

Spectrum of comorbidities in patients of respiratory sicknesses in a tertiary care center

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Introduction: Comorbidities contribute to disease severity and mortality in patients suffering from respiratory illness, it will not only contribute to increase in the severity but also increases the economical burden over the health-care system. The comorbidities will be defined as the presence of the additional diseases with simultaneously presence of the primary disorder. Hence, our study aimed to analyze the spectrum of comorbidities in patients suffering from respiratory diseases admitted in the respiratory medicine ward in a tertiary care center in a developing country. **Materials and Methods:** This study was carried out at the pulmonary medicine ward of Rohilkhand Medical College and Hospital, Bareilly (U.P.), and included all cases admitted during the period of 1 year from May 2016 to April 2017. **Results:** A total of 1440 patients were included in the study. There were 960 (65%) males and 480 (35%) females with a male-to-female ratio of 1.8:1. The average age for the males was 50.8±14 with a range of 14–85 years, whereas for the females, it was 46.3±12.2 with a range of 13–80 years, the most commonly observed respiratory disease is chronic obstructive pulmonary disease which was seen in 393 (27.3%) followed by tuberculosis which was seen in 314 (21.8%) of the patients, the most common comorbidity observed is hypertension, followed by coronary artery disease (CAD) followed by anemia in association with the respiratory diseases, among comorbid conditions anemia and osteoporosis were found to be more common in females as compared to males, human immunodeficiency virus was found in 7 (0.4%) of patients. **Conclusion:** In our study, most of the cases belong to the obstructive airway group of diseases followed by infective pathology. The major comorbidity which was observed among associated respiratory diseases is hypertension followed by CAD. Hence, there is a need toward targeting the health resources in prioritizing for the prevention of risk factors, thereby preventing the occurrence of disease as well as comorbidity.

KEY WORDS: Asthma, chronic obstructive pulmonary disease, comorbidity, coronary artery disease

INTRODUCTION

The comorbidities are defined as the presence of the additional diseases with simultaneously presence of the primary disorder,

Comorbidities are important to diagnose because it will not only help in treating the patient but also help in the better understanding for the disease processes and help in preventing its further complications.

Our lungs fuel us with oxygen and help in sustaining life, since the lung process air, they are the only internal organ that are constantly exposed to the external environment through the upper respiratory tract. The air in the atmosphere is a mixture of number of ambient gases along with numerous other particulate

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matter, particles, and pathogens, summation of these in the presence of risk factors will responsible for causing respiratory sicknesses.

It is noted that according to Global Adult Tobacco Survey, more than one-third (35%) of adult population in India use tobacco in various forms.^[1]

According to Census 2011, two-third of households in country are using firewood/crop residue, cow dung cake/coal, etc., in their kitchen. The increase use of tobacco worldwide and particularly in developing countries along with extensive use of biofuel is now presenting itself with its adverse consequences on health of person and thereby affecting community. Tobacco is a potential risk factor accounting for six out of the eight leading causes of death and about 800,000–900,000 people die every year in India due to diseases related to tobacco use.^[2]

Comorbidity is associated with worse health outcomes, more complex clinical management, and increased health-care costs.

Hence, the study aimed to analyze the spectrum of comorbidities in patients suffering with the respiratory diseases in the medical ward in a developing country.

MATERIALS AND METHODS

This study was carried out at the Department of Respiratory medicine of Rohilkhand Medical College and Hospital, Bareilly (U.P.), and the study included all the cases which were admitted during the period of 1 year from May 1, 2016, to April 30, 2017.

The data were collected from either from the patient or their relatives, if patient was unable to answer appropriately. All the cases included in the study were followed up till the patient was discharged. All the cases were subjected to the prefixed protocols which is as follows-

1. A detailed medical history along with source of admission
2. Clinical examination including skin fold thickness and body mass index (BMI).
3. Chest X-ray (either P.A or A.P view as per the patient condition)
4. Electrocardiograms ECG/ECHO/computerized tomography study, if needed
5. Arterial blood gas, if required
6. Laboratory investigations which included liver function test and kidney function test, blood sugar levels, complete blood counts, serum electrolytes, bone scan, and other investigations as per requirements
7. Plan of treatment along with length of stay
8. Different comorbidities were identified based on predefined cutoffs as suggested by relevant international societies: Renal impairment defined as estimated glomerular filtration rate of <60 ml/min; anemia is defined as hemoglobin level <8.1 mmol/L in men and <7.5 mmol/L in women; hypertension with systolic blood pressure >140 mmHg or diastolic pressure >90 mmHg; obesity with BMI

greater or equal to 30 kg/m² and underweight with BMI <21 kg/m²; diabetes mellitus is defined as fasting blood glucose level >5.6 mmol/L; dyslipidemia with triglyceride level >1.7 mmol/L or high-density lipoprotein cholesterol level <1.03 mmol/L in men or <1.29 mmol/L in women; osteoporosis (t-score <-2.5); symptoms of anxiety and depression (hospital anxiety and depression scale score ≥10 points); atherosclerosis (carotid intima-media thickness >0.9 mm); and myocardial infarction (CIIS ≥20), human immunodeficiency virus (HIV)-positive by Western blot.

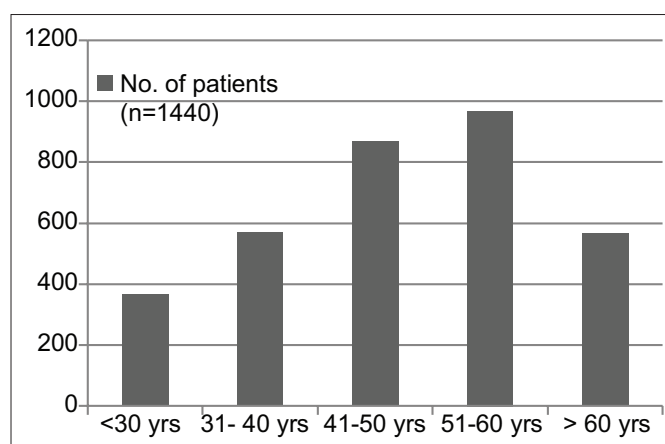
RESULTS

A total of 1440 patients were included in the study. There were 960 (65%) males and 480 (35%) females with a male-to-female ratio of 1.8:1, the average age for the males was 48.4±11.3 with a range of 14–85 years, whereas for the females, it was 46.3±12.2 with a range of 14–85 years, Table 1.

Among 1440 patients, with regard to the spectrum of respiratory diseases, the maximum percentage 393 (27.3%) had chronic obstructive pulmonary disease (COPD) followed by tuberculosis (TB) 314 (21.8%), asthma in 164 (11.4%), post-TB sequelae in 122 (8.5%), bronchiectasis in 107 (7.4%), pleural diseases in 103 (7.2), pneumonia in 98 (6.8%), lung cancers in 68 (4.7%), and interstitial lung disease (ILD) in 19 (1.3%) and others were 52 (3.6%) cases, Table 2.

In our study, the common comorbidities were hypertension 350 (24.3%), coronary artery disease 279 (19.4%), anemia 163

Table 1: Distribution of patients with respiratory diseases among different age groups



Age distribution (years)	Number of patients (n=1440), n (%)
<30	223 (15.5)
31–40	271 (18.8)
41–50	548 (38.1)
51–60	279 (19.4)
>60	115 (8.0)

Table 2: Pattern of the various respiratory diseases in respiratory medicine ward (*n*=1440)

Respiratory disease	Number of patients (<i>n</i> =1440), <i>n</i> (%)
COPD	393 (27.3)
Tuberculosis	314 (21.8)
Asthma	164 (11.4)
Post-TB sequelae	122 (8.5)
Bronchiectasis	107 (7.4)
Pleural diseases	103 (7.2)
Pneumonia	98 (6.8)
Malignancy	68 (4.7)
ILD	19 (1.3)
Others	52 (3.6)

COPD: Chronic obstructive pulmonary disease, TB: Tuberculosis, ILD: Interstitial lung disease

(11.3%), diabetes mellitus 151 (10.5%), obesity 126 (8.8%), chronic liver disease 101 (7.0%), renal impairment 82 (5.7%), depression 27 (2.0%), dyslipidemia 14 (1.9%), osteoporosis 19 (1.3%), benign prostatic hypertrophy (BPH) 12 (0.8%), pelvic inflammatory disease (PID) 10 (0.7%), and HIV 07 (0.4%), while 98 (6.8%) of patients had no comorbidity. Distribution of the patients as per the various respiratory diseases is shown in Table 3.

DISCUSSION

This study was carried out with the aim to evaluate the clinical profile along with different pattern of various respiratory diseases, associated comorbidities, and outcome seen in different patients admitted in the department of respiratory medicine at a tertiary care hospital in West Uttar Pradesh.

Out of a total of 1440 patients who were admitted in the department of respiratory medicine, 960 (65%) were male and 480 (35%) females, with a M:F ratio of 1.8:1, similar observation, that is, M:F ratio of 1.5:1 was observed by Vanfleteren *et al.*^[3] and ratio of 2:1 was observed by Das Gupta *et al.*^[4] and similar results that are ratio of 3.5:1 were observed by Sachdeva *et al.*^[5] The male preponderance was observed by studies done by Umoh *et al.*,^[6] Sachdeva *et al.*,^[5] Soto-Campos *et al.*,^[7] Alamoudi,^[8] and Kumar *et al.*^[9] while female preponderance seen in Pokharel *et al.*^[10]

The age group mostly affected was from 30 to 60 years with 2530 (75.8%) cases, Umoh *et al.*^[6] and Sachdeva *et al.*^[5] also found similar age group in their study in 65% and 60% of patients, respectively.

The mean age in this study was found to be 50.8±14, similar finding was seen in the study done by Sachdeva *et al.*^[5] and the mean age of 48.6±12 was observed by Kumar *et al.*^[9] while the mean age of 40.35±15 years was observed by study done by Umoh *et al.*^[5]

The maximum percentage 393 (27.3%) had COPD followed by TB 314 (21.8%), asthma in 164 (11.4%), post-TB sequelae in

Table 3: Spectrum of comorbidities in respiratory diseases

Comorbidities	Number of patients (<i>n</i> =1440), <i>n</i> (%)
Hypertension	350 (24.3)
CAD	279 (19.4)
Anemia	163 (11.3)
Diabetes mellitus	151 (10.5)
Obesity	126 (8.8)
Chronic liver disease	101 (7.0)
Renal impairment	82 (5.7)
Depression	27 (2.0)
Dyslipidemia	14 (1.9)
Osteoporosis	19 (1.3)
BPH	12 (0.8)
PID	10 (0.7)
HIV	07 (0.4)
No association comorbidities	98 (6.8)

CAD: Coronary artery disease, BPH: Benign prostatic hypertrophy, PID: Pelvic inflammatory disease, HIV: Human immunodeficiency virus

Table 4: Spectrum of comorbidities in respiratory diseases on the basis of gender

Comorbidities	Males (%)	Females (%)
Hypertension	204 (14.2)	132 (9.2)
CAD	152 (10.6)	127 (8.8)
Anemia	65 (4.5)	98 (6.8)
Hyperglycemia	76 (5.3)	75 (5.2)
Obesity	73 (5.1)	53 (3.7)
Osteoporosis	42 (2.9)	59 (4.1)
Chronic liver disease	43 (3.0)	39 (2.7)
Depression	13 (0.9)	17 (1.2)
Dyslipidemia	20 (1.4)	7 (0.5)
Renal impairment	13 (0.9)	6 (0.4)
BPH	11 (0.8)	-
PID	-	10 (0.7)
HIV	6 (0.4)	1 (0.006)
No association comorbidities	55 (3.8)	43 (3.0)

CAD: Coronary artery disease, BPH: Benign prostatic hypertrophy, PID: Pelvic inflammatory disease, HIV: Human immunodeficiency virus

122 (8.5%), bronchiectasis in 107 (7.4%), pleural diseases in 103 (7.2%), pneumonia in 98 (6.8%), lung cancers in 68 (4.7%), and ILD in 19 (1.3%) and others were 52 (3.6%) cases while the study performed by Sachdeva *et al.*^[5] observed TB as the most common sufferings with 217 cases (66.7%), followed by COPD 196 (20.2%), while the study done by Alamoudi,^[8] asthma was the most common sufferings in 312 cases (38.6%) followed by COPD in 139 cases (17.2%) [Table 2 and Figure 1].

The common comorbidities were hypertension in 350 cases (24.3%), coronary artery disease in 279 cases (19.4%), anemia 163 (11.3%), diabetes mellitus 151 (10.5%), obesity 126 (8.8%), chronic liver disease 101 (7.0%), renal impairment

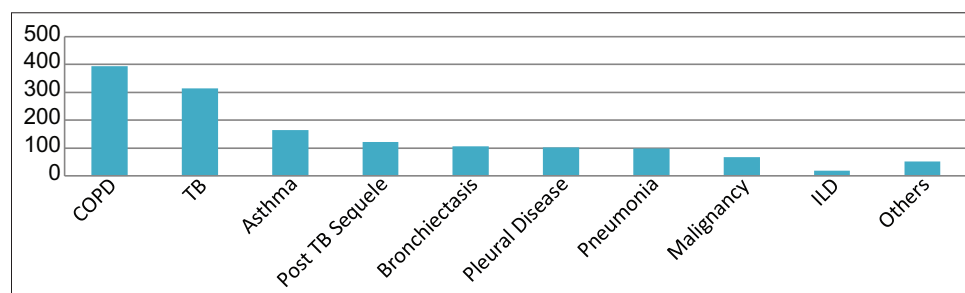


Figure 1: Bar graphic representation of respiratory diseases in respiratory medicine ward (n = 1440)

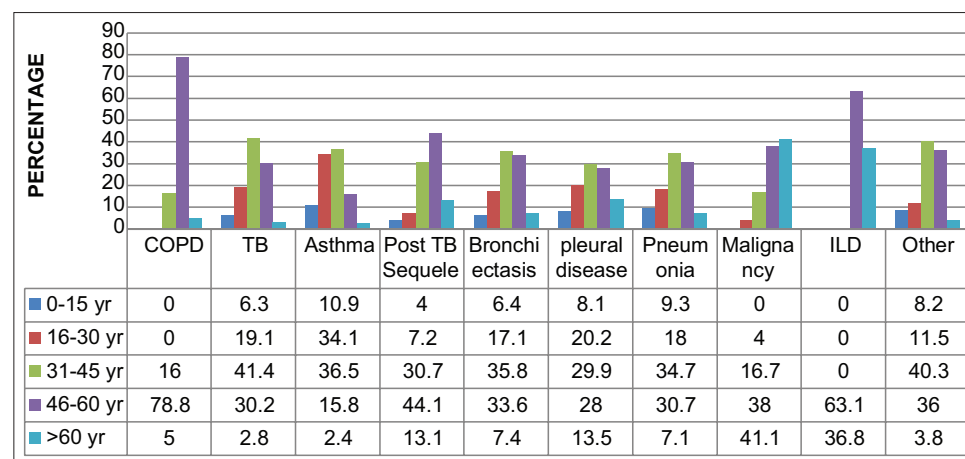


Figure 2: Age group distribution of respiratory diseases

82 (5.7%), depression 27 (2.0%), dyslipidemia 14 (1.9%), osteoporosis 19 (1.3%), BPH 12 (0.8%), PID 10 (0.7%), and HIV 07 (0.4%), while 98 (6.8%) of patients had no comorbidity. While Desalu *et al.*^[11] were found to have HIV as most common comorbidity, that is, 11.5% of patients in their study followed by hypertension observed in 4.9% of patients. The presence of comorbidities is directly associated with the seriousness of the condition affecting duration of stay, complication, and mortality rate. Umoh *et al.*^[6] noticed comorbidities in 156 (48%) cases, while similar observation was made by Kumar *et al.*,^[9] that is, hypertension as most common comorbidity in there study.

With regard to sex distribution among the comorbidities, comorbid conditions were found to be more common in males except anemia and osteoporosis which were more common among females. Among males, BPH was observed in 11 (0.8%) of patients while PID in females was observed in 10 (0.7%) of patients [Table 4 and Figure 2].

CONCLUSION

Despite the limitation in our study, our study population represent the spectrum of respiratory diseases presenting at a tertiary care center. As per general observation, the burden of respiratory diseases in the developing countries is huge. Low socioeconomic condition, poor diet, environmental pollution, tobacco smoking along with history of childhood infections are mainly responsible for the development of various respiratory diseases and its associated complications. The need of the hour

is to generate data to support these assumptions along with a uniform guideline for disease management and control which is a major challenge. Timely pharmacological interventions along with rehabilitative program can improve prognosis and quality of life of these patients.

In our study, most of the cases refers to the obstructive airway diseases followed by infective pathology. The major comorbidity which was observed among associated respiratory diseases is hypertension followed by hyperglycemia. Hence, there is a need toward targeting the health resources in prioritizing for the prevention of risk factors, thereby preventing the occurrence of disease as well as comorbidity.

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