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CLINICAL EVALUATION OF RESPIRATORY DISEASE IN CORRELATION TO ENDOCRINAL AND CARDIOVASCULAR IMBALANCE

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ABSTRACT

Aim: Clinical evaluation of respiratory disease in correlation to endocrinal and cardiovascular imbalance. **Objective:** To evaluate the clinical features and epidemiological factors of respiratory disease(lower respiratory tract infection). To evaluate the association of respiratory disease (lower respiratory tract infection) with various etiology. To study the endocrinal & cardiovascular imbalance in patients with respiratory disease (LRTI). To evaluate pulmonary complications through various respiratory, endocrinal and cardiovascular parameters. To evaluate systemic response in patients due to imbalance which might affect severity of the disease through various parameters. **Material and Methods:** A study was multicentric cross sectional observational type, included 66 subjects from inpatient department of multi-specialty hospitals in the area of Vastral, Ahmedabad, Gujarat. India. This study protocol was approved by the Sangini Hospital Ethics committee, Ahmedabad. Various parameters were evaluated in enrolled subjects, i.e., age, sex, etiology, co-morbidity, COVID – 19 infection, chest PA, CRP, complete blood count, spirometric value, SpO_2, random blood sugar, total cholesterol level, blood pressure, electrolytes level (Na, K). All the particulars were inquired by a questionnaire containing their medical history. The Kruskal Wallis test was performed to determine whether there are statistically significant differences between groups. Graphs and tables were created using Microsoft Word and Excel (2019), GraphPad 10.2.2. **Results:** In this observational study, subjects of lower respiratory tract infection (N= 66), 29 (44%) subjects were lower respiratory tract infection, 18 (27%) subjects were lower respiratory tract infection with endocrinal co-morbidity, 19 (29%) subjects were lower respiratory tract infection with cardiovascular disease as co-morbidity. Among those subjects 37 subjects were infected with COVID-19 and 29 were not infected at the time of COVID pandemic. Acute bronchitis occurred in 52% Subject, pneumonia in 33%, COPD in 12% & Acute respiratory distress syndrome in 3% subjects. Nodular opacity, Pleural effusion, Broncho vascular markings and consolidation seen in the infected subjects. Fibro – calcified opacity and cardiomegaly seen in subjects with cardiovascular co-morbidity. After applying a significance level of 0.05 to the Kruskal-Wallis test on the laboratory parameters, In enrolled clinical subjects the p value obtained for CRP(0.04), WBC(0.03), neutrophil(0.04),SpO_2(0.01), random blood sugar(0.0001), total cholesterol(0.005), systolic blood pressure(0.0001) and diastolic blood pressure were(0.0001) which is less than 0.05 indicating there is a significant difference in severity levels in our clinical study groups. As per my study P value for parameters like lymphocytes, platelet, FEV1/FVC ratio, creatinine, sodium and potassium were obtained more than 0.05 indicating there is no significant difference in these parameters in our clinical study groups. **Conclusion:** In summary, the purpose of our study was the clinical evaluation of respiratory disease in correlation to endocrinal and cardiovascular imbalance. Upon thorough examination and contrast, a number of significant conclusions have been drawn. It can be ascribed to a mix of age-related factor, lifestyle choices, healthcare access, on disease development. Various factors like age, type of infection, stress and co-morbidities affects the lung capacity. In this study, found significant difference in various endocrinal and cardiovascular parameters which is connected through etiological factors and co-morbidity of the subjects.

As per my study CRP value, systolic blood pressure and diastolic blood pressure found more significant in cardiovascular co-morbid subjects. White blood count, neutrophil, total cholesterol and random blood sugar levels were more significant in endocrinal imbalance co-morbid subjects. This approach can help in diagnosis and prevention strategies for improving patient health. It is essential to distinguish the root causes for better management of patient's health.

KEYWORDS: Nodular opacity, Pleural effusion, Broncho vascular markings and consolidation seen in the infected subjects.

1. INTRODUCTION

Respiratory disease refers to a variety of diseases or conditions that impair the function of the lungs. Respiratory disease can impair respiratory function, or the capacity to breathe, as well as pulmonary function, or how well the *lungs* perform.[1,2] There are numerous lung disorders that can be caused by bacterial, viral, or fungal infections. Other lung disorders, such as asthma, mesothelioma, and lung cancer, are linked to environmental causes. Chronic lower respiratory disorders include chronic bronchitis, emphysema, and chronic obstructive pulmonary disease (COPD). Chronic lower respiratory disorders are one of the top causes of death in the United States.[3]

Asthma and COPD are respiratory illnesses that cause airways to constrict or block, reducing air flow. Other lung disorders, such as pulmonary fibrosis, a scarring of lung tissue caused by many circumstances, and pneumonia, a bacterial or viral illness in which air sacs fill with fluid, limit the lungs' ability to hold air.[4] Lung cancer is a disease caused by abnormal cell development. Though most lung cancers begin in the lungs, some cases begin elsewhere in the body and spread to the lungs. Second-hand smoke can also raise a person's risk of developing the condition. Asbestos, radon gas, air pollution, and substances such as uranium, beryllium, vinyl chloride, and arsenic have also been related to respiratory disease.[5] Patients suffering from respiratory diseases are given the necessary treatment. They are given bronchodilators and glucocorticoids. Each of these things can have an impact on our body's endocrinal and cardiovascular systems. Several pathways are triggered by risk factors for respiratory illnesses, resulting in hormonal imbalances in the body.[6,7]

Cardiovascular diseases (CVDs) are a set of heart and blood vessel abnormalities. Individuals may experience elevated blood pressure, elevated blood glucose, The link between lung and heart disorders has long been recognized, with necropsy studies revealing silent myocardial infarctions or coronary artery calcification as the cause of death in individuals with advanced emphysema.[8,9]

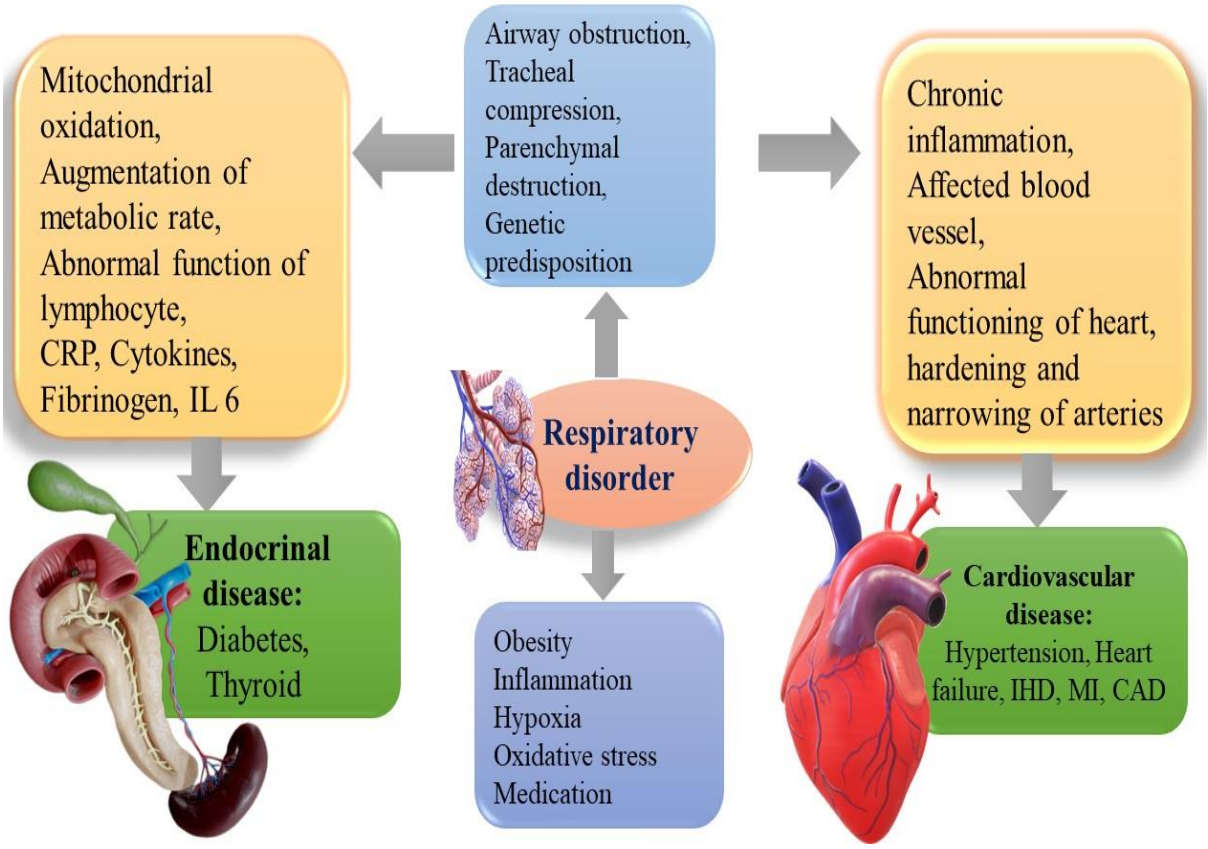


Fig 1: Correlation of endocrinal and cardiovascular imbalance with respiratory disease.

2. Review of Literature

Sr no.	Author	Title	Parameters	Conclusion	Ref. no
1	Charles T.-C. Lee, I-Chieh Mao, Ching-Hsiung Lin, et.al	Chronic obstructive pulmonary disease: a risk factor for type 2 diabetes: a nationwide population-based study.	Assessment of COPD Blood glucose Lipid profile Hypertension CVS disease Steroid use	Patients with COPD have a higher risk of type 2 diabetes compared with control subjects after adjusting for confounding factors such as sex, age, residential area, insurance premium, steroid use, hypertriglycemia, hypertension, CAD and cerebrovascular disease.	[10]
2	P. Lange, S. Groth, J. Kastrup, J. Mortensen, et.al	Diabetes mellitus, plasma glucose and lung function in a cross-sectional population study.	BMI FEV_1 FVC Smoking status Presence of DM	Our findings demonstrate that in a population survey, somewhat lower levels of FEV 1 and FVC are linked to both insulin-dependent and non-insulin-dependent diabetes (NIDD:M). This implies that the degree of pulmonary function decline may be influenced by the severity of diabetes mellitus.	[11]
3	Robert E. Walter, Alexa Beiser, Rachel J. et.al	Association between Glycemic State and Lung Function.	Spirometric data Smoking status Bloodglucose Lipid profile	Among the participants in our analysis, a DM diagnosis was linked to a greater decline in residual FVC than FEV1.	[12]
4	Nigun Guvener, et.al	Alveolar gas exchange in patients with Type 2 diabetes mellitus.	BMI Blood tests Spirometric data Lipid profile Blood glucose	Diabetes mellitus is linked to degenerative alterations in a number of organs and tissues in many people. According to experimental research, diabetes mellitus also targets the lung as an organ.	[13]
5	Fernando J. Martinez, et.al	A Reversible Cause of Diaphragmatic Dysfunction.	Spirometric data Chest Roentgenogram TSH	In this report, patients with diagnosed primary hypothyroidism complained of easy fatiguability and dyspnea with exertion. Every patient in this study had resting lung functions that were comparable to those mentioned by previous researchers.	[14]
6	Vis Niranjan, Darvin G. McBrayer, et.al	Glycemic Control and Cardiopulmonary Function in Patients with Insulin-dependent Diabetes Mellitus.	Demographic data Duration of IDDM Insulin dose Glycosylated haemoglobin	The main reason of the marked impairment in aerobic capacity in young, asymptomatic patients with long-standing IDDM is a decreased maximum stroke volume. Less severe deficits in cardiopulmonary function are linked to the long-term maintenance of nearly normal glucose levels.	[15]
7	F. Laghi, N. Adiguzel, Et.al	Endocrinological derangements in COPD.	Contractile properties Histochemistry	There is a lack of information regarding the potential elevated risk of particular endocrinopathies in people with COPD, despite rising study and plausibility.	[16]
8	Ioanna Dimopoulou, Ioannis Ilias, Et.al	Effects of Severity of Chronic Obstructive Pulmonary Disease on Thyroid Function.	PFTs ABG analysis Thyroid function test	We aimed to examine thyroid function in patients with stable COPD, who showed varying degrees of airway obstruction, indicating a spectrum of disease severity. It was discovered that the thyroid hormone levels of each of our individuals at rest were normal. Nonetheless, there was evidence of some thyroid malfunction in cases of severe COPD.	[17]

9	Daniela Buklioska Ilievska, Ivana Mickovski	Comorbidities of patients with chronic obstructive pulmonary disease (COPD): thyroid abnormalities in stable COPD.	COPD severity Spirometric data Thyroid hormone status	This experiment demonstrates that thyroid dysfunction is widespread among people with COPD. The current investigation demonstrates that individuals with COPD had greater rates of both subclinical and clinical hyperthyroidism as compared to the non-COPD group.	[18]
10	Chang-Hee Kwon, Eun-Jung Rhee, et.al	Reduced lung function is independently associated with increased risk of type 2 diabetes in Korean men.	Spirometric data BP Blood glucose Smoking status Lipid profile	In conclusion, there was a significant correlation found between the occurrence of type 2 diabetes in Korean men and lower FVC (% expected) and FEV1 (% predicted). This finding raises the possibility that decreased lung function as determined by FVC and FEV1 may occur before type 2 diabetes develops.	[19]
11	Shah Mohammad Abbas Waseem, et.al	A study of metabolic syndrome in chronic obstructive pulmonary disease patients attending out-patient department of a medical college.	Waist circumference (cm) Lipid profile Fasting Blood Glucose BP Spirometric data	In COPD patients, metabolic syndrome manifests as a co-morbidity. Since smoking is a significant risk factor for COPD, it is expected that smoking will cause inflammation, which will impact cholesterol and sugar levels and raise blood pressure.	[20]
12	Seong Yong Lim1, Eun-Jung Rhee, et.al	Metabolic Syndrome, Insulin Resistance and Systemic Inflammation as Risk Factors for Reduced Lung Function in Korean Non-smoking Males.	BMI Spirometric data Blood reports BP	The main discovery of this study is that, even within the normal range of lung function, there was a significant increase in the prevalence of MetS, risk of insulin resistance, and concentration of serum has-CRP when the study population was divided into quartiles based on FVC or FEV1.	[21]
13	Steve Tseng, Anna Agnese, et.al	Pulmonary Hypertension Related to Chronic Obstructive Pulmonary Disease and Diffuse Parenchymal Lung Disease.	Echo cardio-gram PFTs BNP/NT-proBNP V_E/Vco_2	Due mostly to aberrant gas exchange and lung parenchyma damage, the majority of individuals with COPD and DPLD have very minor pulmonary vascular disease and even heart failure.	[22]
14	Berne Eriksson, Anne Lindberg, et.al	Association of heart diseases with COPD and restrictive lung function e Results from a population survey.	BMI Smoking status Socio-economic status Spirometric data Assessment of heart disease.	Heart disease prevalence rose as COPD severity increased. In contrast, the group reporting myocardial infarction had a notably high rate of COPD. Restrictive lung function was highly prevalent in persons with various cardiac conditions.	[23]
15	Paul carter, Deepak Bhat, et.al	Association of Cardiovascular Disease With Respiratory Disease.	Demographic data CVS disease Other disease association with respiratory disease	IHD and HF in particular are cardiovascular disorders that are independently linked to lung disease and have a substantial impact on all-cause mortality. However, coronary revascularization is not as common in people with pulmonary disease.	[24]
16	Peter Lange, Rasmus	Cardiovascular Morbidity in	BMI Spirometric data	We looked into the frequency of cardiovascular disease in people with	[25]

	Mogelvang, et.al	COPD: A Study of the General Population.	Blood pressure Blood reports Echocardiographic findings Medication	spirometric indicators of COPD in this general population study. Overall, we discovered that there were more cardiovascular risk factors present, as well as a history of and treatment for Only the frequency of left ventricular hypertrophy, as determined by echocardiography, was much higher in the COPD group in terms of myocardial function.	
17	Carlos Iribarren, Irina V Tolstykh, et.al	Are patients with asthma at increased risk of coronary heart disease?	Demographic data BMI Smoking status Total serum cholesterol WBC count Parental history	An independent link between asthma and a statistically significant but slight increase in the risk of CHD in women was found. To support or contradict these preliminary epidemiological findings, more research is necessary.	[26]
18	Jun-Jun Yeh, Cheng-Li Lin, et.al	Relationship between pneumonia and cardiovascular diseases: A retrospective cohort study of the general population.	Demographic data BMI Comorbidities Medication used	Regardless of age, gender, comorbidities, or usage of antibiotics, pneumonia risk was linked to cardiovascular diseases (CVDs), notably heart failure in older male patients. Furthermore, there was an increased incidence of CAP and HAP in patients with CVDs.	[27]
19	Daniel M. Musher, et.al	The Association between Pneumococcal Pneumonia and Acute Cardiac Events	Demographics Comorbidities Echocardiography Laboratory characteristics	Pneumococcal pneumonia patients are significantly more likely to experience a concomitant acute cardiac event, such as a myocardial infarction, a severe arrhythmia, or worsening or new CHF. Pneumonia-related mortality is greatly increased by this conjunction.	[28]
20	Johan danesh, et.al	Association of fibrinogen, C-reactive protein, albumin, or leukocyte count with coronary artery disease.	Fibronogen level CRP protein Total blood count	For every factor, these prospective studies show remarkable consistency, suggesting a moderate but very significant statistical connection with CHD.	[29]

3. AIM: Clinical evaluation of respiratory disease in correlation to endocrinal and cardiovascular imbalance.

OBJECTIVE

- To evaluate the clinical features and epidemiological factors of respiratory disease. (lower respiratory tract infection)
- To evaluate the association of respiratory disease (lower respiratory tract infection) with various etiology.
- To evaluate pulmonary complications patients through various parameters like chest X-ray, FEV_1/FVC (≥80%), SpO_2 (95%), CRP (0-6 mg/L).
- To evaluate systemic response in patients due to imbalance which might affect severity of the disease through various parameters i.e., FBS (≥ 100 mg/dl), PPBS (≥ 140 mg/dl), TSH (0.55-4.78 μIU/ml), RBS (70-200 mg/dL), Echo. (50-70%), Creatinine (0.8 - 1.3 mg/dL), HB (13.0 – 16.5 g/dL), CBC, BP (120/80mm/Hg).
- To investigate the mutual influence and shared risk factor and potential mechanism for co-occurrence of these conditions through patient assessment and detailed patient profiling.

4. Plan of Work

4.1 Study design: A cross-sectional observational study was conducted by the Department of Pharmacology in A-one Pharmacy College, Ahmedabad. Collaboration with various multispecialty hospital in Vastral, Ahmedabad. Gujarat. Institutional Ethics Committee permission was obtained before initiating the study, meeting the mentioned inclusion and exclusion criteria. Required permission for carrying out the study was obtained from Sangini Hospital Ethics committee, Ahmedabad. Registration no: ECR/147/Inst/GJ/2013/RR-19.

Sample size was 66 in randomized allocation time duration 4 months.

4.2 Inclusion criteria

Patients with the established diagnosis of various respiratory disease (LRTI), attending inpatient department of multispeciality hospital.
Both male/ female (> 18 yrs.)
Patients taking medications for other co-morbid conditions like diabetes mellitus (type 1 and type 2), thyroid (TSH: 0.55-4.78 µIU/ml) and other cardiovascular disease (IHD, CAD, MI, etc).

Patients with complication of expectoration, fatigue, common cold, fever with chills, coughing associated with dyspnoea on exertion, weakness, FEV_1/FVC ratio 80% reference value. Decrease in in ratio shows airflow obstruction included in study depending upon various stages.

Participants may be needed to be on a consistent treatment regimen for their respiratory ailment, or the study may focus on persons who are medication-naive.
Patient willing to give written informed consent.

4.3 Exclusion Criteria

Pregnancy or breastfeeding are not recommended since the effects of the research interventions on foetal development or nursing infants are uncertain or entail risks.

Patients who refuse to participate in the study.
Implementing age limitations in order to target a certain group or to avoid age-related changes in respiratory and endocrinal and cardiovascular parameters. (Patients age <18 yrs. excluded).

4.4 Method of collection of data

All patients attending the treatment in respiratory department (LRTI) and satisfying aforementioned inclusion and exclusion criteria were recruited in the study after receiving informed consent from the patient. Patient with symptoms like breathlessness, persistent cough, fatigue, wheeze, chest infection, mucus production, chronic chest pain. All the particulars were inquired by a questionnaire containing their medical history.

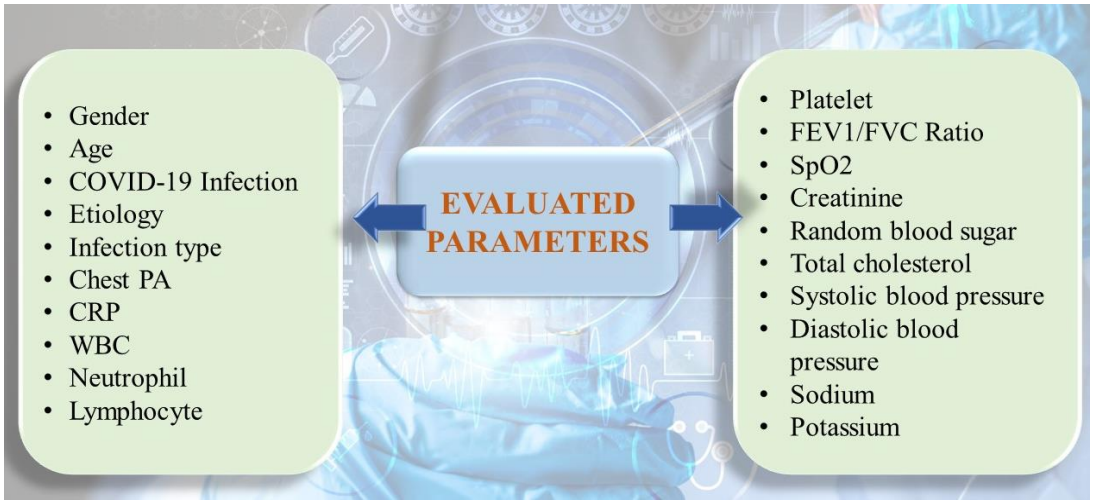


Fig 2: Evaluated parameters for clinical study groups.

5. RESULTS

A Total number of 66 lower respiratory tract infection (LRTI) subjects among them males 31 and females 35 were included in this study. Clinical-epidemiological data regarding the subjects were noted in the case record form. Patients were included in this study after informed written consent. A structured interview assisted questionnaire was used to collect the data. Subjects were diagnosed clinically by a clinical investigator. Required permission for carrying out the study was obtained from Sangini Hospital Ethic committee, Ahmedabad. In clinical study observation out of 66 subjects, I found that 37 subjects infected with COVID -19 and 29 was not infected with COVID -19. In clinical study observation out of 66 subjects, I found that there were 32 subjects affected with viral infection, 22 subjects with bacterial infection and 12 subjects were affected with allergen(smoke). In observational clinical study among 66 subjects, 2 subjects were Acute respiratory distress syndrome patient, 34 subjects were acute bronchitis patients, 22 infected with pneumonia, 8 subjects infected with chronic obstructive pulmonary disease (COPD). In observational clinical study among 66 subjects, 29 subjects were LRTI patients, 18 subjects were LRTI + endocrinal co-morbidities, 19 subjects were LRTI + CVD co-morbidities.

Table 1: Frequency of observed subjects for clinical study.

Parameters	Frequency (%)			
Gender	Male (47%)	Female (53%)		
Age (Yr.)	18-34 (29%)	35-44(18%)	45-64(38%)	≥ 65 (15%)
COVID 19 infection	Infected subjects (56%)	Non-infected subjects (44%)		
Etiology	Allergen (18%)	Viral infection (49%)	Bacterial infection (33%)	
Infection type	Acute bronchitis (52%)	Pneumonia (33%)	COPD (12%)	ARDS (3%)

Chest X-ray Posterior Anterior Projection of Observed Subjects

A typical chest X-ray displays a well-defined chest cavity, healthy heart, and clean lungs. There are no lumps, tumours, or nodules that are apparent. Subjects with lower respiratory tract infection has shown nodular opacity, Broncho vascular markings, pleural effusion and consolidation. Subjects with lower respiratory tract infection and endocrinal imbalance has also shown nodular opacity, subtle opacity and Broncho vascular markings. Subjects with lower respiratory tract infection has also shown nodular opacity, fibro calcified opacity, pleural thickness and cardiomegaly. It helps us to understand patients have heart problems, consolidation, pneumonia or any other serious conditions.

Table 2: Chest X-ray Posterior Anterior Projection of Observed Subjects.

Clinical study groups	LRTI (29)	LRTI + Endo.(18)	LRTI + CVD (19)
Nodular opacity	10	2	7
Fibro-calcified opacity	-	-	2
Subtle opacity	5	8	2
Pleural thickness	1	-	2
Broncho vascular markings	6	6	-
Cardiomegaly	1	-	5
Pleural effusion	3	2	-
Patch of consolidation	2	-	1

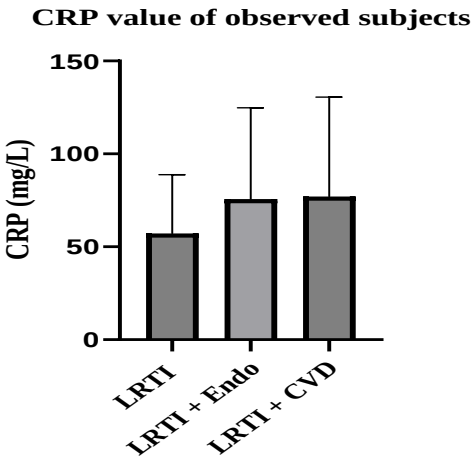
The Kruskal Wallis test was performed to determine whether there are statistically significant differences between groups. Various parameters were evaluated and obtained values are shown in table 3.

Table 3: Evaluated parameters of observed subjects.

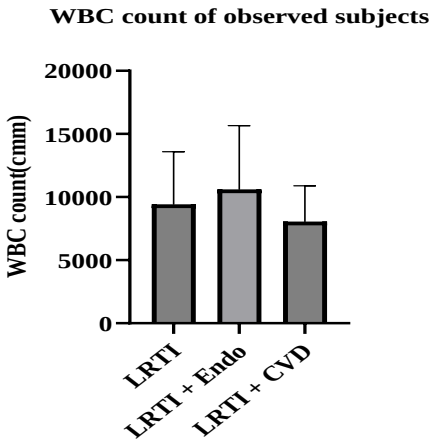
Clinical study groups	LRTI (44%)	LRTI + Endocrinal Imbalance (27%)	LRTI + CVD (29%)	P value
CRP (mg/L)	57.21 ± 5.87	75.70 ± 11.38	77.05 ± 12.26	0.04183*
WBC (cmm)	9420.34 ± 7.6	10605.4 ± 11.9	8053.53 ±6.50	0.039*
Neutrophil (%)	72.41 ± 2.48	75.11 ± 2.26	70 ± 2.86	0.048*
Lymphocyte (%)	40.34 ± 3.08	48.05 ± 5.75	42.78 ± 5.50	0.64
Platelet (cmm)	2.55 ± 0.11	2.84 ± 0.26	2.52 ± 0.20	0.41
FEV1/FVC Ratio (%)	79.55 ±1.12	78.05 ± 1.08	77.05 ±1.14	0.30
SpO_2 (%)	94.79 ± 0.28	93.33 ± 0.45	92.89 ± 0.60	0.01*
Creatinine (mg/dL)	0.76 ±0.03	0.80 ±0.05	0.90 ±0.06	0.26
Random blood sugar (mg/dL)	112.205 ±3.56	194.503 ±14.38	110.416 ±6.77	0.0001**
Total cholesterol (mg/dL)	167.104 ±7.00	207.38 ±11.13	194.202 ±9.26	0.005**
Systolic blood pressure (mmHg)	120.06 ±2.33	135.11±4.80	146.31±3.91	0.0001**
Diastolic blood pressure (mmHg)	73.37 ±1.60	78.22±3.15	90.05±2.63	0.0001**
Sodium (mg/dL)	124.33±1.64	122.31±2.23	123.66±3.21	0.70
Potassium (mmol/L)	4.30±0.10	4.09±0.12	4.28±0.13	0.59

*p value < 0.05 was obtained from Kruskal Wallis test for comparisons of LRTI groups found ,significant difference in LRTI groups.

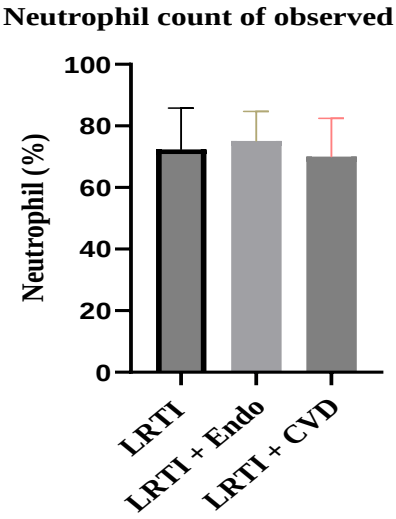
**p value < 0.001 was obtained from Kruskal Wallis test for comparisons of LRTI groups, highly significant difference in LRTI groups.



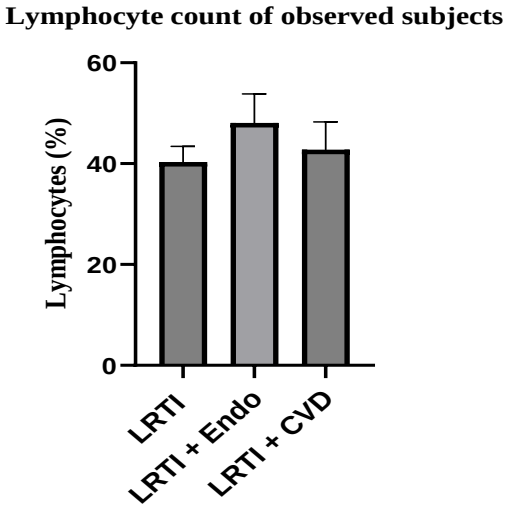
[Fig. 3: CRP value]



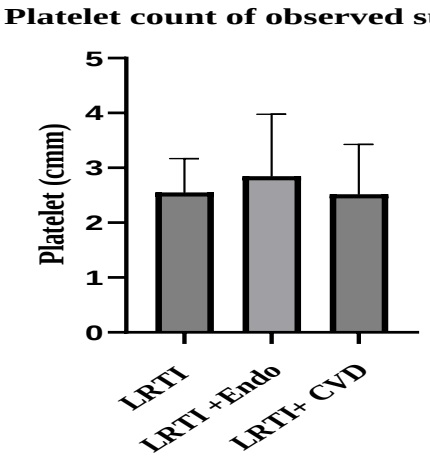
[Fig. 4: WBC count]



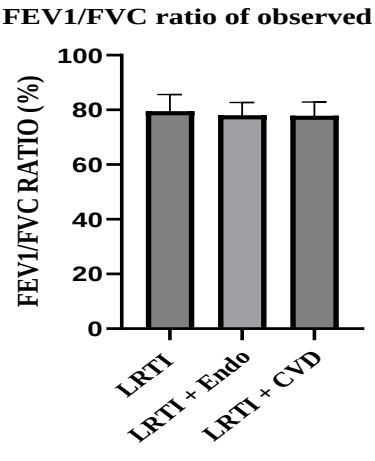
[Fig. 5: Neutrophil count]



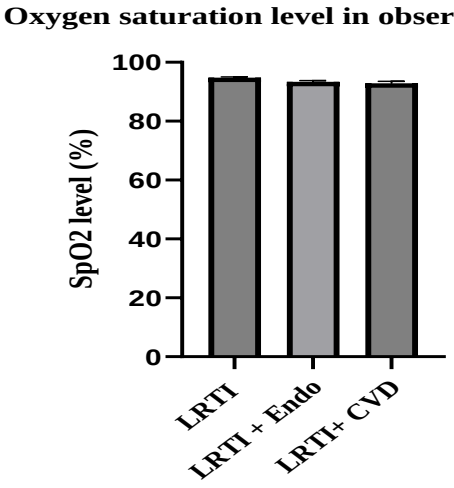
[Fig.6: Lymphocyte count]



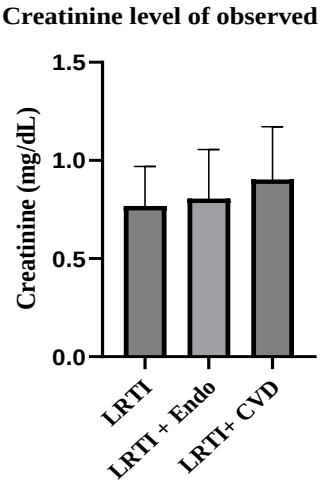
[Fig. 7: Platelet count]



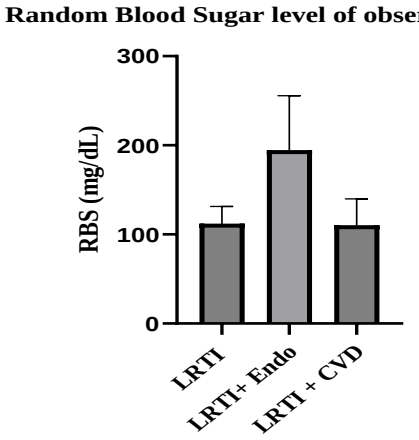
[Fig. 8:FEV1 /FVC Ratio]



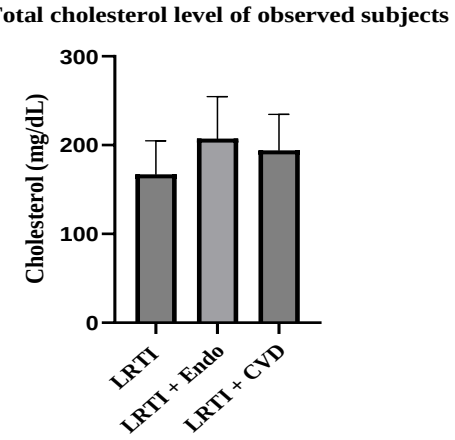
[Fig. 9: SpO2 level]



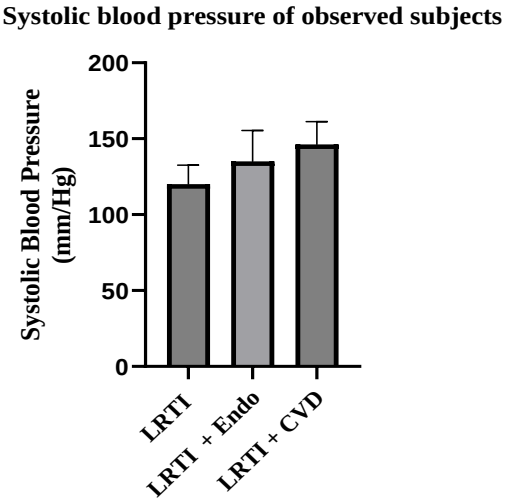
[Fig. 10:Creatinine level]



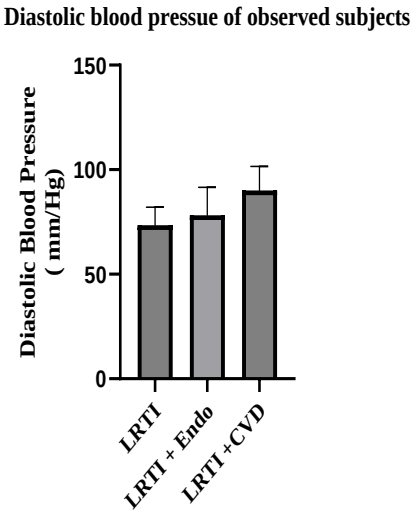
[Fig. 11: RBS level]



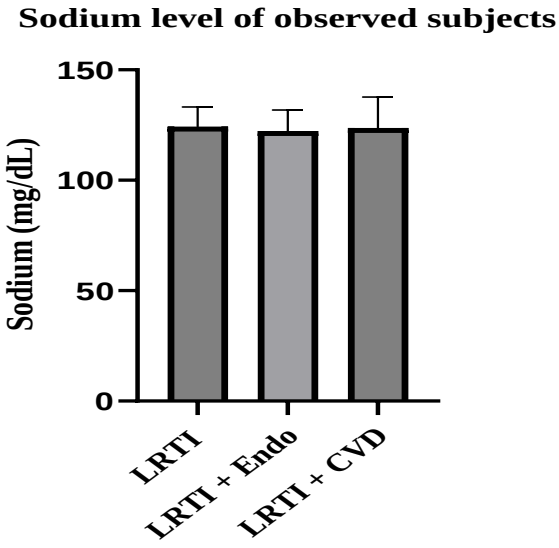
[Fig. 12: Total cholesterol level]



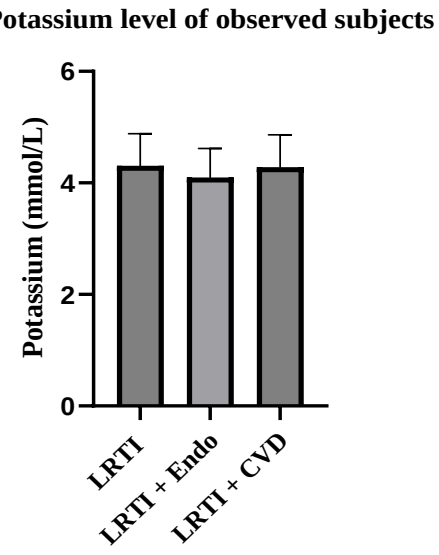
[Fig. 13: SBP level]



[Fig. 14: DBP level]



[Fig. 15: Sodium level]



[Fig. 16: Potassium level]

6. CONCLUSION

In summary, the purpose of our study was the clinical evaluation of respiratory disease in correlation to endocrinal and cardiovascular imbalance. Upon thorough examination and contrast, a number of significant conclusions have been drawn. Firstly, in our clinical examination prevalence of lower respiratory tract infection was seen higher in age ≥ 44 years.

It can be ascribed to a mix of age-related factor, lifestyle choices, healthcare access, on disease development. Mostly co-morbidities can be seen in older age people but nowadays in due to our lifestyles young people can be seen with various co-morbidities like diabetes, hypertension. In observed 66 subjects there were 56% subject infected with COVID -19 at the pandemic time. After questionnaire we have not found any severe impact on their health due to COVID -19 infection. Based on our study we concluded that mostly lower respiratory tract infection out of 66 subjects 49% subject's infection were caused by viral infection, 33% caused by bacterial infection and 18% caused by allergen. Chest X-Ray Posterior Anterior projection opacity vary according to the severity and co-morbidities of the observed subjects.

In this study level of inflammatory marker CRP were analysed. Our results show that there is slightly increase in CRP value in subjects with co-morbidity as compared subjects without co-morbidity. Subjects with cardiovascular disease co-morbidity were showing elevated CRP value. White blood cells count was increased in subjects with lower respiratory tract infection with endocrinal imbalance.

In our cross-sectional observational study forced expiratory volume and forced vital capacity ratio slightly decreased in subjects with endocrinal and cardiovascular co-morbidity as compare to subjects without co-morbidity. Healthy subjects have shown good lung capacity. Various factors like age, type of infection, stress and co-morbidities affects the lung capacity.

Oxygen saturation level is an element for understanding the patient's characteristics. Imbalance in the level can lead to hypoxemia and acute effects in individual organ systems. Slightly decreased level of SpO_2 was found in CVD co-morbidity, and endocrinal imbalance subjects as compared to subjects without co-morbidity.

Type 2 diabetes was initially identified in a few patients who had lower respiratory infection. The correlation between COPD and a higher risk of type 2 diabetes could be explained by a number of factors. First, systemic and chronic inflammation are features of COPD. It has been shown that lifestyle risk factors are common to the development of diabetes and COPD. Total cholesterol one major risk factor for cardiovascular disease is hypertension, which can be brought on by elevated cholesterol levels. Random blood sugar levels and total cholesterol levels were higher in subjects with lower respiratory tract infection with endocrinal imbalance. Among the conditions that make up metabolic syndrome are insulin resistance, dyslipidaemia, obesity, and hypertension. Hypertension is one of these conditions. Increased blood pressure level was found in subjects with lower respiratory tract infection with cardiovascular disease co-morbidity.

From evaluated parameters for clinical evaluation, we concluded that in white blood count, neutrophil, oxygen saturation level, C- reactive protein, random blood sugar, total cholesterol level, systolic blood pressure and diastolic blood pressure values found significant (P value <0.05). Endocrine disease management requires careful

monitoring and control of total cholesterol levels in order to lower the risk of cardiovascular consequences. Although there are effective strategies to stop prediabetes from becoming diabetes and lower the risk of complications from the disease, the duration of glycaemic burden is a powerful predictor of unfavourable outcomes.

Lymphocyte, forced expiratory volume and forced vital capacity ratio, platelet count, creatinine level and sodium, potassium level values does not find significant in our clinical study (P value >0.05). This approach can help in diagnosis and prevention strategies for improving patient health. It is essential to distinguish the root causes for better management of patient's health.

6.1 Limitations

The study is cross-sectional, it does not consider changes over time. Long-term follow-up to evaluate outcomes or the long-term consequences of interventions may not be possible in short-term research. This makes it more difficult to assess how long-lasting or significant the results are. The study is conducted in limited time and in particular area in the city. Results from research done in a certain place might not be relevant in the future because of shifting environmental exposures, healthcare practices, population demographics, and other variables. Continual monitoring or longitudinal research may be required to document temporal changes and patterns.

6.2 Future Scopes

Enhancing early identification and prevention efforts may be possible by identifying early markers or risk factors that connect respiratory disorders to endocrine and cardiovascular abnormalities. In order to identify people who are more likely to develop certain disorders, screening programmes may be created. Patient education programmes could emphasise self-management techniques, following prescribed dosages, and lifestyle changes as ways to lessen the impact of these related illnesses.The creation of integrated healthcare models that treat cardiovascular, endocrine, and respiratory health holistically may be aided by research in this field.

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