ORIGINAL RESEARCH PAPER

Volume-7 | Issue-12 | December-2018 | PRINT ISSN No 2277 - 8179

INTERNATIONAL JOURNAL OF SCIENTIFIC RESEARCH

"THE STUDY OF EVALUATION OF PULMONARY FUNCTION IN VARIOUS OCCUPATIONS".

Medicine

Hafiz Deshmukh — Assistant professor, Department of Respiratory Medicine, MGM Medical College and Hospital, Aurangabad.

Rekha Bolla* — Resident, Department of Respiratory Medicine, MGM Medical College and Hospital, Aurangabad. *Corresponding Author

Ashish Deshmukh — Professor and HOD, Department of Respiratory Medicine, MGM Medical College and Hospital, Aurangabad.

Sunil Jadhav — Associate Professor, Department of Respiratory Medicine, MGM Medical College and Hospital, Aurangabad.

ABSTRACT

Today occupational lung diseases rates as one of the most common work related illness and therefore an issue of great priority in the industrialized countries and also increasingly in the developing countries. Air pollution is one of the most important etiological factor in developing occupational lung disease to those who exposed to it. Today's urban streets environment is polluted by vehicular exhaust due to poor ventilation and the number of vehicles have increased and manual vehicles (bicycles, carts, tangas etc.) have been replaced by automobiles working on petrol and diesel fuels.

Materials and methods : The present cross sectional study was done in the context to study the evaluation of lung functions in various occupations attending Respiratory medicine OPD. Different Occupational workers who worked for more than eight years and smokers had higher risks of having chronic respiratory morbidity when compared to those who worked for less than eight years and non smokers. The obstructive lung functions were more common than restrictive functions in workers who worked for more than eight years and smokers. Traffic police and hawkers were the high risk group compared to shopkeepers of having respiratory impairment due to atmospheric pollution in my study.

Results: We studied a total of 300 cases of which 100 were shopkeepers , 100 hawkers and 100 traffic police men. Gender distribution amongst the study population indicates 80.7%was males and 19.3% were females. Out of 300 cases 74 cases (32 traffic police,26 shopkeepers and 25 hawkers) were smokers. PFT parameters like FEV1, FEV, PEFR, FEF 25-75% ,FEV1/FVC values in different population with different occupations were compared in present study.

Conclusion: The study showed that the among different occupational workers who worked for more than eight years and smokers had higher odds of having chronic respiratory morbidity when compared to those worked for less than eight years and non smokers.The obstructive lung functions were more common than restrictive functions in workers who worked for more than eight years and smokers

KEYWORDS

INTRODUCTION:

Health of person is largely affected by the environment in which they work, thus making occupation an important determinant of health[(1).] Occupational hazards cause early deaths to millions of people worldwide and also result in avoidable morbidity that adversely affect the quality of life.The worlds health report 2002 placed occupational risks as the tenth leading cause of mortality and morbidity.[(2)]More than 80% of the global burden of occupational disease as well as injury is borne by people in the developing countries [(3)] since they are home to about 70% of world's work population.

Occupational lung diseases rates as one of the most common work related illness and thereforeanissue of great priority in the industrialized countries and also increasingly in the developing countries.[(3)] World health organisation (WHO) also defined as contamination of outdoor or indoor environment by any physical, chemical or biological agent, which changed natural characteristics of air atmosphere.[(4)]

The National air quality monitoring programme, in major cities in India showed that suspended particulate matters(SPM) exceed the standards in all of these cities most of the time throughout the year over last 14 years

Traffic police, hawkers and shop keepers are exposed to environment air pollution for years together. In the long, the pollutants may produce disease like asthma and bronchitis in the exposed individuals with changes in normal lung functions. Pulmonary function tests(PFT) using a computerized spirometer assesses all the parameters of the respiratoryfunction and gives a fair idea about the respiratory health of an individual. Therefore, these changes can be observed even before the disease becomes symptomatic by a detailed assessment of PFT.

Sothis study was undertaken with the objectives to assess and compare lung function test between traffic police man, hawkers and shopkeepers.

MATERIALAND METHODOLOGY:

The study is a cross sectional survey of 300 patients conducted at MGM Hospital Aurangabad after obtaining permission of the institutional ethics committee.

The study data is from January 2017 to January 2018.
The survey was conducted by taking written and informed consent from the patients.

STUDY AIMS AND OBJECTIVE:

To study lung function assessment in various occupations:

1. Traffic police men
2. Hawkers
3. Shopkeepers on the side of the road

INCLUSION CRITERIA:

- All the workers who give consent to perform PFT will be included in the study.
- BMI between 18.5-25
- Above 18 years of age

EXCLUSION CRITERIA:

- Workers having acute illness
- Workers having acute myocardial infarction
- Workers who are confused and delirious
- Patient unable to generate adequate inspiration with vital capacity <10ml/kg or an inspiratory capacity <33%of predicted normal value.

SAMPLE SIZE: study was carried out among traffic police men , hawkers and shopkeepers, with sampe size of 100 of each occupation.

PROTOCOL FOR DATA COLLECTION

Survey was conducted in three phases:

1. Interview of the subjects
2. Anthropometric measurement and
3. Pulmonary function test

INTERVIEW: A short history was administered face to face to the subject relating age, sex , duration in occupation, working hour/week, protective equipment use status, tobacco related behaviours and respiratory symptoms.

ANTHROPOMETRIC MEASUREMENT: Body weight was measured using bathroom scale to accurate to 0.5kg. the scale was kept on the flat surface and adjusted with '0'mark. Now the subject was requested to step on it bare feet. Weights were taken in light cloth. Weight was recorded to the nearest 0.5kg .

Height was measured using anthropometric rod. Height of the subject was recorded without footwear and expressed to the nearest 0.1cm.

BMI of the subject is calculated by equation BMI(kg/m2) =weight(kg)/height(m). subjects having BMI from 18.5-25.0 were selected for pulmonary function test

PULMONARY FUNCTION TEST: It was done using a portable spirometer and print outs were obtained from a computer.The subject was asked to loosen tight clothing and was seated comfortably. The subjects were instructed to takea full breath in, then close the lips around the mouth piece and blow out as hard and fast possible in standingupright posture. Inspiration should be full and unhurried and expiration once begins should be continued without ta pause. Three consecutive spirometric measurements were carried out. The highest values were recorded. Test values for the FVC, FEV1, FEV1/FVC fell below the lower limit of 95%confidence interval of the predicted value were classified as an abnormal. A lowest spirometric FVC together with a normal or high FEV1/FVC ratio has been classified as a restrictive abnormality. The fall in FEV1, PEFR and other flow rates indicate obstructive lung changes

OBSERVATION AND RESULTS:

TABLE NO 1 Gender distribution and Anthropometric parameters:

OCCUPATION	GENDER	AGE	AVERAGE DURATION OF EXPOSURE	DURATION OF EXPOSURE
TRAFFIC POLICE	MALE (100) FEMALE (0)	37.79 ±5.22	7.29±2.95	EXP≤8HRS=55 EXP>8HRS=45
HAWKERS	MALE (65) FEMALE (35)	40.09 ±10.6	11.77±7.06	EXP≤8HRS=44 EXP>8HRS=56
SHOPKEEPERS	MALE (77) FEMALE (33)	39.75 ±10.6	13.86±9.05	EXP≤8HRS=42 EXP>8HRS=58
P VALUE	<0.05	0.162	<0.05	0.14

Table no 1 showing gender distribution amongst study population which indicates 242 was males and 58 was females and anthropometric parameters distribution , mean age of the study population in shopkeeper was 39.75+10.6 years of age , in hawkers it was 40.09+10.6 years of age and in traffic police it was 37.79+5.22 years of age . the average duration of exposure in shopkeeper was 13.86±9.05years , in hawkers it was 11.77±7.06 years and in traffic police it was 7.29±2.95 years . there was statistically significant difference between different occupation and average duration of exposure.(p value <0.05)

TABLE NO : 2 Smoking habits

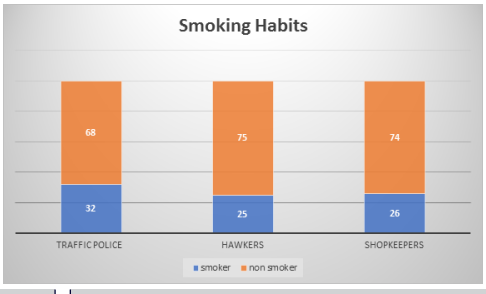

Table no 2 showing 226 cases of the study population there was no history of smoking . out of 74 cases who had history of smoking 32 were traffic police , 24 were shopkeeper and 18 were hawker. There was statistically significant difference between occupation and smoking history.

COMPARISON OF RESPIRATORY SYMPTOMS AMONG WORKERS ACCORDING TO DURATION OF EXPOSURE

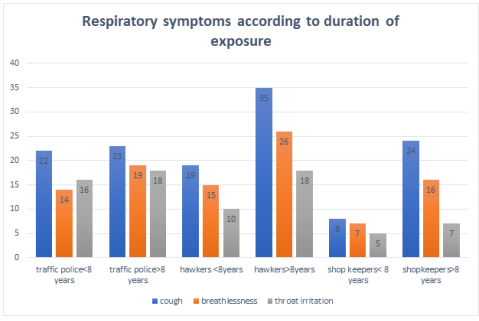

Table no 3 showing comparison of respiratory symptoms among workers according to duration of exposure in various occupations. Cough was the most common symptom seen among the workers followed by breathlessness and throat irritation. Subjects with higher duration of exposure showed higher respiratory morbidities. There was statistically significant difference between different occupation and various respiratory symptoms according to years of exposure. (p value <0.05)

COMPARISION OF LUNG VOLUMES AMONG WORKERS ACCORDING TO DURATION OF EXPOSURE

TABLE 3 Showing comparision of PFT parameters among workers according to duration of exposure. PFT parameters were lower among the all the subjects with >8 years of exposure when compared with those with <8 years of exposure. there was no statistically significant difference between different occupation and PFT values according to years of exposure.

LUNG VOLUMES	TRAFFIC POLICE		HAWKERS		SHOP KEEPER	
	DURATION OF EXPOSURE		DURATION OF EXPOSURE		DURATION OF EXPOSURE	
	≤8 YRS	>8 YRS	≤8 YRS	>8 YRS	≤8 YRS	>8 YRS
FVC (%)	100.24 ±16	91.78±21	99.23±23	91.44±21	100.75±14	96.48±21
FEV1 (%)	94.46±13.5	88.53±18.48	97.39±14	87.12±19	96.91±11.14	93.78±19.17
FEV1 /FVC(%)	77.5±13.84	77.88±7.35	81.93±8.34	77.58±9.02	81.7±7.3	77.49±11
FEV_{25-75} (%)	62.6±27	60.42±23	65.93±27	58.28±23	65.01±23.52	69.78±26
PEFR (%)	78.86±21	75.22±22	81.69±22.6	71.18±22.19	82.35±21	77.95±17
P-VALUE	>0.05					

COMPARSION OF LUNG FUNCTIONS AMONG WORKERS ACCORDING TO DURATION OF EXPOSURE

	TRAFFIC POLICE		HAWKERS		SHOP KEEPERS	
	DURATION OF EXPOSURE		DURATION OF EXPOSURE		DURATION OF EXPOSURE	
	<8YEARS (N-55)	>8 YEARS (N-45)	<8YEARS (N-44)	>8 YEARS (N-56)	<8 YEARS (N-42)	>8 YEARS (N-58)
NORMAL	38(69%)	19(42%)	30(69%)	23(41%)	37(89%)	36(62%)
OBSTRUCTION	14(26%)	15(34%)	10(22%)	23(41%)	4(9%)	14(24%)
RESTRICTION	3(5%)	9(20%)	4(9%)	7(13%)	1(2%)	5(8%)
MIXED	0	2(4%)	0	3(5%)	0	3(6%)
P -VALUE	>0.05					

Table no 4 showing comparison of lung functions among workers according to duration of exposure. results were showing that subjects with >8 years of exposure were having more abnormal lung functions compare to subjects with ≤8 years of exposure. Obstructive lung disease is the most common abnormality seen, followed by restrictive lung disease and mixed abnormalities. There was no statistically significant difference between different occupation and various lung functions according to years of exposure .

COMPARISION OF LUNG VOLUMES AMONG WORKERS ACCORDING TO SMOKING HABITS:

LUNG VOLUMES	TRAFFIC POLICE		HAWKERS		SHOP KEEPER	
	NON SMOKER	SMOKER	NON SMOKER	SMOKER	NON SMOKER	SMOKER
FVC(%)	99.11±18	90.784±20	97.14±22	88.04±23	98.63±16	97.19±25
FEV1(%)	95.23±15	84.48±16	93.50±17	86.04±19	96.19±14	91.80±21
FEV1/FVC (%)	77.99±12	76..99±9.77	80.45±8.41	76.63±10.2	79.98±10	77.12±9.48
FEV_{25-75}(%)	63.97±25	56.62±24	62.91±26	57.85±22	70.44±24.42	59.79±27
PEFR(%)	80.58±22	70.08±18	76.68±23	73.17±21	81.80±19	73.78±15
P- VALUE	>0.05					

TABLE NO 5 showing comparision of lung volumes among workers according to smoking history. PFT parameters were lower among the all the subjects with smoking history when compared to non smokers. There was no statistically significant difference between different occupation and various PFT values according to smoking history.

DISCUSSION:

Occupational morbidity studies in India have mostly been among industrial workers exposed to occupational hazards. Workers who are continuously exposed to high levels of ambient air pollution due to the nature of job.

This study was done in the context to the study of evaluation of lung functions in various occupations. Westudied aa total of 300 casesof which 100 were shopkeepers ,100 were hawkers and 100 were traffic police men after matching inclusion and exclusion criteria.

As per demographic data obtained from cases the mean age of the study population in shopkeepers was 39.75±10.6 years of age, in hawkers it was 40.09±10.6 years of age and in traffic police it was 37.79±5.22 years of age .80.7% of study population was male while females contribute 19.3%. There was statistically significant difference between different occupation and sex distribution.

In the present study showing 217 cases of the study population there was no history of smoking. Out of 83 cases that had history of smoking 32 were traffic police ,26 were shop keeper and 25 were hawker. There was statistically significant difference between different occupation and smoking history. In the similar study conducted by PARVATI PAL et al., 2010, 15 traffic police men had history of smoking.[5]in the similar study conducted by N.MOHAN RAO et al.,1992, 26.9% of shop keepers were smokers[6]. In the similar study conducted by AmrithPakkala et al.,43.3%of hawkers were had smoking history.[7]

In the present study, duration and hours per day of work it was observed that the mean duration of the study population in shop keepers was 13.86±9.05 years, in hawkers it was 11.77±7.06 years and in traffic police it was 7.29±2.95 years. The mean hours/day in shopkeeper was 8.21±183, in hawkers it was 8.33±1602 and in traffic police it was 8.97±0.17.

In the present study, 169 cases of the study population there was no history of cough.Out of 131 cases that had history of cough 45 were traffic police, 32 were shopkeepers and 54 were hawkers.Cough was the predominant symptom among the group of workers who were non smokers and those with <8 years exposure.

Out of 203 cases of study population there was no history of dyspnea.Out of 97 cases who had history of dyspnea,33 were traffic police, 23 were shopkeepers and 41 were hawkers. Dyspneawas the predominant symptom among the group of workers who were smokers and those with >8 years exposure. In the study by NurulNor Nazurahbtabdul Wahid et al.,2014 in hawkers breathlessness was present in 22.2%of the study population.[8]

In the present study ,227 cases of the study population there was no history of throat irritation. Out of 73 cases who had history of throat irritation 34 were traffic police ,12 were shopkeepers and 27 were hawkers. Throat irritation was least symptom present among the workers when compared to cough and breathlessness.

In the present study, lung function parameters (FVC,FEV1, FEV1/FVC,FEV25-75%, PEFR) were lower among the all the subjects with smoking habits and >8 years of exposure when compared with those who were nonsmokers and <8 years of exposure respectively. There was no significant difference in FEV1 and FVC values between different occupations in the study population. There was no significant difference in PEFR values between different occupations in the study population.

In the similar study conducted by N.MOHAN RAO et al.,1992 in shopkeepers , the PFT values showed significant reduction in FEV1, FEF 25-75% and vital capacity in heavy polluted shopkeepers.In smokers, only heavy polluted area shopkeepers demonstrated significant decrement in FEV% and $FEF_{25-75\%}$ value[6]

In the present study,Out of 300 workers 117 had abnormal lung function

Out of 100 57 traffic police showed normal and 43 showed abnormal lung functions(29-obstruction,12 -restriction,2-mixed)

Out of 100, 53 hawkers showed normal and 47 showed abnormal lung functions(33-obstruction,11-restriction,3-mixed)

Out of 100 ,73 shopkeepers showed normal and 27 showed abnormal lung function(18 obstruction, 6 restriction ,3 mixed).

The study showed that the among different occupational workers who worked for more than eight years and smokers had higher odds of having chronic respiratory morbidity when compared to those worked for less than eight years and non smokers.The obstructive lung functions were more common than restrictive functions in workers who worked for more than eight years and smokers similar findings were observed in the study conducted by Mohan rao et al.,1992 in shopkeepers[6]and Gupta et al.,2011in traffic police.[9]

CONCLUSION:

In conclusion, my study showed significant respiratory morbidities along with abnormal lung functions among all 3 groups of occupations. Traffic police and hawkers are at risk compared to shopkeepers for development of respiratory impairment due to atmospheric pollution

REFERENCES

1. Nelson DI, Concha-Barrientos M, Driscoll T, Steenland K, Fingerhut M, Punnett L,etal. The global burden of selected occupational diseases and injury risks: Methodology and summary.Am J Ind Med 2005; 48:400-18.
2. World Health Organization. Regional strategy on occupational health and safety in SEAR countries.2005. http://apps.searo.who.int/pds_docs/B0053.pdf. [Accessed on 23/10/2013].
3. jeebhayMF ,QuirceS.Occupational asthma in the developing and industrialized world: a review . Int J Tuberc Lung Dis. 2007 Feb;11(2):122-33.
4. WHO. 2005- Air Quality Guidelines Global Update. 496pp,WHO
5. Parvati Pal , John Robert A.,T.K.Dutta And G.K. Pal et al. Pulmonary function test in traffic police Personnel in Pondicherry. Indian J PhysiolPharmacol 2010; 54(4) : 329-336
6. N.Mohan Rao, T . S . Patel, C .V .Raiyani, A. L. Aggarwal, P. K . Kulkarni, S .K . Chattterjee And S. K. Kashyap et al. Pulmonary function status of shop keepers of Ahmedabad Exposed to autoexhaust pollutants. Indian J PhysiolPharmacol 1992:36(1) : 60-64.
7. AmrithPakkala, ThippeswamyRaghavendra, ChitradurgaPalaiahGanashree. Effect of automobile pollution on pulmonary function tests of exposed hawkers. Muller Journal of Medical Sciences and Research, 2013, 4; 2; 96-98.
8. Nurul Nor Nazurahbt AbdulWahid , N.B. P Balalla , David Koh et al.Respiratory symptoms of vendors in an open air hawker center in Brunei Darussalam. Frontiers in public health October 2014/Volume 2/Article 167.
9. Sharat Gupta, Shallu Mittal, Avnish Kumar, Kamal D. Singh et al. Respiratory effects of sir pollutants among non-smoking traffic policemen of Patiala, India. Lung India. Vol 28.Issue 4. Oct-Dec 2011