

Research Article

Effect of traffic air pollution on spirometric parameters in Eastern Uttar Pradesh population, India

Vinay Singh^{1*}, Devesh Kumar¹, Farhat Ali¹, Gaurav Kumar²

¹Department of Physiology, B. R. D Medical College, Gorakhpur, Uttar Pradesh, India

²Department of Physiology, TMMC and RC, Moradabad, Uttar Pradesh, India

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*Correspondence:

Dr. Vinay Singh,

E-mail: vinaysinghdr12@gmail.com

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ABSTRACT

Background: In the present era of the 21st century there are lots of discussion on environmental pollution and its impact on life and various clinical studies done to find out the effect of air pollution on respiratory physiology, particularly pulmonary functions. Pulmonary function tests give valuable information about lung physiology in health and disease. In the present study to assess the pulmonary function test between the population groups exposed to traffic related air pollution.

Methods: A cross sectional retrospective cohort study was conducted in B R D Medical College. It was done on 73 males, out of which 35 were traffic policeman (15 smokers, 20 non-smokers) and remaining 38 belonged to non-exposed control group (15 smokers, 23 non-smokers). Pulmonary function tests (PFTs) were performed with computerized spirometer. The respiratory parameter was recorded and analyzed. To check statistical of data student t-test was performed.

Results: Comparison of ratio FEV₁/FVC among two populations, revealed lower values for Traffic policeman group. This difference was significant among the non-smoker (P=0.0061), while not significant among the smoker (P=0.3419).

Conclusions: The respiratory parameters were changed due to traffic related air pollution. So traffic related air pollution can be a risk factor in the development of respiratory obstruction.

Keywords: Air pollution, Traffic policemen, PFTs, Spirometer

INTRODUCTION

In the present era of the 21st century there are lots of discussion on environmental pollution and its impact on life and various clinical studies done to find out the effect of air pollution on respiratory physiology, particularly pulmonary functions.¹

There are more than 100 contaminants which pollute the atmospheric air, important ones are CO₂, CO, SO₂, H₂S, organic sulfides, fluorine compound, oxides of N₂, NH₃, Suspended particulate matter, Lead oxide and contaminants from motor vehicle exhaust gas containing

of NO₂, Suspended particulate matter CO and Lead.^{3,5} Normally the particles of more than 10 micron size are held in upper respiratory tract and particle less than 10 micron size goes beyond the trachea which produces pulmonary abnormalities.²

Pulmonary function tests give valuable information about Lung physiology in health and disease.⁴ They also give information about which particular function of Lung has been impaired and also provide information as the extent and nature of the disability developed.⁸ In the present study to assess the pulmonary function test between the population group exposed to traffic related air pollution.

METHODS

The subject of the two groups was control and traffic police. Control were Para medical staff of B.R.D.M.C. Gorakhpur, traffic policemen were taken from Gorakhpur city, Uttar Pradesh, India based on smoking behavior.

The subject was categorized into two groups:

- Smokers
- Non-Smokers

A Study was done on 73 males, out of which 35 were traffic policeman (15 smokers, 20 non- smokers) mean age $42.17 \pm$ years, mean height 173.63 ± 5.64 cm and mean exposure to air polluted 11.35 years. Remaining 38 belonged to non- exposed control group (15 smokers, 23 non-smokers). Mean age 40.8 ± 4.73 years; mean height 171.63 ± 5.64 cm.

Respiratory system evolution was done by a respiratory physician by clinical history and clinical examination of the chest. Each subject underwent a detailed physical examination i.e. built height, weight, pallor, Icterus, weight loss, anorexia, clubbing pedal edema, cyanosis and Lymph node examinations.

Any history of disorders such as myocardial infection, angina, chest pain, bronchitis, pneumonia, pleurisy, tuberculosis, asthma, bronchi ecstasies and other systemic anomaly were excluded from the study.

In the pulmonary function tests, the subject was asked to first take 3-4 normal breath, then they were asked to take slow and deep inspiration and then were introduced to blow out forcefully and rapidly through the mouthpiece of the spirometer followed inspiration. Another one or two practice trail the highest of three test reading was taken a final reading according to American thoracic society criteria for acceptability and reproducibility for spirometer. The respiratory parameter was recorded and analyzed. To check statistical of data, students 'T' test was used.

RESULTS

Percent of predicted for forced vital capacity (FVC) and forced expiratory volume in 1 Sec. (FEV_1) between traffic policeman was higher than the control group, but the differences were difference was not statistically significant and comparison of ratio FEV_1/FVC among two populations, revealed low values of the traffic policeman group. This difference was significant among the nonsmokers ($p=0.0061$), while not significant smokers ($p=0.3419$) (Table 1).

Intra group comparison of mean values of ratio FEV_1/FVC between smokers and nonsmokers of the same group shows lower value among the smokers. This difference is statically significant among control groups ($p<0.05$) but is not statically significant among the traffic police group ($p>0.05$) (Table 1).

Table 1: Ratio FEV_1/FVC .

	Control		Traffic policeman		P Value
	Number (n)	Mean \pm SD	Number (n)	Mean \pm SD	
Smokers	15	79 ± 5.83	15	77 ± 4.49	0.3419
Nonsmokers	23	54 ± 6.68	20	79 ± 4.63	0.0061
Total	38	82 ± 6.62	35	78 ± 4.6	0.0059
P Value (s-NS)		0.0212 (<0.05)		0.2269 (>0.050)	

DISCUSSION

In this study it was absorbed that the traffic related air pollution can be a risk factor for the development of airway obstruction. The FEV_1/FVC ratio is a strong indicator of airway obstructive disease in this study, the FEV_1/FVC ratio was lower in Traffic policemen than control group and this was significant in non-smokers groups not in smokers groups because smoking itself a factor that affect the FEV_1/FVC ratio.

Mean FEV_1/FVC was significantly lower among the smokers in the control group than nonsmoker of the same group.⁷ For present finding it can be reasonably

concluded that that chronic exposure to outdoor pollution especially concentration of suspended particulate matter lead to obstructive ventilator defect determined by spirometer.⁶

CONCLUSION

Now study concludes that outdoor air pollution as a causative factor in development of chronic obstructive pulmonary disease.

The respiratory parameters were changed due to Traffic related air pollution. So Traffic related air pollution can be a risk factor in the development of respiratory obstruction.

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