Research Article

A Prospective Observational Study on Drug Utilisation Trends in Respiratory Tract Infections and Patterns of Medication Adherence in Asthma and COPD Patients.

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ABSTRACT

Respiratory tract infections represent the single most common reason patients seek medical attention. Infections of the upper and lower respiratory tract are a major cause of morbidity and mortality throughout the world, patients at the extremes of age, and those with pre-existing lung disease or immune suppression are at particular risk. Drug utilization studies may be defined as studies of the marketing, distribution, prescription and use of drugs in a society, with special emphasis on the resulting medical, social and economic consequences. Medication adherence is defined as the extent to which a patient's medication taking behaviour coincides with the intention of the health advice that has been given by physician. The primary aim of the study is to assess the rational prescribing pattern in our pulmonology department. We have collected a total of 100 prescriptions diagnosed with RTIs and evaluated for prescribing patterns using WHO Prescribing Drug Indicators.58(58%) patients were male and 42(42%) were females. Age wise distribution of patients was found to be: 7(7%) 20-30years, 5(5%) 31-40years, 16 (16%) 41-50 years, 26(26%) 51-60 years, 23(23%) 61-70years, 15(15%) 71-80 years, 8(8%) 81-90 years, respectively. In the present study a total of 667 drugs were prescribed to 100 patients with RTIs. Out of total, 134 Antibiotics (20.08%), 89 Bronchodilators (13.34%), 85 Corticosteroids (12.74%), 69 Proton pump inhibitors (PPIs) (10.34%) and others, respectively. WHO prescribing drug indicators such as i. Average number of drugs per prescription was found to be 6.67 drugs. ii. percentage of prescriptions with Antibiotic prescribed were 78%.iii.percentage of prescriptions with injections prescribed were 72%. iv. Percentage of drugs prescribed by brands name were 89.65% and v. percentage of drugs prescribed from NEDL-2015 were 75.86%. Rational prescribing pattern is observed in our study and most of the drugs are prescribed from NEDL-2015.

Keywords: Drug utilization studies, Prescribing Pattern, Respiratory tract infections, Patient Counselling, Medication Adherence.

INTRODUCTION

The infection of the Respiratory system is differentiated into upper respiratory tract infections (URTIs) and lower respiratory tract infections (LRTIs).[1] Respiratory tract infections represent the single most common reason patients seek medical attention.[2] Infections of the upper and lower respiratory tract are a major cause of morbidity and mortality throughout the world, patients at the extremes of age, and those with pre-existing lung disease or immune suppression are at particular risk. [3]

Types:

Upper respiratory tract infections

Most of these infections are of viral in origin. Common upper respiratory tract infections include rhinitis (inflammation of the nasal mucosa), rhino sinusitis or sinusitis (inflammation of the nares and paranasal sinuses, including frontal, ethmoid, maxillary, and sphenoid), pharyngitis (inflammation of the pharynx, hypopharynx, uvula, and tonsils), epiglottitis (Inflammation of the superior portion of the larynx and supraglottic area), laryngitis (inflammation of the larynx), laryngotracheitis (inflammation of the larynx, trachea, and subglottic area), and tracheitis (inflammation of the trachea and subglottic area).[4]
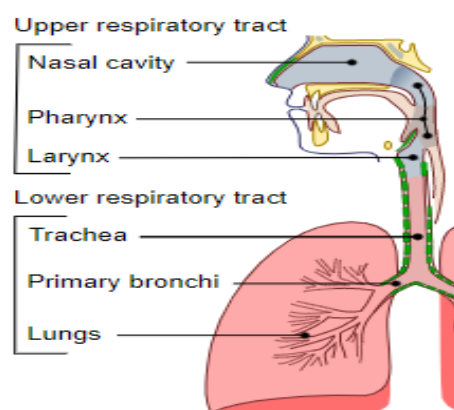

Figure 1: Respiratory tract classification

Lower respiratory tract infections

LRTIs include infectious processes of the lungs including bronchi, bronchioles, and alveoli. The most common infections involving the lower respiratory tract are bronchitis, bronchiolitis, and pneumonia. Lower respiratory tract infections in children and adults most commonly result from either viral or bacterial invasion of lung parenchyma.[5]

Drug utilisation Evaluation concept

Drug utilisation studies plays a crucial role in the health sector as it deals with the patterns of Prescription, quality determinants and outcomes of usage of drugs. Ultimately it provides insight into the efficacy of drug use and results of such research can be used to help to set priorities for the rational allocation of health care budgets.[6]

Drug utilisation evaluation is an ongoing, authorised and systematic quality improvement process, which is designed to:

a. To review drug use and/ prescribing pattern.

b. To develop criteria and standards which develop optimal drug use.

c. To promote appropriate drug use through patient education.

d. Provide feedback of results to clinicians and other relevant groups

Medication Adherence

- Medication adherence is defined as the extent to which a patient's medication taking behaviour coincides with the intention of the health advice that has been given by physician.

- Medication adherence is the most important factor that determines therapeutic outcomes, especially in patients suffering from chronic/Long term illness like Asthma and COPD.

- Low medication adherence will leads to decrease in therapeutic outcome and imposes significant financial burden on individual patients and health care system.[7]

MATERIALS AND METHODS

Study site: The study was conducted in the pulmonology department in the Queen's NRI Hospital.

Study design: Prospective observational study.

Study population: 100 population attending pulmonology OPD & IPD in Queen's NRI Hospital were recruited into the study with their informed consent

Patient selection: The selection of patients involves the following:

Inclusion criteria -

➢ Only those patients who are diagnosed with Respiratory tract infections recruited from pulmonology OPD & IPD were included in the study.

➢ Smokers, alcoholics are included in this study.

➢ Both genders of age >18 yrs are included in the study.

Exclusion criteria

- Pregnancy women and terminally ill are excluded.

- Children and neonates are excluded.

- Patients who are diagnosed with lung cancer.

Study period: The study was conducted in the Queen's NRI Hospital, Visakhapatnam, for a period of Six months.

Data collection: A specially designed data collection format was used to collect all the details of information like IP/OP NO, Age, Gender, date of admission, date of discharge, Reason for admission, Past medical History, Past medication History, Laboratory tests, culture sensitivity tests, diagnosis and treatment.

RESULTS AND DISCUSSIONS

A total of 100 case sheets of patients diagnosed with RTIs were collected from the Queen's NRI Hospital and analysed in consonance with the WHO prescribing drug Indicators. The final interpretations of our study are as follows:
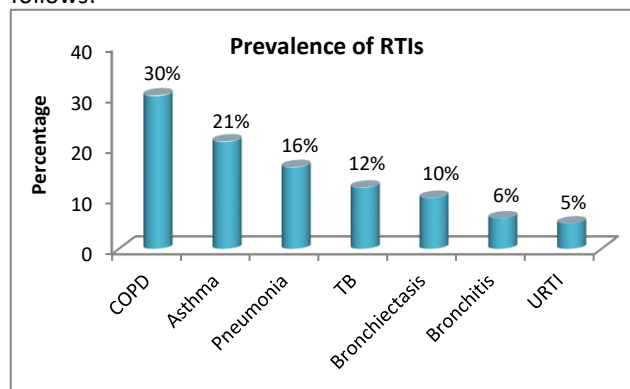
Figure 2: Respiratory tract infection prevalence: The respiratory tract infection prevalence, 30(30%) patients were as diagnosed as Chronic Obstructive Pulmonary Disease, 21(21%) Bronchial Asthma, 16(16%) pneumonia, 12(12%) pulmonary tuberculosis, 10(10%) bronchiectasis, 6(6%) bronchitis, and 5(5%) of upper respiratory tract infections, respectively.
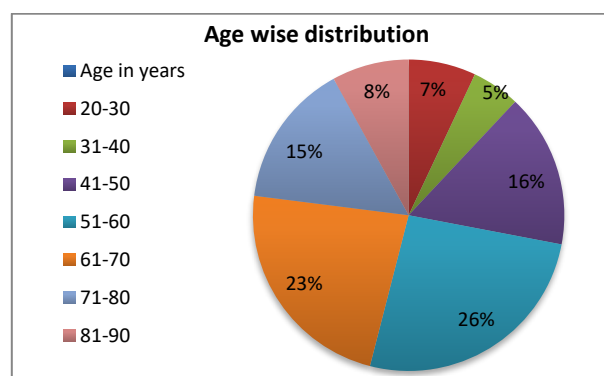
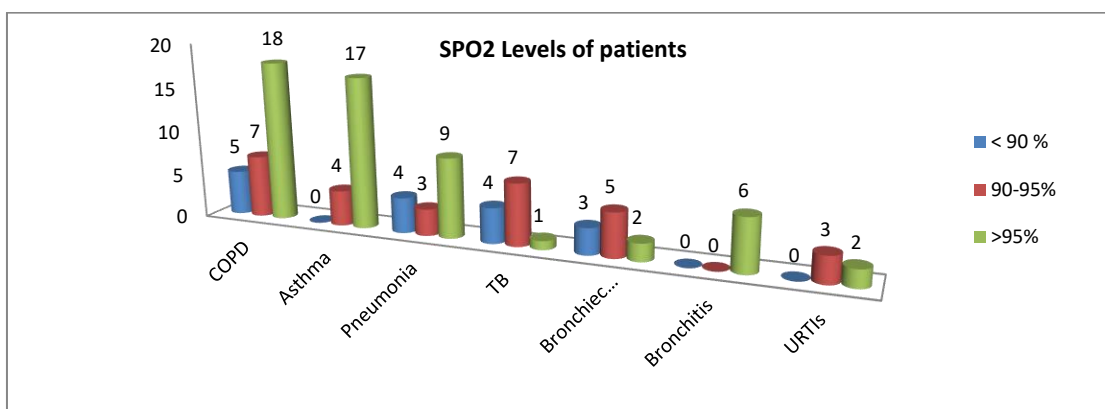**Figure 3:** Age wise distribution of patients with RTIs.

Figure 4: Distribution of patients based on SPO$_2$ level.

Table 1: WHO Prescribing Indicators of Drugs.

Core drug use indicators	Total number and Percentage
Average number of drugs per prescription	6.67 drugs (A total of 667 drugs were given to 100 patients)
Percentage of prescriptions with antibiotic prescribed	78% (Out of 100 prescriptions, 78 prescriptions were resulted in Antibiotic prescribed)
Percentage of prescriptions with injection prescribed	72% (Out of 100 prescriptions,72 prescriptions were resulted in injection prescribed)
Percentage of drugs prescribed by Brand names	89.65% (Out of 667 drugs, 598 drugs were prescribed by brand names)
Percentage of drugs prescribed from NEDL-2015	75.86% (Out of 667 drugs,506 drugs were prescribed from NEDL-2015)

Class of Antibiotics

- Cephalosporins 44(32.85%)
- Fluoroquinolones 25(18.65%)
- Macrolides 24(17.91%)
- Penicillin's 24(17.91%)
- Carbapenems 6(4.47%)
- Tetracycline's 4(2.98%)
- Aminoglycosides 4(2.98%)
- Glycylclycine Antibiotic 1(0.74%)
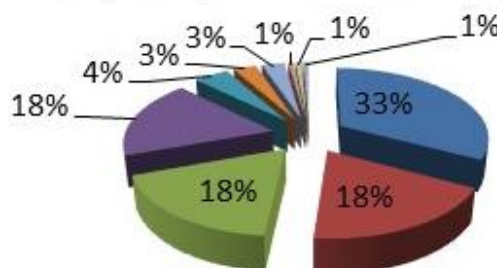- Sulphonamides 1(0.74%)
- Oxazolidinones 1(0.74%)

Figure 5: Percentage of Different Class of Antibiotic Used During Study. The most commonly used Antibiotics were Cephalosporins 44(32.85%), Fluoroquinolones 25(18.65%), Macrolides 24(17.91%) and Penicillin's 24(17.91%) respectively

In the present study a total of 667 drugs were prescribed to 100 patients with RTIs. Out of total, 134 Antibiotics (20.08%), 89 Bronchodilators (13.34%), 85 Corticosteroids (12.74%), 69 Proton pump inhibitors (PPIs) (10.34%), 43 Multivitamins (6.44%), 35 Antihypertensives (5.24%), 30 Anti-tubercular (4.49%), 24 NSAIDs (3.59%), 21 Anti-diabetics (3.14%), 19 Anti-histamines (2.84%), 13 Cough

syrups (1.94%), 12 Anti-viral drugs (1.79%), 11 Anti-emetic (1.64%) and others 82(12.29%) respectively

Table 2: Patterns of Drug Prescription (n = 667).

| Category of drugs	No. of drugs prescribed (%)
Antibiotics	134(20.08%)
Bronchodilators	89(13.34%)
Corticosteroids	85(12.74%)
Proton pump inhibitors(PPIs)	69(10.34%)
Multivitamins	43(6.44%)
Anti-hypertensives	35(5.24%)
Anti-tubercular	30(4.49%)
NSAIDs	24(3.59%)
Anti-diabetics	21(3.14%)
Anti-histamines	19(2.84%)
Cough syrups	13(1.94%)
Anti-Viral	12(1.79%)
Anti-emetic	11(1.64%)
Miscellaneous (others)	82(12.29%)
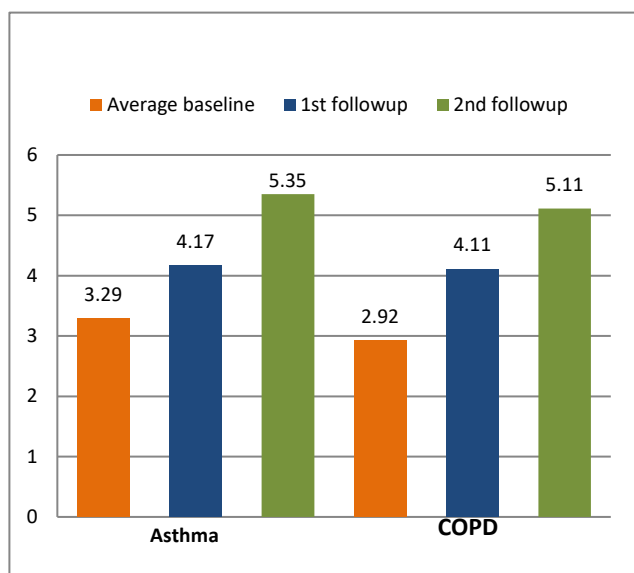
Figure 6: Medication Adherence Scores of Asthma and COPD.

CONCLUSION

The present thesis entitled "A Prospective Observational Study on Drug utilisation trends in RTIs and Patterns of Medication adherence in Asthma and COPD Patients" was carried out for a period of 6 months in Pulmonology department of Queen's NRI Hospital.100 patients were studied for prescribing patterns of WHO Drug use indicators.

In the present study, the respiratory tract infection prevalence, 30(30%) patients was diagnosed as Chronic Obstructive Pulmonary Disease, 21(21%) Bronchial Asthma, 16(16%) pneumonia, 12(12%) pulmonary tuberculosis, 10(10%) bronchiectasis, 6(6%) bronchitis,

and 5(5%) of upper respiratory tract infections respectively.

In the present study 58% were males which are similar to the previous study by (Mirza A. Beg, et al, where 56.41% were males) [8] and 42% females.

The most common RTIs observed are COPD, Asthma, Pneumonia, and PTB, which is similar to the previous study (Mahajan HM et al,) [9]. The most commonly affected age group was 51-60 years, which is similar to the previous study (Mirza A. Beg et al,). This shows that elderly patients are more at risk of developing respiratory tract infections when compared to other age groups

In the present study Antibiotics (n=134) were most commonly prescribed which is in accordance with previous studies done by (Mirza A. Beg et al, Mahajan HM et al,) and Cephalosporins were most commonly prescribed class of Antibiotics which is similar to the study by (Errabelly P et al,). [10]

The most commonly prescribed FDC in our study was Salbutamol+ Ipratropium bromide and Piperacillin+ Tazobactum which is similar to the study by (Mirza A. Beg et al,).

In the present study 39.58% oral, 41.97% injectables, 18.44% inhalational formulation were prescribed during study which is in contrast to the study by (Mirza A.Beg et al,) and average no. of drug per prescription were 6.67 which are similar to study done by (Gogoi S et al,) [11] where average no. of drugs per prescription was 6.92. In the present study 75.86% of drugs were prescribed from NEDL-2015 while in previous study (Mirza A.Beg et al,) only 49.47% drugs were prescribed from NEDL-2015. In this study 89.65% of drugs were prescribed by a Brand name which is accordance with the study by (Mirza A.Beg et al,).

In the present study a total of 51 patients (30 COPD, 21 Asthma patients) were provided with Morisky medication adherence questionnaire at the time of admission and evaluated for 1st and 2nd follow up and 43 patients (26 COPD, 17 Patients) were completed the study for measuring the Medication adherence.

Baseline scores with first follow up score in Asthma patients has shown a mean increase in medication adherence level of 0.88 with p < 0.001, which is statistically significant. Baseline to second follow up score in Asthma patients had shown a mean increase in medication adherence level of 2.06 with p < 0.001, which is statistically significant.

Baseline scores with first follow up score in COPD patients has shown a mean increase in medication adherence level of 1.19 with p < 0.001, which is statistically significant. Baseline scores with Second follow up score in COPD patients has shown a mean increase in medication adherence level of 2.19 with p < 0.001, which is statistically significant. It shows that effect of pharmacist counselling was compared with the improvement of medication adherence score between Asthma and COPD patients.

Suggestions

- At the present study prescribing of drugs by generic names should be increased. As Generic drugs are often more economical than the branded ones. Prescribing by generic names helps the hospital pharmacy to have better inventory control. Regarding the prescribing of FDCs, Potential advantages of FDC's include reduced side effects, increased patient compliance, synergy and increased efficacy and reduced cost, potential disadvantages include inflexible fixed dose ratio, incompatible pharmacokinetics, increased toxicity, physician and pharmacist's ignorance.

- Monitoring of lung function test is recommended in patients with chronic illness.

Future Scope of The Study

- This study will help the physician to have a better insight about prescribing patterns of drugs.

- Pharmacoepidemiological studies can be done to study the uses and effects of drugs in large number of well-defined populations.

- Pharmacoeconomic evaluation can be done to assess the financial burden of respiratory tract infections/diseases.

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ABBREVIATIONS:

1. RTIs-Respiratory tract infections
2. COPD-Chronic Obstructive Pulmonary Disease.
3. OPD-Out Patient Department
4. IPD-In Patient Department
5. PTB-Pulmonary Tuberculosis
6. CAD-Coronary Artery Diseases
7. OSA-Obstructive Sleep Apnoea
8. T-II DM-Type II Diabetes Mellitus.
9. COAD-Chronic Obstructive Airway Disease
10. FDC-Fixed Dose Combination
11. NEDL-National Essential Drug List