



## International Journal of Allied Medical Sciences and Clinical Research (IJAMSCR)

ISSN:2347-6567

IJAMSCR /Volume 6 / Issue 2 / Apr - Jun- 2018  
www.ijamscr.com

Research article

Medical research

### To study pulmonary function in traffic and city police of Jalgaon city

Suchandra Chandankar\*<sup>1</sup>, Sachin Chaudhari<sup>2</sup>, Milind Kahile<sup>3</sup> and Nikhil Patil<sup>4</sup>

<sup>1</sup>B.PTh intern, Dr. Ulhas Patil College of Physiotherapy, Jalgaon

<sup>2</sup>Professor, Dr. Ulhas Patil College of Physiotherapy, Jalgaon

<sup>3</sup>Assistant professor, Dr. Ulhas Patil College of Physiotherapy, Jalgaon

<sup>4</sup>M.PTh Student, Dr. Ulhas Patil College of Physiotherapy, Jalgaon

\*Corresponding Author: Suchandra Chandrakant Chandankar

Email id: scchandankar@gmail.com

#### ABSTRACT

The purpose of this study is to check pulmonary function in traffic and city police of jalgaon city. 120 policemen were selected in the study with age group 30 to 60 years with minimum 5 years of experience for duration of 5 months. PEFR and chest expansion was evaluated for each policemen and was analysed with paired 't' test. Conclusion: Difference in PEFR and Chest Expansion was statistically significant. According to the study Traffic police is more affected than city police because of pollution.

**Keywords:** PEFR (Peak Expiratory Flow Rate), Chest Expansion, Police, Pulmonary Function

#### INTRODUCTION

Occupational diseases reflect health hazards brought on by exposure within the work environment. Due to lack of education, unaware of hazards of their occupations, general backwardness in the sanitation, poor nutrition and climatic proneness of this geographic region to epidemics aggravate their health hazards from work environment. [2, 3]

Jalgaon City is the trade and commercial Centre of North Maharashtra Region, India. City includes all type of pollution groups. National Highway No. 6 is passing through the city and the study includes 07 road crossing on the way. The duty hours of traffic policemen are 9 am to 9 pm including recess. It means for at least 10 hrs the traffic policemen working at road crossing receive the

heavy dose of vehicular pollution as compare to city police who is having same working hours. [3]

The National Highway (NH 6) Passing through the city is characterized by a continuous flow of heavy-duty trucks and containers. Among the vehicular flow the diesel vehicles are in higher population. Smoke is one of the major outcomes of diesel burning. Nearly all diesel smoke particles fall into the fine particle size. Small size and large number of particles offer greater surface area that allows toxic organic compounds to get adsorb easily. Fine smoke particles can go deep into the lower respiratory tract and damages the lung tissue. [3, 5]

The continuous vehicular exhaust inhalation can lead in the symptom of lower respiratory tract such as cough, shortness of breath and pain with inspiration. All these leads to reduced Pulmonary functions like PEFR. It also results in reduced chest

expansion due to accumulation of platelets in pulmonary capillaries. In the long run, the pollutants may produce disease like Asthma and Bronchitis in the exposed individuals with changes in normal lung functions. [5, 6]

This study shows link between exposure to vehicular exhaust and pulmonary function. [6, 8]

## METHODOLOGY

120 policemen with minimum 10 years of service experience from age group 30- 60 years were

randomize divided into 2 groups i.e Group\_ A ( 60 City Policemen) & Group ( 60 Traffic Policemen) with study duration of 5 months. The PEFR testing was conducted by sitting the subject comfortably in the chair. Regular sterilization of the mouth piece was done before the use. The subject were asked to take normal inspiration followed by maximal exhalation. Three such test were performed and subject were coached to improve the efforts. The best of the three performances of PEFR was taken in to account.

### Assessment of severity of airflow obstruction according to PEFR values are group as normal and below normal

Group	Values (Lit/min)
Normal	Above 300
Below Normal	Below 300

Chest Expansion was measured by inch tape. It helps to know the amount of chest tightness or reduced chest expansion due to accumulation of

platelets in the pulmonary capillaries and/ or any spinal deformity (Kyphosis, Scoliosis).

## STATISTICAL ANALYSIS

Values observed in 120 subjects (60 traffic police & 60 City Police)

Age Group	Group_A	Group_B
30 – 39 yrs	32	5
40 – 49 yrs	16	23
Above 50 yrs	12	32

Chest Expansion	Mean
Group_A	3.70
Group_B	3.067

Dyspnoea Grading	Group_A	Group_B
0	19	21
1	33	19
2	8	20

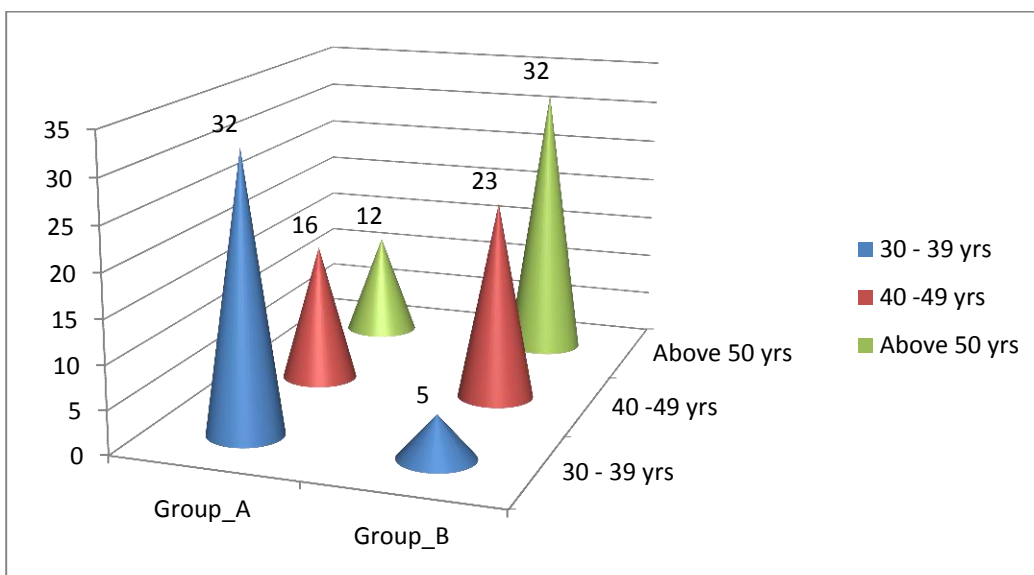
Working Years	Group_A	Group_B
10 – 19	38	38
20 -29	14	13
Above 30	8	9

PEFR ( Lit./min)	Group_A	Group_B
Below 300	4	19
300 and above	56	41

**Table 1: Age Groups in Traffic & City Policemen**

Age Group	Group_A	Group_B
30 – 39 yrs	32	5
40 – 49 yrs	16	23
Above 50 yrs	12	32

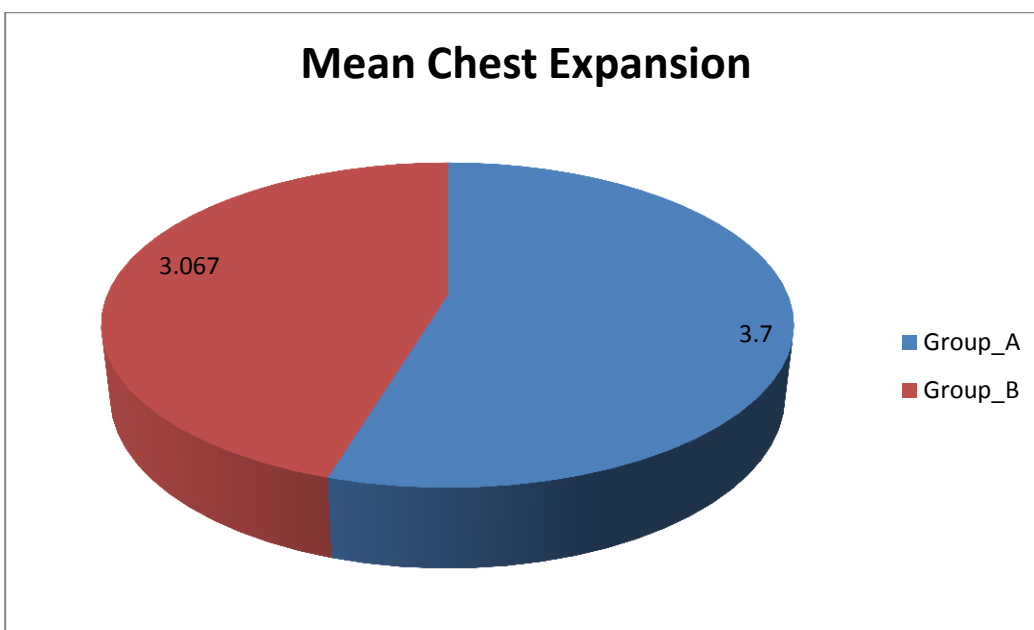
Total 120 subjects out of that 60 traffic policemen & 60 City policemen.



**Table 2: Chest expansion observed in traffic & city policemen**

The mean Chest Expansion in 120 policemen of Group\_A & Group\_B.

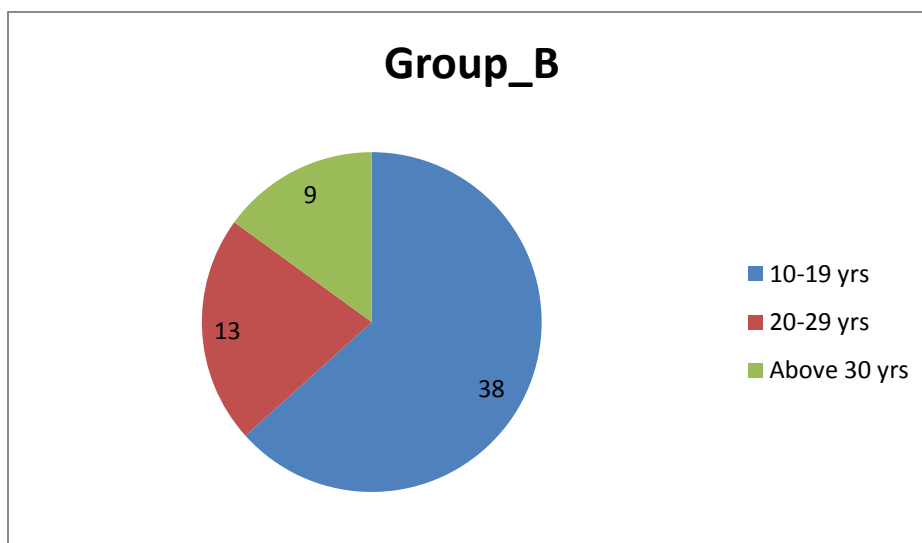
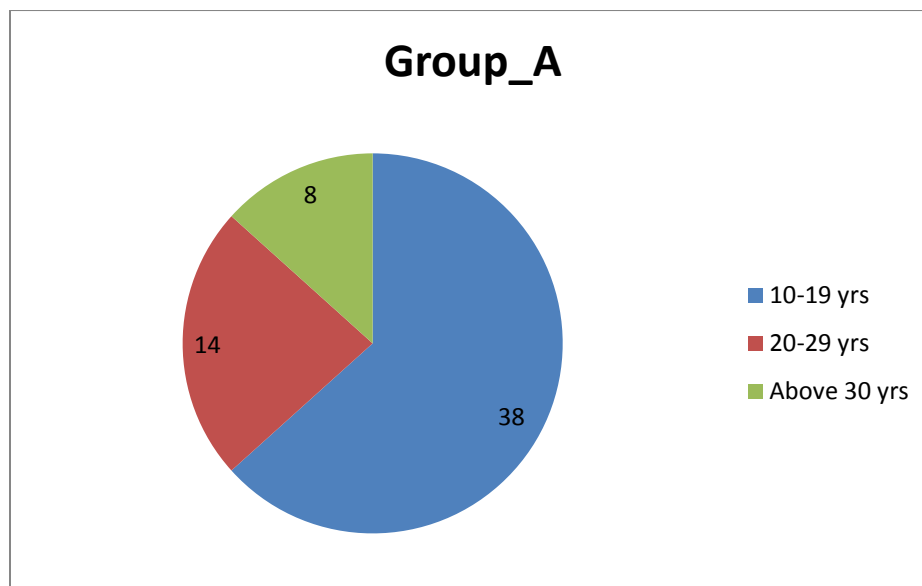
Chest Expansion	Mean
Group_A	3.70
Group_B	3.067



**TABLE 3: Working Year of exposure to air pollution in Group\_A & Group\_B.**

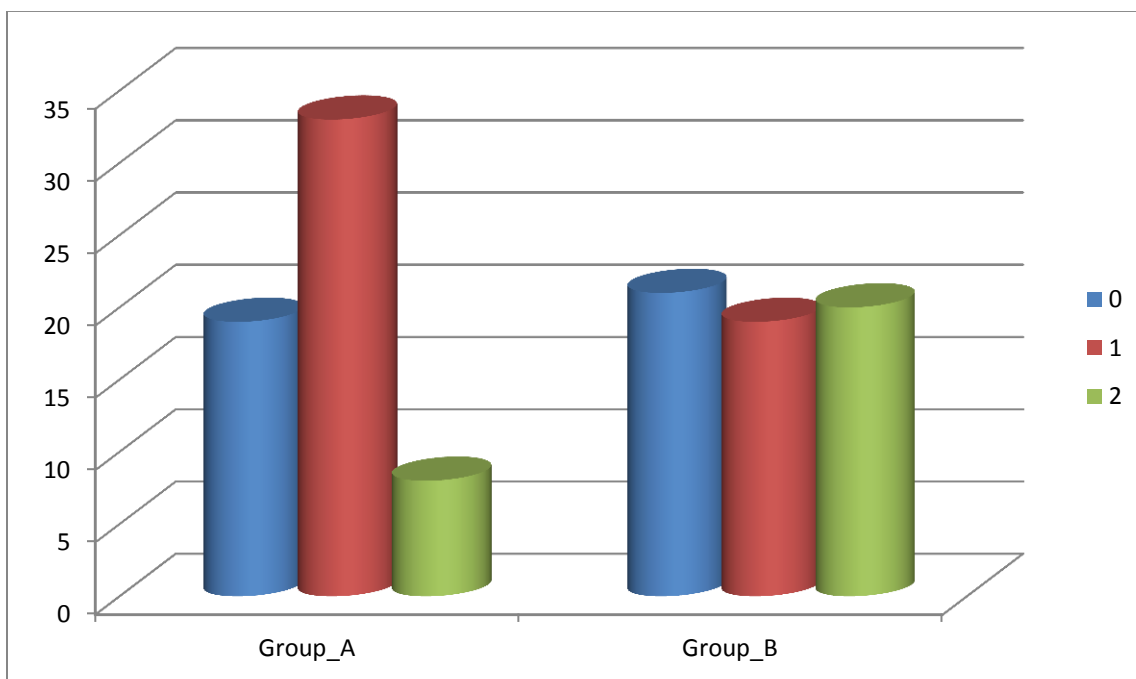
Working Years	Group_A	Group_B
10 - 19	38	38
20 -29	14	13
Above 30	8	9

Working years of exposure to air pollutants

**Table 4 : Symptoms Of Breathlessness In Group\_A & Group\_B.**

Rate of Dyspnoea during working in Traffic and City police.

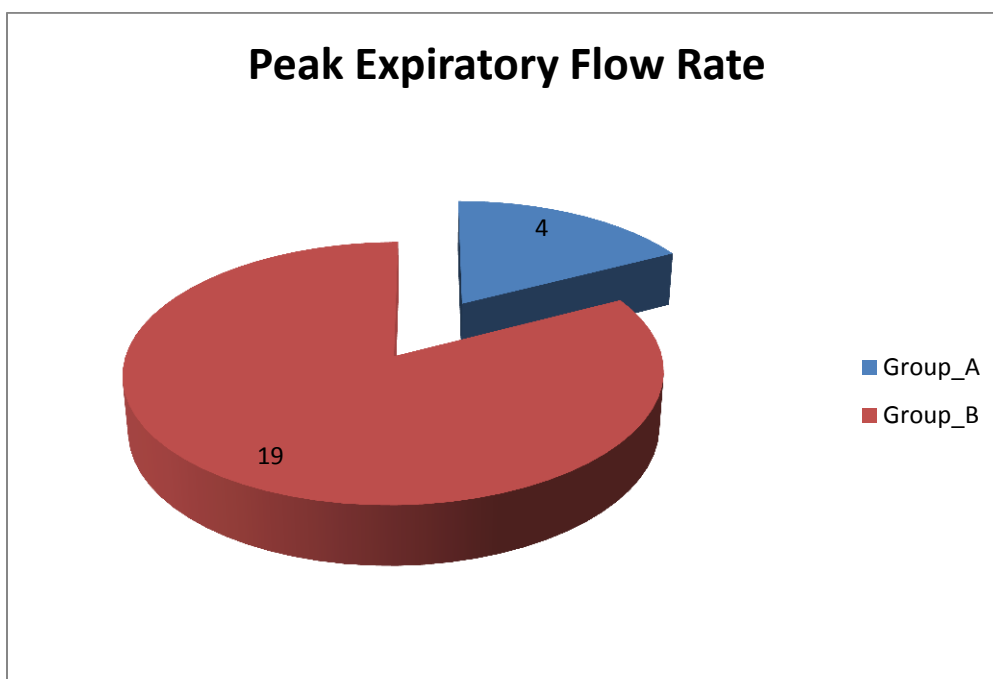
Dyspnoea Grading	Group_A	Group_B
0	19	21
1	33	19
2	8	20



**Table 4 : Comparison of PEFR in Group\_A & Group\_B.**

Peak Expiratory Flow Rate in Traffic and City police.

This graph shows the number of policemen having Reduced PEFR in both the groups.



## RESULT

Significant difference was observed in the PEFR values of City police vs Traffic police  $p=0.003$ .

Also, significant difference was observed between the chest expansion of City police & Traffic police with  $p=0.001$ .

There was no significant difference observed in dyspnea grading among City police vs Traffic police.

## DISCUSSION

In the survey conducted in 120 policemen, we found that 23 subjects (4 city policemen & 19 traffic policemen) have reduced Pulmonary functions. Study shows that increase in exposure to pollutants leads in decrease in PEFR values from the expected. With exposure to toxic chemicals and gases released from the vehicular emission produced irritation and allergy in the lungs and air passage of individuals who are exposed for a long time. This leads increase in cough production and bronchoconstriction. Changes in PEFR and lung functions are most probably associated with both exposure and age of the subject. There is chest tightness due to temporary accumulation of platelets in the pulmonary capillaries after organic dust exposure. Vehicular gases act as an irritant to both the alveoli and bronchus.

The test was performed for comparison of reduced pulmonary function in target groups. It was observed that PEFR in traffic policemen was less than the city policemen. Peak Expiratory Flow Rate (PEFR) is the best test of expiratory efforts. The PEFR was worst affected in traffic policemen. Chest expansion observed is T-Value= 3.44, P-value = 0.001 of the expected value.

This supports that our assumptions is correct, that traffic policemen have respiratory impairment like reduced pulmonary function as well as reduced Chest expansion.

Other factors contributing to dyspnoea and fatigue are:

- Increase in physiological dead space.
- Lung over inflation
- Overloading and weakening of inspiratory muscles.
- Increased work of breathing.

## CONCLUSIONS

The study was restricted to the police community. The Lower age limit was 30 yrs and upper limit was 57 yrs. Difference in PEFR and Chest Expansion was statistically significant.

According to the study Traffic police is more affected than city police because of pollution. Hence, precautionary measures for their health are needed by carrying out health promotion and health education activities.

## ACKNOWLEDGMENTS

I would like to thank my parents for the constant support and strength. I am extremely grateful to Dr. Sachin Chaudhary for his advice and help. I express my humble gratitude to Dr. Milind Kahile under whose expert guidance I was able to successfully complete the study. I am thankful to Dr. Nikhil Patil for his constant support and help. I am also thankful for all teachers for their encouragement and help. Last but not the least, I express my thanks to all my subjects who participated in my study and gave their full cooperation for its completion.

## REFERENCES

- [1]. Cotes JE Lung function- Assessment& application in medicine. 4<sup>th</sup> ed. Blackwell Scientific Publication, Melbourne, 1978.
- [2]. National Institute of Health, National heart, Lung and Blood institute Global initiatives for asthma: a global strategy for asthma management and prevention. NHLBI/WHO Workshop Report 20, 1995.
- [3]. Balmes J, The role of ozone exposure in the epidemiology of asthma. *Environ Health* 101, 1993, 219-24.
- [4]. Edwards J, Walters S, Griffiths R Hospital admissions for asthma in preschool children: relationship to major roads in Birmingham, United Kingdom. *Arch Environ Health* 49, 1994, 223-7.
- [5]. Chatterjee BP, Alma J, Gangopadhyay PK, A study of dynamic lung function in jute mill workers, *Indian J Indus Med* 35, 1989, 157-65.
- [6]. Chattopadhyaya BP, Dipali S, Satipati C 662 ST INGLE et al. *Industrial Health* 2005,43, 656-662 Pulmonary function test and the jute mill workers. *Indian J Occup Health* 37, 1994, 1- 10.
- [7]. Taggart Sc Asthmatic bronchial hyper responsiveness varies with ambient levels of summertime air pollution. *EurResir J* 9, 1, 1996, 146-54.

- [8]. Ruses I Analysis of relationship between environmental factors and asthma emergency admissions, Allergy 53, 1998, 394-401.
- [9]. Cassino C, Ito K, Bader I, Ciotoli C, Thurston G, Reibman J Cigarette smoking and ozone associated emergency department use for asthma by adults. Am J Cri. Care Med 159, 1999, 1773-9.
- [10]. English P, Neutra R, Scalf R, Sullivan M, Waller L, Zhu L Examination association between childhood asthma and traffic flow using geographic information system. Environ Health Perspect, 107, 1999, 761-7.
- [11]. Cotes JE, Malhotra MS (1964) Difference in lung functions between Indians and Europeans. J Physiol 177, 17-8.
- [12]. Stone V Environmental air pollution. Am J critcure med 162, 2000, S44-7.
- [13]. Grahm NM The epidemiology of acute respiratory infections in children and adults: a global Prospective. Epidemiol Rev 12, 1990, 149-78.
- [14]. Tiitten P, Timonen KL, Ruuskanen J, Mirme A, Pekkanen J Fine particulates air pollution, re-suspended road dust and respiratory health among symptomatic children. EurRespir J 13, 1999, 266-73
- [15]. Thomas PT, ZelikoffJT air pollutants: Moderators of pulmonary host resistance against infection. In : Air pollution and health eds. Holgate St, Samet JM, Korean HS, Maynard R, Academy Press, San Diego, 1999, 357-9.
- [16]. Dockery DW, Pope III CA Acute respiratory effects of particulate air pollution. Annu Rev Public Health 15, 1994, 107-32.
- [17]. Pope III CA, Dockery DW, Schwartz J Reviews of epidemiological evidence of health effects of particulate air pollution. Inhale Toxicol 7, 1997, 1-18.
- [18]. US National research council (USNRC) Indoor Pollutants. Eds. By committee on indoor air pollutants, National Academy press, Washington DC, 1981.
- [19]. Williams MH Who needs its? Chest 89, 1986, 769-80.
- [20]. WHO Health environment in Sustainable Development. WHO, Geneva, 1997.

**How to cite this article:** Suchandra Chandankar, Sachin Chaudhari, Milind Kahile and Nikhil Patil. To Study Pulmonary Function in Traffic and City Police of Jalgaon city. Int J of Allied Med Sci and Clin Res 2018; 6(2): 242-248.

**Source of Support:** Nil. **Conflict of Interest:** None declared.