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Assessment of Peak Expiratory Flow Rate with Years of Exposure in Power Loom Workers in Rural Area in Salem District

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ABSTRACT

Introduction *Occupation is the one in which person not only earns daily bread but also spends one third of their life time. Occupational pulmonary diseases are more widespread and more disabling than any other group of occupational disease. Environmental factors influence respiratory morbidities significantly, occupational exposure being among the most important. So,The powerloom workers have increased prevalence of both obstructive and restrictive lung functions.* ***Aim of the study:*** *The study was designed to assess the Peak expiratory flow rate with years of exposure in powerloom workers .* ***Materials & Methods:*** *250 subjects between the age group of 30-70 years who volunteered to enroll for the study were selected in a rural area in Salem district. Peak expiratory flow rate was measured by using Wrights peak flow meter.* ***Results:*** *The result shows the subjects who were exposed to the dust for ≥ 2 years were found to have lower PEF than those who were exposed for < 2 years.* ***Conclusion:*** *This present study may be used to know the hazards of cotton exposure and this study may also be used to prevent the occupational hazards in Power loom workers by using the preventive measures of decreased exposure to work by shift method, proper ventilation, using mask while working time, and routine physical examination for every one year.*

Keywords*: power loom workers, peak expiratory flow rate, and pulmonary function*

INTRODUCTION

The textile industry is one of the oldest and second largest industry in the world. So, powerloom provides a major source of employment to the rural people in India[1]. It also plays a magnificent role in the socio-economic development of a society. Numerous epidemiological studies have documented decrements in pulmonary function and various other health problems associated with long-term air pollution exposure[2]. The power loom workers are generally at risk due to constant exposure to different types of pollutants emitted from the industries. Health problems posed by the pollutants at the work environment of an individual are closely linked to the nature and level of exposure to these hazardous pollutants[3]. Environmental factors influence respiratory morbidities significantly, occupational exposure being among the most important[4]. Environmental factors are believed to play a significant role in the development of allergic respiratory diseases, such as asthma and rhinitis[5]. Inhalation of different pollutants exposed from the industries cause damage to the membrane structure and mechanical efficiency. This leads to alteration in the functional properties of the lungs, resulting in various respiratory diseases. In textile workers duration of exposure, ageing and smoking can further complicate pulmonary functions.

In epidemiological studies of subjects exposed to community air pollutants, pulmonary function tests (PFT) are used as screening tests to determine their effects[6]. Pulmonary function test provides an objective and quantifiable measure of lung functions.

PULMONARY FUNCTION TESTS: Respiratory problems can be detected by using an instrument called Wright's peak flow meter. By using this instrument, we estimate the peak expiratory flow rate (PEFR) which is the important screening test for detecting the obstructive lung diseases. The workers who carried out the earliest lung function surveys in the Indian subcontinent emphasized the need for standardized values for lung function indices on the basis of ethnic group and environment. From this it is seen that young Indian males have a PEFRof about 450-550 lpm, while in young females it is a little lower (320–470 lpm)[7].

MATERIALS AND METHODS

In this study 250 subjects between the age group of 30-70 years who volunteered to enroll for the study were selected. The study was done in a rural area in Salem district. Written informed consent was taken from all the subjects. Institutional ethical clearance was obtained before starting the study. A detailed history consisting of name, age, sex, socio economic status, duration of work and smoking habits were taken from the subjects. Inclusion criteria: Age group between 30-70YRS of genders and in Both Powerloom workers. Exclusion criteria: Age <30yrs&> 70 years, H/O Smoking and Known respiratory illness.

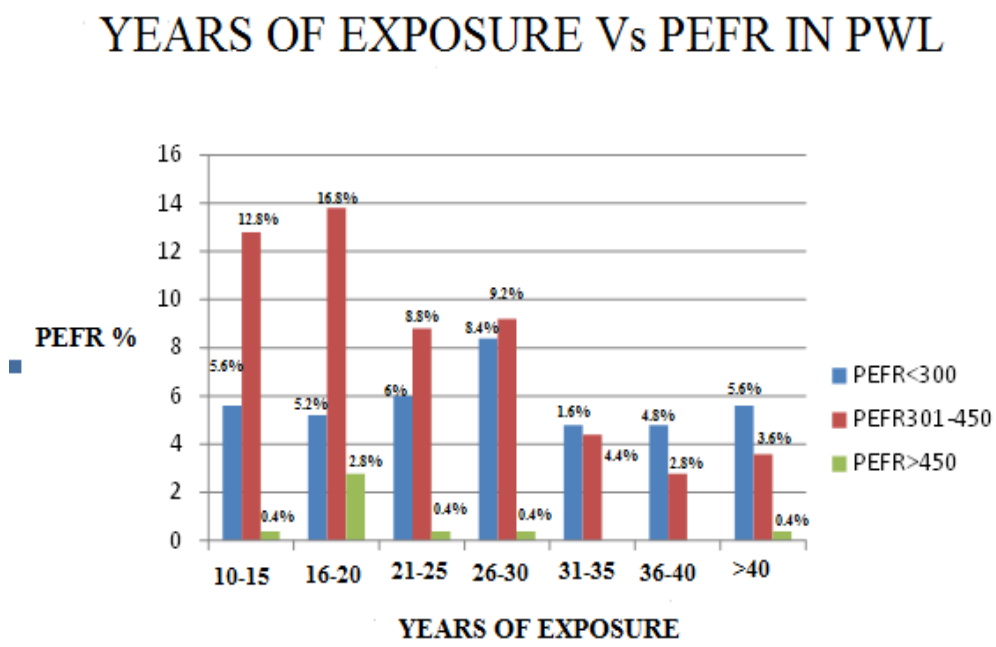
WRIGHT'S PEAK FLOW METER: Wright's Peak flow (WPF) meter is an instrument, introduced by Hadorn in 1942. It is an accurate, rugged, and portable instrument. The instrument is a light plastic cylinder measuring 15X5 cm and weighing 72 g (without mouth-piece. This instrument is used to measure PEFR for physiological studies, and found to be suitable. It is an accurate, rugged, and portable instrument. The peak expiratory flow (PEF) is a simple, reproducible and easily affordable test of lung function[8]. The device is robust and easy to use, and can be rendered aseptic by simple decontamination procedures .This test is readily available and routinely used in medical offices and hospitals where patients with lung diseases are treated[9]. Portable peak flow meters are widely used in clinical practice for measurement of peak expiratory flow (PEF) at many different altitudes throughout the world[10]. Proper instruction was given to the subject and the subject was asked to inspire maximally and put their maximum effort during expiration and breathe out maximally into the peak flow meter with nose clipped. The readings were taken in standing position. PEFR was recorded thrice and the highest of three readings were taken in lit/min.

RESULTS

TABLE : Years of Exposure and Pefr for Powerloom Workers

		PEFR							
		<250	251-300	301-350	351-400	401-450	>450	Total	P VALUE
YEARS OFEXPOSURE	10-15	5	9	6	21	5	1	47	
	16-20	5	8	9	21	12	7	62	
	21-25	4	11	8	8	6	1	38	
	16-30	3	18	8	11	4	1	45	
	31-35	1	3	3	6	2	0	15	
	36-40	6	6	1	5	1	0	19	
	>40	5	9	1	3	5	1	24	
Total		29	64	36	75	35	11	250	<0.02

Table shows the comparison between the PEFR with years of exposure in powerloom workers. This table shows as the exposure increases the PEFR decreases which is statistically significant (p=<0.02).



Legend: 1 shows the comparison between the PEFR with years of exposure in powerloom workers. This table shows as the exposure increases the PEFR decreases which is statistically significant (p=<0.02).

DISCUSSION

Peak Expiratory Flow Rate (PEFR) is the maximum rate of air flow achieved during a forced expiration following a maximal inspiration[11]. Of the many indices available for monitoring ventilatory function in man, the peak expiratory flow rate (PEFR) is probably the only index which can be measured simply and reliably. This index is therefore popular for monitoring the ventilatory function of asthma sufferers in the home[12.] K.C. Gupta and P.S. Kulkarni et al have done study on "Byssinosis in textile industry of Ahmedabad". They found that increase in exposure of years decreases the PEFR[13]. David Fishwick et al done a study on "Lung function in Lancashire cotton and man made fibre spinning mill operatives". He explained that PEFR is decreased when there is increase in years of exposure[14]. Timothy J. *et al* done a study on "Peak flow as a measure of airway dysfunction in swine confinement Operators" explained that portable peak flow meter is the useful indicator of airway injury[15]. The subjects who were exposed to the dust for ≥ 2 years were found to have lower PEF than those who were exposed for < 2 years. This is due to the irritation of upper respiratory tract mucosa due to prolonged exposure resulting in the hypertrophy of the mucosal lining. This in turn results in the increased secretion of mucus and formation of mucosal plugs, which causes obstruction to the exhaled air. Moreover in the present study a higher proportion of those exposed for ≥ 2 years had respiratory morbidity as compared to those exposed for < 2 years. Though most of the dust related respiratory morbidities among the subjects are restrictive in nature, it has resulted in reduced PEF[16].

CONCLUSION

This present study may used to know the hazards of cotton exposure and this study may also used to prevent the occupational hazardous diseases by using the preventive measure of decreased exposure to work by shift method, proper ventilation, using mask while working time, and routine physical examination for every one year

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