

Assessment of Peak Expiratory Flow Rate in Young Healthy Females Working in Clinical Laboratory in Air Conditioner

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ABSTRACT

Background: In multinational industries in urban areas use of air conditioning (AC) systems, specifically central AC is supposed to be a necessary part of their luxurious life. Air-conditioners (AC) are devices/systems that are used indoors to cool air by reducing the humidity of the air following condensation of the water vapour. It has been observed that hyperventilation of cold dry air causes bronchoconstriction in asthmatic patients. Cold dry air is what we inhale while using AC's hence alteration in pulmonary functions may also be simulated in AC users. Purpose of the study was to measure the Peak Expiratory Flow Rate in young healthy females working in air conditioned clinical laboratory.

Material and Method: 30 healthy young females with age between 20 to 40 years were included in the study by simple random sampling on the basis of selection criteria from clinical laboratory. The assessment of peak expiratory flow meter was done for the participants working in clinical laboratory in air condition. The procedure using peak flow meter is carried out for 3 times and the highest value from the three of peak cough flow is measured using the statistical method mean and standard deviation.

Result: The mean and standard deviation values of peak cough flow are calculated using statistical method. The mean of Peak Cough Flow is 313.75 l/min

Conclusion: This study concluded that peak expiratory flow rate (PEFR) is reduced in healthy young females those who are working in

clinical laboratory under exposure of air condition.

Keywords: Peak expiratory flow rate, Healthy females, Air condition, Clinical laboratory.

INTRODUCTION

AC is a necessary element of their comfortable life. Air inside is cooled and dehumidified for thermal comfort by AC systems.¹ Air conditioners (AC) are used extensively these days indoor as well as while travelling. The reduction in humidity of the air being cooled is due to the condensation of water vapors.² Common complaints among AC users include mucous membrane irritation, breathing difficulties, irritated skin and constitutional/neurological symptoms such as headache and fatigue, COPD, bronchoconstriction and asthma.³

The peak cough flows were measured using the Peak Flow Meter. Illness associated with sensitisation to microorganisms growing in an air conditioning or humidifier system may take several forms Hypersensitivity pneumonitis' Caused by bacteria, fungi contaminating air conditioning system are sometimes found in air conditioning system. While such micro organisms are potentially pathogenic or allergic, it can lead to human respiratory ailments such as humidifier fever.⁴ Respiratory muscle weakness is a frequent occurrence in many diseases .Although it is

well established that weakness of the respiratory muscles produces a restrictive ventilator defect, the precise relationship between the degree of, muscle weakness and the type of lung dysfunction is still unclear.⁵

The peak-flow meter, which was designed as a simple and reliable device for measuring the maximum expiratory flow rate during a forced expiration, is now in worldwide used as a measure of ventilator capacity. Air blown into the instrument cannot escape until it has moved and uncovered part of the slot.⁶ Peak expiratory flow rate are the fundamental tools for the evaluation of an individual's respiratory system and are also the prime clinical aids to diagnose, treat, and rehabilitate the respiratory malfunctions. These tests have been found to reflect the disorder as well as the severity of airway impedance. Diet, obesity, air pollution and physical activity are among the several major factors that significantly affect Peak expiratory flow rate.⁷

Intensive use of air conditioners in modern living has increased the risk of atopic sensitization and eosinophil activity. Hypersensitivity pneumonitis caused by bacteria, fungi. Respiratory diseases such as Chronic Obstructive Pulmonary Disease. Cardiovascular problem in predisposed individuals. Respiratory diseases such as asthma and prolonged exposure to AC can contribute to worsening asthma and develop to lung infection. Other effects such as Dry and irritated eyes, Mouth, Throat or Nasal passages, Headaches, Sore throat, Loss of voice. There are less literature available on assessment of peak expiratory flow rate in young females, so this study was conducted to assess the peak expiratory flow rate in young females working in clinical laboratory.⁸

METHODS AND MATERIALS

Study design was Descriptive observational study. 30 healthy young females with age between 20 to 40 years were included in the study by simple random sampling on the basis of selection criteria from clinical laboratory. The

assessment of peak expiratory flow meter was done for the participants working in clinical laboratory in air condition. The procedure using peak flow meter is carried out for 3 times and the highest value from the three of peak cough flow is measured using the statistical method mean and standard deviation.

Outcome measure: Peak expiratory Flow Rate

- Ask the participant to loosen any tight clothing that might prevent you from breathing deeply.
- Make sure to stand or sit up straight while you're taking the test.
- Use Peak Flow Meter to perform the PEFr test.
- This is a handheld instrument with a mouthpiece on one end and a scale on the other.
- Ask to blow air into the mouthpiece a small plastic arrow moves. This measures the airflow speeds.
- Breathe in as deeply as you can.
- Blow into the mouthpiece as quickly and as hard as you can. Do not put your tongue in front of the mouthpiece.
- Do the test three times.
- Note the highest speed of the three.

RESULTS

The data collected was analyzed by various statistical methods such as Mean, Standard Deviation (S.D.). The present study was taken place at the Clinical laboratory in Dr. A.P.J. Abdul Kalam College of Physiotherapy including 24 participants working in clinical laboratory in air condition. The procedure using peak flow meter is carried out for 3 times and the highest value from the three of peak cough flow is measured, using the statistical method mean and standard deviation values are taken, the mean of Peak Cough Flow is 313.75 l/min

	MEAN	SD
PEAK COUGH FLOW	313.75 L/min	22.227

DISCUSSION

The present study showed that Peak cough flow is reduced in healthy females working in clinical laboratory in air condition.

Air-conditioners (AC) are devices/systems that are used indoors to cool air by reducing the humidity of the air following condensation of the water vapour.¹ It has been observed that hyperventilation of cold dry air causes bronchoconstriction in asthmatic patients. Cold dry air is what we inhale while using AC's hence alteration in pulmonary functions may also be simulated in AC users. It can cause mild airflow obstruction and reduction in expiratory flow.

Borse lj et al conducted study on effect of air conditioner on pulmonary functions. In this Study, included 30 young healthy male software professionals exposed to air conditioner work environment. The findings suggested that exposure to air conditioner work environment is risk factor for development of respiratory dysfunction and prone to allergic disorders in future.¹

Sultan a. Meo, The objective of the study was to assess the effects of wood dust and the duration of exposure on peak expiratory flow rate (PEFR) to minimize possible health risks for wood workers by providing them with information about wood dust related hazards. It was designed as a matched case-control cross-sectional study of spirometry in forty six non-smoking wood workers, aged 20–60 years, who worked without the benefit of wood dust control ventilation or respiratory protective devices. PEFR measurements were performed using an electronic spirometer. This study results demonstrated that in wood workers exposed for longer periods than 8 years, PEFR was significantly reduced as compared with their matched controls. This study concluded that PEFR in wood workers is impaired and the stratification of results shows a doseresponse effect of years of wood dust exposure on its value.⁹

CONCLUSION

This study concluded that Peak Expiratory flow Rate (PEFR) is reduced in healthy young females those who are working in clinical laboratory under exposure of air condition for more than 5 years.

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