**ORIGINAL RESEARCH**

# Breath carbon monoxide level in non-smokers

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**ABSTRACT**

**Background:** It's possible to view tobacco usage and smoking as a scourge on a healthy society. Individuals who are in close proximity to smokers breathe in their smoke and are referred to as "secondary smokers" or "passive smokers." The present study was conducted to assess breath carbon monoxide level of non- smokers. **Materials & Methods:**50 maleswere divided into 2 groups. Group I consisted of 25 non-smokers exposed to environmental tobacco smoke (ETS) and group II consisted of 25 non-smokers not exposed to ETS. All subjects underwent clinical examination. Breath CO levels of both the groups were measured by the Mini Smokelyzer. **Results:** Age group 21-30 years had 7 subjects in group I and 8 in group II, 31-40 years had 13 in group I and 11 in group II and 41-50 years had 5 in group I and 6 in group II. The difference was significant ($P< 0.05$). Breath CO level 0-6 (ppm) was seen in 2 and 16, 7-10 (ppm) in 17 and 9 and >10 (ppm) in 6 subjects in group I and II respectively. The difference was significant ($P< 0.05$). **Conclusion:** With respect to non-smokers In addition to other negative effects of smoking, respiratory illnesses are more common in passive smokers. Smokers ought to be aware of the negative effects smoking has on other people as well as on themselves and give up smoking in public areas, hotels, restaurants, and pubs.

**Keywords:** passive smokers, tobacco, Breath CO



## INTRODUCTION

It's possible to view tobacco usage and smoking as a scourge on a healthy society. Individuals who are in close proximity to smokers breathe in their smoke and are referred to as "secondary smokers" or "passive smokers."[1] Like active smokers, passive smokers also experience smoking-related illnesses. at big cities like Delhi, smoking by customers is a typical occurrence at restaurants and hotels. Serving guests in these types of hotels and restaurants for eight to ten hours a day exposes them to the smoke that active smokers release into the closed space of the business, which can have negative consequences on their health.[2]

Although there are other small-scale exposure sources, including as occupational exposure and vehicle smoke emissions, smoking is still thought to be the primary cause of carbon monoxide (CO) exposure.[3] Numerous studies have been conducted to establish a relationship between breath CO levels and the amount of cigarettes smoked daily.[4]When inhaled from tobacco smoke, carbon monoxide (CO) is absorbed by the lungs, enters the bloodstream, and mixes with hemoglobin to generate carboxyhemoglobin (COHb), which can be detected in the blood and serves as a helpful indicator of the absorption of tobacco smoke.After breathing in tobacco smoke, CO stays in the blood for around 24 hours, depending on a number of variables including gender, level of physical activity, and ventilation rate.[5] Due to the concentration gradient at the alveoli, it then re-enters the alveoli. With the aid of portable CO analysers, one can determine the amount of CO present in expired air. It has been discovered that the breath CO concentration is a trustworthy predictor of the blood's COHb level.[6]The present study was conducted to assess breathcarbon monoxide level of non- smokers.

## MATERIALS & METHODS

The study was carried out on 50 males. All gave their written consent to participate in the study.

Data such as name, age, etc. was recorded. They were divided into 2 groups. Group I consisted of 25 non-smokers exposed to environmental tobacco smoke (ETS) and group II consisted of 25 non-smokers not exposed to ETS. All subjects underwent clinical examination. Breath CO levels of both the groups were measured by the Mini Smokelyzer. Results thus obtained were subjected to statistical analysis. P value $< 0.05$ was considered significant.

## RESULTS

**Table I Distribution of patients**

| Age group (years) | Group I | Group II | P value |
|---|---|---|---|
| 21-30 | 7 | 8 | 0.82 |
| 31-40 | 13 | 11 | |
| 41-50 | 5 | 6 | |

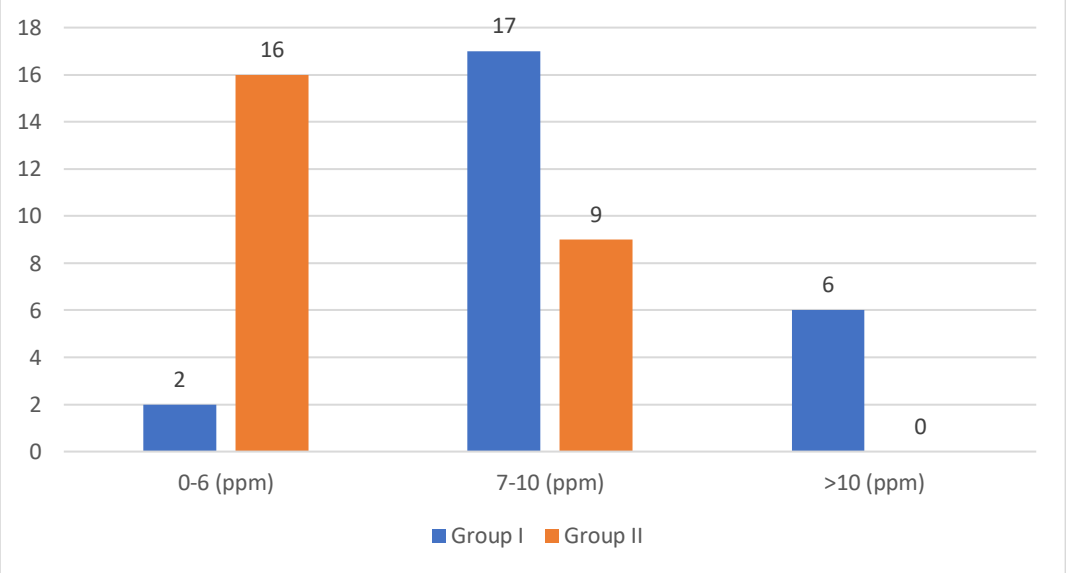
Table I shows that age group 21-30 years had 7 subjects in group I and 8 in group II, 31-40 years had 13 in group I and 11 in group II and 41-50 years had 5 in group I and 6 in group II. The difference was significant (P< 0.05).

**Table II Assessment of breath CO level**

| Breath CO level | Group I | Group II | P value |
|---|---|---|---|
| 0-6 (ppm) | 2 | 16 | 0.01 |
| 7-10 (ppm) | 17 | 9 | |
| >10 (ppm) | 6 | 0 | |

Table II, graph I shows that breath CO level0-6 (ppm)was seen in 2 and 16, 7-10 (ppm) in 17 and 9 and >10 (ppm) in 6 subjects in group I and II respectively. The difference was significant (P< 0.05).

**Graph I Assessment of breath CO level**




## DISCUSSION

The breath carbon monoxide (CO) level in non-smokers exposed to environmental tobacco smoke (ETS), also known as secondhand smoke, is an important indicator of passive exposure to tobacco smoke.[7]Environmental tobacco smoke is a mixture of the smoke emitted by the burning end of a cigarette (sidestream smoke) and the smoke exhaled by the smoker (mainstream smoke). It contains numerous harmful chemicals, including carbon monoxide.CO is a colorless, odorless gas produced by the incomplete combustion of tobacco. When inhaled, CO binds to hemoglobin in the blood, reducing oxygen delivery to tissues and organs.[8]Breath CO can be measured using a breath CO monitor, a non-invasive device often used to assess exposure to tobacco smoke.In non-smokers, baseline breath CO levels are typically between 0 and 6 parts per million (ppm).[9]When exposed to secondhand smoke, non-smokers can show an increase in breath CO levels due to inhalation of carbon monoxide present in the environment.[10]The present study was conducted to assess breath carbon monoxide level of non- smokers.

We found that age group 21-30 years had 7 subjects in group I and 8 in group II, 31-40 years had 13 in group I and 11 in group II and 41-50 years had 5 in group I and 6 in group II. Kumar et al[11]measured breath carbon monoxide (CO) levels of non-smoking subjects exposed to ETS and of non-smoking subjects not exposed to ETS. The study was conducted with the help of a pre-designed questionnaire. One hundred male subjects were selected for the study. The mean breath CO level (ppm) was higher in group I compared to group II (9.18±2.84 versus 4.56 ±1.62).

We found that breath CO level 0-6 (ppm) was seen in 2 and 16, 7-10 (ppm) in 17 and 9 and >10 (ppm) in 6 subjects in group I and II respectively. Devecia et al[12]compared the exhaled CO levels in established smokers and non-smokers. The exhaled CO levels were measured in 322 subjects (243 healthy smokers, 55 healthy non-smokers, 24 passive smokers) who applied to healthy stand during the spring student. Exhaled CO

concentration was measured using the EC50 Smokerlyser. The mean exhaled CO level was 17.13+/-8.50 parts per million (ppm) for healthy smokers and 3.61+/-2.15 ppm for healthy non-smokers, and 5.20+/-3.38 ppm for passive smokers. There were significant positive correlation between CO levels and daily cigarette consumption, and CO levels and duration of smoking in healthy smokers ($r=+0.550$, $P<0.001$, $r=+0.265$, $P<0.001$, respectively. Spearman's test). When smokers and non-smokers were looked at as a whole, a cutoff of 6.5 ppm had a sensitivity of 90% and specificity of 83%.

The shortcoming of the study is small sample size.

## CONCLUSION

Authors found that with respect to non-smokers In addition to other negative effects of smoking, respiratory illnesses are more common in passive smokers. Smokers ought to be aware of the negative effects smoking has on other people as well as on themselves and give up smoking in public areas, hotels, restaurants, and pubs.

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