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Research Article

RESPIRATORY HEALTH OF AUTO RICKSHAW DRIVERS IN AURANGABAD CITY

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ABSTRACT

Introduction: Aurangabad is an historical city with rapid rate of urbanization and industrialization. There is increase demand for public transport facilities. In Aurangabad city most popular mode of transport is by sharing auto rickshaw,that aggravates environmental pollution. Automobile exhaust affects different body system functions. Present study was under taken to assess respiratory health in auto rickshaw drivers of Aurangabad. **Method:** A total of 55 auto drivers formed study group and 55 non smoker employees of the college formed control group in age group of 25- 45 years, who have satisfied inclusion and exclusion criteria and have consented to participate in study were enrolled. Each enrolled subjects height, weight was recorded and evaluation of lung function test was done using electronic spirometery. **Result:** There was significant decline in lung functions in auto rickshaw drivers as compare to control group. We can conclude that there is adverse effect of vehicle exhaust on lung functions leading to obstructive type of lung disease and which can be reduced by adequate interventions taken. (Improvement in caloric consumption and nutritional intake, physical exercise, change in type of auto rickshaws)

INTRODUCTION

Rapid rate of urbanization of Aurangabad city and expanding industrialization has lead to many problems. This has lead to increased use of automobiles which in turn aggravates environmental pollution. The major modes of public transport in Aurangabad city is three wheeler in form of seat- auto and shared auto rickshaws which run on diesel. Frequently increasing rate of petrol affects the profit of drivers, so kerosene is mixed with petrol and used. Diesel and kerosene auto rickshaws are major source of pollution. Auto rickshaw drivers are continuously exposed to environmental pollution. Incomplete combustion of diesel leads to production of various gases (NO2, CO2, CO, O3, and SO2), liquids and solid particles. Long term airborne pollution exposure leads to injury to the airways and lungs leading to decrements in pulmonary function and various other health problems [1-5].

Spirometry is a measure of airflow and lung volumes during a forced expiratory maneuver from full inspiration. It is a simple and fundamental test to measure dynamic lung volumes to diagnosis and assess of airways disease [6]. Spirometery provides four basic measurements FVC, FEV1, FEV1/FVC and PEF, all these parameters needed to interpret spirometery to demonstrate two basic patterns of disorders obstructive and restrictive

In the current study we are going to compare the respiratory functions like Forced Vital Capacity (FVC), Forced Expiratory Volume in first second (FEV1), FEV1%, Forced Expiratory Flow in 25-75% of Vital Capacity(FEF25-75) and Peak Expiratory Flow Rate (PEFR) in auto rickshaw drivers and normal control group in Aurangabad city.

MATERIAL AND METHOD

Study Design: The present study was conducted in Aurangabad city in Maharashtra. The study group consisted of 55 males in age group of 25-45 years, who are driving auto rickshaw for more than 5 years in Aurangabad city. The control group consisted of 55 males of same age group from members of college who are non smokers and not exposed to auto rickshaw driving.

Method: Inclusion criteria included 1) male subject in the age group of 25-45 years. 2) All male subject with no history of allergic disorders, respiratory disorders, or systemic disease. 3) No history of smoking, chewing tobacco and intake of alcohol. Exclusion criteria were 1) subjects with age less than 20 years and more than 45 years. 2) Subjects with chest wall deformities, neuromuscular disease, obesity and females. 3) Any history of smoking, addiction of tobacco, alcohol intake was excluded from the study. Institutional ethical clearance was obtained.

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A brief personal history was taken and written consent was obtained as per Helinski declaration modified according to the test protocol. Respiratory parameters (lung function tests) were performed using electronic spirometry. The software used in it was Uni-Em spirometry. The spirometry used for the study was of turbine flow type.

Statistical analysis: Results were analyzed by using Unpaired Student T-test with "P" value < 0.05 for significance.

RESULTS AND DISCUSSION

Study group- auto rickshaw drivers (n-55) and control group- subjects non auto drivers (n-55) that have satisfied the inclusion and exclusion criteria were selected.

Table 1 Comparison of Age, height, weight, Duration of auto driving in groups

Parameters	Control group (mean±SD)	Study group (mean±SD)
Age(yrs)	32.2 ± 1.437	33.2±1.398
Height (cm)	167.85±9.03	165.20±5.57
Weight(kg)	54.5± 7.65	50.80±5.41
Duration of auto driving(yrs)		7.7± 3.71

Table-1 There was no significant difference between age, height, and weight of two groups on above parameters.

Table-2 Comparison of lung volumes and capacities between control and study groups

Parameter	Control group(mean±SD)	Study group (mean±SD)	P-value*
FVC(L)	3.42 ± 0.60	3.51 ± 0.56	Not significant
FEV1 (L)	2.54 ± 0.38	2.79 ± 0.58	Not significant
FEV1%	82.6 ± 0.60	64 ± 0.94	Highly Significant

*P value<0.05 is statistically significant, P value<0.001 is highly statistically significant

Table-2 There was highly statistically significant decrease in FEV1% in the study group when compared to the control group. There was no statistically significant change in FVC and FEV1.

Table 3 Comparison of flow rates between control study groups

Parameter	Control group(mean±SD)	Study group (mean±SD)	P-value*
PEFR (L/min)	7.02 ± 0.36	5.78 ± 0.42	Not significant
FEF 25-75 (L/min)	3 .28 ± 1.05	2.435 ± 0.68	significant

Table -3 there was statistically significant decrease in FEF 25-75 (L/min) between two groups whereas PEFR decrease in study group is not statistically significant.

DISCUSSION

In the present study, it is seen that auto rickshaw drivers have less weight than controls this may due to low quality of nutrition and low socio-economic status. Lung functions like FVC, FEV1, FEV1%, PEFR and FEF 25-75 % were estimated in normal and auto rikshaw drivers. It was observed that there was a highly significant reduction in FEV1% and significant reduction in FEF 25-75 % in the auto rickshaw drivers when compared to normal individuals. There was no significant difference in other lung functions parameters between auto rickshaw drivers and control normal subjects. Our data shows that there is obstructive type of pulmonary involvement in auto rickshaw drivers.

Auto rickshaw drivers are long term exposed to vehicle exhaust, petrol vapor inhalation and dust which leads to acute health problem. As auto drivers are most of time on busy roads and exposed to automobile exhaust and other air pollutants. Automobile exhaust is a complex mixture of different gases like Sulphur dioxide (SO2), Carbon dioxide, Carbon monoxide (CO), Nitrogen dioxide (NO2) and particulate matter. It is been demonstrated that exposure to particulate matter combined with exposure to an irritant gas such as NO2 result in greater damage to lung than when exposed to either substance individually. The gaseous pollutants may also alter the properties and concentration of surfactant and contribute to early closure of small airways. Much of the terminal bronchioles may be compromised before other pulmonary function tests such as FEV1 are affected. [7-9] similar results were shown in earlier studies on auto drivers.[10-12]

Ciliary escalator action prevents the dust particles in the inhaled air, which are ladened with bacteria from reaching the lung. But particles with size < 2µm in diameter reaches the alveoli. [13] diesel exhaust particles have size ≤ 0.1 µm. Which produces inflammation by reactive oxygen species in lungs and affects its function. [14-15]

CONCLUSION

In our study it was observed that FVC and FEV1 in auto drivers though less than control group but was in normal limits. FEV1% and FEF 25-75 of auto drivers was significantly less than control group which exhibit a significant decline in lung functions. Duration of auto driving had no relation with decrease in lung functions as duration considered in study was less than 10 years. Measures to be taken to reduce and prevent the ill effects of pollutant. Nutritional status to be improved, regular health check up for pulmonary function test. Imparting health education and use of face masks, physical exercise, and use of CNG or solar panel auto rickshaws.

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