



## THE STUDY OF PULMONARY FUNCTION TEST IN POULTRY CONFINEMENT WORKERS

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### ABSTRACT

**Introduction** India is one of the most important livestock rearing countries, in which poultry industry is raising at the rate of about 8% per annum. Today India is the 3rd largest egg producer in the world.

Poultry farming involves breeding and rearing of chicks for various purposes. Individuals working in poultry production are constantly exposed to varying concentration of airborne contaminants which includes gases, endotoxin, ammonia, hydrogen sulphide, organic dusts, fungi, bacteria etc. Research conducted in other countries have reported respiratory related problems in poultry workers. As increasing number of Indian population are being engaged in poultry production, this study is undertaken to estimate the potential respiratory risks in poultry workers of Indian stock. Aim: To record the pulmonary function in poultry confinement workers and compare it with controls who are not exposed to poultry environment. **Materials and methods** Study was conducted in NUTRI poultry farm situated in Kunigal district. This is a case control study involving 30 poultry workers and 30 controls in the age group of 18-40 yrs whose age, gender and BMI were matched. PFT was recorded using COSMED computerized spirometer kit micro RS232 and recordings of FVC, FEV1, FEV1/FVC%, FEF25-75 and PEFR were measured. **Results** In poultry workers the spirometric parameters FVC ( $p=0.005$ ), FEV1 ( $p<0.001$ ), FEV1/FVC ( $p=0.003$ ), FEF25-75 ( $p<0.001$ ) and PEFR ( $p<0.001$ ) were reduced significantly compared to controls. **Conclusion** Result shows respiratory dysfunction in poultry workers. Use of individual protection equipment along with special attention to air quality inside the poultry is advised.

### KEYWORDS :

#### INTRODUCTION

Poultry is one of the fastest growing segments of the agricultural sector in India today. The production of eggs and broilers has been rising at a rate of 8 to 10 percent per annum. As a result, India is now the world's fifth largest egg producer and the eighteenth largest producer of broilers.(1) Poultry farming involves breeding and rearing of chicks for various purposes. Individuals working in poultry production are constantly exposed to varying concentration of airborne contaminants which includes gases, endotoxin, ammonia, hydrogen sulphide, organic dusts, fungi, bacteria etc. long term exposure to this environment may put the workers at risk for developing respiratory dysfunction(2). Research conducted in other countries have reported respiratory related problems in poultry workers. As increasing number of Indian population are being engaged in poultry production, this study is undertaken to estimate the potential respiratory risks in poultry workers of Indian stock.

#### OBJECTIVES

1. To study the Pulmonary function Test in poultry confinement workers.
2. To compare with controls who are not exposed to poultry environment.

#### METHODOLOGY

Study was conducted in NUTRI poultry farm situated in Kunigal district. This is a case control study involving 30 poultry workers and 30 controls in the age group of 18-40 yrs whose age, gender and BMI were matched.

Cases included healthy male and female poultry workers in the age group of 18 – 40 yrs who were exposed to poultry environment for a minimum of 6 months. Controls included individuals who were not exposed to poultry environment. Individuals with respiratory tract infection, any acute or chronic systemic illness, chest wall deformities, pregnant women and those who were on drugs and smokers were excluded from the study. Written informed consent was taken,

General physical examination was done. Procedure was demonstrated. Nose clip was applied and subject was asked to breathe through the mouth piece connected to turbine flow meter of computerized spirometry kit micro (RS 232). PFT was recorded using COSMED computerized spirometer kit micro RS232 and recordings of FVC, FEV1, FEV1/FVC%, FEF25-75 and PEFR were measured. Minimum of 3 recordings were taken at the interval of 5 minutes and best of the 3 recording was selected. Parameters recorded were FEV1-Forced expiratory volume in 1st one second, FVC- Forced vital capacity, FEV1/FVC %, PEFR- Peak expiratory flow rate, FEF 25-75 %- Mean forced expiratory flow during middle half of the FVC.

#### RESULTS AND ANALYSIS

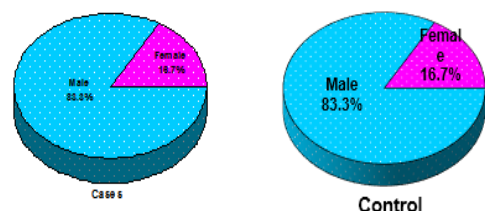
Descriptive and inferential statistical analysis has been carried out in the present study. Results on continuous measurements are presented on Mean SD (Min-Max) and results on categorical measurements are presented in Number (%). Significance is assessed at 5 % level of significance.

+ Suggestive significance (P value:  $0.05 < P < 0.10$ )

\* Moderately significant (P value:  $0.01 < P < 0.05$ )

\*\* Strongly significant (P value:  $P < 0.01$ )

Graph 1 : Gender distribution of subjects



Graph 1 shows gender distribution of subjects in cases and controls. Study included 83.3% of males and 16.7% of females in both cases and controls.

**Table 1: Anthropometric parameters in cases and controls.**

Anthropometric Variables	cases	controls	P Value
Age in years	28.37±5.75	28.77±5.78	0.789
Height in cm	159.43±7.61	159±6.36	0.82
Weight in Kg	57.8±2.66	57.9±7.93	0.96
BMI (Kg/m <sup>2</sup> )	22.66±2.66	22.85±2.33	0.770

Table 1 shows anthropometric parameters in cases and controls. P value is more than 0.5 which indicates that the anthropometric parameters were matched between cases and controls.

**Table 2: Comparison of Pulmonary Function test in Poultry workers and control subjects.**

PFT parameters	Cases	Control	P value
FVC L	3.02±0.66	3.53±0.71	0.005**
FEV1 L	2.29±0.64	3.03±0.55	<0.001**
FEV1/FVC %	76.61±16.24	86.61±7.64	0.003**
FEF25-75 L/s	2.45±0.80	3.34±0.96	<0.001**
PEFR L/m	257.10±101.05	429.67±71.92	<0.001**

Table 2 of FVC, FEV1, FEV1/FVC, PEFR, FEF 25-75% indicate that there is significant decline in Pulmonary Function Test in Poultry confinement workers compared to controls

## DISCUSSION

The above study correlates with study done by Kirychuk SP et al who showed that poultry workers had greater prevalence of current and chronic cough and phlegm and significant lower FEF25 and FEV1 / FVC than non farming control subjects.(2) The study correlates with study done by Hagmar et al which showed that there was decrease in FVC and FEV1 in poultry workers. (3) The study also correlates with studies of Alencar M et al where there was significantly lower FEV1 and FVC in workers exposed for more than 4 yrs (4) and Radon K et al who showed higher mean baseline spirometric values in pig farmers compared to poultry farmers and baseline lung function as associated with ventilation of animal houses. (5)

Exposure to organic dust causes an increase in polymorphonuclear leukocytes in alveoli and small airways. On repeated exposure causes Influx of mononuclear cells and release of inflammatory mediators which can cause bronchoconstriction. (6)

The above study thus concludes that long term exposure to poultry environment causes decrease in pulmonary function.

## CONCLUSION

The results of the study showed respiratory dysfunction in poultry workers. As increasing number of population are being engaged in poultry industry in India, Individual respiratory protection equipment along with special attention to air quality inside the poultry is advised.

Limitations: The study was done in a single poultry farm with limited sample size, hence more study is required to be done in more than one farm and using larger sample size.

## REFERENCES

1. [https://www.researchgate.net/publication/228958495\\_The\\_poultry\\_industry\\_in\\_India](https://www.researchgate.net/publication/228958495_The_poultry_industry_in_India)
2. Kirychuk SP, Senthilselvan A, Dosman JA, Juorio V. Respiratory symptoms and lung function in poultry confinement workers in Western Canada. *Can Respir J* 2003;10(7):375-380
3. Alencar M, Naos I, Gontigo LA. Respiratory risks in Broiler production workers. *Brazilian journal of poultry sciences* 2004;6(1):23-29
4. Radon K, Weber C, Iversen M, Danuser B, Federsen S. Exposure assessment and Lung function in pig and poultry farmers. *Occup Environ Med* 2001;58:405-410
5. Kirychuk SP, Dosman JA, Reynolds SJ, Wilson P. Total Dust and endotoxin in poultry operation: Comparison between cage and floor housing and respiratory effects in workers. *JOEM* 2006;48:741-748
6. Lango DL, Kasper DL, Hauser SL, Jamson L, Loscalzo J. Disorders of Respiratory System. *Harrison's Principle of internal Medicine*. 18th ed; vol 1: 255