



ijcrr

Vol 04 issue 11
 Category: Research
 Received on:10/04/12
 Revised on:21/04/12
 Accepted on:03/05/12

COMPARATIVE STUDY OF CHANGES IN MAXIMUM EXPIRATORY PRESSURE (MEP) IN SAW MILL WORKERS FROM BIJAPUR CITY OF KARNATAKA STATE OF INDIA

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ABSTRACT

Background: Workers exposed to a variety of wood dusts have been shown to exhibit occupational asthma, lung function deficits, and elevated levels of respiratory symptoms. Despite the popularity of pine and spruce, the health effects of exposures to these woods have not been extensively investigated. A study was undertaken to investigate the respiratory health of a group of sawmill workers processing pine and spruce (n = 94)¹. A comparative study of changes in Maximum Expiratory Pressure MEP (mm.Hg) was carried out in saw mill workers of Bijapur city. This study consisted of 100 subjects of which 50 saw mill workers & 50 controls of similar age & socio economic status. MEP(mm.Hg) values in saw mill workers was significantly reduced in our study as compared to controls. MEP is used as a simple tool to measure respiratory muscle strength. Probably the saw mill workers after prolonged exposure to the wood dust develop respiratory muscle weakness and reduced cough reflex. The strength of respiratory muscles is assessed best by using simple equipment i.e. modified Black's apparatus. Many studies showed that Maximal Expiratory Pressure alone can be used as a measuring tool for respiratory muscle strength. MEP is useful in determining the ability of a person to cough effectively.

Key Words: MEP, Saw Mill Workers , Modified Black's apparatus.

INTRODUCTION

In recent years many studies in concern with respiratory effects of wood dust toxicity in the exposed workers have been conducted. The dusts of various woods including organic dusts have been studied. Research efforts are also extended with respect to their effects on health. Cotton dust and grain dust are examples of organic dusts on which substantial health research efforts have been extended. Wood dust is another variety of organic dust, exposure to which is known to cause substantial health impacts.

Early recognition of altered lung functions will be of great clinical, social and preventive significance in the Industrial workers, who are constantly exposed to various air born pollutants. Reduction in lung function is reported in cotton mill workers, coal miners, grain and flour mill workers, workers exposed to tobacco dust, barley dust and talc dust.²⁻⁶

Maximum Expiratory Pressure (MEP)

Various respiratory symptoms are associated with respiratory muscle dysfunction. There are reports of progressive weakness of respiratory muscles in patients with multicore myopathy, multiple sclerosis, motor neuron disorder,

malnutrition and congestive heart failure. Measurement of respiratory muscle strength is useful in order to detect respiratory muscle weakness and to quantify its severity. In patients with severe respiratory muscle weakness, Vital Capacity is reduced, but is a non specific and relatively insensitive measurement. Conventionally, strength of respiratory muscles is evaluated by determining both Maximal Inspiratory Pressure (MIP) and Maximal Expiratory Pressure (MEP), during maximal static maneuver against a closed shutter⁷⁻¹³. This study was undertaken to assess the respiratory muscle strength in saw mill workers using simple parameters and equipments.

METHODS

The study was conducted on the Saw mill workers of Bijapur city in North Karnataka. The subjects of control group are selected from among the workers of BLDE'S Sri. B.M.Patil Medical Collage (Same socio economic group). Sample size:- About 50 subjects were included in the study from each group. The age and sex of the subjects of control group are selected so as to match the study group.

All the individuals both in the study and control groups were subjected to history taking and clinical examination prior to tests.

Inclusion Criteria:

Only healthy male subjects were included in the study. The health status of the subjects is determined through thorough clinical examination and history taking.

Exclusion Criteria:

The subjects with the following disorders are excluded from the study:

1.Subjects with any known cardiopulmonary disorders.

2.Subjects with any known endocrine disorders.
3.Subjects with any known congenital defects.
4.Smokers.

The following parameters are recorded in the subjects:

I. Physical Anthropometry

a) Height in cms. (nearest to 0.5 cm)
b) Weight in kgs (nearest to 0.5 kg)
c) Chest circumference in cms. (nearest to 0.1 cm)

II. Physiological parameters¹⁴⁻¹⁷

a) Respiratory Rate -It is recorded by inspection and palpation of chest and abdomen & expressed as cycles per minute.

b) Pulse rate -It is expressed as beats per minute. Right radial pulse is examined by compressing radial artery in the semi pronated forearm and slightly flexed wrist of the subject.

c) Blood pressure [SBP and DBP mm.Hg].It is recorded by using mercurial sphygmo manometer, (Diamond make) by palpatary and auscultatory methods.

MEP(Maximum Expiratory Pressure)

MEP (Maximum Expiratory Pressure) is recorded by using Modified Black's Apparatus. Subject is asked to deep inspiration and blow forcefully into the rubber tube connected to aneroid pressure gauge through three way connector and hold for one second and looked for pressure reading. Like this, three readings are taken at the interval of one minute. Highest reading is taken for calculation¹⁸.

Statistical analysis^{19,20}

All the data are presented as Mean \pm SD {SEM}. The significance of difference in parameters between groups are ascertained by Student's 't' test, 'Z' test & chi-square test.

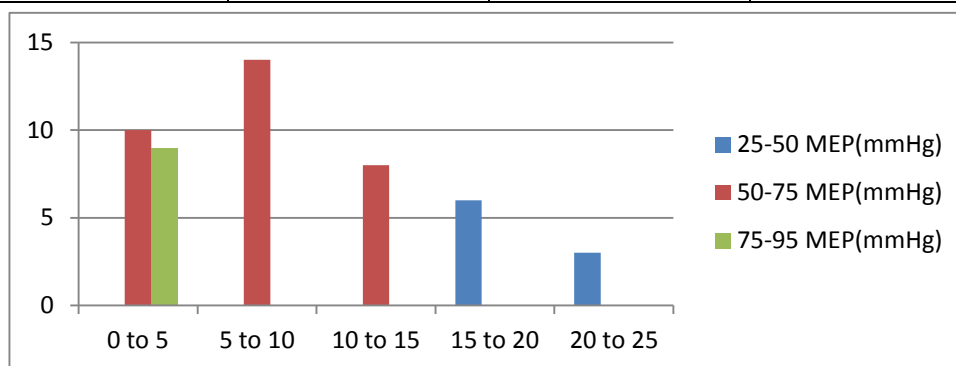
RESULTS

Table 1 Showing Mean MEP & Chest Expansion in subjects & controls

| Sl.no. | Parameters | Mean \pm S.D. | | Test Value 'Z' test | 'P' Value |
|--------|--------------------------|-----------------|------------------|------------------------|--------------------------------|
| | | Subjects | Controls | | |
| 1 | MEP (mm Hg) | 60.2 \pm 12.9 | 136 \pm 1.84 | 2.92 | 0.005 significant |
| 2 | Chest Expansion (cms) | 2.44 \pm 1.11 | 3.78 \pm 0.616 | 7.47 | 0.001 highly significant |

Table 2: MEP(mm.Hg) Vs Duration of exposure(yrs)

| Duration of exposure(in years) | 25 – 50 | 50 – 75 | 75 – 95 |
|--------------------------------|---------|---------|---------|
| 0 - 5 | 0 | 10 | 9 |
| 5 - 10 | 0 | 14 | 0 |
| 10 - 15 | 0 | 8 | 0 |
| 15 - 20 | 6 | 0 | 0 |
| 20 - 25 | 3 | 0 | 0 |



Graph showing the Comparison of MEP with duration of exposure to wood dust (In years)

DISCUSSION AND CONCLUSION

The present study was undertaken on the sample containing 50 saw mill workers applying necessary inclusion and exclusion criteria as mentioned earlier. The subjects of study group (saw mill workers) were screened with proper taking of history with special reference to history of occupation (questionnaire)²¹. They were subjected to clinical examination in detail. The experimental group was compared with 50 subjects in control group from non-teaching staff of Shri. B.M.Patil Medical College (Age and socio economic status were matched).

The anthropometric parameters like age (yrs), weight (in kgs), height (in cms) and chest expansion (in cms) were recorded in both the groups.

Physiological parameters like pulse rate (bpm) and blood pressure (SBP& DBP in mm.Hg) were recorded in both the groups.

Physiological parameter i.e. MEP (mm.Hg) was recorded in both the groups.

In our study significant difference was seen between subjects of control group & experimental group exposed to saw dust. The subjects exposed to saw dust showed decrease in MEP (mm Hg) (Table-1)

Conflict of interest

The authors wish to state that they have no conflict of interest that might improperly influence this work. This study was unfunded.

ACKNOWLEDGEMENT

I would like to thank the principal Dr R C Bidari, Shri B M Patil Medical College Bijapur, Karnataka, India for his constant inspiration and support and other experts who have helped in this case study. Authors acknowledge the immense help received from the scholars whose articles are cited and included in references of this manuscript. The authors are also grateful to authors / editors / publishers of all those articles, journals and books from where the literature for this article has been reviewed and discussed.

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