

# Knowledge on Effect of Air Conditioner Use on Sleep, Human Health and the Environment Among Dental Students

D. Srija<sup>1</sup>, K. V. N. R. Pratap<sup>2</sup>, T. Madhavi Padma<sup>3</sup>, V. Shiva Kalyan<sup>4</sup>, P. Srikanth<sup>5</sup>

<sup>1</sup>Student (BDS), Department of Public Health Dentistry, Mamata Dental College, Khammam, India

<sup>2</sup>Professor & HoD, Department of Public Health Dentistry, Mamata Dental College, Khammam, India

<sup>3</sup>Professor, Department of Public Health Dentistry, Mamata Dental College, Khammam, India

<sup>4</sup>Reader, Department of Public Health Dentistry, Mamata Dental College, Khammam, India

<sup>5</sup>Lecturer, Department of Public Health Dentistry, Mamata Dental College, Khammam, India

**Abstract:** With the improvement of standard of living, air conditioning has widely been applied. However, health problems associated with air conditioner systems appear more frequently. The global climatic changes are also associated with the air conditioner usage have been noticed. Global and localized studies linking climate variables with air conditioner alone are lacking. More research and detailed data is needed looking at the effects of increasing air conditioner use, climate changes and human health and sleep quality.

**Keywords:** air conditioner use, human health

## 1. Introduction

With a considerable rise in temperatures globally over the past few years, there is an increase in outdoor and indoor heat load and harm to health [1]. It also impairs work productivity for millions of people.

The main purpose of air conditioner is to provide thermal comfort and humidity control of indoor air quality [IAQ] for the occupants [2]. But the intensive use of air conditioner causes the increased inhalation of cold dry air which has side effects on human health [3].

However, air conditioners are not only harmful to human health but also destructive to the environment. This is because of the negative impact they have on the environment, as they release harmful gases like chlorofluorocarbons and hydro chlorofluorocarbons [1]. These are part of greenhouse gases that trap heat and lead to the depletion of the ozone layer.

Since the previous studies were conducted on general population but not on dental students and also as they stay in air conditioned class rooms and accommodation this survey is being conducted on them.

The aim of this research study which was conducted on the undergraduate dental students of Mamata Dental College, Khammam, Telangana is to evaluate the knowledge on effects of air conditioner use on sleep, human health and the environment. This study also enlightens the same as the effects of air conditioner on sleep, human health and the environment.

## 2. Methodology

### A. Permission

Permission was taken from the head of the department, department of public health dentistry. Questionnaire is explained and informed consent was taken prior to the study from study subjects.

### B. Study design

A cross sectional questionnaire based study was conducted among students of Mamata Dental College.

### C. Pilot study

Questionnaire framed based on related articles were distributed among 30 dental students to know reliability of the questionnaire.

### D. Inclusion criteria

All interns, 4th year, 3rd year students who were present during the day of the survey are included in the study. The duration of the study was from 03<sup>rd</sup> June 2019 to 04<sup>th</sup> June 2019.

### E. Exclusion criteria

Students who were absent during the day of survey were excluded.

### F. Study procedure

The study was conducted among 200 dental students. Questionnaires were distributed to 3<sup>rd</sup>, 4<sup>th</sup> year students and interns during their working hours i.e., 9:00am to 4:00pm. Questionnaire includes personal data and questions pertaining to the current study.

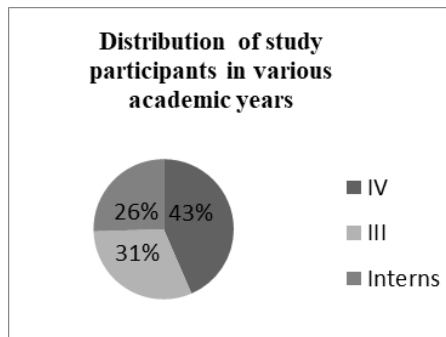
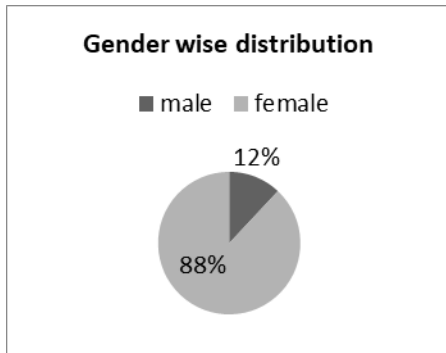
### G. Statistical analysis

The data collected through the questionnaire is tabulated into an Excel sheet and sent for analysis.

### Results

The total number of dental students participating in this study

are 200. Mean age of the study group is 22.5. Of the student number of students included in the study most of them are females that is 176 (88%) and majority of them are of fourth academic year that is 87 (43.5%).



In the table-1 shown below as majority of 126 students (63%) open the windows when the air conditioner is not available and the rest of 44 students (22%) do not open the windows. The statistically significant difference observed was  $p=0.05\%$ .

For majority of people the purpose in mind while using an air conditioner is as a necessity for 147 members (73.5%) and as

Table 1

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	126	63.0	63.0
	No	44	22.0	85.0
	some times	30	15.0	100.0
	Total	200	100.0	100.0

enhancing one's status for 10 people (5%). The statistically significant difference observed was  $p<0.05\%$  (table-2).

The maximum number of people feel that it is not safe to switch on the air conditioner for whole night that is 115 (57.5%) and other minimum number of people that is 85 (42.5%) feel

Table 2

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Necessity	147	73.5	73.5
	As a luxury	43	21.5	95.0
	Enhancing one's status	10	5.0	100.0
	Total	200	100.0	100.0

that it is safe. Statistically significant difference observed was  $p<0.05\%$  (table-3).

Table 3

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid	yes	85	42.5	42.5
	no	115	57.5	100.0
	Total	200	100.0	100.0

Majority say that extensive use of conditional is not eco-friendly that is 155 students (77.5%) and the rest of the minimum say that air conditioners are eco-friendly that is 45 students (22.5%). Statistically significant difference observed was  $p<0.05\%$  (table-4).

Table 4

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid	yes	85	42.5	42.5
	no	115	57.5	100.0
	Total	200	100.0	100.0

For maximum number of students to know that the usage of air conditioner contributes to the depletion of ozone layer and global warming was for 161 people (80.5%) and on the contrary rest of 38 people (19%) do not know. Statistically significant difference observed was  $p<0.05\%$  (table-5).

Table 5

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid	yes	161	80.5	80.5
	no	38	19.0	99.5
	3	1	.5	100.0
	Total	200	100.0	100.0

### 3. Discussion

The present study provides the information about the knowledge on the effect of air conditioner usage on sleep, human health and the environment. it was conducted on the dental undergraduate students of age group 18 to 23.

Results of the study show that majority of dental students (74.5%) mostly stay in air conditioned places and exhibit moderate usage of the air conditioner.

About 49.5% of them set the temperature on the air conditioner between 19°C to 25°C and greater part of students (82.4%) feel that they get sufficient and good quality of sleep with in the presence of an air conditioner.

Maximum students in the study read the air conditioner to be a necessity rather than a luxury. In spite of the good sleep quality, majority (57.5%) do not think it is safe to switch on the air conditioner for the whole night.

On the other hand, large number of students (53.5%) think that air conditioners cause health issues like breathing problems, headache, dehydration and dry skin.

Similarly, 77.5 percent of students agree to it that, extensive use of air conditioner is not eco-friendly and majority of 80.5% have the knowledge about the role of air conditioner's contribution to the depletion of the ozone layer and consecutive global warming.

#### 4. Conclusion

The students think it is true that air conditioners are a technological comfort but prolonged use of air conditioner causes more harm than good. So, reducing the extensive usage of the air conditioners and using them only when necessary can be more eco-friendly and also promote human health and wellness.

#### References

- [1] Lundgren Kownacki, Karin. (2013). Sustainability Challenges from Climate Change and Air Conditioning Use in Urban Areas. *Sustainability*. 5. 3116-3128.
- [2] Yu B.F, Hu Z.B, Liu Melody, Yang H. L, Kong Q.X, and Liu, Y.H. (2009). Review of research on air-conditioning systems and indoor air quality control for human health. *International Journal of Refrigeration*. 32. 3-20.
- [3] Maturi lavanya, and Rajanand Gaikwad, "The effects of air conditioners on pulmonary functions in young adults," *Int J Intg Med Sci* 2017, Vol. 4(6):501-06.
- [4] Yusuke Nakayama, Umemiya Noriko, Jun-ichiro Arai, Tomohiro Kobayashi, Tatsuya Sakane and Yoshiki Tachibana. (2015). Effects of Air-conditioner use and Residential Performance on Summer Sleep Quality Analyses of Falling Asleep, Maintaining Sleep Factor and Fatigue Recovery Factor. *Energy Procedia*. 78. 1003-1008.
- [5] Pout C, and Hitchin, Roger, (2009). Future environmental impacts of room air-conditioners in Europe. *Building Research and Information - Building Res Inform*. 37. 358-368.