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Assessment of Physiological Variation of Blood Components in People with Pulmonary Airway Abnormalities.

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ABSTRACT

Various studies have proved the correlation of systemic inflammatory changes in airway abnormalities with eosinophils and neutrophils. However, relation between other leucocyte groups and their relation to airway abnormalities is less clear. Apart from this, physiological changes in the various components of blood, in patients with airway abnormalities is an understudied issue. To assess the physiological variation of the blood components in people with airway abnormalities. We recruited 50 people with pulmonary function abnormalities of both sex, in the age group of 25- 55 years. Anthropometric measurements were taken. Pulmonary function test was measured by using Medispiror. Complete blood count was determined. We observed significant correlation between blood component variations and pulmonary airway abnormalities. Our results showed neutropenia, eosinophilia and lymphocytosis. Anemia was prevalent in 50% of our study population. This study showed that blood component variations are significantly correlated in people with pulmonary airway abnormalities. Management of these secondary changes in the blood components may be beneficial to improve the quality of life of people suffering from pulmonary airway abnormalities like restrictive and obstructive diseases.

Keywords: Pulmonary function abnormalities , eosinophila, neutropenia , lymphocytosis.

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INTRODUCTION

Physiological changes occur in the various components of blood as a result of chronic inflammatory response. It is well known that chronic inflammatory changes also result in the pathogenesis of airway abnormalities like COPD and asthma. Increase in the level of neutrophils and eosinophils in the airway is reflected by increased numbers in peripheral blood [1,2]. However the relation between the leukocyte groups and their relation to airway abnormalities is an understudied issue. Hence we have carried out this study to find out the relation between airway abnormalities determined from pulmonary function test and peripheral blood cell counts of eosinophils, lymphocytes and neutrophils.

Aim

- To determine spirometric variables namely FVC, FEV1 and FEF 25-75%.
- To estimate the peripheral blood cell counts of neutrophils, lymphocytes, and eosinophils.
- To find the relation between the spirometric variables and blood parameters

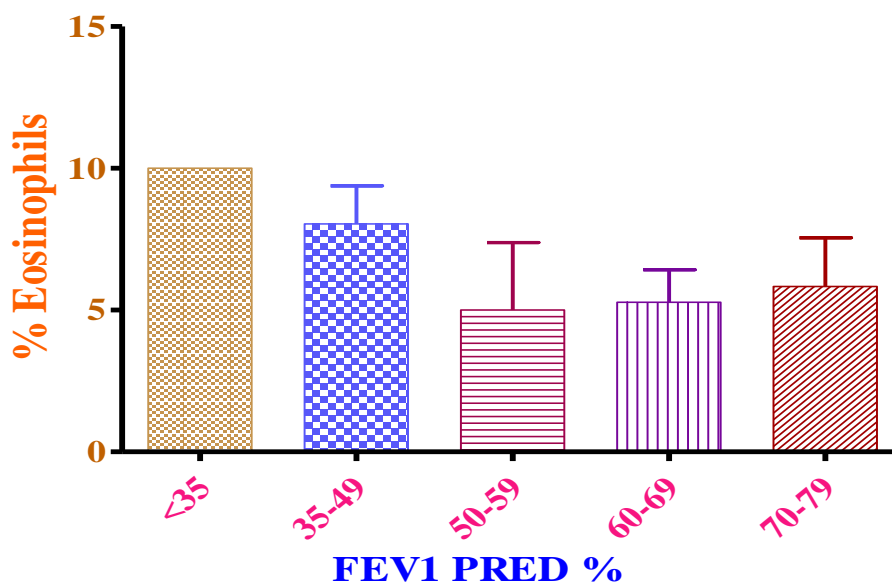
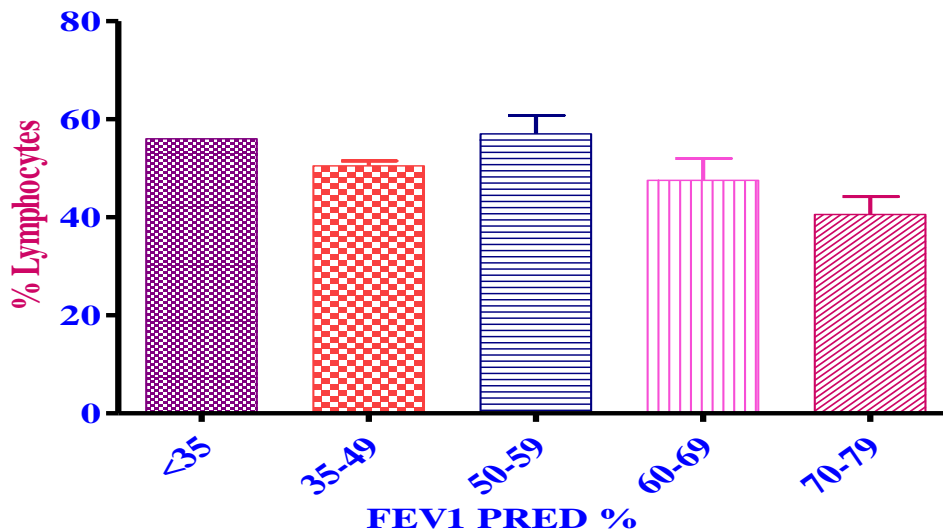
MATERIALS AND METHODS

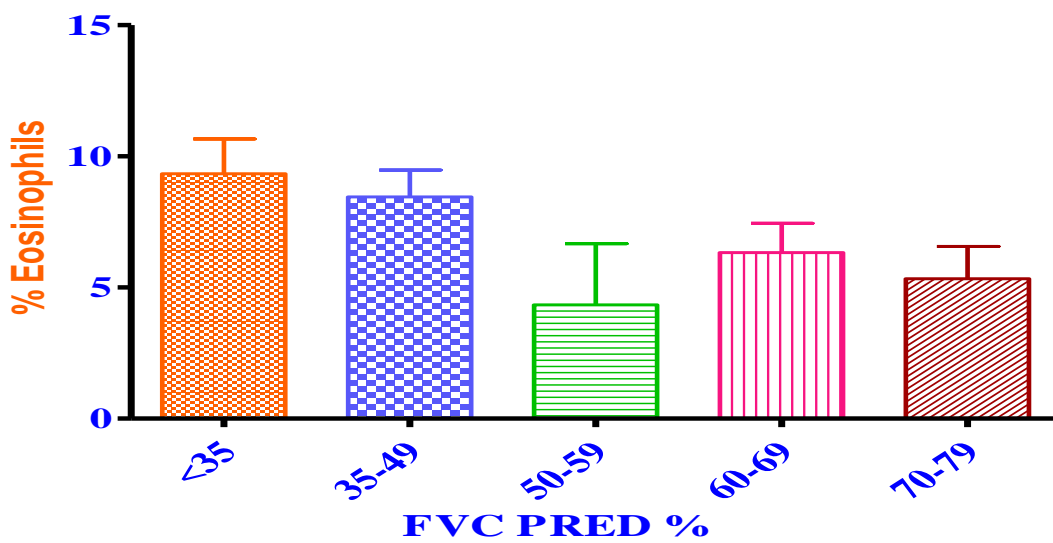
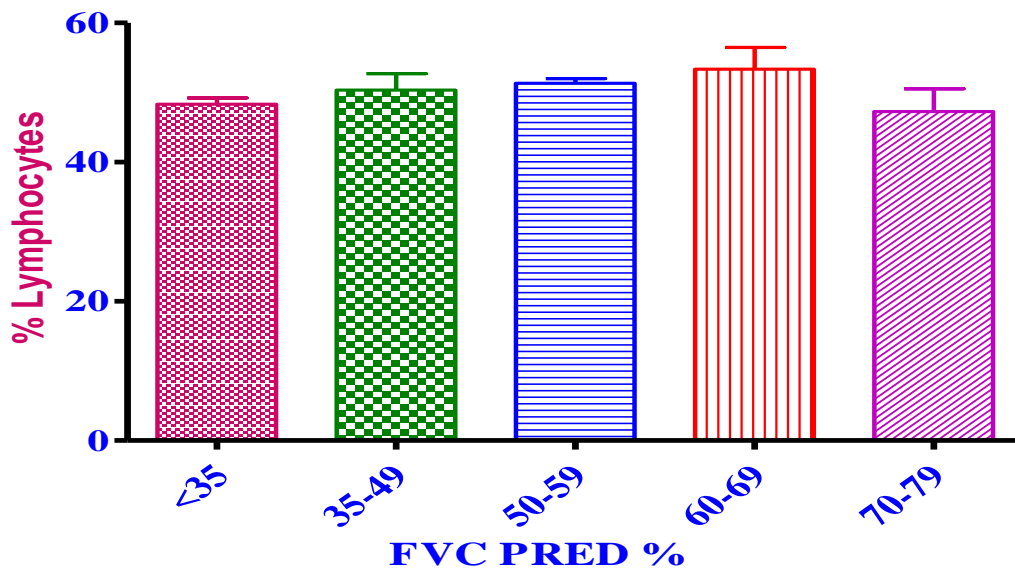
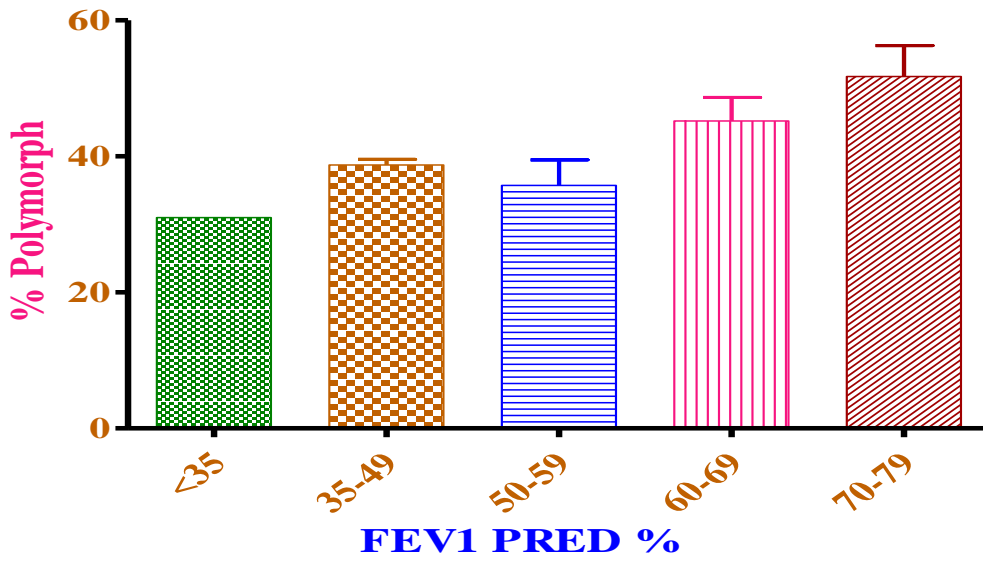
- After obtaining clearance from the Institutional Ethical Committee, we recruited 50 people of both the sexes. Anthropometric measurements were taken. Structured questionnaire was used to collect data regarding the history of allergy, smoking history, age, history of any upper respiratory illness, etc.
- Pulmonary function test was measured by using Medispiror – the subjects were given instructions: to stop bronchodilators – 12 hrs before, stop smoking 6 hrs prior, drugs to be stopped 12 hrs prior, to avoid tight clothing, to avoid heavy meals 2 hrs prior to spirometry . Spirometry was done in sitting position and after applying nose clips. Best of three manouvers was taken as the reading.
- Blood sample was collected. Blood parameters namely RBC count, Hb%, Total WBC count, Differential count, Platelet count were estimated.
- FEV1 and FVC was compared between various leukocyte components after adjusting the FEV1 and FVC for age, sex, height.

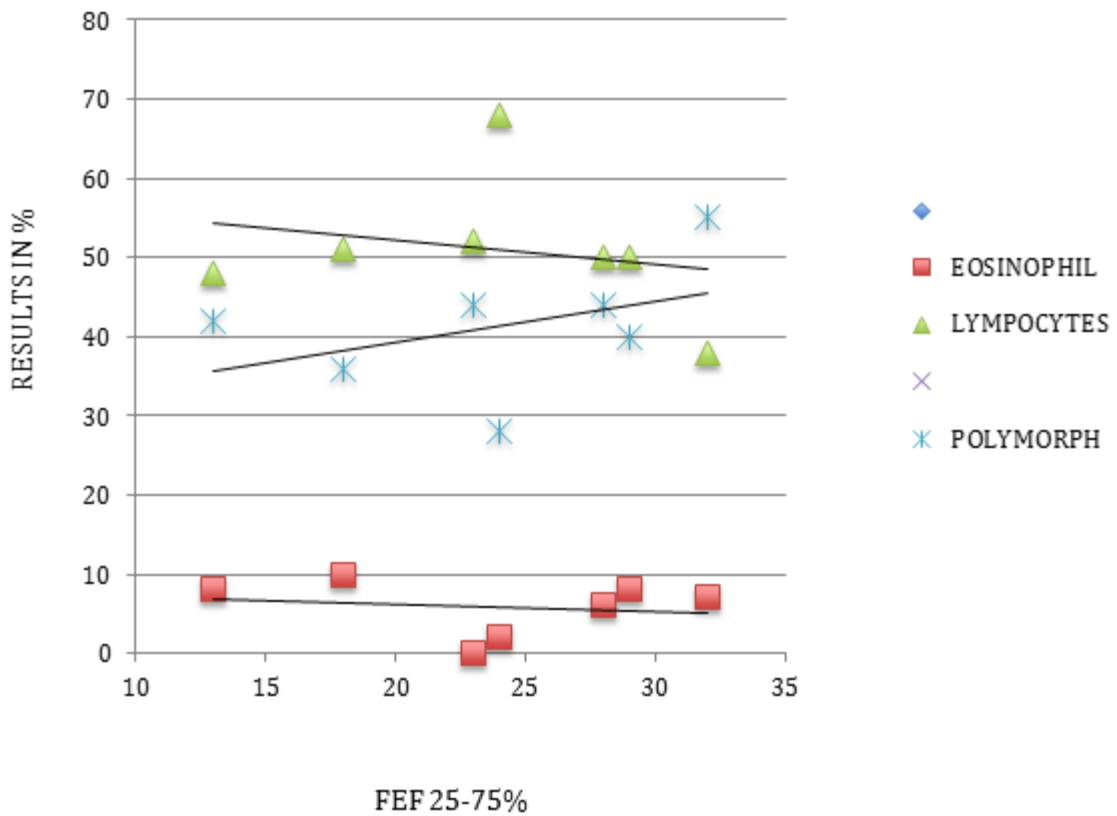
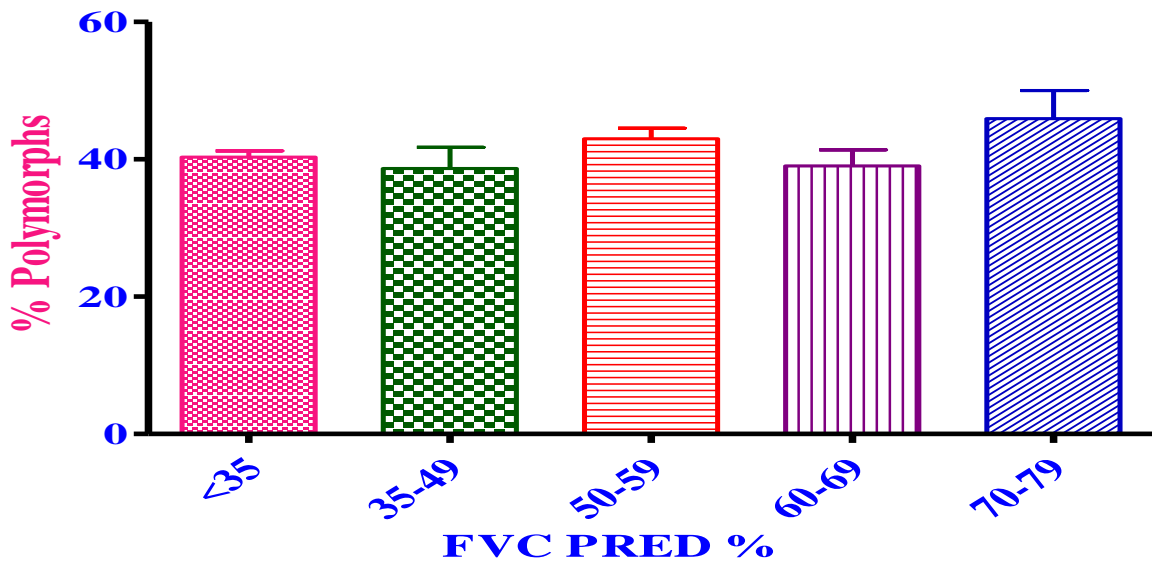
RESULTS

The mean (SD) height was 153.77 ± 8.5 . The mean FVC was 1.75 ± 0.54 litres, FEV1 was 1.61 ± 0.54 litres. The mean lymphocyte count was 50.7 ± 7.9 %, eosinophil count was 6.66 ± 4.38 %, polymorph count was 40.79 ± 8.04 %.

PFT Parameters		Blood Parameters	
FVC	1.75 ± 0.54 L	RBC	4.64 ± 0.59 millions / cu.mm
FEV1	1.61 ± 0.54 L	Hb%	12.5 ± 2.4 gms%
FEV1/FVC%	88.07 ± 12.6 %	TLC	7866.6 ± 2411.1 cells/cu. mm
FEF 25-75%	2.24 ± 1.06	Polymorphs	40.8 ± 7.9 %
PEFR	4.77 ± 1.5 L	Eosinophils	6.6 ± 4.3 %
		Lymphocytes	50.6 ± 7.8%







DISCUSSION

- Eosinophilia is seen in subjects with FEV1 < 35 and FVC < 35% of % pred. Eosinophilic count is inversely proportional to FEV1 values indicating the role of eosinophils in causing airway hyperresponsiveness and airflow obstruction leading to chronic respiratory symptoms.

- Lymphocytosis is seen in subjects who have moderately severe FEV1 abnormality. Lymphocytes are known to traffic from the bloodstream to the bronchoalveolar space and then may later rejoin the peripheral circulation [3-5]
- However lymphocytosis leads to increased apoptosis due to action of Interleukins and TNF – α hence eventually leading to decrease in the count.
- FEF 25-75% which indicates small airway obstruction is negatively correlated to eosinophil count although the correlation is not significant. Increase in eosinophil count alters alveolar ventilation.

CONCLUSION

This is purely an observational study to find the association between disease occurrence and severity and the cell counts in the peripheral blood.

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