

Pattern of Respiratory Diseases and Comorbidities in Patients Attending Casualty Department

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Abstract

Background: The common causes of respiratory emergencies include pneumonias, acute severe asthma, acute exacerbation of Chronic Obstructive Pulmonary diseases (COPD), TB, lung cancers, pneumothorax, pleural effusion, pulmonary embolism and Acute Respiratory Distress Syndrome (ARDS) from other causes. **Aims and Objectives:** To study patterns and co-morbidities of respiratory disease in patients attending casualty department. **Materials and Methods:** This Cross Sectional Study was conducted on 193 patients of Respiratory disease attending emergency department in Medical College and tertiary health care institute. Study was conducted for a period of 2 years (August 2018 to December 2020). Patients were enrolled after matching inclusion and exclusion criteria. Institutional ethics committee permission was taken prior study. **Observations and Results:** The most common age group amongst study population was 51 to 60 years (39.4%) followed by 61 to 70 years (37.8%) and more than 70 years (19.2%). There was male predominance (76.7%) amongst study population as Most of the study population had normal BMI (55.4%) followed by Underweight (27.5%) and Overweight (13.5%). Most of the study population were Farmer (37.3%) followed by Housewife (23.5%), Labourer (11.8%) and Shopkeeper (9.8%). The most common clinical features amongst study population was Breathlessness (100%) followed by Cough with expectoration (58%) and dry cough (22%). Most of the study population had mMRC Dyspnoea Grade 3 (48.2%) followed by grade 2 (30.1%), grade 4 (11.9%), grade 1 (9.8%). COPD (38%) was the most common respiratory disease amongst study population followed by Pleural effusion (19%), Asthma (15%), Pulmonary TB (11%), Pneumonia (6%), Pneumothorax (4%), ARDS (3%), ILD (2%), Pulmonary embolism (1%) and Swine flu (1%). Diabetes (46%) was the most common comorbidity amongst study population followed by Hypertension (36%), Ischemic Heart Disease (15%), Chronic Liver Disease (11%), Chronic kidney Disease (8%), Pneumonia (6%), Pneumothorax (4%) and Malignancy (2%). **Conclusion:** In the present study, Diabetes (46%) was the most common comorbidity amongst study population followed by Hypertension (36%), Ischemic Heart Disease (15%), Chronic Liver Disease (11%), Chronic kidney Disease (8%), Pneumonia (6%), Pneumothorax (4%) and Malignancy (2%). This findings was comparable with the study conducted by Sonisha Gupta et al. (2016)⁴¹, among these patients 10 (35.7%) were diabetic, 16 (57.1%) hypertensive, 6 (21.4%) had cardiac problem and 17 (60.7%) joint pain.

Keywords: Acute Respiratory Distress Syndrome (ARDS), Arterial Blood Gas (ABG), Body Mass Index (BMI), Chronic Obstructive Pulmonary Disease (COPD), Community Acquired Pneumonia (CAP), Interstitial Lung Disease (ILD)

1. Introduction

Respiratory diseases constitute a large percentage of the medical emergencies attending casualty department¹.

The common causes of respiratory emergencies include pneumonias, acute severe asthma, acute exacerbation of Chronic Obstructive Pulmonary diseases (COPD), TB, lung cancers, pneumothorax, pleural effusion, pulmonary

embolism and Acute Respiratory Distress Syndrome (ARDS) from other causes².

It is projected that respiratory conditions such as COPD will constitute one of the highest causes of mortality in the nearest future³. Asthma is projected to increase from 300 to 400 million by the year 2025⁴. It imposes a severe burden on the population and is the major cause of morbidity and mortality worldwide, as 17.4% of all deaths and 13.3% of all Disability-Adjusted Life Years (DALYs) in year 2000 was attributed to five top respiratory diseases⁵.

Individuals with respiratory disease can present to the emergency unit or room as acute illness or as exacerbation of chronic respiratory disease. In most developing countries and resource poor nation adequate provisions of good medical are not widely available and the burdens of respiratory diseases are not well known⁶⁻⁸.

Respiratory diseases are a leading cause of death among adults and children accounting for 12% of all deaths worldwide. In low- and middle-income countries, Upper Respiratory Tract Infections (URTIs) account for 11.3% and 5.4% of all deaths, respectively⁹.

In India another developing country, pneumonia and pulmonary tuberculosis ranked in the top five causes of death Symptoms will be evaluated according to the COPD Assessment Test (CAT) and the modified Medical Research Council (mMRC) dyspnea scale¹⁰⁻¹².

Respiratory disease like COPD may be associated with comorbid conditions like DM, HTN, and osteoporosis and muscle weakness. van Manen and colleagues reported that over 50% of 1,145 patients with COPD had 1 to 2 comorbidities, 15.8% had 3 to 4 comorbidities, and 6.8% had 5 or more comorbid conditions¹³.

Arterial hypertension is one of the most prevalent comorbidities, influencing 40–60% of COPD patients¹⁴. In ILD patients The number of comorbidities diagnosed in an individual patient has a significant impact on survival¹⁵.

Community acquired pneumonia (CAP) is a common illness with an overall rate in adults of approximately 5.16–6.11 cases per 1000 persons per year¹⁶.

Severe infection of the pulmonary parenchyma is the most frequent risk factor for acute respiratory distress syndrome (ARDS)¹⁷.

Sepsis is defined as a life-threatening organ dysfunction caused by a deregulated host response to

infection. Sepsis can evolve to septic shock with an even higher risk of death¹⁸.

Comorbidities have major impact in patients with chronic respiratory diseases by impairing their quality of life, decreasing exercise capacity and increasing healthcare utilization. Unfortunately, the presence of both COPD and other comorbidities is often ominous and contributes significantly to poor health outcomes^{19,20}. Therefore, it is important to screen patients with chronic respiratory diseases for comorbidities and monitor regularly. In addition, those identified with comorbidities should be referred for further assessment and to receive appropriate treatment.

2. Aims and Objectives

To study patterns and co-morbidities of respiratory diseases in patient's attending casualty department.

3. Material and Methods

This Cross Sectional Study was conducted on 193 patients of Respiratory disease attending emergency department in Medical College and tertiary health care institute. Study was conducted for a period of 2 years (August 2018 to December 2020). Patients were enrolled after matching inclusion and exclusion criteria. Institutional ethics committee permission was taken prior study.

3.1 Eligibility Criteria

3.1.1 Inclusion Criteria

All patient's of Respiratory disease attending emergency department.

3.1.2 Exclusion Criteria

Those patient's/relative's who are not giving consent.

3.2 Methodology

The study was conducted in Department of casualty at Dr. Vasantrao Pawar Medical College, Hospital and Research Centre, Nashik, Maharashtra, India. Written informed consent was taken from all study participants, and those who give consent, was be enrolled in the present study. Minimum of 193 patients were included in the study, after satisfying the eligibility criteria. Written informed consent was taken from all study participants, and those

who give consent, were enrolled in the present study to study Pattern of Respiratory diseases and co morbidities in patients attending casualty department.

The bio data, detailed clinical history and all the investigations done were noted in pre-designed case proforma and following parameters were studied.

3.3 Statistical Analysis

All the collected data was entered in Microsoft Excel sheet and then transferred to SPSS software ver. 22 for analysis. Qualitative data was presented as frequency and percentages. Quantitative data was presented as mean and SD.

4. Results

Table 1. Age group

Age group	Frequency	Percentage
36 to 50 years	7	3.6%
51 to 60 years	76	39.4%
61 to 70 years	73	37.8%
more than 70 years	37	19.2%
Total	193	100.0%

As seen in the Table 1, the most common age group amongst study population was 51 to 60 years (39.4%) followed by 61 to 70 years (37.8%) and more than 70 years (19.2%)

Table 2. Sex distribution

Sex	Frequency	Percentage
Female	45	23.3%
Male	148	76.7%
Total	193	100.0%

As seen in the Table 2, there was male predominance (76.7%) amongst study population as compared to female (23.3%).

Table 3. BMI

BMI	Frequency	Percentage
Normal	107	55.4%
Obese	7	3.6%

Overweight	26	13.5%
Underweight	53	27.5%
Total	193	100.0%

As seen in the Table 3, most of the study population had normal BMI (55.4%) followed by Underweight (27.5%) and Overweight (13.5%).

Table 4. Occupation wise classification of study participants

Occupation	Frequency	Percentage
Businessman	11	5.9%
Farmer	72	37.3%
Housewife	45	23.5%
Labourer	23	11.8%
Mechanic	8	3.9%
Pujari	15	7.8%
Shopkeeper	19	9.8%
Total	193	100%

As seen in the Table 4, most of the study population were Farmer (37.3%) followed by Housewife (23.5%), Labourer (11.8%) and Shopkeeper (9.8%).

Table 5. Clinical features

Clinical features	Frequency	Percentage
Dry Cough	43	22%
Cough with Expectoration	112	58%
Breathlessness	193	100%

As seen in the Table 5, the most common clinical features amongst study population was Breathlessness (100%) followed by Cough with expectoration (58%) and dry cough (22%).

Table 6. mMRC dyspnoea grade

mMRC Dyspnoea Grade	Frequency	Percentage
1	19	9.8%
2	58	30.1%
3	93	48.2%
4	23	11.9%
Total	193	100.0

As seen in the Table 6, most of the study population had mMRC Dyspnoea Grade 3 (48.2%) followed by grade 2 (30.1%), grade 4 (11.9%), grade 1 (9.8%).

Table 7. Other parameters

	Mean	Std. Deviation
Age	63.60	8.1
Height(cm)	157.47	7.2
Weight (Kg)	52.14	11.9
BMI	21.09	4.5
SpO2	91.26	3.3
Waist Circumference (cm)	77.62	13.3
FBS	115.20	37.1
Sr TG	135.73	41.5
Sr HDL	45.60	11.5

As seen in the Table 7, mean age, Height(cm), Weight (Kg), BMI, SpO2, Waist Circumference(cm), FBS, Serum TG and Serum HDL was 63.60 ± 8.1 years, 157.47 ± 7.2 , 52.14 ± 11.9 , 21.09 ± 4.5 , 91.26 ± 3.3 , 77.62 ± 13.3 , 115.20 ± 37.1 , 135.73 ± 41.5 and 45.60 ± 11.5 respectively.

Table 8. Respiratory disease

Respiratory disease	Frequency	Percentage
COPD	73	38.0%
Pleural effusion	36	19.0%
Asthma	29	15.0%
Pulmonary TB	21	11.0%
Pneumonia	12	6.0%
Pneumothorax	8	4%
ILD	4	2%
ARDS	6	3%
Pulmonary embolism	2	1%
Swine flu	2	1%
Total	193	100%

As seen in the Table 8, COPD (38%) was the most common respiratory disease amongst study population followed by Pleural effusion (19%), Asthma (15%), Pulmonary TB (11%), Pneumonia (6%), Pneumothorax (4%), ARDS (3%), ILD (2%), Pulmonary embolism (1%) and Swine flu (1%).

Table 9. Comorbidities

Comorbidities	Frequency	Percentage
Diabetes	89	46.0%
Hypertension	69	36.0%

Septicemia	8	4.0%
Chronic Liver Disease	21	11.0%
Chronic kidney Disease	15	8.0%
Ischemic Heart Disease	29	15.0%
Malignancy	4	2.0%

As seen in the Table 8, Diabetes (46%) was the most common comorbidity amongst study population followed by Hypertension (36%), Ischemic Heart Disease (15%), Chronic Liver Disease (11%), Chronic kidney Disease (8%), Pneumonia (6%), Pneumothorax (4%) and Malignancy (2%).

5. Discussion

India is a vast country with an enormously variable population. There are large differences in geographical, environmental, ethnic, religious, cultural and socioeconomic parameters in different population groups in India which affect the human health and disease occurrence. Therefore, the study of disease epidemiology in India is singularly difficult²¹. The burden of respiratory diseases in India is huge. Although some epidemiological data is available on major respiratory problems such as asthma, tuberculosis, COPD and bronchogenic carcinoma an efficient database for different respiratory diseases is absent²²⁻²⁷. Respiratory diseases constitute a major cause of morbidity and mortality worldwide. The top four respiratory diseases, lower respiratory tract infections, COPD, tuberculosis, and lung cancer, are among the ten leading causes of death worldwide²⁸. In India another developing country, pneumonia and pulmonary tuberculosis ranked in the top five causes of death²⁹. The association of respiratory disorders with geographical region may be relevant with population density, industrial and textile pollutants, and tobacco consumption. The relationships between socio-economic developments, behavioral and environmental factors of these diseases were well premeditated³⁰.

5.1 Age group

In the present study, the most common age group amongst study population was 51 to 60 years (39.4%) followed by 61 to 70 years (37.8%) and more than 70 years (19.2%) with the mean age 63.60 ± 8.1 years. This findings was comparable with the study conducted by Olufemi Olumuyiwa Desalu *et al.* (2009)³¹, in which the

mean age of the patients was 49.9 ± 20.3 years and the age distributions showed that 80 (21.7%) of the patients were in age group ≥ 70 years. Nearly one third of the patients affected were aged ≥ 60 years. This trend can be attributed to age related co-morbid medical conditions like heart failure, chronic obstructive pulmonary disease and Diabetes mellitus that predispose patients to respiratory illness³². Madhuragauri Shevade *et al.* (2015)³³, also observed that 63% patients (mean age 43.6 ± 18.5 yrs; M: 58.9%) presented to the doctors for Chronic Respiratory Diseases (CRD).

5.2 Gender

In the present study, there was male predominance (76.7%) amongst study population as female. This findings was comparable with the study conducted by Olufemi Olumuyiwa Desalu *et al.* (2009)³¹, in which one hundred and ninety nine (54.1%) were males and 169 (45.1%) were females with a male to female ratio of 1.2:1. Similar findings was reported by Chhabra *et al.* (2008)³⁴, out of 3465 individuals were interviewed of which 1756 (50.68%) were males and 1709 (49.3%) were females. Similar findings were reported by Dubey *et al.* (2015)³⁵, in which there were 980 males and 710 females with a male to female ratio of 1.38:1. Prevalence of respiratory disease was almost double in males (26.1% – 169/647) as compared to females (13.1% – 113/846). Mean age of respiratory patients was 64.9 years.

5.3 BMI

In the present study, most of the study population had normal BMI (55.4%) followed by Underweight (27.5%), and Overweight (13.5%).

5.4 Occupation

In the present study, most of the study population were Farmer (37.3%) followed by Housewife (23.5%), Labourer (11.8%), and Shopkeeper (9.8%).

5.5 Clinical Features

In the present study, the most common clinical features amongst study population was Breathlessness (100%) followed by Cough with expectoration (58%) and dry cough (22%). This findings was comparable with the study conducted by Ghoshal *et al.* (2016)³⁶, in which Cough or coughing up phlegm was the main reason for the current

visit by patients who were diagnosed with asthma (38%) and COPD (55%), followed by difficulty in breathing (29% and 19%, respectively).

5.6 mMRC Dyspnea

In the present study, most of the study population had mMRC Dyspnoea Grade 3 (48.2%) followed by grade 2 (30.1%), grade 4 (11.9%), grade 1 (9.8%).

In the present study, mean age, Height(cm), Weight (Kg), BMI, SpO₂, Waist Circumference(cm), FBS, Serum TG and Serum HDL was 63.60 ± 8.1 years, 157.47 ± 7.2 , 52.14 ± 11.9 , 21.09 ± 4.5 , 91.26 ± 3.3 , 77.62 ± 13.3 , 115.20 ± 37.1 , 135.73 ± 41.5 and 45.60 ± 11.5 respectively.

5.7 Respiratory Disease

In the present study, COPD (38%) was the most common respiratory disease amongst study population followed by Pleural effusion (19%), Asthma (15%), Pulmonary TB (11%), Pneumonia (6%), Pneumothorax (4%), ARDS (3%), ILD (2%), Pulmonary embolism (1%) and Swine flu (1%). This findings was comparable with the study conducted by Katherine Paulson *et al.*, in which COPD and asthma were responsible for 75.6% and 20.0% of the chronic respiratory disease respectively³⁷. Dominici and colleagues in the year 2006 reported that short-term exposure to fine particle air pollution are dangerous, and significantly increases the risk for cardiovascular and respiratory disease among people over the age of 65 years³⁸. Madhuragauri Shevade *et al.* (2015)³³, also observed that the most common CRDs were Chronic Obstructive Pulmonary Disease (COPD) (29.6%), Tuberculosis (TB) (23%), Asthma (22.5%) and Allergic Rhinitis (8.4%). Similar findings was reported by Dubey *et al.* (2015)³⁵, in which COPD was seen in 269 (15.92%) of the study subjects. It was observed that majority of the cases were more than 60 years of age. Whereas a study conducted by PA Mahesh in Karnataka prevalence of COPD was found to be 7.1% of the total 900 hundred population³⁹. In a study conducted by Angira Das Gupta *et al.* (2008)⁴⁰ in Kolkata, asthma was seen in 26% cases and infective problems excluding tuberculosis and pneumonia was seen in 7.16% cases out of total 2012 patients. This finding was comparable with the study conducted by Sonisha Gupta *et al.* (2016)⁴¹, COPD was the most prevalent respiratory disease constituting 56.4% (159/282) of all respiratory patients. Bronchial asthma was the 2nd most prevalent respiratory diagnosis affecting 57/282 (20.2%) of all

respiratory elderly patients. Mean age was 64 years. Only 13 (22.8%) patients had history of exposure to biomass fuel and 5 (8.8%) were smokers. It is mostly attributed to changes in immune system and negative impact of age on lung physiology. In contrast, there was absence of any association between chronic bronchitis and increasing age in a study conducted in Pune slums⁴². However, Pandey (1984)⁴³ in a rural study in Nepal reported contrasting results with higher prevalence of chronic bronchitis in females, and it was attributed to domestic smoke pollution.

5.8 Comorbidities

In the present study, Diabetes (46%) was the most common comorbidity amongst study population followed by Hypertension (36%), Ischemic Heart Disease (15%), Chronic Liver Disease (11%), Chronic kidney Disease (8%), Pneumonia (6%), Pneumothorax (4%) and Malignancy (2%). This findings was comparable with the study conducted by Sonisha Gupta *et al.* (2016)⁴¹, among these patients 10 (35.7%) were diabetic, 16 (57.1%) hypertensive, 6 (21.4%) had cardiac problem and 17 (60.7%) joint pain⁴¹ (Table 9).

6. Conclusion

The most common clinical features amongst study population was Dyspnoea of grade 3 followed by Cough with expectoration and dry cough. COPD was the most common respiratory disease amongst study population followed by Pleural effusion, Asthma and others. In such patients, avoidance of risk factors along with coordinated, comprehensive, and individualized approach to treatment both pharmacologic and nonpharmacologic, can increase functional status, prevent complications and improve quality of life. Diabetes was the most common comorbidity amongst study population followed by hypertension, Ischemic Heart Disease, Chronic Liver Disease, Chronic kidney Disease, Pneumonia, Pneumothorax and Malignancy. Therefore, targeted surveillance and management of diabetes and other comorbidities is important in patients of respiratory emergency.

7. Abbreviations:

ABG: Arterial Blood Gas
ARDS: Acute Respiratory Distress Syndrome

BMI: Body Mass Index
CAP: Community Acquired Pneumonia
COPD: Chronic Obstructive Pulmonary Disease
CT: Computed Tomography
DM: Diabetes Mellitus
FBS: Fasting Blood Sugar
FEV1: Forced Expiratory Volume In One Second
FVC: Forced Vital Capacity
HTN: Hypertension
ILD: Interstitial Lung Disease
LDH: Lactate Dehydrogenase
MDI: Metered Dose Inhaler
mMRC: modified Medical Research Council
PEF: Peak Expiratory Flow
PEFR: Peak Expiratory Flow Rate
Sr.HDL: SeRum High Density Lipoprotein
Sr.TG: SeRum TriGlyceride

8. References

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How to cite this article: Raj, N., Shinde, R., Dugad, S., Khandpur, J.S., Subbarao, K.S.C.N. and Bharadi, S. Pattern of Respiratory Diseases and Comorbidities in Patients Attending Casualty Department. *MVP J. Med. Sci.* 2020; 8(2): 219-226.