

# Correlation of age with Lung Function in Asthmatics

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## ABSTRACT

**Background:** Bronchial asthma has grown to be one of the major chronic health problem. The present study was conducted to assess correlation of age with lung function in asthmatics. **Methods:** The present study was conducted on 60 asthmatic patients of both genders. Patients were divided into 3 groups of 20 each. Group I were controlled asthmatics, group II had partly controlled and group III had uncontrolled asthmatics. In all patients, lung function tests were performed. **Results:** In age group 20-30 years had 12, group II had 10 and group III had 11 patients. Age group 30-40 years had 8 in group I, group II had 10 and group III had 9 patients. There was significant difference in FEV1 (L), FVC (L), FEV1/FVC and PEFR/Sec in all groups and in different age groups ( $P < 0.05$ ). **Conclusion:** Authors found positive correlation of lung function test and age in uncontrolled asthmatics.

**Keywords:** Asthmatics, Age, Lung function.

## INTRODUCTION

Bronchial asthma has grown to be one of the major chronic health problem worldwide affecting 300 million. The global prevalence ranges from 1%-18%. It affects all age groups with rising treatment costs and burden to the community. Risk factors are genetic predisposition, environmental factors like allergens, pollution, infections, active and passive smoking, temperature variation, pet hair, perfume, over exertion and stress or anxiety.<sup>[1]</sup>

Ageing process is associated with progressive constriction of the homeostatic reserve of every organ.<sup>[2]</sup> The most important physiological changes associated with ageing are of respiratory system depicting the decrease in static elastic recoil of the lung, in respiratory muscle performance, and in compliance of the chest wall and respiratory system, resulting in increased work of breathing.<sup>[3]</sup>

Lung functions decline throughout adult life, even in healthy persons. Cross sectional analysis have suggested that the decline may go faster after age 70. Normal aging results in changes in pulmonary, mechanics, respiratory muscle strength, gas exchange and ventilatory control. Increased rigidity of chest wall and a decrease in respiratory muscle strength with aging result in an increased closing capacity and a decreased forced expiratory volume in first second or FEV1.<sup>[4]</sup>

It is found that release of acetylcholine from parasympathetic nerves activates post junctional muscarinic receptors present on airway smooth muscle, sub mucosal glands and causes bronchoconstriction and mucus secretion.<sup>[5]</sup> The present study was conducted to assess correlation of age with lung function in asthmatics.

## MATERIALS AND METHODS

The present study was conducted in the department of Physiology. It comprised of 60 asthmatic patients of both genders. All were informed regarding the study and written consent was obtained. Ethical clearance was obtained from institutional ethical committee.

General information such as name, age, gender etc. was recorded. A thorough clinical examination was done. Patients were divided into 3 groups of 20 each. Group I were controlled asthmatics, group II had partly controlled and group III had uncontrolled asthmatics. In all patients, lung function tests were performed. Results were tabulated and subjected to statistical analysis. P value less than 0.05 was considered significant.

## RESULTS

**Table 1: Distribution of subjects**

Gender	Group I (Controlled)	Group II (Partly controlled)	Group III (Uncontrolled)
Number	20	20	20

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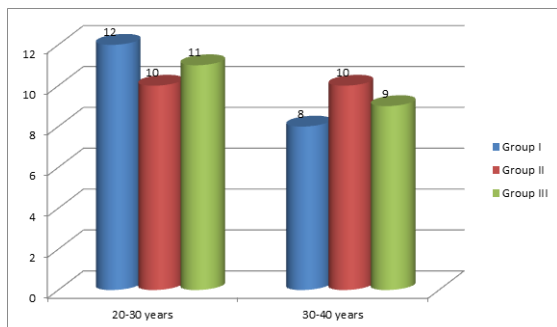
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[Table 1 & Figure 1] shows that group I were controlled asthmatics, group II had partly controlled and group III had uncontrolled asthmatics. Each group had 20 patients each.

**Table 2: Age wise distribution of patients**

Age group (Years)	Group I	Group II	Group III
20-30	12	10	11
30-40	8	10	9

[Table 2 & Figure 2] shows that in age group 20-30 years had 12, group II had 10 and group III had 11 patients. Age group 30-40 years had 8 in group I, group II had 10 and group III had 9 patients.

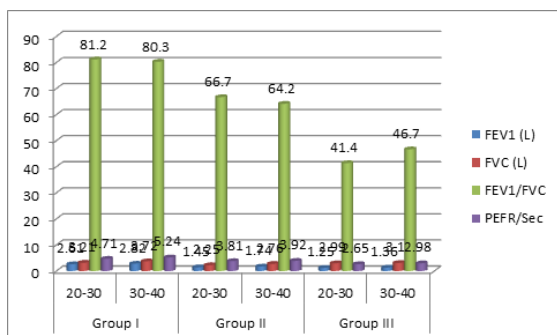


**Figure 1: Age wise distribution of patients**

**Table 4: Lung function tests**

LFT	Group I		Group II		Group III		P value
	20-30	30-40	20-30	30-40	20-30	30-40	
FEV1 (L)	2.61	2.82	1.45	1.74	1.25	1.36	0.05
FVC (L)	3.21	3.72	2.25	2.76	2.99	3.10	0.02
FEV1/FVC	81.2	80.3	66.7	64.2	41.4	46.7	0.01
PEFR/Sec	4.71	5.24	3.81	3.92	2.65	2.98	0.04

[Table 3 & Figure 2] shows that there was significant difference in FEV1 (L), FVC (L), FEV1/FVC and PEFR/Sec in all groups and in different age groups (P< 0.05).



**Figure 2: Lung function tests**

## DISCUSSION

Aging of population is a significant product of demographic transition. It is associated with

progressive constriction of the homeostatic reserve resulting in homostenosis of every organ. Lung function tests are carried out to assess the functioning of the lung and routinely used in clinical practice.<sup>[6]</sup> Nevertheless, there are only a few studies that have established reference standards for pulmonary function with age, especially amongst Indian population. Aminesh et al,<sup>[7]</sup> found that any one of brothers and sisters affected by allergy-type illnesses had inherited the relevant gene, situated on maternal chromosome.<sup>[11]</sup> The present study was conducted to assess correlation of age with lung function in asthmatics.

In present study, group I were controlled asthmatics, group II had partly controlled and group III had uncontrolled asthmatics. Each group had 20 patients each. We found that in age group 20-30 years had 12, group II had 10 and group III had 11 patients. Age group 30-40 years had 8 in group I, group II had 10 and group III had 9 patients. A et al<sup>8</sup> classified patients based on GINA (Global Initiative for Asthma) 2017 guidelines into controlled, partly controlled and uncontrolled group and subdivided into 20- 30 yrs and 31-40 yrs. In this study patients belonging to 20-30 years in uncontrolled group show positive correlation between age and FEV1/FEC ratio whereas negative correlation noted in controlled and partly controlled groups. Positive and significant (P<0.05) correlation was found between age and Peak expiratory Flow Rate (PEFR) in controlled and uncontrolled groups among 20-30 years. The uncontrolled group with mild symptoms progress to severe forms within a short period of time due to genetic susceptibility. Therefore earlier the onset of illness, more profound is their impact on pulmonary function.

We found that there was significant difference in FEV1 (L), FVC (L), FEV1/FVC and PEFR/Sec in all groups and in different age groups (P< 0.05). Burke W et al,<sup>[9]</sup> in his study emphasised family history as a predictor of asthma risk. Recent researches have suggested that the risk of allergies in young children is much greater when the mother is allergic than the father. This is due to the influence of maternal antibodies on the immunity of offspring. Spirometric lung function parameters are used as a diagnostic tool and to monitor therapy efficacy or course of the disease. On the other hand, lung function parameters including forced expiratory volume in one second (FEV1) and forced vital capacity (FVC) are important predictors of morbidity and mortality in elderly persons. In practical use, the FEV1 and FVC are measured in liters and usually each expressed as a percentage of predicted values.<sup>[10]</sup>

A et al,<sup>[11]</sup> conducted a study performed on 50 subjects under the age group of 25-75 years, further divided into 5 age groups: 25-35 years, 36-45 years, 46-55 years, 56-65 years and 66-75 years. This was a cross-sectional design, which was performed in the

Department of Physiotherapy. The values of all lung function tests, namely, FVC, FEV1, PEFR, FEV1/FVC, SVC and MVV were found to be negatively correlated with age ( $r = -0.446, -0.495, -0.427, -0.312, -0.392$  and  $-0.919$ , respectively). It was concluded the the lung functions significantly decline with age.

The Global Initiative for Chronic Obstructive Lung Disease (GOLD) and Global Initiative for Asthma (GINA) both established criteria classifying patients with COPD or asthma into categories according to FEV1/FVC and FEV1 expressed as a percent of predicted values. Conventional assessments of obstructive lung disease course are based on the severity of symptoms, amount of b2-agonist used to treat the symptoms, and lung function rated as % of predicted values. Moreover, the FEV1 predicted values are used as a selective or outcome variable in research.<sup>[12]</sup>

## CONCLUSION

Authors found positive correlation of lung function test and age in uncontrolled asthmatics.

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