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International Journal of Recent Surgical and Medical Sciences

Original Article

Antimicrobial Prescription Pattern in ENT Outpatient Department in a Tertiary Care Teaching Hospital, Telangana, India

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EPub Ahead of Print:
4 April 2023
Published: 30 October 2024

DOI
10.1055/s-0043-1761502

ABSTRACT

Objectives: Otorhinolaryngological infections are very common in adults and in children also. These infections are caused by various microorganisms and to treat these infections, antimicrobial agents are used frequently. As irrational use of antimicrobials leads to the development of antibiotic resistance and it is a big threat to the society, the present study was planned to get awareness among the practitioners regarding the antimicrobial prescription pattern.

To study the prescription pattern of antimicrobial agents in outpatient department of otorhinolaryngology in a tertiary care teaching hospital.

Material and Methods: An observational study was planned over a period of 8 months from July 2019 to February 2020 in ENT outpatient department (OPD) at Mamata General Hospital, Khammam in Telangana. In total, 562 prescriptions were collected. Patient's details, probable diagnosis, prescribed medication details such as generic name, dose, and dosage forms were taken. The collected data was analyzed and the conclusions were drawn using descriptive analysis.

Results: Total number of prescriptions were 562. The majority of the prescriptions belonged to the 21 to 40 years of age group. Males were included more than females (males 320 and females 242). Chronic suppurative otitis media (CSOM) (16.2%) was the commonest infection. Most commonly prescribed antimicrobial was amoxicillin and clavulanic acid combination (26.17%), followed by cefpodoxime with clavulanic acid (21.9%) and ciprofloxacin (19.06%). In 371 (66.01%) prescriptions, only one antimicrobial was prescribed, whereas in 36 (6.40%) prescriptions no antibiotic was given. The average number of drugs per prescription was 3.18 and the average number of antimicrobials per prescription was 1.25. Tablet form (52.9%) was the commonest dosage form and most of the drugs were prescribed by generic name (74.06%).

Conclusion: The present study though prescription pattern of antibiotics and adherence to the hospital formulary by the physicians in the hospital is encouraging, still there is a chance in reducing the number of drugs prescribed per patient. The findings of this study will be useful to prescribe antimicrobials rationally so that the patient and health care system on the whole will be benefited.

Keywords: antibiotic resistance, antimicrobial usage, CSOM, polypharmacy

INTRODUCTION

Diseases of ENT are common in general population. ENT diseases affect all age groups ranging from children to adults with significant disability-adjusted life-year (DALY) of patient.[1] Most common ENT infections that can be managed with medications are acute rhinitis,

sinusitis, adenoiditis, tonsillitis, pharyngitis, acute and chronic suppurative otitis media (CSOM), otitis externa, laryngitis and epiglottitis. If these conditions are not treated properly some serious consequences can occur like stridor, hoarseness of voice, permanent hearing problems and emotional disturbances which lowers the patient's quality of life.[2]

Upper respiratory tract infections (URTI)s such as tonsillitis, pharyngitis, nasopharyngitis, and otitis media contribute to 20 to 40% of infections among patients who are attending outpatient departments (OPD).[3] For some ENT and respiratory infections such as rhinopharyngitis and acute bronchitis, though the etiology is viral antibiotics were prescribed commonly.

Antimicrobial prescription pattern differs from place to place, depending on the antimicrobial susceptibility, infecting organisms, physician preference, and costs.[4] Irrational antimicrobial usage such as antibiotics in nonbacterial infections, inadequate dosage, and improper route has led to ineffective treatment, prolongation of illness, increased frequency of adverse drug reactions, suboptimal therapy, therapeutic failure, polypharmacy, which ultimately causes increased burden of medical cost as well as the emergence of antibiotic resistance.[5,6] The International Network for the Rational Use of Drugs (INRUD) was established in 1989 and developed various guidelines to promote the rational use of drugs in developing countries.[7]

Regarding the rationale use of antibiotics, sufficient literature is available in India and abroad.[8–10] As increased antibiotic resistance is having impact on economy of developing countries such as India, we thought this type of study will also help physicians to prescribe appropriate antibiotics. This observational study was designed to evaluate the antimicrobial usage in otolaryngology outpatient department. Based on the present study results, we can plan proper interventions and modifications at the level of the physician and the institution to promote rational antibiotic usage.

MATERIAL AND METHODS

An observational study was planned over a period of 8 months from July 2019 to February 2020 in ENT outpatient department (OPD) at Mamata General Hospital, Khammam in Telangana after obtaining approval from the Institutional Ethics Committee (IEC/IRB: 97/19).

Inclusion criteria

Patients attending ENT OPD with infective etiology who has given written consent. Patients of all age groups of both the sexes

Exclusion criteria

Inpatients
- Follow-up visit patients
- Seriously sick patients
- Pregnant and lactating women

Sample size

As per our inclusion and exclusion criteria, a total of 562 prescriptions were collected that were having proper diagnosis and medications.

Parameters for evaluation

According to the World Health Organization (WHO), core drug prescribing indicators such as the average number of drugs per prescription (total number of drugs/total number of prescriptions), average number of antibiotics per prescription (total number of antibiotics/total number of prescriptions), average duration of antibiotic drug treatment (number of antibiotics for a particular duration/total number of antibiotics), and percentage of antibiotics prescribed by generic name (antibiotics prescribed with generic name/total number of antibiotics prescribed × 100) were evaluated.[11] The information regarding patients demographic details such as age, sex, clinical details such as type of ENT infections and antibiotic drug data (group, route of administration, dosage and duration) were analyzed.

Statistical analysis

Data entry was done in Microsoft office excel 2018 and analyzed. Results on categorical measurements are presented as number and percentage and using this, tables were generated.

RESULTS

A total of 562 prescriptions collected from the ENT OPD were classified according to the site of origin, which included 210 ear, 178 throat, and 136 nasal infections. The total number of drugs prescribed was 1,789, of which 703 were antibiotics. Based on the age group classification, 44.83% of the prescriptions belonged to patients of 21 to 40 years, followed by 1 to 20 years (29.53%) [Table 1]. Of total 562 prescriptions, 56.9% were males and remaining 43.1% were females. Most common infections observed were CSOM followed by sinusitis and tonsillitis [Table 2].

Analysis of antibiotic prescriptions

In total, 66.01% of the patients received a single antibiotic, 27.58% of the patients received two antibiotics, and remaining

Table 1: Age- and gender-wise distribution of patients.

	Male ($n=320$)	Female ($n=242$)	Total ($N=562$)	Percentage (%)
< 1 year	1	3	4	0.71
1–20 year	79	87	166	29.53
21–40 year	164	88	252	44.83
41–60 year	58	49	107	19.03
61–80 year	18	15	33	5.87
Total	(56.9%)	(43.1%)	(100%)	100%

n, number of male and female prescriptions; N, total number of prescriptions

Table 2: Type and prevalence of ENT infections.

ENT infections ($N=562$)	Frequency of infections	
	Frequency	%
Ear diseases ($n=210$)		
CSOM	91	16.2
Otitis externa	34	6.04
ASOM	33	5.87
Fungal infections (otomycosis)	27	4.80
Furunculosis	14	2.49
Aural polyp	11	1.96
Nose diseases ($n=136$)		
Sinusitis*	77	13.70
Acute rhinosinusitis	46	8.18
Vestibulitis	7	1.24
Epistaxis	6	1.06
Throat diseases ($n=178$)		
Tonsillitis	73	12.98
Pharyngitis	48	8.54
Adenoiditis	22	3.91
Laryngitis	15	2.66
Submandibular swelling	11	1.96
Parotid abscess	9	1.60
Combined ($n=38$)		
Pharyngitis+ CSOM	21	3.73
Tonsillopharyngitis	17	3.02

Abbreviations: ASOM, acute suppurative otitis media; CSOM, chronic suppurative otitis media; n, number of male and female prescriptions; N, total number of prescriptions.

*Sinusitis with polyps, sinusitis without polyps and fungal sinusitis.

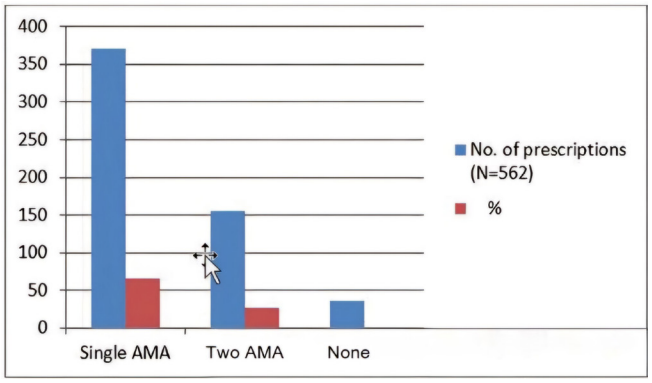

Figure 1: Numberof antimicrobial agents used per prescription. Blue indicates total number of prescriptions. i.e. 562; Red indicates % of patients based on regime of antibiotics i.e. single, two and none

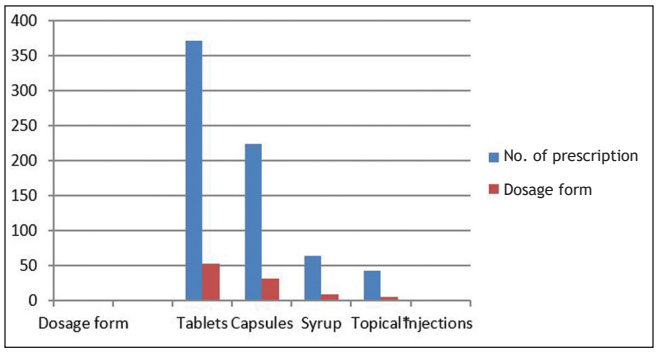

Figure 2: Distribution of various dosage formulations of antibiotics prescribed.
Blue indicates total number of prescriptions. i.e. 562; Red indicates % of patients based on regime of antibiotics i.e. single, two and none

Table 3: Different classes of antibiotics prescribed.

Class of drugs	Frequency ($N=703$)	% Consumption
Penicillins	244	34.7
Cephalosporins	176	25
Fluoroquinolones	164	23.3
Macrolides	28	3.98
Antifungal drugs	27	3.84
Miscellaneous*	64	9.1

*Metronidazole, cotrimoxazole, bacitracin, linezolid, doxycycline, and mupirocin.

6.40% of patients did not receive any antibiotic. The average number of antibiotics prescribed per encounter was 1.25 [Figure 1]. Next, 52.9% of dosage forms were tablets, followed by 31.8% of capsules and 9.10% of syrups [Figure 2]. Also, 93.9% of antibiotics were prescribed by oral route, followed by 6.11% of topical application, whereas injectables were not prescribed.

In our study, penicillins (34.7%), cephalosporins (25%), and fluroquinolones (23.3%) were commonly prescribed antibiotics [Table 3]. Amoxicillin with clavulanic acid was observed to be the most common FDC, followed by cefpodoxime with clavulanic acid [Table 4]. Also, 70.3% antibiotics were prescribed for 3 to 5 days and 27.6% were prescribed for 6 to 10 days and 2.13% were for more than

Table 4: Types and frequency of antibiotics prescribed.

Class of antimicrobials	Antimicrobial agents prescribed	Frequency of prescribed antibiotics (*N* = 703)	% of antibiotic consumption
Penicillins (244)	Amoxicillin	4	0.56
	Amoxicillin + clavulanic acid	184	26.17
	Ampicillin + cloxacillin	56	7.96
Cephalosporins (176)	Cefpodoxime + clavulanic acid	154	21.9
	Cefuroxime	12	1.70
	Cefixime	10	1.42
Fluoroquinolones (164)	Ciprofloxacin	134	19.06
	Ofloxacin	22	3.13
	Levofloxacin	8	1.13
Macrolides (28)	Azithromycin	18	2.56
	Clarithromycin	10	1.92
Antifungal drugs (27)	Clotrimazole	18	2.56
	Nystatin	9	1.28
	Metronidazole	14	1.99
Others (64)	Cotrimoxazole	14	1.99
	Bacitracin	13	1.84
	Linezolid	12	1.70
	Doxycycline	08	1.13
	Mupirocin	03	0.42

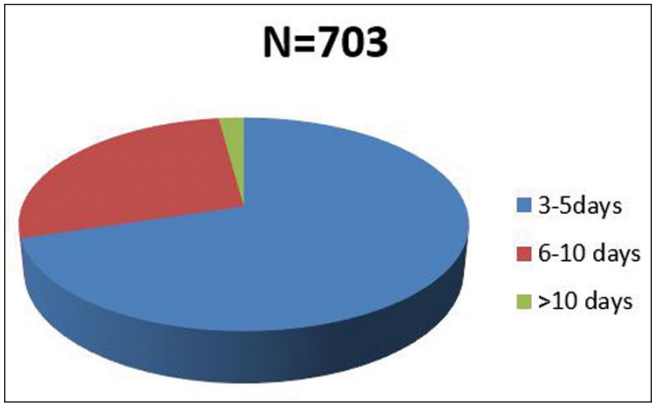

Figure 3: Duration of antibiotics prescribed.

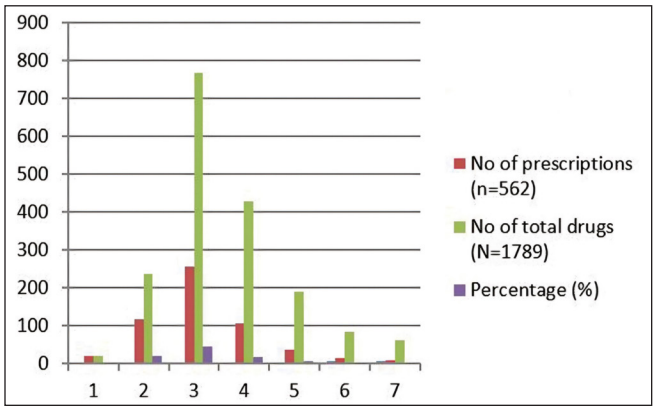

Figure 4: Number of drugs prescribed per prescription.

Table 5: Prescriptions of total drugs and antibiotics as per brand/generic names.

Parameter	Number of drugs (*N* = 1789)	Percentage (%)	Number of antibiotics (*n* = 703)	Percentage
Drugs prescribed by brand name	464	25.9	242	34.42
Drugs prescribed by generic name	1,325	74.06	461	65.57

N, number of drugs ; n, number of antibiotics

10 days [Figure 3]. Most antibiotics prescribed were generic (65.57%) [Table 5].

Analysis of Adjuvant Drug Prescriptions

Of 562 prescriptions, 256 (45.5%) had three drugs per prescription, followed by two drugs (21%) with an average of 3.18 [Figure 4]. In the adjuvant group, nasal decongestants were commonly prescribed (52%), followed by antihistamines (18%) and non-steroidal anti-inflammatory drugs (13%) [Figure 5].

DISCUSSION

In practice, while covering the most likely pathogens in the treatment of ENT infections is empirical, culture-sensitive

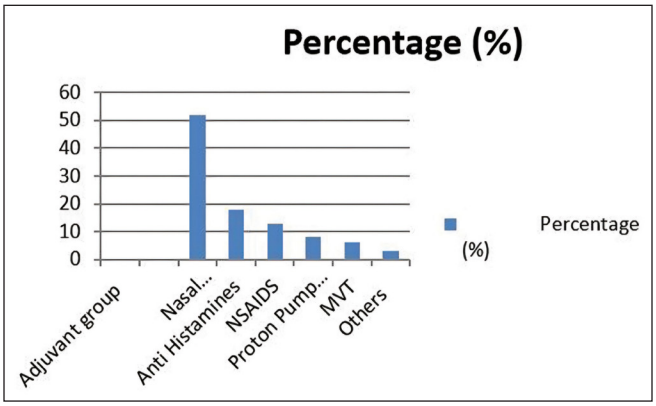

Figure 5: Distribution of prescriptions based on the adjuvants prescribed.

antibiotics are prescribed for some times on need basis. The present observational study describes prescription pattern of antibiotics in the OPD of ENT department. These type of studies guide the rational use of drugs and also useful in making treatment cost-effective and beneficial to patients and reduce the medical burden in developing countries such as India.[12]

More number of antibiotic prescriptions were observed in the 21 to 40 years age group patients and the least were observed in the geriatric age group, similar to Ain et al (66.3% between 6 and 35 years age group and 2.17% in 66 to 85 years group).[13] In our study, 56.9% of prescriptions were male and 43.1% were female patients similar to studies by Ain et al (62.68% males) and Suman et al (62% males).[13,14] Higher ambulatory working adult male population and higher exposure to environmental pollutants and pathogens might be the cause of increased prevalence in males. In contrast to our study, more number of female patients (53.12%) were enrolled in a study by Harish *et al*.[15]

In this study, prescriptions with single antimicrobial agent were 66.01% and with two AMA were 27.58% which was similar to the study by Padwal et al (92.98% of prescriptions with one AMA and 2.10% with two AMA).[16] The average number of antibiotics per prescription was 1.25, which was lower than in the studies done by Suman et al (2015) (1.69),[14] Ain et al (2010) (1.58),[13] Pallavi et al (2016) (2.42),[4] and higher than Padwal et al (2015) (0.98).[16] Penicillins (34.7%), cephalosporins (25%), and fluoroquinolones (23.3%) were commonly prescribed antibiotics and in the FDC, amoxicillin with clavulanic acid was the commonest followed by cefpodoxime with clavulanic acid. Studies conducted by Suman et al (85%), Khan et al (75.68%), Bhat et al (77%), and Anandhasayanam et al (61%) have reported that β-lactam antibiotics were given the highest priority.[14,17–19] The change in the prescription pattern from a narrow spectrum to extended-spectrum penicillins could overcome the problem of antibiotic resistance. Lisha et al[20] observed an almost similar pattern of antibiotic prescription but in contrast to our study, 41% of injectables were prescribed. In our study, CSOM was the most common infection, followed by sinusitis and tonsillitis. Das et al (2005) also reported that CSOM was the commonest infection (60%) in their study.[5] The commonest route of administration was oral, followed by topical. No injectable antibiotics were prescribed. Similar findings such as zero injections were given out of 855 prescriptions in a study done by Padwal et al.[16] This absolute lack of use of injections indicate physicians' awareness regarding side effects related to the over use of injections.

The WHO recommendation for average number of drugs per prescription is 2 to2.5. However, in this study, it was 3.18 which is also reported by Khan et al (2.70),[17] indicating a trend of polypharmacy.[21] As the over prescribing of drugs has higher chances of drug–drug interactions, increased risk of adverse drug reactions, increase in unnecessary cost of treatment and most importantly antibiotic resistance average number of drugs per prescription should be reduced.[22,23] Analysis of prescription of adjuvants showed predominant prescription of nasal decongestants (52%) followed by antihistamines (18%), which are similar to those of Srinivasa et al's study with 60% of nasal decongestants.[24]

About 74.06% of drugs prescribed were generic, which is in contrast with other studies reporting a higher use of brand names.[13,25,26] In the present study, 96% of drugs prescribed were from the hospital formulary list, meaning that physicians are adhering to the list. Also, 95% of the drugs prescribed were from the National List of Essential Medicines, India. The WHO recommendation is 100% prescription of drugs from the essential drug list (EDL).[27] This study clearly showed the prescription pattern of antibiotics, increased prescriptions of generic drugs, and importance of rationale use of antibiotics, which would be useful for all practitioners to reduce the antibiotic resistance and unnecessary medical burden of people of India.

LIMITATIONS

The study was performed for a period of 8 months only. Seasonal variations in ENT infections and their prescribing patterns were not counted. Though the sample size was high, this study was conducted in one hospital only. In this study, antimicrobial therapy was based on empirical and clinical diagnosis as laboratory investigations were not done.

CONCLUSION

The pattern of prescribing a drug and its utilization plays a major role in advising a physician and hospital administration

to prescribe antibiotics rationally and analyze its cost beneficiality. The present study though prescription pattern of antibiotics and adherence to the hospital formulary by the physicians in the hospital is encouraging, still there is a chance in reducing the number of drugs prescribed per patient. Extensive studies on the restricted use of antibiotics and updation of development to formulate guidelines for the treatment of common diseases through continuing medical education (CME) is needed. So that the patient and health care system on the whole will be benefitted.

Author declaration

- Ethics Committee approval was obtained for this present study.
- Informed consent obtained from the patients included in the study.

Funding

None.

Conflicts of interest

None declared.

Acknowledgments

Authors would like to extend their thanks to respected Dean and Principal and HOD for allowing us to conduct this study in the institution. Authors are also extremely grateful to the faculty of ENT department for their cooperation in the entire study period.

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How to cite this article: Aalasyam N, Potnuru S, Sileveru CM, Pokala U, Naveen P. Antimicrobial Prescription Pattern in ENT Outpatient Department in a Tertiary Care Teaching Hospital, Telangana, India. Int J Recent Sur Med Sci. 2024;10:S28-34. doi: 10.1055/s-0043-1761502