

Drug utilization study in lower respiratory tract infections - attending respiratory medicine outpatient department in a tertiary care teaching hospital in central india - A retrospective study¹Dr. Vandana Badar, Professor and Head, Dept. of Pharmacology, I.G.G.M.C., Nagpur.²Dr. Sriramagiri Sai Vinay, Junior resident, I.G.G.M.C., Nagpur.³Dr. Safwan Sachora, Junior resident, I.G.G.M.C., Nagpur.⁴Dr. Shashanka Sekhar Patel, Junior resident, I.G.G.M.C., Nagpur.**Corresponding Author:** Dr. Vandana Badar, Professor and Head, Dept. of Pharmacology, I.G.G.M.C., Nagpur.**How to citation this article:** Dr. Vandana Badar, Dr. Sriramagiri Sai Vinay, Dr. Safwan Sachora, Dr. Shashanka Sekhar Patel, “Drug utilization study in lower respiratory tract infections - attending respiratory medicine outpatient department in a tertiary care teaching hospital in central india - A retrospective study”, IJMACR- May - 2023, Volume – 6, Issue - 3, P. No. 403 – 408.**Open Access Article:** © 2023, Dr. Vandana Badar, et al. This is an open access journal and article distributed under the terms of the creative commons attribution license (<http://creativecommons.org/licenses/by/4.0>). Which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.**Type of Publication:** Original Research Article**Conflicts of Interest:** Nil**Abstract****Background:** Lower respiratory tract infections (LRTI) are common infections encountered in respiratory medicine OPD in India. LRTIs are infections that involve the airways below larynx, mainly including bronchitis, pneumonia, and bronchiolitis. The primary treatment modality in LRTIS is anti-microbial agents such as Amoxicillin and clavulanic acid, azithromycin, and doxycycline. If used irrationally lead to resistance. In this scenario, a drug utilization study becomes crucial for understanding its prescription pattern and ensuring its rational use.**Objectives:** To understand the prescription pattern in LRTIs and their rationality To create awareness about irrational drug use and drug resistance**Methods:** it is a retrospective observational study conducted among the patients attending OPD dated 17/9/2021 to 22/3/2022 in respiratory medicine of a tertiary care hospital with the permission of IEC. Precriptions of patients with diagnosis of LRTI collected using digital database. Analysis done depending on their demographic profile and treatment; Results evaluated with MS Excel and presented as percentages.**Result:** Of the 854 patients, 462(54%) were male and 392(46%) females. Age-wise distribution was done 18-30 years – 187 (21.9%), 31-40 years – 151 (17.7%), 41-50 years - 121(14.2%), 51-60 years - 129(15.1%), 60+ years - 266(31.1%) respectively. A total of 4317 drugs prescribed, 854 (19.8%) antibiotics, 854(19.8%) Proton-pump inhibitor, 854 (19.8%) antihistaminics, 813 (18.8%) antipyretics, 323(7.5%) corticosteroids, 619(14.3%)

miscellaneous. Among miscellaneous, cough syrup is commonly prescribed. The most common prescribed antimicrobial is amoxicillin-clavulanic acid 584(68%), followed by azithromycin 217 (26%), doxycycline 24 (2.8%), and ciprofloxacin 29 (3.4%). Drugs prescribed oral 3928(92.1%) and inhalational 343(7.9%). Fixed dose combinations were 1438(33.3%) amoxicillin and clavulanic acid and cough syrup are some FDCs prescribed. 5.1 drugs were prescribed per prescription. Generic names prescribed 91%.

Conclusion: The drug prescription pattern observed in the study was found majorly to be the rationale, generic, and hence less chances of antimicrobial resistance. Polypharmacy was observed

Keywords: Drug utilization studies, lower respiratory tract infections, rational prescription

Introduction

Lower respiratory tract infections are one of the most common infections encountered in respiratory medicine outpatient department. LRTIs are the infections involve the airways below larynx. This mainly includes Bronchitis, Pneumonia, Bronchiolitis, tuberculosis, and also acute exacerbations of COPD, chronic bronchitis (AECB), bronchiectasis. LRTIs account for 2.74 million deaths worldwide, making them the fifth leading cause of death and the number one infectious cause. As a health issue, LRTIs are much more serious than URTIs and place a significant strain on the budget(1)

The symptoms of LRTIs are cough with or without phlegm, fever, dyspnea, chest pain, hemoptysis, rapid breathing, wheezing, and dull headache. Infections in LRT are primarily the result of: viruses like flu or RSV, bacteria like streptococcus, staphylococcus aureus, and fungal infections.

Environmental pollutants, tobacco smoke, dust, and air pollution can irritate or cause inflammation in the airways, leading to infection.(2)(3)

Antibiotics, such as amoxicillin and clavulanic acid, azithromycin, and doxycycline, are commonly prescribed for initial treatment, but it's crucial to be mindful of their overuse to prevent the emergence of antibiotic-resistant strains. For symptomatic relief, anti-biotics are often used in conjunction with antihistamines, anti-tussive, antipyretics, and corticosteroids (inhaled or systemic) (2)

This study help us in understanding the prescription pattern of antibiotics in LRTI patients. it is the first step towards rational anti-microbial prescription and preventing drug resistance.

Material and methods

Study design: this is a retrospective observational study conducted among the patients attending outpatient department of respiratory medicine dated 17/9/2021 to 22/ 3/ 2022 in a tertiary care teaching hospital in central India

Study duration: 6 months

Place of work / source of data: the study will be conducted on analysing prescriptions of LRTI patients attending respiratory medicine OPD collected from efficient data base in a tertiary care hospital in central India

Study population

- Sample size: on analysing the data, out of 12808 patients registered in respiratory OPD, 854 patients were suspected of LRTI. So sample size of my study is 854
- Inclusion Criteria: Patients above 18 years of age with suspicion of LRTI, outpatient department
- Exclusion Criteria: pregnant women, children, IPD patients

• Data analysis: Results evaluated with MS Excel and presented as percentages

The data of the adult patient suffering from LRTI will be studied under following headings:

- Male vs female ratio
- Total number of drugs prescribed
- Drugs prescribed per prescription
- Classes of drugs prescribed
- Rationality of prescription
- Types of antibiotics prescribed

Results

Of the 854 patients, 462(54%) were male and 392(46%) female.

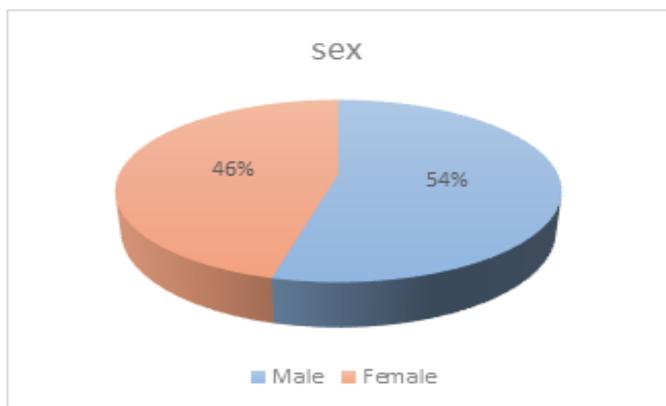


Figure 1: sex

Age-wise distribution was done 18-30 years – 187 (21.9%), 31-40 years – 151 (17.7%), 41-50 years – 121 (14.2%), 51-60 years - 129(15.1%), 60+ years – 266 (31.1%) respectively.

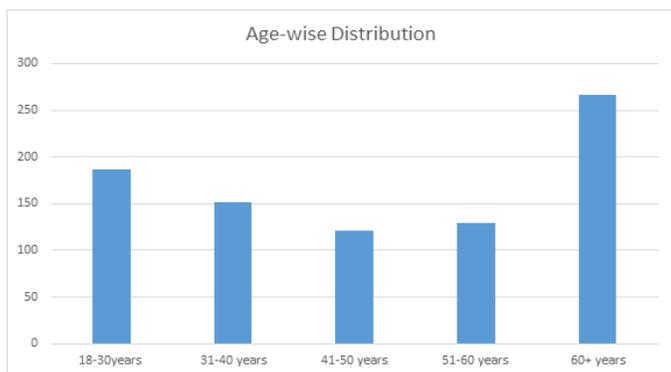


Figure 2: Age-wise distribution

The common clinical symptoms seen were cough and expectoration in 794(92%), followed by fever in 614 patients (72%) breathlessness in 231 (27%) and Haemoptysis in patients 34(4%)

A total of 4317 drugs prescribed, 854 (19.8%) antibiotics, 854 (19.8%) Proton-pump inhibitor, 854 (19.8%) antihistaminics, 813(18.8%) antipyretics, 323 (7.5%) corticosteroids, 619(14.3%) miscellaneous.

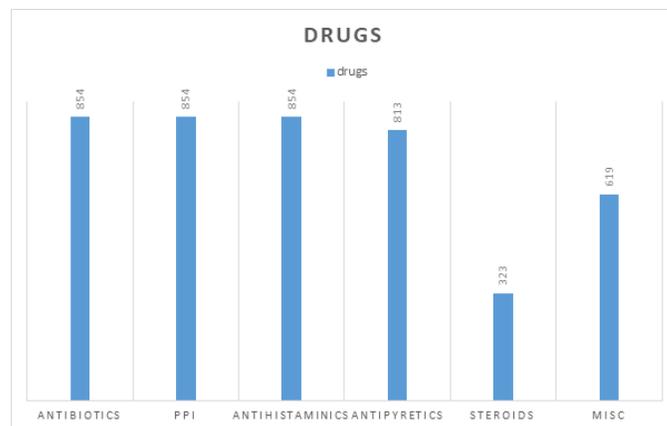


Figure 3: classes of drugs prescribed

The most common prescribed antimicrobial is amoxiclav 584 (68%), followed by azithromycin 217(26%), doxycycline 24(2.8%), and ciprofloxacin 29(3.4%).

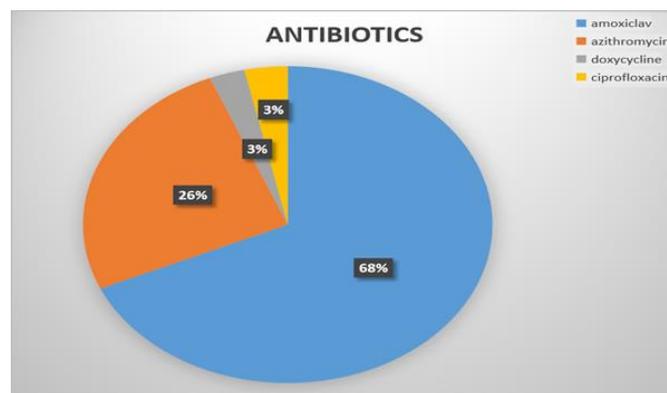


Figure 4: antibiotics

Drugs prescribed oral 3928(92.1%) and inhalational 343 (7.9%). Fixed dose combinations were 1438 (33.3%). 5.1 drugs were prescribed per prescription. Generic names prescribed 91%.

Table 1: WHO Prescribing Indicators

Indicators of drug use	Present Study	WHO optimal values(4)	Avula N et al.(5)	Kumar & Selva et al.(6)
Average number of medicines per encounter	5.1	1.6-1.8	7.8	5.59
Percentage of prescriptions with generic name	91%	100%	11%	19.3%
Percentage of encounters with drugs prescribed from EML	96%	100%	53.24%	40.09%
Number of encounters with an injection prescribed	0	13.4%-24.1%	31.24%	9.25%
Percentage of encounters with one or more antibiotics	19.8%	20%-26.8%	52.71%	94%

Discussion

The present study aimed to assess the drug utilization patterns among patients with Lower Respiratory Tract Infections (LRTI) who attended respiratory medicine outpatient departments (OPDs). A total of 854 prescriptions were evaluated for this purpose.

In day-to-day clinical practice, the management of lower respiratory tract infections involves an empirical approach, striving to achieve specificity in treatment based on the likely pathogens. Drug utilization studies are an integral part of pharmacoepidemiologic al research to gain insights into the usage patterns, efficiency of drug utilization, and clinical outcomes associated with drug therapy. Through insights gained from drug utilization studies, the healthcare system can better understand and enhance prescribing and administration practices, ensuring rational drug use according to established standards. These studies can also provide valuable feedback to physicians and aid in the design and delivery of educational programs for healthcare providers. (5)(6)(7) (4)

The commonly affected age group was the 31-40 years group which is very much similar compared to Harish et al(8) 21-40yrs but different from Avula et al(5) 46-60yrs. The most common symptom reported was cough and expectoration which is similar to other studies like M.M.

Ahmed et al(9).The antibiotics were most commonly prescribed drugs in the treatment of LRTI which is in accordance with the other previous studies.(10)(11) In the present study, the most commonly prescribed antibiotics were amoxicillin clavulanic acid which is in line with the study by Err belly P et al(12) but different from Harish GN et al(8).

In the present study, the formulation of drugs prescribed was 92.1 oral, 7.9% inhalational, and no injectable, while in another study 86% of drugs were prescribed by oral and 14% by nasal route(7). The number of drugs per prescription was 5.1, which is very less compared to other studies like Gogoi S et al(13), where the average number of drugs per prescription was 6.92. Average number of drugs per prescription is an important index of prescription audit. It is preferable to keep the mean number of drugs per prescription as low as possible since higher figures always lead to drug interactions.

In the present study, 96% drugs were prescribed from the national essential list of medicines and 91% drugs were prescribed by generic name, which is contrast to other studies where most drugs prescribed by brand names.(5)(11)(14) Prescribing by generic name has the main advantage of using generic drugs is the cost, which can be up to 85% less than that of a brand-name drug. Lower-cost generic drugs have been shown to increase

the likelihood that patients take medications prescribed and to improve patients' health outcomes. Generic drugs also decrease confusion between the drugs. (14)(15)

Regarding the prescribing of FDCs, Potential advantages of FDCs include reduced side effects, increased patient compliance, synergy and increased efficacy, and reduced cost, potential disadvantages include inflexible fixed dose ratio, incompatible pharm acokinetics, increased toxicity, physician and pharm acist's ignorance. FDCs are observed 33% which is more compared to Kumar and Selva et al 13.38%(6)

Conclusion

The study revealed that the drug prescription trend was predominantly characterized by rational prescribing practices and the use of generic medications, along with a tendency towards polypharmacy. Since the study is done on outpatient setting, culture and sensitivity reports might not be readily available. So choosing an antibiotic might be a dilemma for the physician. There is hence a need for educational programmes in order to facilitate rational use of antibiotics and promote sensible use of available resources. Every hospital should also follow standard treatment guidelines taking into consideration the sensitivity pattern of the organisms in the locality to promote rational prescribing.(6)

Acknowledgement

We are thankful to the faculty members and head of the department, Pulmonary Medicine Dr. Radha Munje madam for granting us the permission and for their guidance throughout the study.

References

1. Lower respiratory tract infection. (2023 J 28). IW https://en.wikipedia.org/wiki/Lower_respiratory_tract_infectio. Lower respiratory tract infection. (2023, January 28). In Wikipedia. https://en.wikipedia.org/wiki/Lower_respiratory_tract_infection.

[org/wiki/Lower_respiratory_tract_infection](https://en.wikipedia.org/wiki/Lower_respiratory_tract_infection).

2. Mahashur. Management of lower respiratory tract infection in outpatient settings: Focus on clari thro mycin. *Lung India*. 2018;35(2):143–9.
3. Kasper DL, Fauci AS, Hauser SL, Longo DL, Jameson JL, Loscalzo J E. *Harrison's Principles of Internal Medicine*. 21th ed. New York: McGraw-Hill Education; 2022.
4. WHO. Introduction to Drug Utilization Research World Health Organization. Solutions. 2003. 17–18 p.
5. Naveen A, Sravani MR. Study of drug utilization trends in respiratory tract infections in a tertiary care teaching hospital: a retrospective study. *Int J Basic Clin Pharmacol*. 2017 Oct 25;6(11):2583.
6. Kumar RN, Selva P. Analysis of prescription pattern of antibiotics among patients with respiratory tract infections at a tertiary care hospital. *Biomed Pharmacol J*. 2019;12(3):1595–602.
7. Beg MA, Dutta SB, Bawa S, Kaur A, Vishal S, Kumar U. Prescribing trends in respiratory tract infections in a tertiary care teaching hospital. *Int J Res Med Sci*. 2017 May 27;5(6):2588.
8. Govind Naik H, Khanwelkar CC, Kolar A, Desai R, Gidamudi S. National journal of medical research drug utilization study on antibiotics use in lower respiratory tract infection.
9. Ahmed MM, ELMaraghy AA, Andrawas EW. Study of prescription patterns of antibiotics in treating lower respiratory tract infections at Sohag Chest Hospital. *Egypt J Chest Dis Tuberc [Internet]*. 2016; 65 (1): 143–55. Available from: <http://dx.doi.org/10.1016/j.ejcdt.2015.04.012>
10. Khadeer Ahamad S, Qhader Shareef M, Sree Lakshmi P, Tazheen Fatima S. Drug Utilization Patter n in Respiratory Tract Infections In A Tertiary Care

Hospital Introduction.

11. Sharma C, Endow A, Dutta S. Assessment of drug use pattern for lower respiratory tract infection in outpatient department of paediatric at central referral hospital: a cross-sectional study. *Int J Basic Clin Pharmacol.* 2017 Sep 23;6(10):2352.
12. Errabelly P, Ramavath V, Afreen A, Sanaboina A. Analysis of the prescribing patterns of antibiotics in respiratory tract infections at department of medicine at a tertiary care hospital. *Int J Pharm Sci Res [Internet].* 2015;6(7):2963. Available from: [http:// dx.doi.org/10.13040/IJPSR.0975-8232.6](http://dx.doi.org/10.13040/IJPSR.0975-8232.6)
13. Gogoi S. A study on prescribing pattern of antibiotics for upper respiratory tract infections by general practitioners in rural areas of Assam. *Int J Basic Clin Pharmacol.* 2015;4(5):60–2.
14. Mb H, Mb R, Bhandare B, Head P&. Prescribing pattern of antibiotics in lower respiratory tract infection among children aged less than 5 years. *Indian J Pharm Pharmacol.* 3(4):182.
15. Badar V, Parulekar V, Garate P. A prescription pattern study of respiratory tract infections in paediatric indoor patients in a tertiary care teaching hospital - A prospective observational study. *Asian J Pharm Clin Res.* 2018 Jul 1;11(7):251–4.