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Original Research Article

Epidemiological distribution and drug utilization study in patients with respiratory tract diseases at district general hospital Amravati, Maharashtra, India

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ABSTRACT

Background: In the present study we have focused on the trends in the Epidemiological distribution and drug utilization in respiratory tract diseases. A cross sectional and observational study conducted in both in-patient and out-patient department of District General Hospital, Amravati. The institutional ethical committee of Government college of Pharmacy, Amravati authorised this study. After obtaining verbal consent, patient demographics and drugs prescription data were collected and analysed. Along with this interaction with the patients were also done whenever required.
Materials and Methods: Data obtained was analysed using convenience sampling, a non-probability sampling method and entered in Microsoft excel.
Results : A total of 184 patients were observed in our study of which 63.58% were males and 36.42% were females. From all the prescriptions, we observed that there were 923 medicines prescribed in 184 prescriptions with an average of 5.1 medicines per prescription
Conclusion: In this paper, we observed how the drugs are utilized by the physician and most commonly prescribed drugs in RTD. From this study, it is evident that antibiotics were not prescribed in majority of patients and is a matter of serious concern. Prescribing by generic names has to be encouraged with patient counselling for cessation of smoking, alcohol and tobacco consumption.

1. Introduction

Respiratory tract disease involves diseases which affects the lungs and other parts of the respiratory system. This disease may be caused by infection, by smoking tobacco, or by breathing in second hand tobacco smoke, radon, asbestos, or other forms of air pollution. Respiratory diseases include asthma, chronic obstructive pulmonary disease (COPD), pulmonary fibrosis, pneumonia, tuberculosis and lung cancer. They are also known as lung disorder and pulmonary disease.

Respiratory diseases impose an immense worldwide health burden. Five of these diseases are among most common causes of severe illness and death worldwide.[1]

COPD- Chronic obstructive pulmonary disease (COPD), a common preventable and treatable disease, is characterized by persistent airflow limitation that is usually progressive and that is caused by an enhanced chronic inflammatory response in the airways and the lung to noxious particles or gases.[2]

Asthma- Asthma is defined as a chronic inflammatory disease of the airways. The chronic inflammation is associated with airway hyperresponsiveness (an exaggerated airway-narrowing response to specific triggers such as viruses, allergens and exercise) that leads

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to recurrent episodes of wheezing, breathlessness, chest tightness and/or coughing that can vary over time and in intensity.[3]

TB- It is a chronic disease caused by the bacillus Mycobacterium tuberculosis and spreads from person to person through air. TB usually affects the lungs but it can also affect other parts of the body, such as brain, intestines, kidneys, or the spine. Symptoms of TB depend on where in the body the TB bacteria are growing.[4]

LRTI- Lower respiratory tract infection (LRTI) is a broad terminology which includes acute bronchitis, pneumonia, acute exacerbations of chronic obstructive pulmonary disease/chronic bronchitis (AECB), and acute exacerbation of bronchiectasis.[5]

RAD- Reactive airway disease (RAD) is similar to asthma. RAD occurs when your bronchial tubes, which bring air into your lungs, overreact to an irritant, swell, and cause breathing problems.[6]

Respiratory diseases account for more than 10% of all disability-adjusted life-years (DALYs), a metric that estimates the amount of active and productive life lost due to a condition.[7]They are second only to cardiovascular diseases (including stroke).[8] Altogether, more than 1 billion people suffer from either acute or chronic respiratory conditions. The stark reality is that, each year, 4 million people die prematurely from chronic respiratory disease.[9] Infants and young children are particularly susceptible. A total of 9 million children under 5 years old die annually, and pneumonia is the world's leading killer of these children.[1]

Epidemiology is study of use and effects of drugs in a large number of populations. Epidemiological distribution involves gathering and analysis of information in order to identify possible causation and related factors that can be applied in clinical practise to group of people and also individual undergoing treatment. It examines the relationship between drug exposure and health outcome in a defined population. Drug utilization focuses on the various medical, social, and economic aspects of drug use. Medical consequences include the risks and benefits of drug therapy, whereas social aspects can be related to inappropriate use. Economic issues deal with the cost of drugs and treatment for patients and society.[10]

In this study, the in-patient and out-patient department represented an important platform for conducting such studies as patients from all over Amravati district present with a wide range of respiratory diseases and the drug use is quite extensive at District general hospital, Amravati. Therefore, evaluating the epidemiological distribution and the drug usage patterns in this departmental setting has the potential of determining the epidemiology and rationality of drug therapy being given in the particular region to a broader extent.

2. Materials and Methods

A cross sectional observational study was conducted in both out-patient and in-patient department of District general hospital, Amravati & District T.B. hospital, Amravati for a period of 6 months October-21 to March-22. Patient demographics and drugs prescription data were collected and analysed. Along with this interaction with the patient was also done whenever required. This was an observational study involving all the patients with both genders and all ages who are suffering from Respiratory tract diseases. The patients who were not willing to participate and pregnant women were excluded from the study.

The present study was initiated with an enrolment of patients based on inclusion and exclusion criteria. The patients who were visiting the tertiary care centre were monitored in the study. The patient background information like age, gender and reason for hospital visit were collected. The patient's diagnosis and prescribed medicines were noted. All the drugs prescribed for the patients were noted and monitored. To achieve the desired outcome Convenience sampling, a non-probability sampling method was used. The collected data was entered in Microsoft excel and analysed for frequency and percentages, the results were demonstrated in the forms of table and graphs. The convenience sampling method is the most applicable and widely used method in clinical research.[11]

3. Results

In this project, we observed the epidemiological distribution and how the drugs are utilized by the physician. Epidemiological distribution and drug utilization study was done on the basis of prospective and retrospective study, age, gender, region patient belonging to, social history, clinical features, given treatment, Name of drug (Antibiotics, Proton pump inhibitor and other antacids, Multivitamins, Bronchodilators, Antihistaminic, NSAIDs, Antipyretic, Nebulization) and Fixed dose combination, etc.

Out of which TB contributes 32.06% of total study including both retrospective and prospective, followed by LRTI, COPD, ASTHMA, RAD which contribute 30.43%, 19.02%, 14.67%, 3.8% respectively.Table 1

In the current study, a total number of 184 medical records of hospitalized patients with RTD between 2020 and 2021 were reviewed. The majority of patients were males 63.58% and 36.42% were females.

Active smoking remains the main risk factor, but other factors are becoming better known, such as occupational factors, infections and the role of air pollution. Prevalence of COPD varies according to country, age and gender. This disease is also associated with significant comorbidities. The majority of the studies (12.49%) concerned patients above 60 years of age, in particular those aged between 20 to above 60 yrs. Total 19(10.32%) male and 5(2.71%)

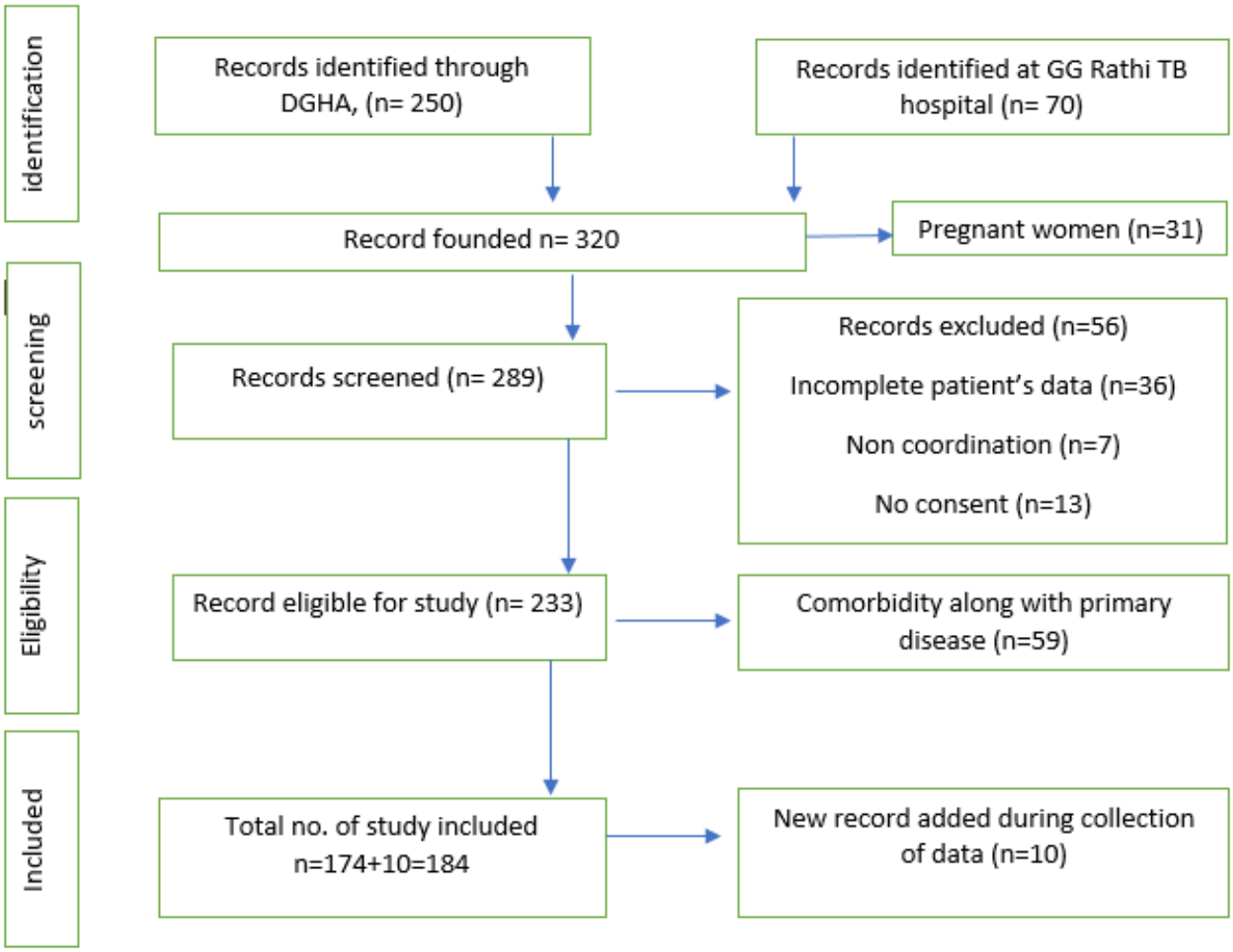

Fig. 1: Patients were enrolled into study by considering the following criteria

Table 1: Showing the distribution of various types of respiratory tract diseases according to prospective and retrospective study

Type of study	LRTI	TB	COPD	Asthma	RAD
Prospective	23 (12.50%)	36 (19.56%)	14 (7.60%)	11 (5.97%)	4 (2.17%)
Retrospective	33 (17.93%)	23 (12.50%)	21 (11.41%)	16 (8.69%)	3 (1.63%)
Total	56 (30.43%)	59 (32.06%)	35 (19.01%)	27 (14.67%)	7 (3.80%)
Percentage (%)	30.43	32.06	19.01	14.67	3.8

Table 2: Showing the distribution of various types of respiratory tract diseases according to age group and gender

Disease Age Group (Years)	LRTI		TB		COPD		Asthma		RAD		Total	
	M	F	M	F	M	F	M	F	M	F	M	F
1 month to 10	10	27	0	0	0	0	6	1	1	2	17	30
10 to 20	0	1	1	1	0	1	0	1	0	0	1	4
20 to 60	10	2	40	10	5	5	11	3	2	0	68	20
Above 60	4	2	3	4	19	5	3	2	2	0	31	13

female was affected with COPD out of total 35(19.01%) patients Female and male are equally affected with COPD in age group of 20-60 years, contributing 5(2.17%) male & 5(2.17%) female out of 35 patients.

Briefly out of 184 patients of RTD 27(14.67%) patient were affected with asthma in which 20(10.86%) were male and 7(3.79%) were female. Among infectious diseases on the surface of the globe Tuberculosis (TB) is a leading cause of mortality and morbidity. The present study describes the distribution of TB at District general hospital, Amravati. It was observed that the highest burden of TB cases has been found in male as compared to female with a ratio of 23.91% and 8.14% respectively out of total 184 patient of RTD. High occurrence of TB was recorded in the age group of 21-60 years (27.16%).

LRTI is most common in paediatric patients (30.43%), especially in the age group ranging from 1 month to 10 years. In this age group female are severely affected as compared to male Our study reveals that the reason why LRTI is most common in paediatric patients is that children's and infants has weakened or less immune system as compared adults and highly sensitive to respiratory irritants like dust, pollen grains and other environmental factor. The study shows that, the majority of people affected with LRTI was belonging to age group of 20-60 years out of which 11(5.97%) were male and 3(1.63%) were female.

Out of 184 individuals, 7 (3.80%) were affected with to have RAD. Total 5 (2.71%) male and 2(1.08%) female was affected with RAD. Age group of 1 month to 10 years was mostly affected contributing total 1.62% of RT disease. Followed by age group of 10 to 20 & 20 to 60 contributing equally i.e. 1.08%.

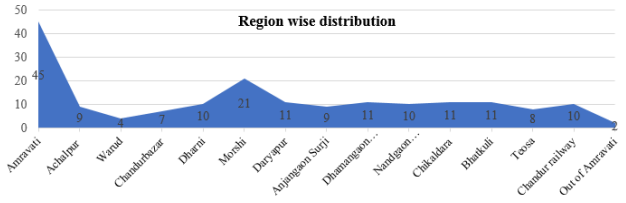

Fig. 2: Distribution of RTD patient's according to region patient belonging to, out of 184 patients, majority of the patients were from Amravati region 45 (24.45%) and the least number of patients were from out of Amravati 02 (1.08%).

There were 301 antibiotics prescribed by a physician in 184 prescriptions contributing about 32.61% of total population enrolled in the study. Fixed dose combinations are the medications with a combination of 2 or more drugs with fixed doses. The physician prescribed 381(41.27%) FDC drugs in total.Table 4

Drugs were prescribed as per indicated symptoms of patients. Our study shows antibiotics (32.61%) are the most prescribed drugs for RTD followed by Proton pump inhibitors (15.05%), multi- vitamins (13.86%) and anti-histaminic (9.64%).

Different routes of administration like oral, Intravenous and Nasal sprays were used in the present study. A few rotahalers were also prescribed in some prescriptions. The Intravenous route of administration 425(46%) was more preferred to other routes. It was followed by oral route 154(17%) and Nasal route was the least preferred 62(7%).Table 7

Table 3: Classification based on social history of RTD patients, Majority of Patients with RTD had social history of Alcoholic + Tobacco 108(46.35%), followed by Primary smoker 77(33.04%).

Social History	Patients
Primary smoker (Bidi/cigarette/Hookah)	77(33.04%)
Alcoholic + Tobacco	108(46.35%)
Occupational	12(5.15%)
Past Medical/Medication History	36(15.45%)

Table 4: Showing the prescribing pattern of drugs in respiratory tract diseases.

Parameter	Total number
Total no. of prescriptions	184
Total no. of drug prescribed	923
Average no. of drug per prescription	5.1
Total no. of antibiotics	301
Total no. of FDC drugs	381

Table 5: Showing the number of FDC drugs prescribed for respiratory tract disease during the study period.

FDC drug	Total number
Amoxicillin + Clavulanic acid	86
Levocetirizine + Montelukast	11
Piperacillin + Tazobactam	40
Etofylline + Theophylline	69
Deriphylline + Dexamethasone	119
HRZE	43
MDR- drugs	13

Table 6: Showing the total number of different classes of drugs prescribed by physician during the study period.

Parameter	LRTI	TB	COPD	Asthma	RAD	Total
Antibiotics	111	62	78	43	7	301
Proton pump inhibitor and other antacids	37	65	13	18	6	139
Multivitamins	37	53	16	15	6	127
Bronchodilators	15	11	18	19	2	65
Antihistaminic	28	18	17	15	11	89
NSAIDs	15	8	11	9	5	48
Antipyretic	14	7	8	10	3	42
Nebulisation	9	11	15	13	3	51

Table 7: Showing the total number ofdifferent dosage forms used during the study period

Dosage form	Total number
Tablets	154 (17%)
Capsules	139 (15%)
Syrups	57 (6%)
Injections	425 (46%)
Nebulisation/Nasal spray	62 (7%)
IV injectables	86 (9%)

4. Discussion

A cross-section observational study was conducted among out-patients as well as in-patients those who visit District general hospital Amravati and Government GG Rathi TB hospital, Amravati for the management of Respiratory tract diseases. This study was done to study Epidemiological distribution and use of drugs as both play an important role in improving human health and in promoting well-being. In this study, the patients were classified according to age group, 1 month to 10 years included 17 males and 30 females, 10 to 20 years included 1 male and 4 female, 20 to 60 years included 68 males and 20 females, above 60 years included 31 males and 13 females. From the above data, RTD are more prevalent in age group between 20-60 years. When the gender is taken into consideration from the collection 184 cases, males 63.58% and 36.42% were females. From this data, we observed that males are more prone to RTD when compared to females. 56(30.43%) patients were with LRTI, 59(32.06%) with TB, 35(19.01%) with COPD, 27(14.67%) with Asthma and 7(3.8%) with RAD.

Drug prescriptions form a very important point of contact between the doctor and the patients. In total 923 drugs prescribed for 184 patients, among those 301 were antibiotics, and others include histamine blockers, Proton pump inhibitors, multi-vitamins, bronchodilators, NSAIDs, antipyretics and nebulisation. Drugs were prescribed as per indicated symptoms, of patients. Our study shows antibiotics (32.61%) are the most prescribed drugs for RTD followed by Proton pump inhibitors (15.05%), multi-vitamins (13.86%) and anti-histaminic (9.64%) among the 184 cases. Overall prescribing patterns suggested that monotherapy 542 (58.72%) is most frequently used than combination therapy 381 (41.27%).

LRTI patients were diagnosed by chest X-ray and CRP, TB patients were diagnosed by AFB, DST, CBNAAT, Chest X-ray, COPD and Asthma patients were diagnosed by Lung function test, Chest X-ray, CRP and RAD patients were diagnosed by Chest X-ray, CRP. Most of RTD patients in our study had social history of Alcohol consumption, Primary smoker and Tobacco chewer belonging to Amravati region.

The present study is one of few single centre studies related to Respiratory tract diseases in Amravati district. Its findings may improve our insight into the clinical, epidemiological distribution and drug utilization of patients with RTD. These data may reveal important information for program managers and policy makers at regional and national levels to help priority settings, program planning, and resource allocation as well as to determine the most cost-effective treatment and preventive interventions. However, additional studies are required among population with RTD to develop appropriate preventive and therapeutic strategies.

5. Conclusion

From this study, males were 63.58% and females were 36.42%. We observed that males are more prone to RTD when compared to females. Based on age, RTD are more prevalent in age group between 20-60 years. When prescriptions were screened thoroughly, antibiotics were not prescribed in the 67.38% of cases. Most commonly used antibiotic was Amoxicillin clavulanic acid. Most drugs are prescribed by brand names. Prescribing by generic drugs helps the hospital pharmacy to have better inventory control and has to be encouraged with patient counselling for cessation of Alcohol, smoking and tobacco chewing. The findings from this study may provide important missing data on RTD and give precise insights into identification of risk factors that can be modified with simple strategies such as immunizations, parental education, adequate nutrition, environmental sanitation, avoidance of pollution and appropriate counselling. Though there has been lots of work reported on this topic presently, however there are several untouched aspects about co-relation of epidemiological distribution and drug utilization study in patients with Respiratory tract diseases. Keeping this in view, the study was conducted.

6. Conflict of Interest

The authors declare that they have no conflict of interest.

7. Source of Funding

None.

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References

1. Wang H, Naghavi M, Allen C, Barber RM, Bhutta ZA, Carter A, et al. Global, regional, and national life expectancy, all-cause mortality, and cause-specific mortality for 249 causes of death, 1980–2015: a systematic analysis for the Global Burden of Disease

Study 2015. *Lancet*. 2015;388(10053):1544–59. doi:10.1016/S0140-6736(16)31012-1.
2. Qureshi H, Sharafkhaneh A, Hanania NA. Chronic obstructive pulmonary disease exacerbations: latest evidence and clinical implications. *Ther Adv Chronic Dis*. 2014;5(5):212–27.
3. Quirt A, Hildebrand KJ, Mazza J, Noya F, Kim H. Asthma. *Allergy Asthma Clin Immunol*. 2018;14(2):50. doi:10.1186/s13223-018-0279-0.
4. Zaman K. Tuberculosis: A Global Health Problem. *J Health Popul Nutr*. 2010;28(2):111–3. doi:10.3329/jhpn.v28i2.4879.
5. Mahashur A. Management of lower respiratory tract infection in outpatient settings: Focus on clarithromycin. *Lung India*. 2018;35(2):143–9. doi:10.4103/lungindia.lungindia_262_17.
6. Douglas LC, Feder KJ. RAD: reactive airways disease or really asthma disease. *Pediatrics*. 2017;139(1):e20160625. doi:10.1542/peds.2016-0625.
7. Forum of International Respiratory Societies. The Global Impact of Respiratory Disease–Second Edition; 2017.
8. Global, regional, and national disability-adjusted life-years (DALYs) for 315 diseases and injuries and healthy life expectancy (HALE), 1990–2015: a systematic analysis for the Global Burden of Disease Study 2015. *Lancet*. 2015;388(10053):1603–58.
9. World Health Organization. (2014). Global status report on noncommunicable diseases (No. WHO/NMH/NVI/15.1). World Health Organization; 2014. Available from: https://apps.who.int/iris/bitstream/handle/10665/148114/9789241564854_eng.pdf.
10. Wettermark B, Elseviers M, Almarsdóttir AB, Andersen M, Benko R, Bennie M, et al. Drug Utilization Research: Methods and Applications. Wiley-Blackwell; 2016. p. 536.
11. Elfil M, Negida A. Sampling methods in clinical research; an educational review. *Emergency*. 2017;5(1):e52.

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