



A STUDY OF PULMONARY FUNCTION TESTS IN COTTON MILL WORKERS OF GUNTUR DISTRICT

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ABSTRACT

Byssinosis is a respiratory disease caused by inhalation of cotton dust for prolonged period of time. This is most frequently occurs in the cotton mill workers. The word byssinosis is derived from Latin which means fine, soft, white fibers. Byssinosis is characterized by cough, wheeze, and chest tightness on the 1st day of work after returning from rest. **AIM;** The present study taken to evaluate the lung function of cotton mill workers who were working for past 10 years. **METHODS;** The present study was conducted on two groups of male subjects, comprising of apparently healthy males, of age ranging from 30-40 years. Group -1 consists of 238 male subjects who had occupational history of working in card room of cotton mills for about 10 years. Group-2 consists of 159 male subjects of same ages (30-40 years) who were working in the pickles factory and milk factory for the past 10 years. These subjects never worked in cotton mills. Group-2 taken as control group. The study was conducted on Mondays (which is first working day after rest) on computerized spirometer -spirometer SPL 95. Pulmonary functions were recorded i.e FVC, FEV1, PEF, PEF25%-75%. **RESULTS;** . FVC was decreased significantly (<0.001) in group-1 when compared with group-2. FEV1 in the cotton mill workers decreased significantly (<0.001) than the control subjects. Group-1 showed significant decrease (<0.001) in PEF than group-2. FEV 25%-75% in the cotton mill workers decreased significantly (<0.001) than the control subjects.

Key words; byssinosis, FVC, FEV1, PEF, FEV25%-75%.

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INTRODUCTION

Byssinosis is a respiratory disease caused by inhalation of cotton dust for prolonged period of time. This is most frequently occurs in the cotton mill workers. The word byssinosis is derived from Latin which means fine, soft, white fibers. Byssinosis is characterized by cough, wheeze, chest tightness on the 1st day of work after returning from rest.

India is the 2nd leading cotton producing country in the world next to China. It is estimated that nearly 20 million people working in the cotton industry. Workers are exposed to cotton dust particles which are in the sizes from 0.1 to 150 microns. They are released into the atmosphere during processing, picking, crushing, grinding, abrading and loading. The particles more than 10 microns settle down from the air rapidly while smaller particles remain

suspended indefinitely. The particles smaller than 5 microns are directly inhaled into the lungs and are retained there. This fraction of dust is called respirable dust and is mainly responsible for pneumoconiosis. When the workers exposed to cotton dust for more than 10 years their lung function altered which is depending on size of the particle, duration exposure.

FVC is the maximum amount of air that can be expired forcefully after maximum inspiration. FVC is decreased in restrictive lung diseases.

FEV1 the maximum amount of air that can be forcefully expired in the first second after force full inspiration. It is the most frequently used index for assessing airway obstruction, broncho constriction. FEV1 is expressed as percentage of the vital capacity.

PEFR is the maximum speed of expiration. PEFR decreased in restrictive lung diseases.

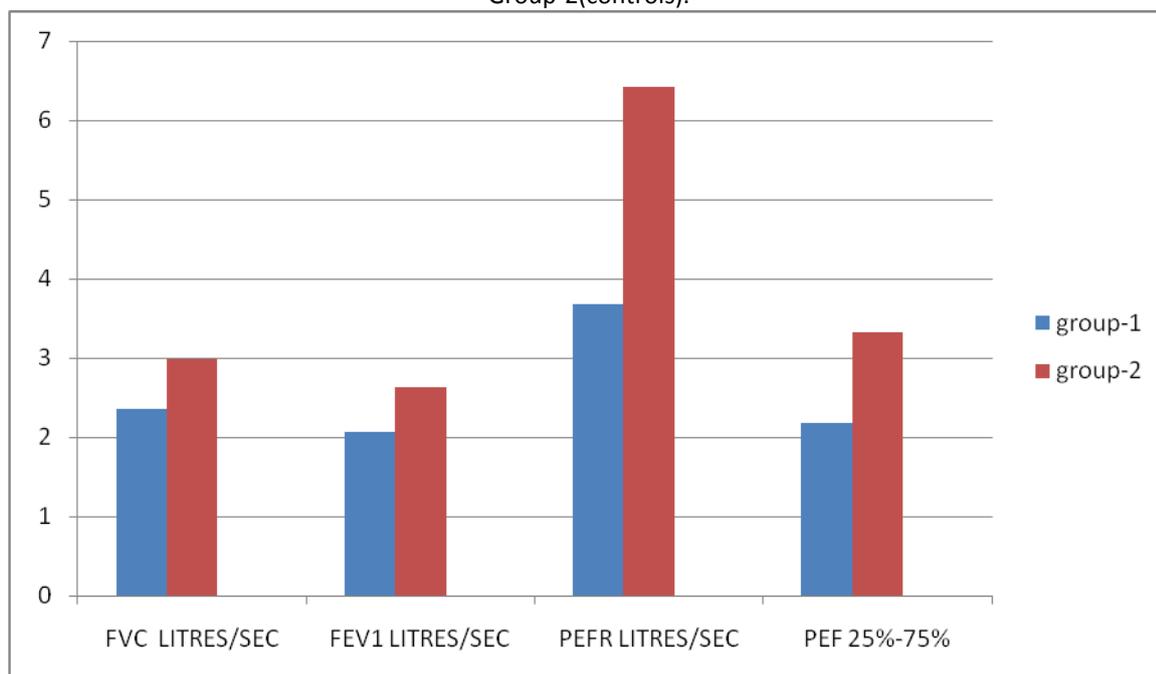
FEV 25%-75% is the flow of air coming out of the lung during the middle portion of a forced expiration. the average flow between 25% and 75% of vital capacity.

Key words; bysionosis, FVC, FEV1, PEFR, FEV25%-75%

Table-1/ FIG -1; comparison of Age, Height, Weight, BMI, FVC, FEV1, PEFR, PEF25%-75% In Group-1 (cotton mill workers) and Group-2 (controls).

	Group-1	Group-2	p-value
AGE	35.32	35.16	>0.05
HEIGHT cm	162.3	162.8	>0.05
WEIGHT kg	63.4	63.6	>0.05
BMI cm/kg	24.07	24	>0.05
FVC LITRES/SEC	2.36	2.98	<0.001
FEV1 LITRES/SEC	2.06	2.63	<0.001
PEFR LITRES/SEC	3.68	6.42	<0.001
PEF 25%-75%	2.18	3.32	<0.001

Table-2/ FIG -2; comparison of FVC, FEV1, PEFR, PEF25%-75% In Group-1 (cotton mill workers) and Group-2 (controls).



METHODS

The present study was conducted on two groups of male subjects, comprising of apparently healthy males, of age ranging from 30-40 years. group -1 consists of 238 male subjects who had occupational history of working in card room of cotton mills for about 10 years.

Group-2 consists of 159 male subjects of same ages (30-40 years) who were working in the pickles factory and milk factory. These subjects never worked in cotton mills. group-2 taken as control group

The group-1 and group-2 subjects apparently healthy individuals free from cardiovascular, neurological diseases and were non smokers.

Exclusion criteria: smokers, obesity, cardiovascular disease, anemia, neurological diseases.

All the subjects of group-1 and group-2 were informed about the experimental protocol and taken consent. The heights and weights of subjects were recorded BMI calculated.

The study was conducted on Mondays (which is first working day after rest) on computerized spirometer - spirometry SPL 95. The subjects were asked to stand in front of the spirometer and with mouth piece held firmly between lips. They were asked to inhale or exhale in to the spirometer with nose clip applied. Subjects were asked to take two or three normal breathings after which deep inspiration followed by rapid and forceful expiration. Pulmonary functions were recorded i.e FVC, FEV1, PEFR, PEF25%-75%. Results statistically analyzed using student t-test and p values calculated

RESULTS

There is no significant differences in age, height, weight, BMI of the two groups (table-1/fig-1). FVC was decreased significantly (<0.001) in group-1 (cotton mill workers) when compared with group-2 (controls). FEV1 in the cotton mill workers decreased significantly (<0.001) than the control subjects. group-1 showed significant decrease (<0.001) in PEFR than group-2. FEV 25%-75% in the cotton mill workers decreased significantly (<0.001) than the control subjects (table-2/fig-2)

DISCUSSION

Cotton dust is a complex mixture of components which may include ground-up plant matter, cotton fiber, bacteria, fungi, soil, or pesticides. It may include other contaminants that have accumulated during the growing, harvesting, and subsequent processing or during storage periods. Any dust present during the handling and processing of cotton is considered cotton dust. Manufacturing processes using new or waste cotton fibers or cotton fiber by-products from textile mills also produce cotton dust (1). Inhalation of cotton dust causes release of histamine from mast cells. Histamine acts on the smooth muscles resulting broncho constriction. Air way mucus glands secrete more amount of mucus in the presence of histamine. Histamine directly stimulates vagal nerves causing smooth muscle contraction. Contraction of smooth muscles of air ways reduces the air entry in to lungs. In the present study cotton mill workers (group-1) showed decreased FVC, FEV1, PEFR, FEV25%-75% levels when compared to controls (group-2 who were not exposed)

which is in agreement with the study of Dr. sujatha talakoti, dr anand N patil, dr manjunatha Aithala et al (2).

Saadat Ali Khan Aiza saadia (3) studied pulmonary function in Pakistani cotton ginner and found that significant fall in the FVC, FEV1, PEFR of cotton ginner which is consistent with our study.

Sangeeta Vyas (10) studied pulmonary function tests in workers of different dust industries and found that FEV1, PEFR, FEV25%-75% values were decreased in cotton industry workers which correlated with present study.

In the present study there was significant decrease in FVC In group-1 subjects observed which is in agreement with the studies Wang XR (5), GERALD DJ BECK (6), E Neil Schachter (7), Rao VL (8) Glindmeyer HW (9), Ramaswamy, P (10) Mohammed Kh (11).

FEV1 showed significantly decreased values in the cotton workers when compared with controls is in accordance with the studies of Sangeeta Vyas (4), Wang XR (5), GERALD DJ BECK (6), Glindmeyer HW (9) Ramaswamy, P (10) Mohammed Kh (11), Ángeles Jaén (12), Larson R K, Barman (13), Bakirci N (14)

SUMMARY

Dramatic and disastrous episodes of air pollution inversion have been documented in many industrial centers in the world. Exposure occurs through the manufacturing process, but is most pronounced in those portions of the factory involved with the treatment of cotton prior to spinning i.e blowing, mixing and carding. The workers of carding room exposed more to cotton dust and are likely in getting byssinosis. In the present study it was observed that there was an inverse relationship between chronic exposure to cotton dust and pulmonary function tests.

To decrease the diseases related cotton dust exposure the following measures have to be implemented.

- 1) Usage of exhausts to increase ventilation.
- 2) Wetting procedures to decrease aerosols.
- 3) Sampling of work place done to determine the amount of cotton dust in the environment for every six months.
- 4) Regular health checks up.
- 5) Providing masks.

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