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Comparative Study of Body Mass Index with Pulmonary Function Test Parameter (Peak Expiratory Flow Rate) Among Power Loom and Non Powerloom Workers in Rural Area in Salem District

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ABSTRACT

The textile industry is one of the oldest and second largest industries in the world. So, power loom provides a major source of employment to the rural people in India. The power loom workers can be exposed to dust, generated from the textile products in various stages during the textile manufacturing process. Numerous epidemiological studies have documented decrements in pulmonary function and various other health problems associated with long-term air pollution exposure. obesity is also an major cause which affects the pulmonary function periodically .Obesity can also affects the thorax, diaphragm and abdominal muscles which alters respiratory function even if the lungs are under normal circumstances. The study was designed to compare Body mass index with peak expiratory flow rate among power loom and non power loom workers in rural area in Salem district. 500 subjects between the age group of 30-70 years who volunteered to enroll for the study were selected. It included 250 power loom workers and 250 non power loom workers in a rural area in Salem district. Body mass index were measured by height and weight of the subjects. Peak expiratory flow rate was measured by using Wrights peak flow meter. The result shows as BMI increased PEFR decreased in both Power loom and non Power loom workers. But comparison with non power loom workers, PEFR was further more decreased in power loom workers when compared to non power loom workers which was statistically significant. Obesity may also cause impairment of diaphragmatic activity-dependent respiratory function. The mechanical behaviour of the respiratory system in obese individuals may altering lung volume, airway calibre or respiratory muscle strength.

Keywords: Body mass index, power loom workers, non power loom workers, peak expiratory flow rate**,** and pulmonary function.

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INTRODUCTION

Obesity has become a major public health concern in many parts of the world. In recent years it has reached epidemic proportions among adolescents and children in whom it has become an increasingly important medical problem. Many of the outcomes associated with obesity that were previously considered to be diseases of adults. Being overweight or obese increases the risk of many diseases and health conditions, including respiratory problems[1]. The power loom workers can be exposed to dust, generated from the textile products in various stage during the textile manufacturing process. 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[2]. The worldwide incidence of dust related disease among workers in the dusty section of textile mills is nearly 40%. Occupational pulmonary diseases are more widespread and more disabling than any other group of occupational disease. Different occupational pulmonary diseases asbestosis, silicosis etc. are influenced by the type of dust, duration of exposure and the concentration and size of airborne dust in the breathing zone. Byssinosis is a most common restrictive lung disease occurring in power loom workers caused by exposure to cotton fibres and flax dust at cotton and textile mills [3].Various other diseases like asthma and chronic obstructive pulmonary disease (COPD) also occur due to cotton dust exposure. The cotton dust is an airborne dust. Its particle are variable in length. The smallest size of cotton fibre, is about 2 mm in diameter. All the particles with aerodynamic diameter more than 2 mm are deposited in the nose and pharynx. Particles between 3-10 mm in diameter are deposited in the tracheobronchial tree and Particles between 0.1-3 mm are deposited in the alveoli. Cotton dust consists of ground up plant matter, cotton contaminants, which may have accumulated during the growing, harvesting and subsequent processing or due to storage procedures. The main sources of dust production in cotton mills where the mean annual dust exposure is a above 100 ug/m3 are ginning room, blower room, card room and during spinning[4]. The excess decline in lung function can be expected at mean cotton dust exposure of 200 ug/m3 annually and exposure must be reduced to 100 ug/m3 annually in order to prevent dust related decline in the lung functions. Exposure to cotton dust in industrial environments causes an inflammation in the airways[5]. Many studies have also demonstrated an association between excess weight or weight gain and pulmonary dysfunction. Several studies have considered the association between body composition, fat distribution, and lung function in elderly subjects and the relationship between physical performance and lung function. Most of the studies evaluating the relationship between obesity and respiratory function tests have been carried out in adults.

Pulmonary Function Tests:

Tests that could assess the function of the pulmonary system are called pulmonary function tests (PFT) or the Standardized measurement for assessing the presence and severity of respiratory dysfunction is pulmonary function test. PFT offer the best hope for early detection of COPD and for objective documentation of the severity of occupational lung disease. Assessing pulmonary function is a simple standardized technique that can be performed rapidly and accurately to detailed methods that are time consuming. 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[6].

MATERIALS AND METHOD

In the study 500 subjects between the age group of 30-70 years who volunteered to enroll for the study were selected. It included 250 power loom workers and 250 non power loom workers. 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 Power loom& Non power loom workers.

Exclusion criteria:

Age<30yrs&> 70 years, H/O Smoking and Known respiratory illness. Standing height was recorded without shoes and with light cloths on a wall mounted measuring tape to the nearest of centimeters (<5 mm and >5 mm). Weight was measured without shoes and with light cloths on a Krups weighing machine with a least count of 100 grams. • Body mass index was calculated by the formula of weight (in Kg) and height (in meters). BMI = Weight (Kg)/(height in m2) [7].

RESULTS AND DISCUSSION

Legend: 1 Shows increase in BMI decreases PEFR which is statistically significant (p=<0.0001).

Comparison between BMI and PEFR on Non Power Loom Workers

Legend 2 shows the comparison between BMI and PEFR among non power workers. This chart shows PEFR decreased in power loom workers when compared non power loom workers which is statistically significant (p=<0.0005).

The body mass represent two compartments: fat mass i.e. metabolically inactive energy store and fat-free mass (FFM) i.e. metabolically active organs and skeletal muscle. Peak Expiratory Flow Rate (PEFR) is the maximum rate of air flow achieved during a forced expiration following a maximal inspiration increase in BMI decreases PEFR which is statistically

significant (p=<0.0001). The comparison between BMI and PEFR among non power workers. PEFR decreased in power loom workers when compared non power loom workers which is statistically significant (p=<0.0005). By definition, it is "The largest expiratory flow rate achieved with a maximally forced effort from a position of maximal inspiration, expressed in liters/min. 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[8]. The relationship of pulmonary function and overall weight is a more complex issue[9]. A study conducted on "Correlation between peak flow and body mass index in obese and non-obese children". In this study the author explained that Increased BMI causes decreased PEFR. In another`done a study on "correlation of pulmonary function tests with body fat percentage in young individuals". She found a significant correlation between BMI and PEFR. She explained that increased BMI cause decreased PEFR[10]. The initiation and the severity of symptoms and impaired pulmonary function seem to be associated with the magnitude of the dust level .Hypertrophy of mucosal cells due to irritation by dust, resulting in increased secretions of mucus and formation of mucosal plugs which causes obstruction to the exhaled air. So, This was the reason were PEFR were decreased in power loom workers when compared to non power loom workers where BMI increased.

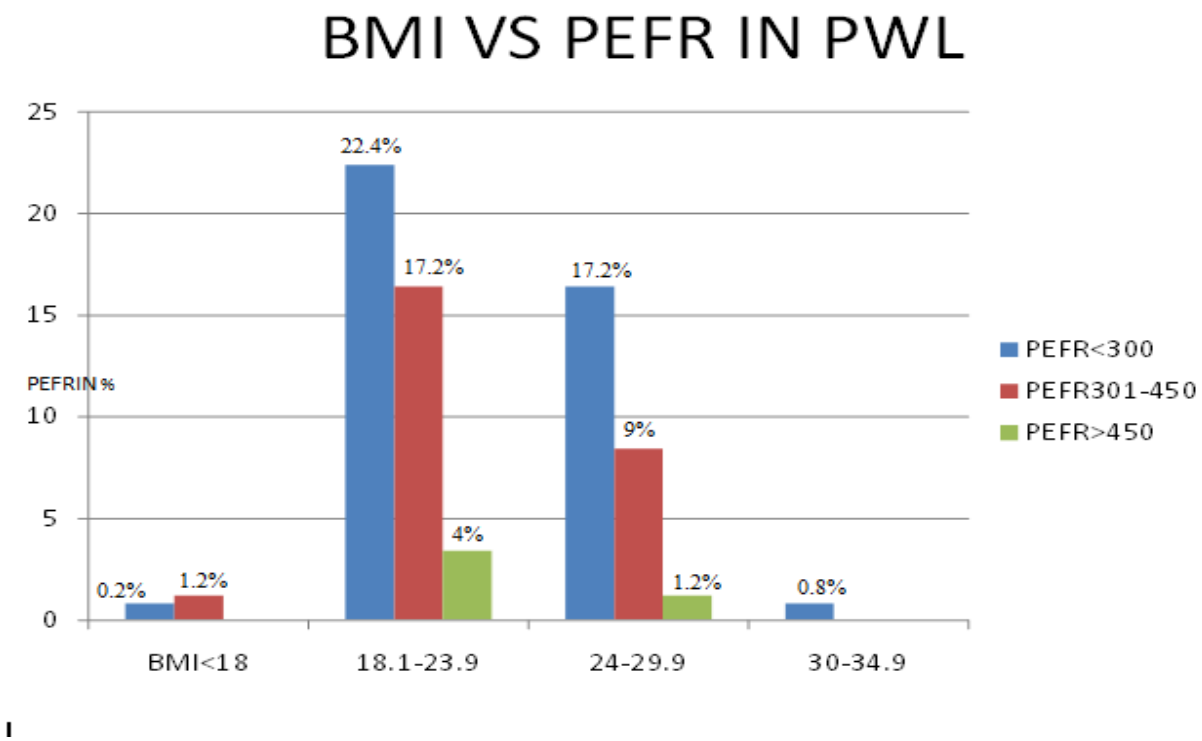

Figure 1: BMI and PEFR for Power Loom Workers

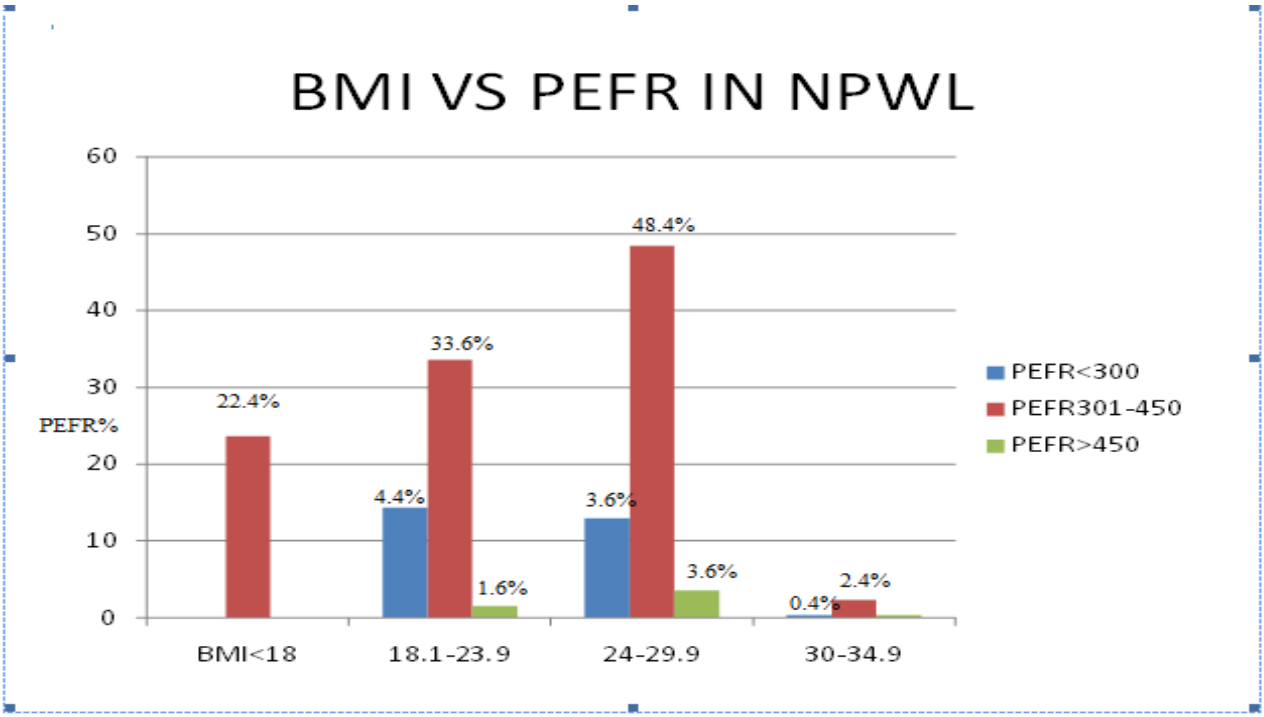

Figure 2: BMI and PEFR for NON Power Loom Workers

CONCLUSION

This present study may used to know the hazards of over body weight with 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 to control the disease at certain extent.

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REFERENCES

1. DebidasRay, “Peak expiratory flow in rural resident of Tamilnadu, India”. Thorax; 48: 163-166.
2. Wright BM X- “Miniature wrights peak flow meter”. BMJ 1978; 1627-8.
3. Zughal Gundogdu, “Correlation between peak flow and body mass index in obese and non obese children in Kocaeli, Turkey”. prim care Respir J 2011: 20 (4):403-406.
4. Rasslan Z, Saad R, Stirbulov R, Fabbri RMA, “Evaluation of pulmonary function test in class 1 and 2 obesity”. J Bras pneumol 2004:30; 508-14.
5. Ulger Z, Dernir E, TanacR, “The effect of childhood obesity on respiratory function test and airway hyper responsiveness Turkish”. J peadiatrics2006:48 43-50.

6. Anuradha r, "correlation of pulmonary function tests with body fat percentage in young, Individuals". Indian J physiol Pharmacol 2008; 52 (4): 383–388.
7. Yogesh Saxena, "Abdominal Obesity and Pulmonary Functions in young Indian adults: a prospective study". Indian J physiolpharma col 2009; 53(4)
8. Warren M, Gold DM, "Pulmonary function testing". In: Murray JF, Nadel JA, Mason RJ, Boushey HAJr, editors. Textbook of Respiratory Medicine. 3rd ed. Philadelphia: Saunders; 2000. p. 781-882.
9. Chaitra B, "Effect of Aerobic exercise training on peak expiratory flow rate: a pragmatic randomized control trial". International Journal of Biological &Medical research.
10. Hussain G, "Cooperative study of peak expiratory flow rate in cigarette smokers and non smoker of Lahore district". Annals vol 13. No 4 oct- dec 2007.