

*LETTER TO THE EDITOR*

**PULMONARY FUNCTION TESTS IN SAW MILL FACTORY WORKERS**

Sir,

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The prevalence of pneumoconiosis varies from 15-30% in various parts of India (1). Occupational asthma may account for about 10% of adult asthma (2). Asthma associated with work is being recognized with increased frequency in carpenters, saw mill workers and furniture makers. The cause for occupational asthma is wood/saw dust. Earlier studies have documented increased incidence of asthma, chronic bronchitis and hypersensitivity pneumonia in wood cutters and saw mill workers (3, 4). Reduction in pulmonary function indices are known to be associated with these respiratory conditions (5). Studies of respiratory morbidity and lung function assessment have been performed among workers from various occupations but there are very few studies among saw mill workers. Hence, we have conducted the present study to assess the pulmonary function tests in saw mill workers, to test the hypothesis that inhalation of wooden dust decreases pulmonary function in saw mill workers.

The present study was undertaken in saw mill workers in Nanded region of Maharashtra. A total of 30 saw mill workers in the age group of 18 to 25 years were included in the study. All workers were male. Smokers and tobacco chewers were excluded from the study. Healthy workers with no previous history of respiratory or other significant illness were selected. History

of exposure to wooden dust was noted. Age of the subjects and anthropometric measurement, height (cm) and weight (kg) were recorded. They are matched in terms of height and weight. Procedures were done in accordance with standards of ethical committee of Govt. Medical College, Nanded, Maharashtra on human experimentation.

Ventilatory functions were measured with the help of computerized "MEDSPIROR" (RMS recorders and medicare systems, Chandigarh, India) instrument. Informed consent was obtained from all subject. The pulmonary function indices studied were forced vital capacity (FVC), forced expiratory volume in first second ( $FEV_1\%$ ), forced expiratory volume in third second ( $FEV_3\%$ ) and peak expiratory flow rate (PEFR).

Before each test the subjects were familiarized with testing procedure. All the procedures were carried out in sitting position during morning hours. During the test, the subjects were adequately encouraged to perform at their optimum level and also a nose clip was applied during vital capacity manoeuvre. Test was repeated 3 times and the highest value was considered as a final reading for each subject and mean of highest values of each group was calculated which are presented in Table I. All readings were recorded at BTPS. Subjects were divided into three groups

TABLE I: Pulmonary function indices in three groups.

Parameter	Group I n=10			Group II n=12			Group III n=08		
	% P	P	O	% P	P	O	% P	P	O
FVC (L)	75%	3.48	2.58±0.22	74%	3.20	2.38±0.34	60%	3.15	1.89±0.24
FEV <sub>1</sub> (L)	68%	3.00	2.06±0.20	70%	2.80	1.98±0.26	68%	2.74	1.88±0.77
FEV <sub>3</sub> (L)	61%	3.33	2.04±0.37	63%	3.16	2.02±0.21	64%	3.06	1.98±0.21
PEFR (L/s.)	83%	7.72	6.42±0.56	69%	8.70	6.01±0.23	68%	8.59	5.88±0.24

P = Predicted Value.  
O = Observed Value.  
%P = Predicted Value.

depending upon the duration of exposure to wood/saw dust as follows :-

Group I – Less than 2 years exposure to wood/saw dust.

Group II – Between 2–4 years exposure to wood/saw dust.

Group III – Between 4–6 years exposure to wood/saw dust.

The statistical analysis was done by using “SPSS” software. By applying ANOVA test to the observed values of group I, II, III, it was observed that FEV<sub>1</sub> and PEFR were significantly decreased at 5% level of significance.

However, FVC was not altered significantly while FEV<sub>1</sub> was significantly reduced, which is indicative of obstructive pulmonary disease. Decrease in FEV<sub>1</sub>, is

TABLE II: Showing F-Values for three groups according to different parameters.

Sr. No.	Parameter	F <sub>cal.</sub> Value	Result
1.	FVC	-2181.7388	Not significant
2.	FEV <sub>1</sub>	407.8888	Significant
3.	FEV <sub>3</sub>	-15.7371	Not significant
4.	PEFR	7.1014	Significant

significant at 5% level of significance (F<sub>calculated</sub> Value = 407.8888). This shows that exposure to saw dust causes obstructive pulmonary impairment. Pulmonary functions starts declining at about 40 years of age (6, 7). The age group which was selected in this study was 18–25 years, so possibly the change seen in FEV<sub>1</sub> is not due to age factor but due to exposure to saw dust.

PEFR shows significant decrease at 5% level of significance (F<sub>Calculated</sub>-Value = 7.1014). This suggest that wooden dust has an effect on PEFR. This is probably due to hypertrophy of mucosal cells due to irritation by wood/saw dust, resulting in increased secretions of mucus and formation of mucosal plugs which causes obstruction to the exhaled air (8). The pattern of lung volumes in saw mill workers in our study are in agreement with earlier reports by Bhat MR (9). However Singh SH et al (10) found no significant reduction in FVC in cotton spinners, this finding coincide with our study.

In occupational asthma, in addition to wood/saw dust, other precipitating agents include western red cedar dust, enzymes and isocyanates. Wood/saw dust can produce

bronchial hypersensitivity when high levels of exposure have occurred (3). The dust particles initiate the disease process but they themselves do not settle in lung parenchyma (1). The workers present with shortness of breath and nonreproductive cough, pulmonary function tests show marked

decrease in lung values (3, 4).

This study indicates that inhalation of wood/saw dust is associated with a reduction in pulmonary function and also greater decline in pulmonary function with greater duration of exposure.

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#### REFERENCES

1. Kulkarni AP, Baride JP. Occupational health. Textbook of Community Medicine 2ed. *Vora Medical Publication Mumbai* 1998; 261–280.
2. Meredith S, Norman H. Occupational asthma; measures of frequency from four countries. *Thorax* 1996; 51: 435–440.
3. David HW, David CC. Occupational health 2nd ed. Barry SL, David HH. Eds. Little Brown and Company, Boston 1998; 319–344.
4. Morell F, Rogar A. Subrosis clinical study and new etiological agents in a series of eight patient. *Chest* 2003; 124(3): 1145–1152.
5. Honig EG, Ingram RH. Chronic Bronchitis, emphysema, and Airways obstruction. In: Harisons principles of Internal medicine. 14th Ed. Vol. 2; New York, McGraw Hill Co. 1998; 1451–1459.
6. Jain SK, Gupta CK. Lung function studies in healthy men and women over forty. *Indian J Med Res* 1967; 55: 612–619.
7. Mathew L, Sengupta J, Lakhera SC, Raman CV. Age related changes in lung functions in Indian Servicemen. *Indian J Med Res* 1984; 79: 529–537.
8. Culver BH, Butler J. Alterations in pulmonary functions. In principles of Geriatric Medicine 3rd ed. Andes R, Bierman EL and Hazzard WR Eds. McGraw Hill Book Co. Ltd. (Lond) 1985; Chap 26: 280–287.
9. Bhat MR, Ramaswamy C. A comparative study of lung functions in Rice mill and Saw mill workers. *Indian J Physiol Pharmacol* 1991; 35(1): 27–30.
10. Singh SH, Gupta HL, Gandhi A, Rai UC. A study of lung functional abnormalities in workers of cotton spinning shop. *Indian J Physiol Pharmacol* 1986; Vol. 30: 79–84.

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