



Expiratory Flow Rates in City Traffic Policemen of Nanded City

KEYWORDS

Diabetes, Kombucha, Streptozotocin, Atherogenic

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ABSTRACT *BACKGROUND : Early recognition of altered lung functions will have preventive significance in the workers who are constantly exposed to air borne pollution. City traffic policemen are constantly exposed to air-borne pollution they are at higher risk for developing impaired respiratory functions.*

AIM : The aim of this study was to compare the expiratory flow rates in city traffic policemen and control (all males). The effect of smoking was also taken into account. Our hypothesis was that air pollution affects the expiratory flow rates.

METHODS : A case-control study was conducted comparing city traffic policemen aged 28 to 45 years with controls of same sex, height and weight. The study was conducted over a period of one year. The work and occupational exposure history was obtained by administered questionnaire and data was collected. PEFR, FEF 25% TO 75% FEF 50% and FEF 0.2- 1.2 were recorded by using computerized "MEDSPIROR" spirometer.

RESULTS : Sixty city traffic policemen (average age – 34.88 yrs.) and 60 controls (average age 33.28) completed the questionnaire. All control subjects selected were nonsmokers, whereas 18 of city traffic policemen were smokers and 42 were nonsmokers.

CONCLUSIONS : Our study suggests that air pollution on road affects expiratory flow rates in non-smoker city traffic policemen suggesting small air way obstruction. Smoking further adds burden .

INTRODUCTION :

Pulmonary function tests are used as screening tests for various epidemiological studies in subjects exposed to community air pollutants (1,2). There is a tremendous increase in the use of automotive vehicles in India, especially in urban cities. The fleet of automobiles, two wheelers, three wheelers, heavy duty trucks, diesel engines etc., when move from one place to another especially on ill maintained dusty roads the air pollution goes on increasing. The automobile exhausts give out variety of pollutants and ill maintained vehicles aggravate the problems (3). The Automobiles emit hydrocarbons carbon monoxide, lead, nitrogen oxides, sulphur dioxide and particulate matter (4). In addition diesel engines when misused or badly adjusted are capable of emitting black smoke and malodorous fumes. Oxides of nitrogen hydrocarbons and ozone these are respiratory toxicant (4).

In may be presumed that city pollution is entirely due to automobile exhausts as industrial area is out of city.

In order to study the health hazards of automobile exhausts of human system especially respiratory system the section of population considered most suitable for study was the traffic police personnel who are posted at various traffic junctions through which maximum number of vehicles pass. So the present study was carried on traffic policemen to test the hypothesis that air pollution caused by automobile exhausts impairs respiratory function.

Material and Methods:

The study subject consisted of 60 males employed as traffic policemen in Nanded city and 60 controls. All controls were non smokers. Average age of all subject i.e. traffic policemen was 37.88 ± 7.5 years & controls were of same

age, height & weight.

Written consent of each subject was taken prior to study. The work and occupational exposure history, smoking history was obtained by administered questionnaire and data was collected. Lung functions were recorded in sitting posture using computerized portable "Medispiror" spirometer. (RMS records & medicare systems Chandigarh, India). The spirometry was performed in the morning hours. All the subjects were asked to exhale into spirometer as forcibly and possibly after maximum inspiration. It was ensured that a tight seal was maintained between lips and the mouthpiece of the spirometer. Each test was repeated 3 times and highest reading was taken for calculation.

The study was approved by institutional ethical committee.

The parameters studied were included Peak expiratory flow rate (PEFR) Lit / Sec, Expiratory flow rate between 25-75% of Vital Capacity, Forced expiratory flow at 75% of FVC, (FEF 75%), (Lit/s), Forced expiratory flow at 2-2.2 Lit / Sec. flow at which first 1000 ml of FEF is expired out.

Statistical analysis was done by using Unpaired 't' test by SPSS software.

RESULT :

Sixty traffic policemen (average age 37.88 years) and 60 controls (average age 37.28) completed the questionnaire. All controls were nonsmokers whereas 18 of city traffic policemen were smokers and 42 were nonsmokers.

In our study **Table -1** and **Table -2** show that PEFR was significantly reduced in traffic police officers ($t=3.26$) than the control group ($p<0.01$), FEF 50% and FEF 75% values

were also significantly reduced in traffic policemen than in controls. (P<0.01 for both) (t=25.13 & t=4.82 respectively).

FEF 0.2-1.2 lit i.e. the flow at which the initial 1000 ml. of air are breathed out also is significantly reduced in traffic officers than our control group (t=29.30, p< 0.01)

Table -1 : Shows Comparison of mean of expiratory flow rates in three groups.

Variables	Control Non-smokers N=60	Traffic policemen Non-smokers N=42	Traffic policemen Smokers n=18
PEFR (Lit/s)			
A	7.28	7.61	7.20
P	7.93	8.58	7.90
PEFR (Lit/s) 25% - 75%			
A	3.40	3.24	2.88
P	3.89	3.81	3.85
PEFR (Lit/s)			
A	2.12	2.00	1.77
P	2.80	2.75	2.76
PEFR (Lit/s)0.2 – 1.2			
A	6.91	6.64	6.01
P	7.20	7.08	7.17
PEFR (Lit/s) 50%			
A	5.02	4.00	3.87
P	5.41	5.48	5.43

A= Actual Value, P = Predicted Value

**Table - 2
Shows results of unpaired 't' test in Traffic policemen & controls.**

Parameters Lit/Sec.	'T' value	'p' value	Signifi- cance
PEFR	3.26	P< 0.01	S
FEF 25-75%	4.38	P< 0.01	S
FEF 50%	25.13	P< 0.01	S
FEF 75%	4.82	P< 0.01	S
FEF 0.2-1.2 Lit	29.30	P< 0.01	S

S- significant.

**Table -3
Shows effect of smoking on PFTS in traffic police officers.**

Parameters Lit/ Sec.	'T' value	'p' value	Signifi- cance
PEFR	5.29	P< 0.01	S
FEF 25-75%	6.65	P< 0.01	S
FEF 50%	2.31	P is between 0.05 & 0.01	S
FEF 75%	2.60	P< 0.01	S
FEF 0.2-1.2 Lit	8.13	P< 0.01	S

Table-3 shows effect of smoking on various parameters in traffic police officers. Peak expiratory flow rate was significantly reduced in smokers group than in nonsmoker group (t= 5.29, P< 0.01) FEF 25 – 75% and FEF 30% were also significantly reduced in traffic police officers who were

smokers than nonsmokers (t=6.05 & t = 2.31 respectively and P < 0.01 for both).

FEF 75% also showed significant reduction in traffic policemen (P< 0.01). FEF 0.02 – 1.2 lit was significantly reduced in smoker traffic police personnel than in non smoker (t=8.13 & P < 0.01)

DISCUSSION :

The purpose of this study was to evaluate ventilator functions in traffic policemen. The adverse health effects and deterioration of pulmonary function from inhaling various air pollutants such a particulate matter are well recognized (6).

In our study peak expiratory flow rate which occurs at 90 percent of total lung capacity was significantly reduced in traffic officers than control group (P< 0.01). This may be because of bronchial constriction.

Our study also showed significant decrease in FEF 0.2-1.2 lit. in traffic police officers than control group (P<0.01) FEF 0.2-1.2 Lit represents flow at which the initial 1000 ml. Of air breathed out. This volume comes from the large airways, and is crude indication of PEER.

Our findings are in line with other studies on animal models (7) which showed that automobile exhausts mainly nitrogen dioxide produces morphologic alternations in the respiratory tract. Bronchiolar response is characterized by hypertrophy and hyperplasia of epithelial cells, loss of secretory granules and surface protrusions in Clara cells and loss of ciliated cells or cilia.

The initial portion of V.C. i.e. from peak flow to FEF 50% is effort dependant, the flow FEF 50% downwards is relatively effort independent & is determined by lung elastic recoil and the flow resistant properties of smaller airways(8) FEF 50% FEF 75% and FEF 25-75% were decreased in traffic police officers than our control group (P< 0.0) The impairment in all these parameters indicates the presence of smaller airway obstruction. Reduction in FEF 75% is an early indication of smaller airway obstruction. Our results correlate with other studies conducted on traffic policemen (9-10).

These studies reveal significant respiratory impairment in the traffic policemen due to exposure to vehicular pollution. Impairment in smaller airways may be because of thickened collagen fibers, decrease in elastic, content by the noxious air pollutants (8). Other studies noted higher prevalence of chronic bronchitis, chronic obstructive lung disease and asthma in areas with higher air pollution than areas with lesser pollution (3,11). Also they noted improvement in respiratory health following a reduction in exposure to traffic related air pollutants (11).

Our study also showed significant reduction in all parameters in smoker group than nonsmoker traffic policemen. This relationship was observed in Ahmadabad shop keepers exposed to air pollutants (7). Cigarette smoke contains significant amounts of oxides of nitrogen and an additive effect of high level of NO2 in high polluted areas might be responsible for this (13).

The increase in prevalence of impairment strongly documents that air pollutants produce toxic effects on pulmonary function in highly exposed population and smoking had an additive effect.

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