

A study on assessment of lung functions among traffic policemen in Bareilly city

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Aim: This study was assessment of lung functions among traffic policemen as compared to non-traffic policemen. **Introduction:** Air pollution due to vehicle emissions is a serious health hazard and is a major cause of air quality crisis in metropolitan cities. Traffic policemen of such cities are at a constant risk of developing various health problems due to continuous exposure. **Materials and Methods:** A cross-sectional study was conducted to compare lung function profile of traffic policemen with non-traffic policemen. Information on duration of exposure, respiratory symptoms, and use of protective equipment were obtained. Spirometry was done to assess lung function. Observed values of spirometric parameters such as forced vital capacity (FVC), forced expiratory volume in 1 s (FEV1), FVC/FEV1 ratio, PEF, and peak expiratory flow 25–75% were compared with predicted values. **Results:** Data revealed abnormal spirometric parameters in 78.9% ($n = 39$) of traffic police personnel, out of which 26% ($n = 13$) restrictive, 32% ($n = 16$) obstructive pattern was seen. In non-traffic police personnel, 46.1% ($n = 23$) have deranged spirometry out of which 15.3% ($n = 7$) were obstructive. This may be due to exposure to vehicular pollution for several hours in a day for many years causing decreased functional capacity of the lungs and chronic smoking worsens the condition. **Conclusion:** Respiratory function of traffic policemen showed reduction compared to their expected values emphasizing the need for compulsory use of personal protective equipment (face mask). Periodic health check-ups are required to understand the impact of vehicular pollution on their health. Periodic switchovers of traffic police personnel to indoor desk jobs may aid in reducing the exposure and thus the risk.

KEY WORDS: Occupational risk, Motor vehicle pollution, Obstructive pulmonary diseases, Spirometry

INTRODUCTION

Air pollution is the major risk health hazard specially in metropolitan cities.^[1,2] Air pollution results in respiratory, cardiovascular diseases, and increased risk of malignancy.^[3,4]

Acute effects may be irritation of eye and nose, cough etc., while long-term exposure leads to COPD.^[5] Occupation also plays an important role in etiology of various lung diseases. Road traffic is responsible for producing volatile organic compounds, suspended particulate matter, oxides of sulfur, oxides of nitrogen, and carbon monoxide, which, in turn, are responsible for deleterious effects on our respiratory system.^[6-8]

Traffic police personnel are continuously exposed to noisy and polluted environment during the shift hours. Long-term exposure to the air pollutants generated by motor vehicles, diesel exhaust particles is causative of cough, sputum production, dyspnea, and decremented lung function.

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Spirometry plays a vital role in determining deterioration in pulmonary functions and, hence, can detect the detrimental lung functions at the earliest when preventive and corrective measures are likely to be more beneficial.^[9,10]

The present study was aimed at lung function evaluation in traffic police personnel versus non-traffic police personnel posted in Bareilly, to see whether prolonged exposure to vehicular exhaust had any hazardous effect on their lung functions.

Place of Study

Rohilkhand Medical College and Hospital, Bareilly.

MATERIALS AND METHODS

A cross-sectional study was conducted to compare lung function profile of traffic policemen versus non-traffic policemen (as a control group). Information on duration of exposure, respiratory symptoms, and history of any chronic lung diseases was collected. Spirometry was done and parameters such as forced vital capacity (FVC), forced expiratory volume in 1 s (FEV1), FVC/ FEV1 ratio, PEF, and peak expiratory flow (PEF) 25–75% were compared with predicted values.

FVC – This measures the amount of air exhaled after the complete inhalation.

FEV1 – This measures the amount of air exhaled in the first second of a full forced expiration. This is often expressed as a percentage of FVC and is the measure of airway obstruction or limitation. In normal individuals, the value is approximately 70%. Post-bronchodilator testing was done for those with a FVC/FEV1 ratio <0.7.

Forced expiratory flow (25–75%) – This measures the airflow halfway through exhalation. It is often reduced in small airway diseases.

PEF – It measures the speed of exhalation.

Inclusion Criteria

All traffic and non-traffic police personnel who were willing to participate were included in the study.

Exclusion Criteria

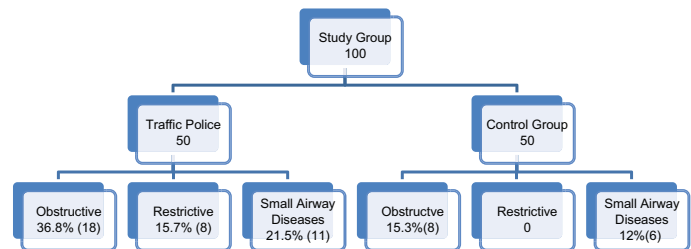
People with history of past history of TB or other chronic lung disease.

RESULTS AND OBSERVATIONS

Most common symptom was dyspnea among traffic policemen, that is, 40% (*n* = 20) and 10% (*n* = 5) among control group.

In this study the mean age of the study population was 39.34 ± 11.20, males were 83 and females were 17 [Table 1].

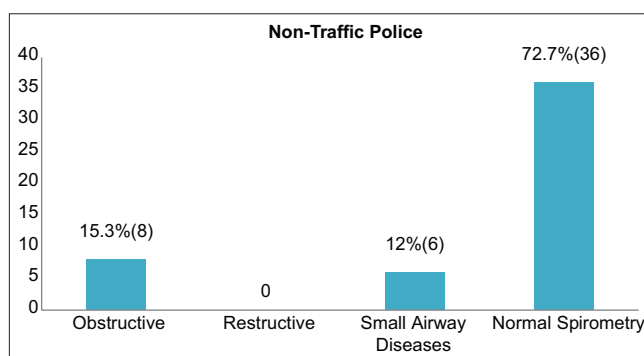
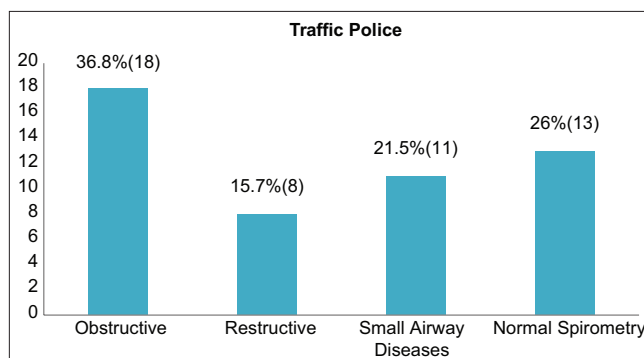
On Spirometric Data Evaluation



Obstruction was twice, that is, 36.8% in traffic policeman as compared to control group (non-traffic policemen), that is, 15.3%.

Significant restriction was seen in traffic policemen, that is, 15.7% as compared to control group.

Small airway disease was also higher in traffic policemen, that is, 21.5% as compared to control group, that is, 12%.



Derangement in spirometry among the control group can be attributed to smoking habit, in which this study was higher in control group, that is, 26% (*n* = 13), while among traffic policemen, it was 16% (*n* = 8).

DISCUSSION

Increasing air pollution in India is a major public health hazard, especially among those who live and work in cities. The

Table 1: Demographic data

Mean age	39.34±11.20
Sex	
Male	83
Female	17
Number of years of service in traffic police	
<3 years	35 (70%)
>3 years	15 (30%)

growing number of vehicles is one of the contributing factors for worsening of air quality. Traffic policemen who are continuously exposed to air pollutants are at high risk.

In the present study, 40% had complaint of dyspnea and 14% cough among traffic policemen. A cross-sectional study conducted at Puducherry to assess the respiratory health status among traffic policemen showed that among 94 traffic policemen, 52.1% reported cough, and another similar study at Patiala reported 68% of frequent cough and 22% of shortness of breath in traffic police.^[5,11] A study done to assess the impacts of vehicular exhaust on traffic police working at Batticaloa town, Sri Lanka, reported 25% shortness of breath and 8.3% frequent cough.^[12]

As per OSHA guidelines, mask or respirator is recommended among those exposed to airborne particulate matter in their work environment and those who are exposed to toxic pollutants emitted from automobiles.^[13] In the present study, of 50 traffic policemen, only 4.3% reported the use of a respiratory mask. A study on knowledge and practice for the prevention of respiratory problems among traffic policemen in Kathmandu valley, stated that 71.5% had used protective devices during their duty hours.^[14]

The present study found that all the PFT parameters were less among traffic policemen which was similar to many studies conducted across India and other countries. The study conducted at Puducherry by Ranganadin *et al.* and Makwana *et al.* in Gujarat showed a reduction in all spirometric parameters, which was similar to the our study, indicating a reduction in the lung function among the study individuals.^[5,15] Ingle *et al.*, at Jalgaon city, conducted a study on the effects of exposure to vehicular pollution and respiratory impairment observed that all the PFT parameters were adversely affected in traffic policemen when compared with the control group.^[16] A comparative study on pulmonary function among traffic policemen versus general policemen was conducted in Puducherry by Pal *et al.*, observed that there was a significant decrease in pulmonary function among traffic policemen when compared to the control group, inferring that traffic air pollution has a detrimental effect on the pulmonary function of traffic policemen.^[7] An analytical cross-sectional study was conducted in Telangana by Maddur *et al.*, among non-smoking traffic policemen and healthy control groups found that traffic police had poor respiratory function as compared to controls and also showed that respiratory function decreases with increase in age and duration of exposure.^[4]

CONCLUSION

Traffic policemen have shown significant lung function impairment as compared to control group. However, the study group was small and we need larger group and randomized study to confirm our result.

Recommendations

The above shown results emphasize on the need for compulsory use of personal protective equipments (face masks). The periodic health checkup is required to understand the impact of vehicular pollution on their health.

Periodic switchover of traffic police to indoor desk jobs may aid in reducing the exposure and thus the risk.

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