



AIR CONDITIONERS - A BLISS OR A CHALLENGE!!

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ABSTRACT: Air conditioner, popularly known as “AC” is one amongst the luxuries in today’s era. Continuous use of Air conditioners for longer durations seems pleasant and comfortable but it has its cons too. The effects are reflected on respiratory system as AC’s cause the increased inhalation of cold dry air making the airway smooth muscle more sensitive and leading to bronchoconstriction. This may lead to altered respiratory rate and pattern with decreased chest circumference. So, this study was carried out to make out the effect of AC usage on respiratory rate and chest expansion of AC users and its comparison with that of Non AC users considering the usage of the same in the long run.

Key words: Air conditioners (AC), Respiratory mechanism, Temperature changes.

AIM AND OBJECTIVE: To find out the effect of long term AC usage over the Respiratory rate and Chest expansion of subjects.

STUDY DESIGN: Case-Control Study

STUDY GROUPS: 100 female subjects using AC on regular basis in hostels (Only in Female Hostels)

The selected subjects were categorized into 2 major groups:

GROUP 1 (Study group) consisted of 50 healthy female students living in AC hostels with AC usage for a minimum duration of 6 hrs / day for atleast 5 days a week from the past 6 months.

Group 2 (Control group): 50 female students living in Non AC hostels.

METHODOLOGY:

STUDY SET-UP: The study was conducted in the Department of Physiology, Maharishi Markandeshwar Institute of Medical Sciences & Research, Mullana (Ambala) for a period of 6 months.

PROCEDURE:

All Subjects were made familiar with the procedure. A written informed consent was taken from them.

GROUP 1: A baseline of 50 students living in AC hostels was recorded with regards to Respiratory rate: by counting the number of breaths for one minute by counting how many times the chest rises. The breathing pattern was also observed which normally is slow and regular with no effort visible. Chest circumference with respect to breathing was also noted with a flexible tape.

After a continuous use of AC's for about 6 months since April 2016 upto October 2016, the monitoring of respiratory rate, chest expansion and breathing pattern was repeated in the same manner in Group 1.

All the subjects were staying in the same hostel and the AC's installed were of centralized pattern i.e the temperature was similar in all the rooms of about 16-18 degree Celsius.¹

GROUP 2 (Control group) consisted of randomly selected 50 healthy female students living in Non-AC hostels who didn't use AC at all.

Taking a baseline initially and following then repeating the procedure after 6 months duration.

EXCLUSION CRITERIA: Subjects with

- i) Smoking habits, breathlessness
- ii) Allergy, wheezing/bronchial asthma, skin diseases
- iii) Past H/O tuberculosis, any chronic drug intake.

RESULT: The mean and standard deviation of Respiratory rate of AC users and Non-Ac users was found to be 13.80 ± 0.99 and 13.32 ± 0.77 respectively. The P value was found to be 0.008 i.e statistically significant.

A slight decrease was associated in chest expansion from 3.7 cm in Non Ac users to 3.6 cm in AC users with a P value of < 0.05 .

Breathing pattern in AC users was becoming deep and shallow compared to the Non Ac users

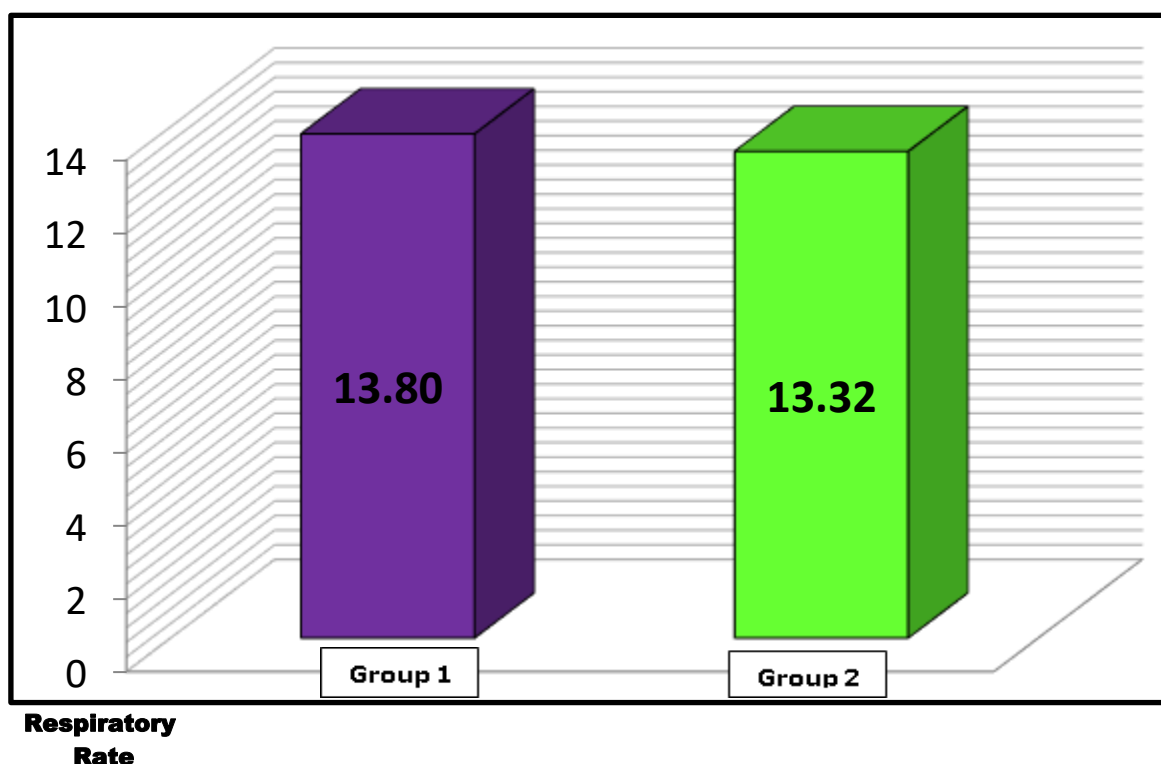


Fig 1: Changes seen in the Respiratory Rate of Group 1 and Group 2 Subjects.

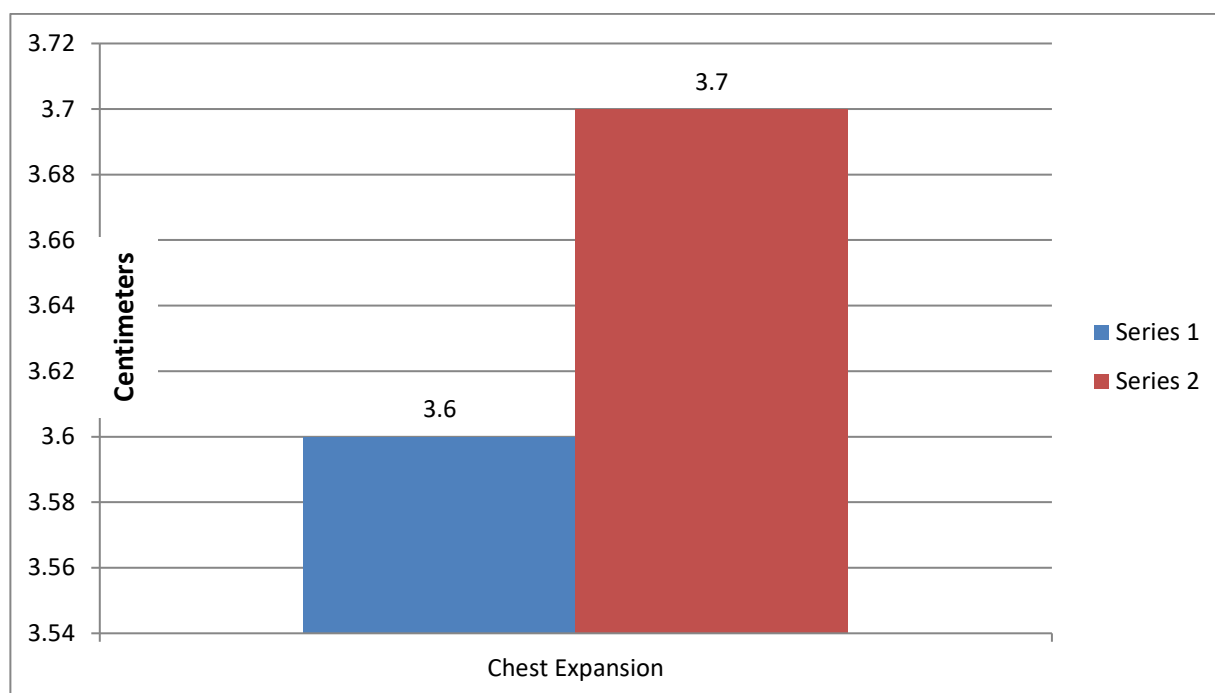


Fig 2: Changes in Chest Expansion in Group 1 and Group 2 students.

DISCUSSION:

The stimulation of irritant receptors produces reflex tachypnoea and bronchoconstriction. It further leads to increased airway resistance with an increased respiratory rate.²

The dynamic compliance is decreased in airway obstruction also leads to an increased respiratory rate³

Bronchoconstriction leads to decreased air way entry with decreased chest expansion.⁴

George O.S and Chandan ML found a significant increase in respiratory rate but the study was carried on males as compared to our study that was carried on female subjects. However, the result is same.⁵

Babitha R, Rangarajan R, Muhil M, Basavarajaiah GM found a significant increase in respiratory rate.⁶

Mc Donald, James S, Nelson J, Lenner KA, Melissal et al stated that stimulation of irritant receptors causes reflex tachypnoea and bronchoconstriction⁷

According to PierriFontanari, Burnet Henri et al the bronchoconstriction causes increased airway resistance that leads to increased respiratory rate.⁸

As observed by Hulke MS et al there is a consistent increase in respiratory rate of air conditioner users when compared to non-ac users.⁹

CONCLUSION:

Regular AC usage on long term will have visible increase on respiratory rate and concurrently decreased chest expansion. Thus use of AC's is creating a need to investigate for any bad consequences in respiratory health and disease in the near future.

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