the past volumes of Healthline journal, i.e., No.6, 7 and 8, the front cover displayed the pISSN 2220-337X eISSN 2320-1525. Kindly read the same as pISSN 2229-337X eISSN 2320-1525. The inconvenience caused if any, due to typographical error is regretted.