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Drug Utilization Study in Indoor Patients of Otorhinolaryngology Department at Tertiary Care Teaching Hospital

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Abstract: ***Background: ENT is a medical abbreviation for ear, nose and throat. Some of the common disorders include, blocked nose or nasal discharge, ear pain, ear discharge, tender swelling behind the ear, sore throat, allergic rhinitis, otitis media and mastoiditis. Rhinitis and sinusitis are among the most common medical condition. Antibiotics are among the most common medications prescribed. As the consumption of antibiotic rises, resistance to antibiotics becomes a major threat to public health. Material & Methods: A prospective observational study conducted by Department of Pharmacology in association with Department of Otorhinolaryngology, at tertiary care teaching hospital attached to medical College. The study was performed over a period of 1 1/2 years. 650 patients were taken in study. Data was collected from inpatient of otorhinolaryngology department after the approval of institutional ethics committee obtained. Data was analyzed using general parameters like demographic profile of patient and some of the WHO indicators. Results: A total of 650 prescriptions were analysed. Out of 650 patients 411 were male and 239 were female. Mean age of the patients in study is 46.2±15.83 (Mean±SD) years. Out of 650 prescriptions, mucormycosis was the most commonillness found in 89 cases during study period followed by Chronic suppurative otitis media (CSOM) found in 71 cases which is followed by carcinoma supraglottis in 61 and sinusitisin39 cases. Prescription index was found to be 4.977. Antimicrobials were the most commonly prescribed drugs 33.79%, followed by proton pump inhibitors 14.62%, antihistaminics 13.72% and antipyretics 11.25%. Among them extended spectrum penicillin were prescribed maximally 31.75%, followed by cephalosporin 24.06%, nitroimidazole 14.27%, quinolone 11.44%, aminoglycoside 10.25%, macrolide 8.14%. Percentage of drugs from essential drug list is 68% & Non-essential drug is 32%. Percentage of drugs prescribed by generic name was 76% & brand name was 24%. Average drug cost per encounter per day for the patient was 377rs. Hospital stay range from 2-30 days with mean of 6.87days. Conclusions: We recommend Regular CMEs for the doctors at different levels to encourage prescribing by generic names and on correct writing of prescriptions may be considered. We also recommend framing strategies for drugs to be cost effective.***

Keywords: Drug utilization study, Otorhinolaryngology, Antibiotics, Resistance

1. Introduction

Drug Utilization is defined by the WHO as the "marketing, distribution, prescription and use of drugs in society, with special emphasis on the resulting medical, social and economic consequences. [(1)]ENT is a medical abbreviation for ear, nose and throat. A rotation in ear, nose and throat is becoming increasingly common in general practice. Some of the common disorders include, blocked nose or nasal discharge, ear pain, ear discharge, tender swelling behind the ear, sore throat, allergic rhinitis, otitis media and mastoiditis. [(2)] Rhinitis and sinusitis are among the most common medical condition. In Western societies an estimated 10% to 25% of the populations have allergic rhinitis. Both Sinusitis and rhinitis can significantly decrease the quality of life and aggravate co-morbid conditions. Although mainstay of management of acute bacterial sinusitis is antibiotics, treatment of chronic sinusitis is less straight forward because only some chronic sinusitis has infectious basis. [(3)] Otitis media is the inflammation of the mucous membrane of the middle ear cleft which includes the middle ear cavity (tympanic cavity), mastoid antrum, mastoid air cells and the Eustachian tube. When the inflammation is associated with a discharge from the ear through a perforation in the tympanic membrane, suppurative (or discharging) otitis media occurs.[(4)] The vast majority of ENT problems that present in the pre hospital setting are minor in nature. However, occasionally innocuous symptoms can develop into life threatening conditions that require immediate assessment and treatment. ENT conditions can be immediately life threatening by causing an A, B, C problem. [A] Airway obstruction which comprises inhaled foreign body, epiglottitis, anaphylaxis/angioedema, croup, facial fractures. [B] Breathing difficulty due to croup, inhaled foreign body. [C] Circulatory problems which includes hemorrhage due to epistaxis, from facial fractures, secondary hemorrhage after ENT surgery, e.g. after tonsillectomy. [(5)] Antibiotics are among the most common medications prescribed both in the hospital setting and the community setting.[(6)] As the consumption of antibiotic rises, resistance to antibiotics becomes a major threat to public health. Existing evidence suggests that there is a causal association between antimicrobial usage in hospital and antimicrobial resistance.[(7)] Antimicrobial resistance, a global problem, is particularly pressing in developing countries where the infectious disease burden is high and cost constrains the replacement of older antibiotics with newer, more expensive ones.[(8)] It can be caused by various factors such as health facilities, medication non adherence, multiple prescribers and dispensers, use of first generation medications,

inappropriate usage of medication, intake of wrong dosage, incorrect usage of medications, use of counterfeit drugs, over and under usage of medications, animal husbandry, etc.[9]

2. Methods

The present study was a prospective observational study conducted by Department of Pharmacology in association with Department of Otorhinolaryngology, at tertiary care teaching hospital attached to medical College. The study was performed over a period of 1 $^{1/2}$ years. 650 patients were taken in study. Data was collected from inpatient of otorhinolaryngology department after the approval of institutional ethics committee obtained. Study was carried out from February 2020 to August 2021.

Selection criteria of patients

Inclusion Criteria:
1) Patients of either sex who were admitted to otorhinolaryngology department.
2) Patients with minimum hospital stay of 24 hours as indoor patient.

Exclusion Criteria:
1) Patients less than 12 years of age.
2) Uncertain diagnosis.
3) Incomplete data entry case records.
4) Unwilling patients.

Sample Size: WHO recommendation on sample size is that there should be at least 600 encounters in a drug utilization study describing current treatment practice.

Collection of Data: Data of patients matching inclusion criteria was recorded only after the approval of institutional ethics committee obtained.

Patient information: Name, gender, age, indoor number, date of admission, date of discharge.

Prescription information: Drug-name, dose, frequency, route, duration

Data Analysis: Data was analyzed using general parameters like demographic profile of patient and some of the WHO indicators as mentioned below.

Indicators:

1) Core Drug Indicators
a) **PRESCRIBING INDICATORS**: Average number of drugs per encounter. Percentage of drugs prescribed by generic name. Percentage of encounters with antibiotics prescribed. Percentage of drug prescribed from Essential drug list formulary.
b) **PATIENTS CARE INDICATORS**: Patient's knowledge of correct dosage.
c) **FACILITY INDICATORS**: Availability of copy of Essential drug list formulary.

2) Complementary Drug Use Indicators:
Average drug cost per encounter Drug cost was taken from book "CIMS july to october 2021" as lowest possible cost available for every drugs.

3. Results

Age and sex wise distribution
A total of 650 prescriptions were analysed. Out of 650 patients411 (63.23%) were male and 239 (36.77%) were female. Mean age of the patients in study is 46.2±15.83 (Mean±SD) years of which mean age of male cases where 47.02±15.44 years and of females where 44.77±16.42 years.

The age group 46-60 years accounted for highest number 226 (34.77%) of patients. Least number of cases where found to be 124(19.07%) in age group 14-30 years & 61-80 years (Table1).

Table 1

Age Group (Years)	Male	Female	Percentage
14– 30	69	55	19.07%
31– 45	110	66	27.07%
46– 60	148	78	34.77%
61– 80	84	40	19.07%
TOTAL	63.23%	36.77%	100%

Out of 650 prescriptions, mucormycosis was the most common illness found in 89 (13.69%) cases during study period followed by Chronic suppurative otitis media(CSOM) found in 71 (10.92%) cases which is followed by carcinoma supraglottis in 61(9.38%) and sinusitisin39(6%) cases.

Average number of drugs per encounter
In our study, prescription index was found to be 4.977. Drugs were prescribed in the range of 2-7drugs per prescription. (table2)

Table 2

Total number of Different Drugs Prescribed	Total number of encounters	Average number of drugs Per encounters
3235	650	4.977

Total number of drugs per encounter
Minimum prescribed drug was 2 drugs (0.31%) and maximum was 4 drugs (42.6%) per prescription. Patients receiving 4 and 5 drugs per prescription were403 (62%) highest range.(Table3).

Table 3

Number of drugs	Number of encounter	Percentage (%)
2	7	1.08%
3	21	3.23%
4	277	42.61%
5	126	19.38%
6	113	17.38%
7	106	16.31%
Total	650	100%

Prescribing frequency of drugs class
Antimicrobials were the most commonly prescribed drugs (33.79%), followed by proton pump inhibitors (14.62%), anti histaminics (13.72%) and antipyretics (11.25%). The

vitamin & mineral supplements (2.07%) and steroids (4.92%) (Table4).

Table 4

Drug class	Number of drugs	Percentage (%)
Antibiotics	1093	33.79%
Proton pump inhibitors	473	14.62%
Antihistamine	444	13.72%
Antipyretic	364	11.25%
NSAIDs	317	9.80%
Antifungal	179	5.53%
Steroidal anti-inflammatory	159	4.92%
Bronchodilator	117	3.62%
Vitamins & Minerals	67	2.07%
Vaccine	20	0.62%
Local Anaesthetic	2	0.06%

Different Class of Antibiotics

Antimicrobial agents were prescribed to majority of the patients. Among them extended spectrum penicillin (augmentin, amoxiclave) were prescribed maximally 31.75%, followed by cephalosporin (ceftriaxone, cefixime) 24.06%, nitroimidazole (metronidazole) 14.27%, quinolone (ciprofloxacine, levofloxacine, moxifloxacine) 11.44%, aminoglycoside (amikacine) 10.25%, macrolide (azithromycine) 8.14% (Table5).

Table 5

Class of Antibiotic	Number of drugs	Percentage
Extended spectrumpenicillin	347	31.75%
Cephalosporin	263	24.06%
Nitroimidazole	156	14.27%
Quinolone	125	11.44%
Aminoglycoside	112	10.25%
Macrolide	89	8.14%
Polypeptideantibiotic	1	0.09%

Percentage of encounters with anantibiotic prescribed

612 out of 650 encounters (94.15%) are with antibiotics prescribed.Only38encounters (5.85%) having no antibiotics. 1093 out of total 3235 drugs are antibiotics. Percentage of antibiotics in total drugs prescribed is 33.787%.

In our study, a single antibiotic was prescribed to 318 (48.92%) patients, two antibiotics were prescribed to 109(16.77%) patients, three antibiotics were prescribed to 185 (28.46%) patients and 38 (5.85%) patients did not receive the antibiotics in their prescription. (Table6)

Table 6

Number of antibiotics	Number of patients	Percentage (%)
0	38	5.85%
1	318	48.9%
2	109	16.77%
3	185	28.46%
	650	100%

Percentage of drugs prescribed from essential drug list

23 out of total 34 drugs are from essential drug list. Percentage of drugs from essential drug list is 68% & Non-essential drug is 32%.

Percentage of drugs prescribed by generic name

26 out of total 34 drugs are prescribed by generic name. Percentage of drugs prescribed by generic name was 76% & brand name was 24%.

Average drug cost per encounter

Drug cost was taken from book "CIMS July to October 2021" as lowest possible cost available.[10] Average drug cost per encounter per day for the patient was 377rs. (Table7).

Table 7

Total Cost (Rs.) of all encounters	Total number of encounters	Average drug cost per encounter (Rs.) per day
244958	650	377

Hospital stay range from 2-30 days with mean of 6.87 days. Highest patients were admitted for 3 & 4 days.

4. Discussion

We have collected data of 650 patients matching inclusion criteria admitted in otorhinolaryngology department of a tertiary care teaching hospital attached to medical College. Data of the patients like age, sex, diagnosis, duration of stay and drug treatment were analyzed. There should be at least 600 encounters included in cross sectional survey describing current treatment practices. In our study sample size was 650. The present descriptive study indicates the general trends of drug prescribing among indoor patients Department of Otorhinolaryngology. In this study, male patients were higher than female patients. This was similar to study conducted by Rahul D. Randad et al showing male predominance (55%) than female.[11] Another study conducted by khan FA & nizamuddin S et al also showing male predominance (60%).[12] Our study showed that majority of the patients were between the age group of 46-60 years (34.77%), followed by 31-45 years (27.07%) and lowest percentage was seen in 14-30 years & 61-80 years (17.07%) , indicating that most of the ear, throat and nose infections were common among adults. Similar findings were reported by study done by sumalatha R. et al.[13] The prescription index in our study was 4.977. Majority of patients had received 4 drugs per prescription constituting 42.61%, followed by 5 drugs per prescription constituting 19.38%. Similarly study done by Sarraf DP et al showed average number of drugs per prescription was 4.06.[14]A study which was done by Sumalatha r. et al showed that average number of drugs per prescription was 2.6 & highest prescription received 3 drugs. However that study was done on opd patients.[13] In our study hospital stay range from 2-30 days with mean of 6.87 days. Study done by Sarraf DP et al showed Hospital stay range from 2-19 days with mean of 5.70 days.[14] In our study, it was found that most of the drugs were prescribed in generic names(76%) rather than brand names(24%), as the physicians were aware of low cost of generic drugs and also keeping in mind that in government set up most of the patients were from low socioeconomic status. Use of generic drugs is helpful in decreasing cost of therapy and avoiding medication errors. As same study conducted by Sumalatha R. et al, showed that most of the drugs were prescribed by generic names (86.5%).[13] whereas all the antibacterial agents were prescribed by their brand names only in study conducted by khan FA & nizamuddin S et al at private medical college.[12] Antimicrobial agents were prescribed to majority of the

patients. Among them extended spectrum penicillin (augmentin, amoxiclave) were prescribed maximally 31.75%, followed by cephalosporin (ceftriaxone, cefixime) 24.06%, nitroimidazole (metronidazole) 14.27%, quinolone (ciprofloxacine, levofloxacine, moxifloxacine) 11.44%, aminoglycoside (amikacine) 10.25%, macrolide (azithromycine) 8.14%. Our study showed that unwanted broad spectrum antimicrobials, newer and costly antimicrobials were not prescribed. The study conducted by sumalatha R. et al have shown that β lactams were the most commonly prescribed antibiotic.[13] Another study conducted by khan FA & nizamuddin S et al also showing the same.[12] The mean number of antibacterial agents prescribed per patient per course was found to be 1.68. study conducted by ain M.R. et al also showing the same result 1.58.[15] In this study, the most common antihistamine prescribed was cetirizine followed by chlorpheniramine followed by loratadine for H1 blocker & famotidine for H2 blocker. The concomitant use of medications prescribed with antimicrobials were antihistamines, antipyretics and analgesics to relieve the nasal congestion, fever and pain respectively. Vitamin supplements like B-complex were given to reduce mouth ulcer and also to patients who are on chronic treatment with antibiotics. Gastroprotective drugs were administered, mainly the H2 blockers (famotidine) and proton pump inhibitors (pantoprazole) to prevent the gastro oesophageal reflux and drug induced gastritis. Majority of the drugs prescribed were from the Who model list of Essential medicines, 21st list 2019.[16] Majority of the drugs were administered by oral route followed by intravenous route. Study done by sumalatha R. et al have majority of oral route followed by topical route. As our study was on indoor patients, the use of intravenous drugs was high.[13] Average drug cost per encounter per day for the patient was 377 rs. It was slightly higher because our study involve covid19 times & included 89 patients with mucormycosis receiving costlier Amphotericine-B & Posaconazole. Study done by Daniel M. et al have average drug cost of 369 rs. Our study showed that the most common type of infection affected the ear like otitis media, ear maggots, followed by throat infection such as tonsillitis and nose infection such as sinusitis, septal abscess and epistaxis.

5. Limitation

Our study had certain limitations, like there was lack of information about definite bacterial etiology and prevalent organisms which could have affected the result of study. Also our study had no information about intravenous fluids use. Since the study was done in a government hospital having limited supply of drugs, the results cannot be compared with private hospitals and our study could not explore the adverse effects of the drugs prescribed.

6. Conclusion

The present study was carried out in tertiary care teaching hospital attached with medical college. During 18 months of study period 650 patients were included. Male patients are more. Patients of age between 30-60 are more. More patients in ENT having chronic suppurative otitis media followed by sinusitis followed by tons illitis. Antibiotics, Proton pump inhibitors, Antihistamines, Antipyretics, Non steroidal anti-inflammatory drugs are the group of drugs which were commonly prescribed. Extended spectrum penicillin (Amoxicillin+ clavulinic acid) is commonly prescribed antibiotic in acute and chronic ENT infections. Antibiotic sensitivity was not done in any cases before prescribing the antibiotic. Average number of drugs per prescription is 4.977.

We recommend Regular CMEs for the doctors at different levels to encourage prescribing by generic names and on correct writing of prescriptions may be considered. We also recommend framing strategies for drugs to be cost effective.

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Declarations

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