

## Study Of Respiratory Functions Out Come In Farmers Using Pesticide Mixtures And The Farmers Doing Organic Farming (Not Using Pesticides) In Punjab: Effect Of Pesticide Mixtures On The Lungs.

<sup>1</sup>Dr. Iqbal Singh (MD), <sup>2</sup>Dr. Sarabjit Kaur MDS), <sup>3</sup>Khushhaaldeep Singh

<sup>1</sup>Assistant Professor Deptt. of Physiology GMC, Patiala, Punjab

<sup>2</sup>Associate Professor Deptt. of Prosthodontic GMC, Patiala, Punjab

<sup>3</sup>TIET Patiala, Punjab

**Abstract:** Inhalation of Pesticides mixtures over a levy period of time leads to proliferation and fibrotic changes in the lungs. Early recognition of this damage provides an important clue to insure good health. Spirometry is an invaluable screening test to identify the patient with airflow obstruction. The study has been conducted on 100 farmers who are using pesticide mixtures for farming (cases) and 100 farmers who are not using the pesticides and doing organic farming between 20-50 years of age. The pulmonary function tests like FEV<sub>1</sub> and PEFr measured by the computerized spirometer (MED-Sprior) showed a highly significant decline in the farmers using the pesticide mixtures. Different pesticide mixtures were associated with flu, thoracic pain allergic rhinitis and obstructive pattern in spirometry. The cause of better preserved lung function especially the flow volumes in the farmers not using any pesticide mixtures and doing organic farming is due to lesser exposure to the irritants and toxic effects of the pesticide mixtures so chronic exposure to the pesticide mixtures is associated with chronic bronchitis and reduced lung functions.

**Keywords:** Pesticide mixtures, organic farming, FEV<sub>1</sub>, PEFr obstructive pattern, asthma.

Date of Submission: 26-12-2019

Date of Acceptance: 10-01-2020

### I. Introduction:

Spirometry is a useful test for detecting the Presence of Respiratory disorders in the population of coal miners. The time of exposure was significantly associated with the respiratory disease exhibited by these miners repertory disease resulting from exposure to particulate matter such as coal mining remains a research challenge in this country and a public health issue. Spirometry is a basic test of fundamental respiratory function for the diagnosis and monitoring of these types of chronic lung diseases. Accurate interpretation of lung function testing requires appropriate reference values<sup>1,2</sup>.

It would be desirable in a large country such as India that a single set of reference equations be used to interpret lung function tests performed across the entire country. North west and south Indian reference equation do not yield equivalent results for spirometry interpretation in north Indian Patients<sup>3</sup>.

Workers in the cotton processing Industries risk developing obstructive respiratory conditions due to prolonged exposure to cotton dust. Obstructive respiratory conditions are common among workers with those in blowing and waste recovery sections being the most effected<sup>4</sup>. Workers in the cotton industry are occupationally exposed to various dust related hazards. Occupational exposure to cotton dust was associated with increased prevalence of respiratory symptoms and obstructive pattern in pulmonary function test<sup>5</sup>.

Despite limitations inherent in the cross sectional approach there is evidence for workers in small weaving factories to face an increased risk of pulmonary function loss and respiratory symptoms<sup>6</sup>. There is a significant association between exposure to work place pollutants and lung function deterioration among brick klin workers<sup>7</sup>. Cement dust exposure is associated with increased respiratory impairment as the major occupational hazard in the cement production industry is cement particles. The most common acute respiratory symptoms in high exposed workers were stuffy nose and shortness of breath<sup>8</sup>.

Welding is a process during which fumes, gases, electromagnetic radiation and noise are emitted as by-products. Metal oxide particles are particularly hazardous components of welding fumes. Welding has been found to be associated with respiratory symptoms<sup>9</sup>.

Workers in the rubber industry are expressed to pulmonary health hazards. Study demonstrated that occupational exposures and smoking may have a synergistic effect on the respiratory symptoms of tyre manufacturing workers<sup>10</sup>.

Chronic paraquat exposure in pesticide mixtures was slightly associated with flu, thoracic pain, allergic Rhinitis and obstructive pattenen in spirometry<sup>11</sup>.

## II. Material And Method

This study was conducted among 100 formers using insecticides/ pesticides (cases) and 100 farmers not using insecticide or doing organic farming (controls) in and around Patiala, Punjab between 20-50 years of age.

Judged to be healthy or the criterion of no exceptional dysphoea/general debility, H/o current /past cardiorespiratory disorder or frequent cold, Obvious sign of malnutrition no obesity, h/o smoking and detailed physical examination was carried out and Hb. concentration was done. The lung function test were suggested by Gandevia and Hugh Jones and Cotes. The procedures were quite simple from patients point of view only two maneuver were required to accumulate all test data i.e. a forced vital capacity and maximum voluntary ventilation. All gas volumes are corrected to B.T.P.S. (body temperature amnient pressure and saturated with water vapour) automatically by the instrument. Pulmonary function tests were carried out in standing position, Height was measured in centimeters. Weight was measured in Kilograms, Body surface area was read from 'Nomogram' Dobous and Dobous.

In the procedure of lung function a nose clip was attached to the subject and a clean month piece was inserted into the breathing tube two maneuver were performed:-

- 1) **Forced Vital Capacity Test:** Subjects were instructed to take maximum inspiration and then place mouth piece firmly in mount and performed, maximum expiration.
- 2) **Maximum voluntary ventilation test procedures:** After rest of five minutes the subject was asked to breathe as rapidly and deep as possible in and out from mouth piece MVV test was run for 12 seconds. Results were taken on the built in printer containing all the patients information and calculated values of all the 14 parameters.

**Statitistical Analysis-** the various statistical cosidrations used were mea, standard deviation, correlation coefficient and regression equation was elevated by constructing ANOVA table.

## III. Results

Anthropometric parameters in cases and controls are shown in table 1 showing mean stranded devotion 't' value 'p' and significance. The value of PEFR, FEV<sub>1</sub> shows statistical significant difference between cases and controls. PEFR Table 2. Shows mean 'SD' and 't' value significance in the cases and controls and show that it is statistically significant.

FEV<sub>1</sub> Table 3 Show mean 'SD' and 't' value significance in the cases and controls and show that it is statistically Highly Significant.

**Table 1: Comparison of Anthropometric Parameters in farmers using insecticides/Pesticides (Case) and farmers not using any insecticides/ pesticides doing organic farming (controls).**

Para Meters	Mean+SD Cases	Mean+SD Controls	t Value	P Value	Sig.
Age	33.18±9.37	31.54±9.45	1.75	>0.05	NS
Weight	60.33±11.81	61.22±10.38	0.84	>0.05	NS
Height	167.90±6.21	167.28±6.79	0.91	>0.05	NS
FVC	3.12±0.57	3.20±0.57	0.32	>0.05	NS
FEV <sub>0.5</sub>	1.91±0.58	1.98±0.57	1.28	>0.05	NS
FEV <sub>1</sub>	3.149±0.482	5.77±1.88	9.876	>0.01	HS
FEV <sub>3</sub>	3.11±0.68	2.616±0.479	1.34	>0.05	NS
PEFR	9.377±6.052	7.670±3.976	2.778	>0.01	HS
FEV <sub>25-75</sub>	3.19±13.17	3.18±1.14	0.11	>0.05	NS
FEF <sub>0.2-1.2</sub>	2.66±0.53	2.73±0.61	1.40	>0.05	HS
FEF <sub>25%</sub>	2.87±0.43	2.35±1.41	1.68	>0.05	NS
FEF <sub>50%</sub>	3.74±1.37	3.83±1.40	0.61	>0.05	NS
FEF <sub>75%</sub>	1.66±0.89	1.77±0.96	1.23	>0.05	NS
FEV <sub>0.5</sub> /FVC	0.61±0.51	0.61±0.74	0.21	>0.05	NS
FEV <sub>1</sub> /FVC	0.85±0.09	0.85±0.10	0.39	>0.05	NS
FEV <sub>3</sub> /FVC	99.40±2.41	99.28±2.83	0.83	>0.05	NS
MVV	108.34±337.87	113.54±31.43	0.80	>0.05	NS

H.S. - Highly Significant  
 NS - Non Significant  
 Sig- Significance

**Table-2 mean +Sd value and significance of PEFR**

	Mean +SD	Tvalue	Significance
Farmer using insecticides /pesticides (cases)	9.37+6.05	2.77	<0.01 H.S
Farmess doing organic farming (controls)	7.67+3.97		

**Table 3 mean +SD t value and significance of FEV1**

	Mean +SD	TValue	Significance
Farmes using insecticides/pesticides (Cases)	3.14+0.48	9.87	<0.01 H.S
Farmers doing organic farming (controls)	2.616+0.47		

#### IV. Discussion

This study was done with an aim to collect more data on the farmer using pesticide mixtures and the farmers doing organic farming (not using the pesticides) and to bridge the gap in our knowledge.

In this study we found that farmers using pesticides mixtures were exposed to the irritating harmful effects like flu, thoracic pain, Allergic Rhinitis and obstruction pattern..

The study showed that the farmer using the pesticide mixtures as compared to the farmers doing the organic farming have highly significant lower value of PEFR and FEV<sub>1</sub> . Moreover the july August months in north India (Punjab) are hot rainy and with high wind speed and the pesticides spray particles remain suspended in the air for long periods and are harmful and toxic.

#### V. Conclusion:

The study of lung function conducted in 100 farmers using pesticide mixtures (cases) and 100 farmers not using pesticide mixtures (controls)

There are 234 pesticides registered in India.

Some are the insecticide/ pesticide/fungicides used in the country are eg. Sulpher (fungicide), Endorsulfan (insecticides), Mancozab ( fungicide), Phorate (insecticide) etc.

Some pesticides are found to be carcinogenic in nature. The in- discriminate use of the pesticides has led to resistant pests thus the farmers are using high dosage of these pesticides . The July August season is hot and rainy and with high wind speed. Due to hot environment the pesticides remain suspended in the air and hence they are inhaled not only by the farmers but also the people living nearby the feilds leading to deterioration in the lung function<sup>12</sup>.

It is seen that the pesticides are fat soluble and once they enter the body they remain there for longer periods and may harm the body. Pesticides are not only inhaled but are also consumed in the crops as the Fertilizes with heavy metal along with the pesticides make the soil and crops toxic and the land may become barren.<sup>13</sup> The following measures are suggested:-

- use of marks while spaying pesticides
- Regular mentoring of blood samples for pesticides concentration.
- Regular monitoring of lung function of farmers using pesticides.
- Making people aware of harmful effects of the pesticides
- Encouraging organic farming
- Use of neem insecticide / pesticide which is safe and very effective and it is biodegradable and environment friendly (Ozoneem Trishul)

#### References

- [1]. Gonzalez N, Diaz SL , Wiches MR, Franky MP, Mendez AC, Herrera ADR: Spirometry in a populations of coal miners in paipa, Colombia, Biomedica 2017 Dec 1;37 (4):498-506.
- [2]. Musafiri S, Van Meerbeeck JP, Musango L, Derom E, Brusselle G, Joos G, Rutayisire C; Siprometric Reference values for an east African Population, Respiration 2013; 85(4):297-304.
- [3]. Aggarwal AN, Gupta D, Jindal Sk: Comparison of Indian reference Equations for respiratory interpretation, Respirology, 2007 Sep;12(5): 763-8.
- [4]. Mberikunashe J, Banda S, Chandambuka A, Gombe NT, Shambira G, Tshimanga M, Matchaba-Hove R: Prevalence and risk factors for obstruction Respiratory conditions among textile industry workers in zinabawe,2006, Pan Air Med J.2010 Jul 17;6:1.
- [5]. Anyfantis ID, Rachiotis G, Hadjichristodoulou C, Gourgoulisanis KI: Respiratory Symptoms and lung function among Greek cotton industry workers : A cross sectional study , Int J OCCU Environ Med.2017 Jan ; 8(1):32-38.

- [6]. Khan Aw, Kundi M, Moshammer H : diminished Pulmonary function in long-term workers exposed to cotton dust determind in a cross- sectional study in small Pakistani enterprises, *Occup Environ Med.*2015 Oct;72 (10):722-7.
- [7]. Tandon S, Gupta S, Singh S, Kumar A: Respiratory Abnormlities among occupationally exposed , Non Smoking brick Klin Workers from Punjab , India, *Int J Occuo Environ med .* 2017 Jul; 8 (3):166-173.
- [8]. Aminian O, Aslani M, Sadeghnilat Hag high K: cross shift study of Acute respiratory effects in cement production Workers, *Acta Med Iran* 2014; 52(2):146-52.
- [9]. Fidan F, Unlu M, Koken T, Tetik L, Akgun S, Demirel R, Serteser M : oxidant-Antioxidant Status and pulmonary function in welding workers , *J occup Health.* 2005 Jul ;47(4):286-92.
- [10]. Attarchi M, Dehghan F, Afrasyabi M, Sadeghi Z, Mohammadi S: Combined effect of cigarette smoking and occupational exposures on lung function: a cross-sectional study of rubber Industry workers, *workplace health saf.* 2013 May:61 (5):213-20.
- [11]. Diaz-criollo S, Palma M, Monroy-Gracia AA, Idrovo Aj, Combariza D, Varona-Urbe ME : chronic Pesticide Mixture Exposure including Paraquat respiratory outcomes among combodian farmers, *Ind health* 2019-Apr18.
- [12]. *Hum.Ecol.Risk Assess.* Vol.20, No.2, 2014 367.
- [13]. *Statistical abstract of Punjab* 2011.

Dr. Iqbal Singh (MD).et.al. “Study Of Respiratory Functions Out Come In Farmers Using Pesticide Mixtures And The Farmers Doing Organic Farming (Not Using Pesticides) In Punjab: Effect Of Pesticide Mixtures On The Lungs.”*IOSR Journal of Dental and Medical Sciences (IOSR-JDMS)*, 19(1), 2020, pp. 63-66.