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Analysis of Drug Utilization Pattern of ENT Infections in Paediatric Patients

			
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ABSTRACT

Background: The study of drug utilization is an evolving field. Infancy and childhood is a period of rapid growth and development and they represent a large part of the population in developing countries. Therefore appropriate intervention to identify the problems in prescribing practices and in promoting rational use of drugs. **Objectives:** To assess the therapeutic regimen of ENT infections in pediatric patients, to identify the incidence of infection in pediatric population, to assess the medication adherence. **Methods:** A prospective observational 6-month study was conducted after obtaining approval from IEC, pediatric patients with different types of ENT infections were the study subjects were selected based on inclusion and exclusion criteria. **Results:** Acute suppurative otitis media which occupied 19% of the total infections, the most prescribed antibiotic was amoxicillin-clavulanate, The average drugs per prescription were found to be 3.6% encounters with brand name was observed, 96% of antibiotics prescribed were from essential drug list (EDL) for the year 2016-2018, there exists a relationship between the age group and medication adherence in paediatric patients and it was found to be statistically significant with p-value less than 0.05. **Conclusion:** Antibiotics are prescribed to paediatric patients based on empirical therapy without sensitive test but most of the patients responded well to the use of antibiotics. It is better to keep the average number of drugs per prescription as low as possible to avoid chances of drug interactions and increased cost. Number of encounters with antibiotic prescribed seems rational for the infection. Oral route was preferred more than the parenteral route. Number of generics prescribed was very low which may lead to medication errors. Low adherence was seen in adolescents while infants showed high adherence comparatively.

INTRODUCTION

Drug utilization evaluation has been defined as the marketing, distribution, prescription and use of drugs in a society with special emphasis on the resulting medical and social consequences^[5,6] Drug utilization study is a component of medical audit that does monitoring and evaluation of the drug prescribing patterns and suggests necessary modifications in prescribing practices to achieve rational therapeutic practices well as cost-effective health care^[7].

Infections of the ear, nose, and throat affect the functioning of adults as well as children, often with significant impairment of daily life activities, work loss, and school absenteeism.^[1] It was envisaged that an increase in global population, infections remain the most important cause of disease. These are responsible for significant school and work absenteeism. The use of antimicrobial agents, especially antibiotics has become a routine practice for the treatment of pediatric illness^[2,3]. The main responsibility of the pharmacist is ensuring that patients get the right drug in the right quantity at the right time. Irrational use of medicines leads to increased incidence of treatment failure, antimicrobial resistance and economic burden on the patient and the community as a whole.^[4] Thus, frequent prescription pattern monitoring of ENT infections are required to keep a check on the appropriate use of drugs, especially antibiotics.

The ears, nose, and throat are adjacent to one another anatomically, similar in histological structure and subject to many of the same diseases.⁽¹⁴⁾

Ear infections are most common among young children as they have short and narrow Eustachian tube^[8]. It can be acute or chronic. Most commonly occurred ear infection is otitis media and otitis externa. Sinusitis is a common illness of pediatric age group, which can lead to serious complications⁽⁹⁾. The technical name for the throat is the pharynx. Throat problems are common. The most common include tonsillitis, pharyngitis, laryngitis⁽¹⁰⁾. Nonspecific URTI have no prominent localizing features. They are identified by a variety of descriptive names including acute infective rhinitis, acute rhinopharyngitis, or nasopharyngitis, acute coryza and acute nasal catarrh as well as by the inclusive label common cold⁽¹¹⁾.

Antibiotics often used for children include Penicillin's (Amoxicillin and penicillin g), Beta-lactamase inhibitors (Amoxicillin-Clavulanic Acid and Augmentin), Cephalosporins Macrolides, Sulfa drugs.

Pediatric population is composed of the very different subpopulation. The FDA guidance (1998) breaks down this population into the following group's neonates (birth to 1 month), infants (1month to 2 years), developing children (2 to 12 years) and adolescents (12 to 16 years)⁽¹²⁾. Medication adherence is defined by the World Health Organization as "the degree to which the person's behavior corresponds with the agreed recommendations from a health care provider. "The World Health Organization (WHO) breaks medication adherence into 5 interacting dimensions: social/economic factors, medical condition-related factors, therapy-related factors, Healthcare system/providers, and patient-related behaviors."⁽¹³⁾

MATERIALS AND METHODS

A prospective observational 6-month study was conducted in the Department of ENT, Pushpagiri Medical College Hospital, Thiruvalla. The pediatric patients with different types of ENT infections were the study subjects. They were selected based on inclusion and exclusion criteria.

INCLUSION CRITERIA

- IP/OP patients.
- Both male and female patients.
- Age: 0-16years.
- Patients with ENT infections.
- Patients consulting ENT specialist.
- Be capable of speaking and reading English or Malayalam
- Patients who are willing to sign the informed consent form.



EXCLUSION CRITERIA

- Patients suffering from surgical and allergic disorders
- Patients who do not give the consent
- Patients with comorbidities.

➤ Age >16 years.

The study was carried out only after obtaining the approval from the IEC. Informed consent was taken from the caretaker. The study mainly focused on the type of infections, its treatment, and medication adherence. A data collection form was designed for the collection of data and WHO prescribing indicators were used. The medication adherence was measured using the '8-items Morisky Medication Adherence Scale'.

RESULTS

In the six-month study, 100 patients were enrolled as per the inclusion-exclusion criteria. The results are as follows.

TABLE 1: DISTRIBUTION OF PATIENTS BASED ON ENT INFECTIONS

Category	Count	Percentage
Ear	26	26%
Nose	29	29%
Throat	38	38%
Combined	7	7%

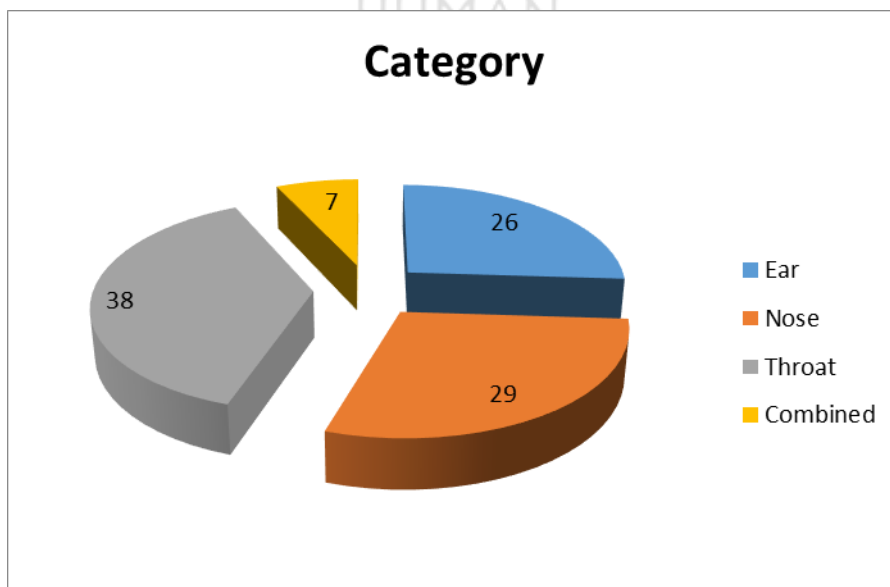


FIGURE 1: DISTRIBUTION OF PATIENTS BASED ON ENT INFECTIONS

In this study, the highest percentage of ENT infections were found to be Throat infection and it's about 38% followed by Nose 29%, Ear 26%, and Combined ENT infection is 7%.

TABLE 2: DISTRIBUTION OF PATIENTS BASED ON AGE GROUP

Age Group	Count	Percentage
Infant	16	16.0%
Child	58	58.0%
Adolescent	26	26.0%

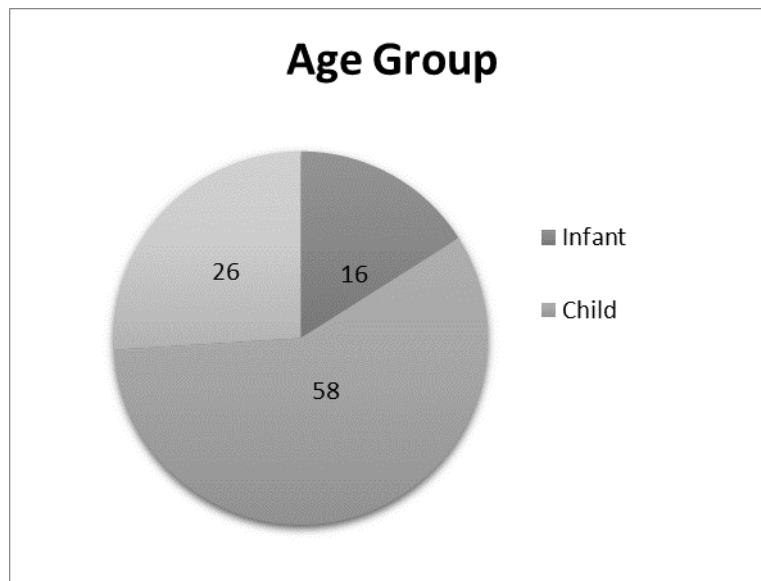


FIGURE 2: DISTRIBUTION OF PATIENTS BASED ON AGE GROUP

Most of the study population falls under 2-12 years (child) age group.

TABLE 3

ENT infections in pediatric patients	Pearson Chi-Square	Df	Asymp. Sig. (2-sided)
Ear	4.147	2	.126
Nose	1.934	2	0.38
Throat	6.203	2	0.045

There is no significant relationship between age and ENT infections.

TABLE 4: DISTRIBUTION OF PATIENTS BASED ON GENDER

Gender	Frequency	Percentage(%)
Male	58	58.0
Female	42	42.0

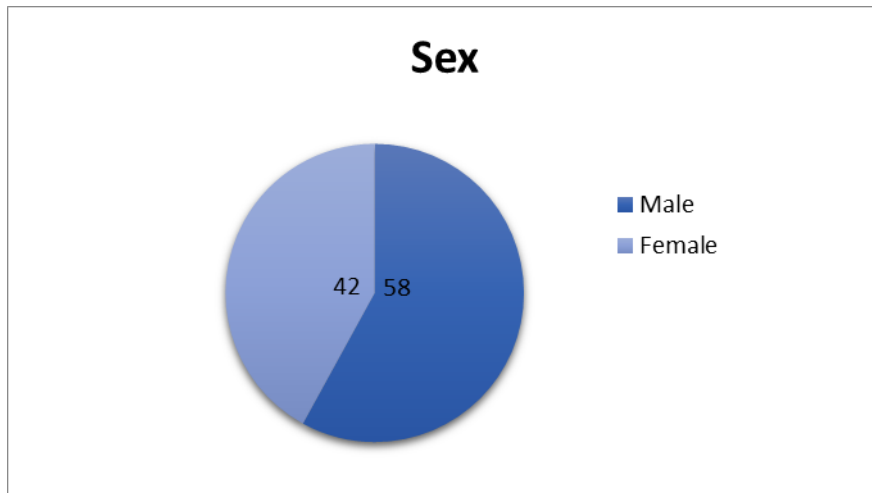


FIGURE 3: DISTRIBUTION OF PATIENTS BASED ON GENDER

Infections were higher in males compared to females during the study period.

TABLE 5: DISTRIBUTION BASED ON GENDER AND INFECTION

Gender	Ear	Nose	Throat	Combined
Female	10	14	15	4
Male	16	15	23	3

Chi-Square Test

Fisher's Exact Test	Exact Sig. (1-sided)
Ear	.559
Nose	0.39
Throat	0.564

There is no significant relationship between gender and ENT infection.

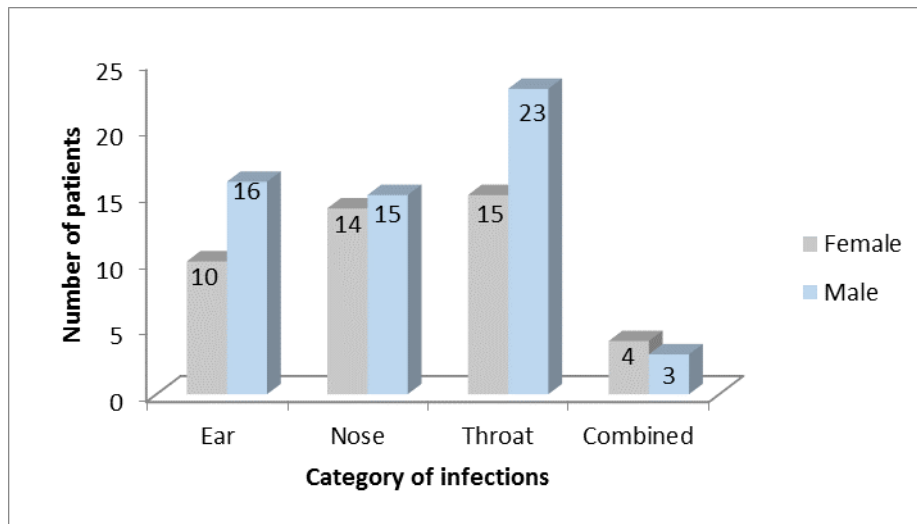


FIGURE 4: DISTRIBUTION BASED ON GENDER AND INFECTION

In-ear, nose and throat infections, male has the slightly higher number of infections while the female has the higher number of combined infections in this study.

TABLE 6: DISTRIBUTION OF PATIENTS BASED ON DIAGNOSIS

Diagnosis	Count	Percentage
Acute suppurative otitis media	19	19.0%
Chronic suppurative otitis media	2	2.0%
Otitis externa	5	5.0%
Acute adenotonsillitis	10	10.0%
Chronic adenotonsillitis	6	6.0%
Tonsillitis	8	8.0%
Pharyngotonsillitis	8	8.0%
Pharyngitis	5	5.0%
Sinusitis	6	6.0%
Rhinitis	9	9.0%
Nonspecific upper respiratory tract infection	N	14.0%
Parotitis	1	1.0%
Combined diseases	7	7.0%

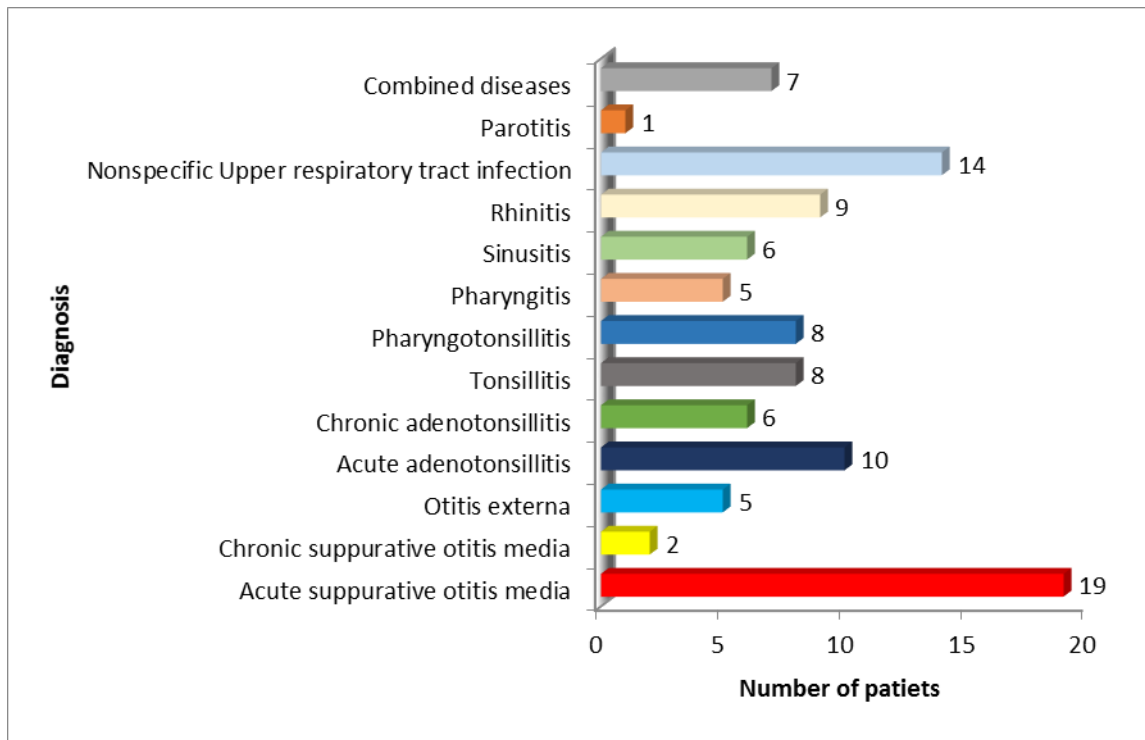


FIGURE 5: DISTRIBUTION OF PATIENTS BASED ON DIAGNOSIS

Here the Most considered diagnosis is acute suppurative otitis media 19%.

TABLE 7: DISTRIBUTION OF PATIENTS BASED ON DRUG PRESCRIBED

Prescribed drugs	Count	Percentage(%)
Multivitamin	7	2.25
Corticosteroids	20	6.43
Analgesic	55	17.68
Antiallergic	72	23.15
Decongestant	37	11.9
Mucolyteexpectorant	2	0.64
Bronchodilator	10	3.22
Protonpumpinhibitorh2antagonist	14	4.5
Oral antiseptic	12	3.86
Antibiotic	82	26.37

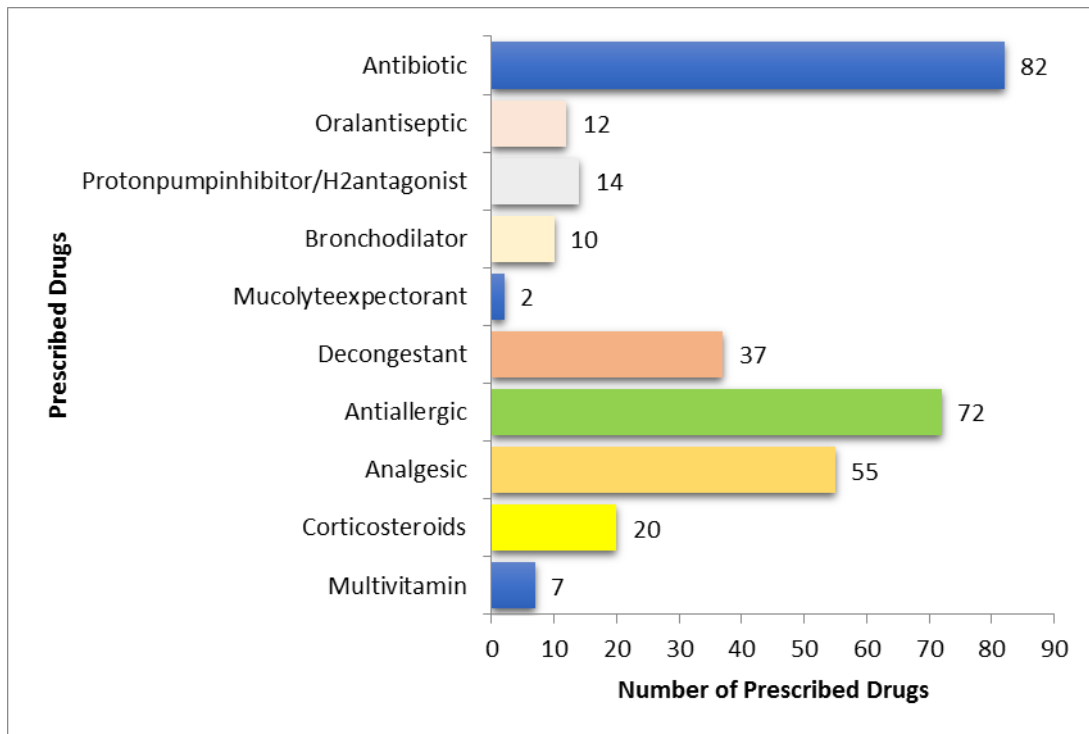


FIGURE 6: DISTRIBUTION OF PATIENTS BASED ON DRUG PRESCRIBED

Antibiotics are the most commonly prescribed drug for ENT infections.

TABLE 8: DISTRIBUTION OF PATIENTS BASED ON CLASS OF ANTIBIOTICS USED

Class of antibiotics	Count	Percentage(%)
Penicillin	20	22.4719
Cephalosporin	19	21.3483
Quinolone	6	6.74157
Macrolide	11	12.3596
Aminoglycoside	1	1.1236
Penicillin/beta-lactamase inhibitor	32	35.9551
Total	89	100

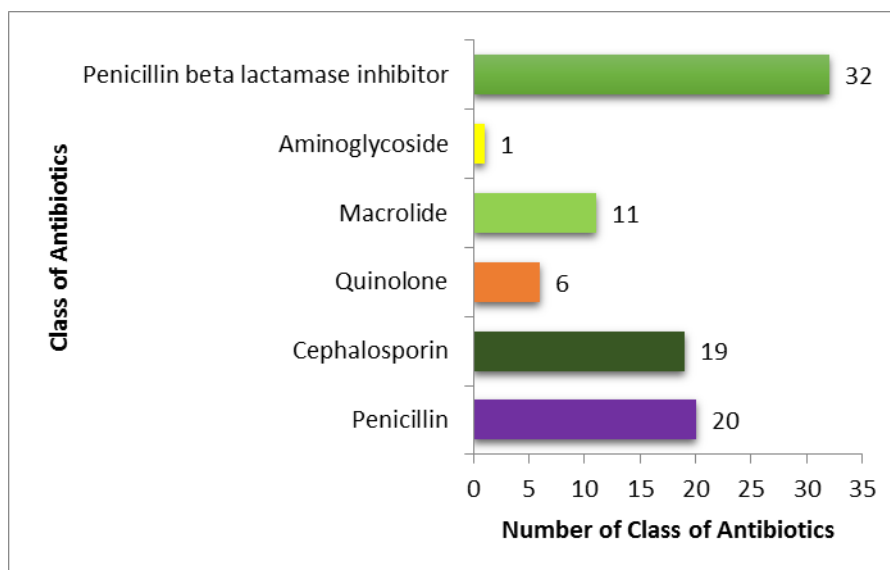


FIGURE 7: DISTRIBUTION OF PATIENTS BASED ON CLASS OF ANTIBIOTICS USED

Penicillin-beta lactamase inhibitors are the highest prescribed class of antibiotics.

TABLE 9: DISTRIBUTION OF PATIENTS BASED ON ANTIBIOTIC PRESCRIBED

Name of Antibiotics	Count	Percentage
Amoxicillin	18	20.93
Amoxicillin-clavulanate	31	36.04
Ampicillin	1	1.162
Ceftriaxone	10	11.62
Cephalexin	2	2.32
Cefixime	4	4.65
Cefprozil	1	1.167
Cefuroxime	1	1.16
Cefpodoxime	2	2.32
Cefpodoximeclavulanate	1	1.162
Azithromycin	10	11.62
Ciprofloxacin	5	5.813

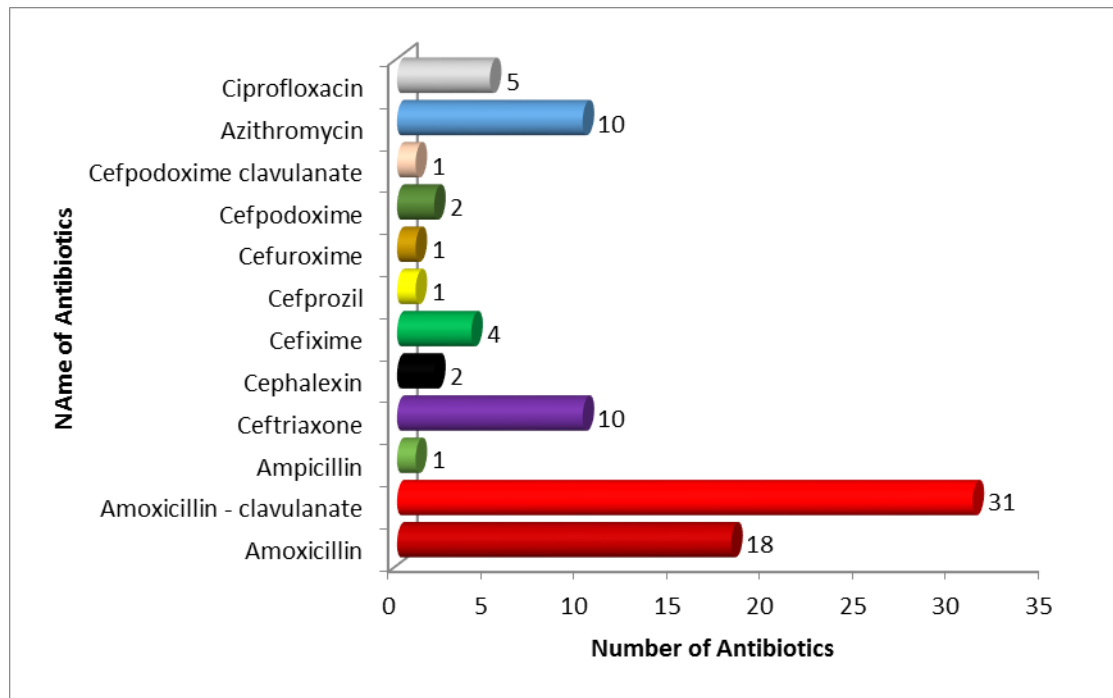


FIGURE 8: DISTRIBUTION OF PATIENTS BASED ON ANTIBIOTIC PRESCRIBED

Among the antibiotics prescribed, amoxicillin-clavulanate is the highest used drug.

TABLE 10: DISTRIBUTION OF ANTIBIOTICS BASED ON INFECTION

Name of antibiotics	Ear	Nose	Throat
Amoxicillin	3	9	6
Amoxicillin-clavulanate	10	10	15
Ampicillin	0	0	1
Ceftriaxone	3	0	7
Cephalexin	2	0	0
Cefixime	0	2	4
Cefprozil	0	0	1
Cefuroxime	0	1	0
Cefpodoxime	1	0	1
Cefpodoximeclavulanate	1	0	0
Azithromycin	1	5	4
Ciprofloxacin	5	0	0
Gentamicin	1	0	0

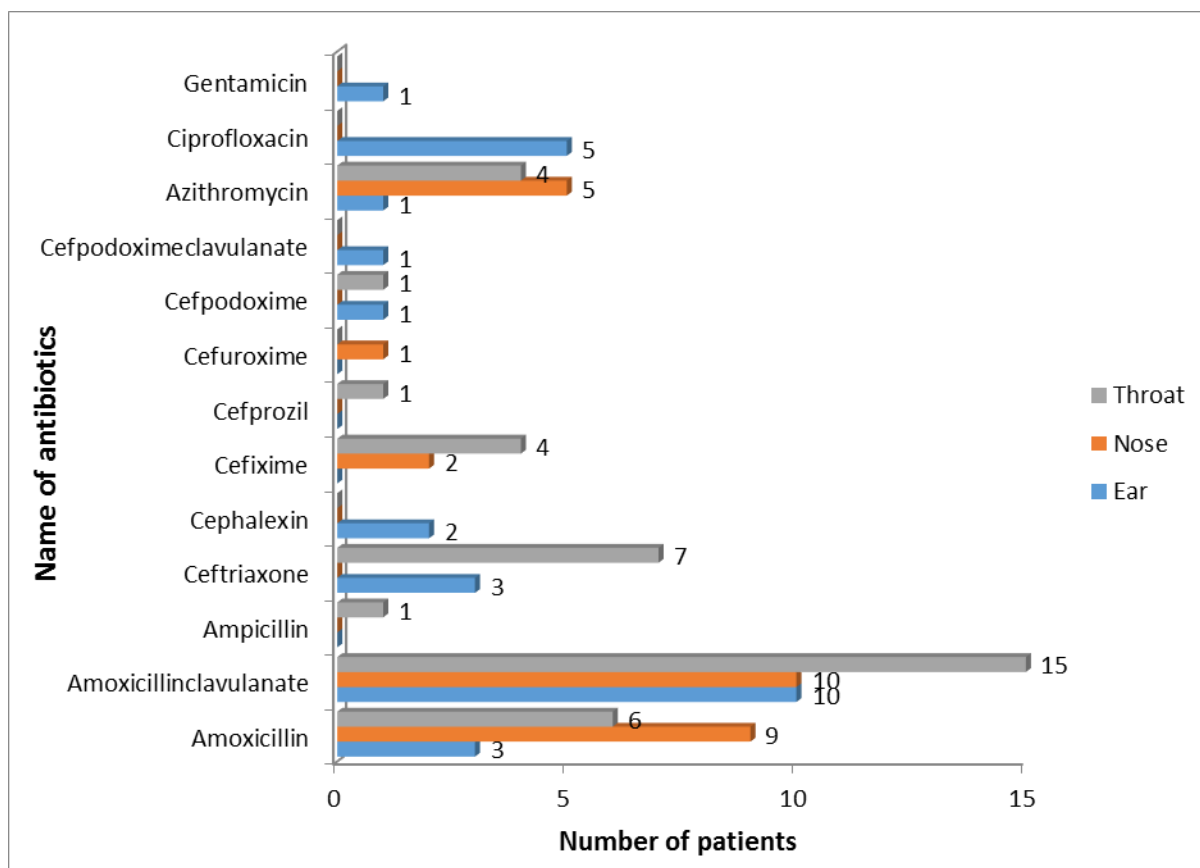


FIGURE 9: DISTRIBUTION OF ANTIBIOTICS BASED ON INFECTION

Most prescribed antibiotic for Ear is Amoxicillin-clavulanate followed by Ciprofloxacin. For Nose, its Amoxicillin-clavulanate followed by Amoxicillin and Azithromycin. In case of throat, it's also Amoxicillin-clavulanate followed by Ceftriaxone and Amoxicillin.

TABLE 11: DISTRIBUTION OF PATIENTS BASED ON ANTIBIOTIC DOSAGE FORM

Antibiotic Dosage Form	Count	Percentage(%)
Tablet	36	40.9
Capsule	4	4.54
Syrup	29	32.95
Parenteral	12	13.63
Topical	7	7.95
Total	88	100

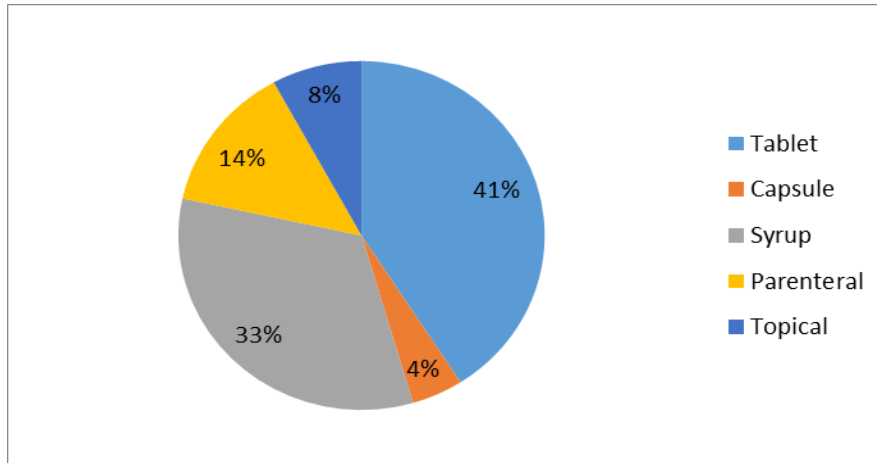


FIGURE 10: DISTRIBUTION OF PATIENTS BASED ON ANTIBIOTIC DOSAGE FORM

From the above figure, it is clear that tablets are the most prescribed dosage form among antibiotics

TABLE 12: AGE AND SEX WISE DISTRIBUTION

Age Group	Sex			
	Male		Female	
	Count	Percentage	Count	Percentage
Infant	8	13.7931	8	19.04
Child	38	65.5172	20	47.61
Adolescent	12	20.6897	14	33.33
Total	58	100	42	100

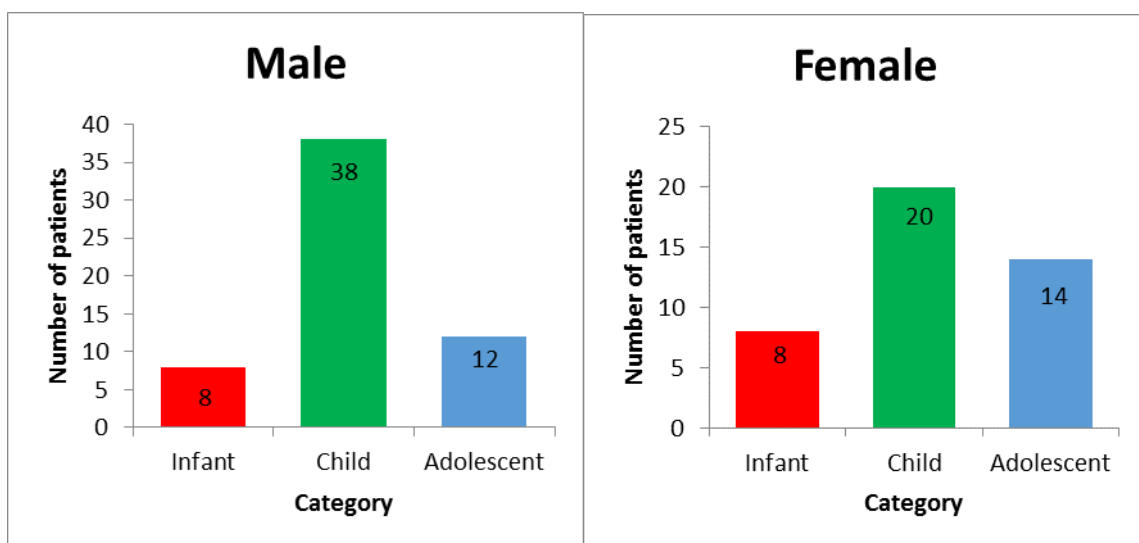


FIGURE 11: AGE AND SEX WISE DISTRIBUTION

Both in male and female, the highest number of infections were seen among 2-12 years age group (child)

TABLE 13: DIAGNOSIS AND AGE GROUP DISTRIBUTION

Diagnosis	Age Group			Total
	Infant	Child	Adolescent	
Acute suppurative otitis media	4	11	4	19
Chronic suppurative otitis media	0	0	2	2
Otitis externa	3	2	0	5
Acute adenotonsillitis	1	6	3	10
Chronic adenotonsillitis	1	5	0	6
Tonsillitis	0	7	1	8
Pharyngotonsillitis	0	8	0	8
Pharyngitis	0	1	4	5
Sinusitis	0	3	3	6
Rhinitis	2	3	4	9
Nonspecific upper respiratory tract infection	4	8	2	14
Parotitis	0	0	1	1
Combined diseases	1	4	2	7

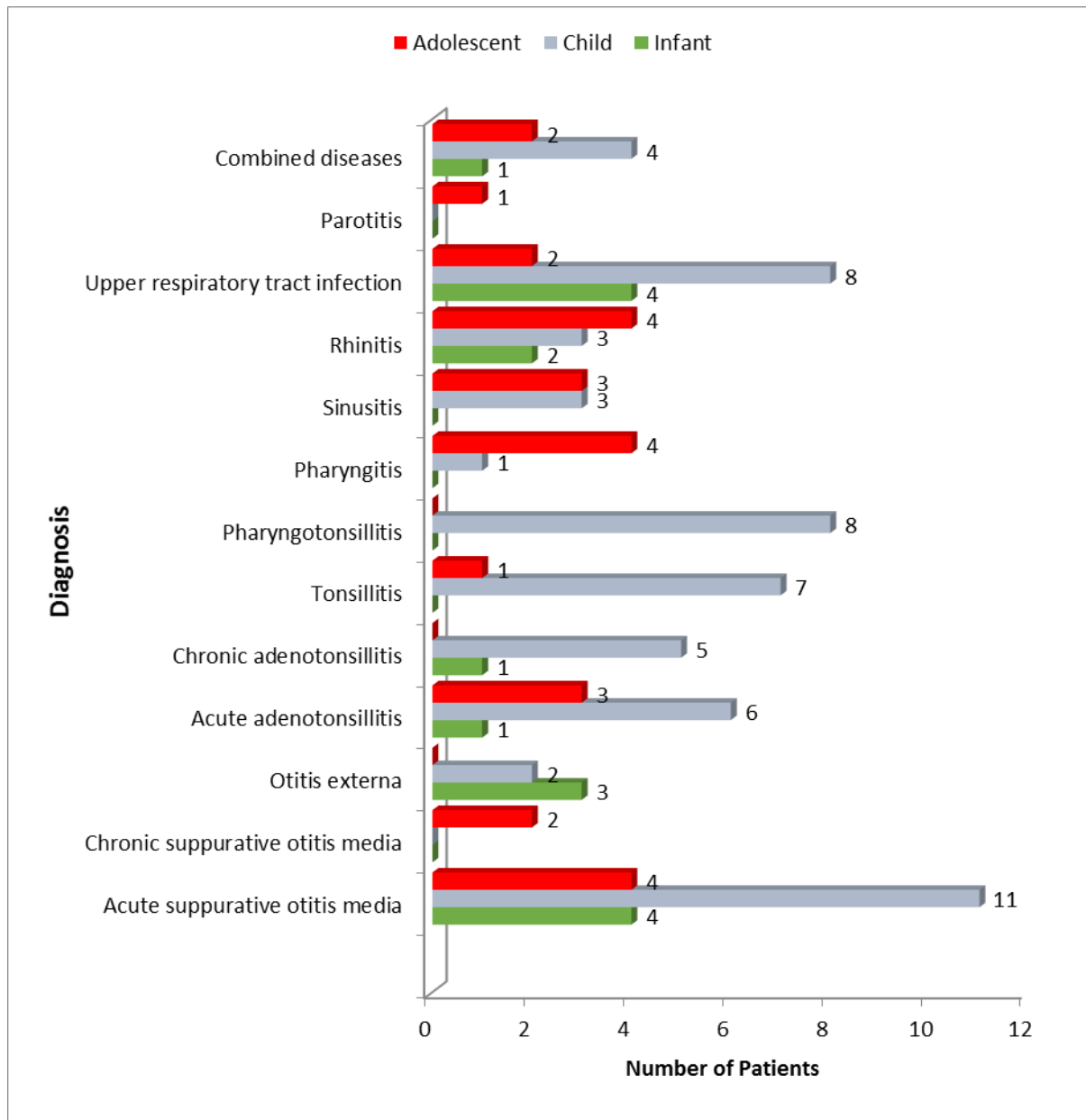


FIGURE 12: DIAGNOSIS AND AGE GROUP DISTRIBUTION

Infants manifested ASOM and nonspecific URTI more, while children showed the higher rate of ASOM and adolescents showed ASOM, Pharyngitis a Rhinitis in equal frequency.

TABLE 14: ENCOUNTERS WITH GENERIC AND BRAND NAMES

Type	Percentage
generic	8
Brand	92

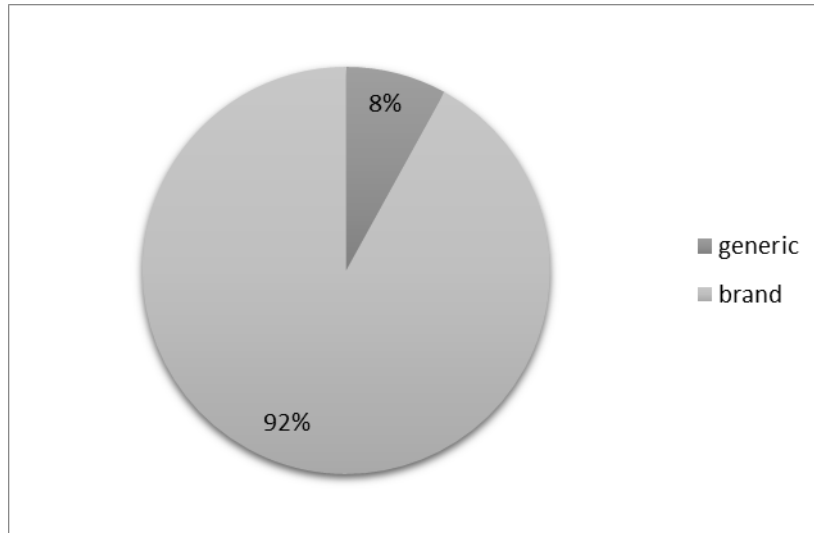


FIGURE 13: ENCOUNTERS WITH GENERIC AND BRAND NAMES

The number of encounters with brand names was observed compared to generics.

TABLE 15: CHOICE OF THERAPY

Prescribed drugs	Count
Symptomatic	18
Antibiotic + Symptomatic	82
Total	100

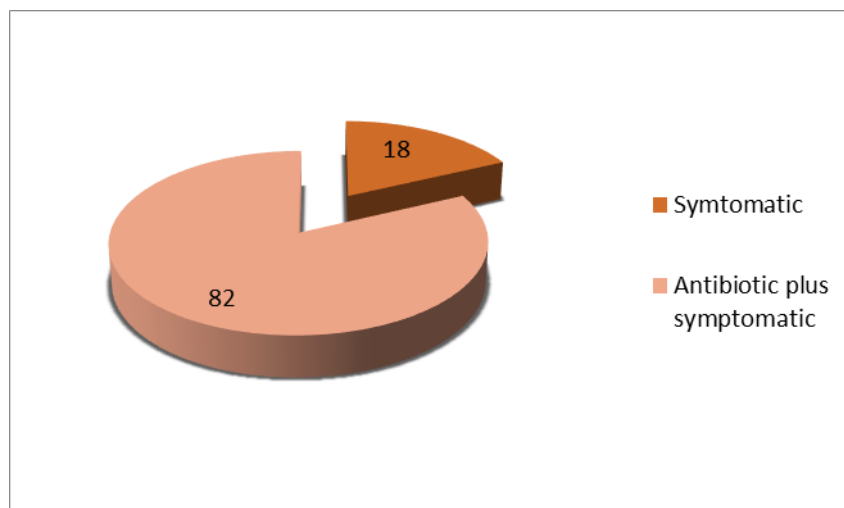


FIGURE 14: CHOICE OF THERAPY

Out of the two therapies followed, antibiotic plus symptomatic therapy was prescribed commonly compared to symptomatic therapy alone.

TABLE 16: AGE AND MEDICATION ADHERENCE DISTRIBUTION

Age Group	Low adherence	Medium adherence	High adherence	Total
Infant	1	7	8	16
Child	17	27	14	58
Adolescent	14	10	2	26
Total	32	44	24	100

	Value	df	Asymp. sided)	Sig. (2-
Pearson Chi-Square	14.980	4	0.005	

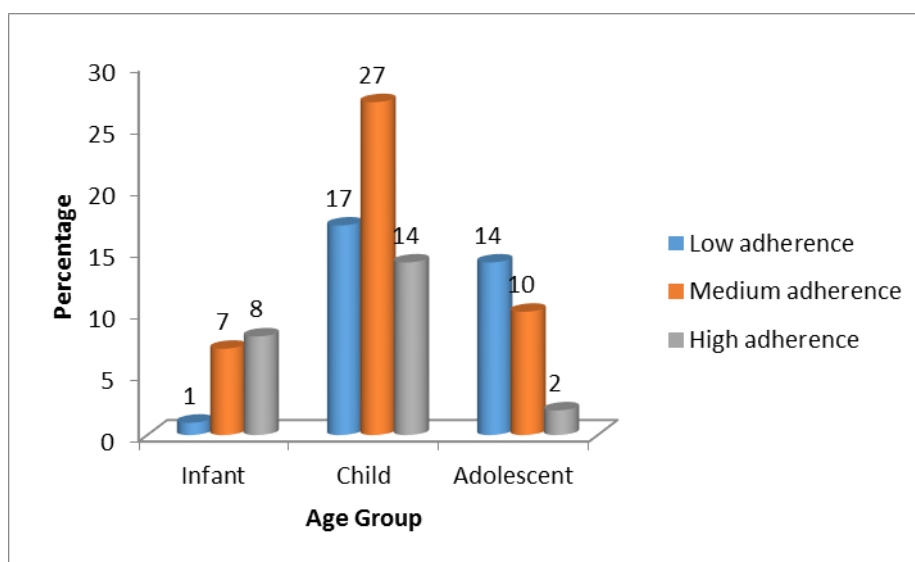


FIGURE 15: AGE AND MEDICATION ADHERENCE DISTRIBUTION

There exists a relationship between the Age group and Medication adherence in pediatric patients. Adolescent group shows the maximum number of low adherence.

CONCLUSION

- The present study reveals that antibiotics are the most prescribed drugs for ENT infections in pediatric patients, amoxicillin-clavulanate of penicillin-beta lactamase inhibitors, a fixed-dose combination, being the most commonly prescribed among them. Antibiotics are prescribed to pediatric patients based on empirical therapy without the

sensitive test but most of the patients responded well to the use of antibiotics. The average drugs per prescription were found to be 3.5. It is better to keep the average number of drugs per prescription as low as possible to avoid chances of drug interactions and increased cost. Almost all antibiotics prescribed were from the WHO Essential Drug List. The number of encounters with antibiotic prescribed seems rational for the infection. Oral route was preferred more than the parenteral route. Throat infections were seen highest in the total study population. However, in evaluating the incidence of diagnosed infections, acute suppurative otitis media has the highest percentage. The occurrence of ENT infections was seen to be highest in 2-12 years of age group, with no significant relation with gender. The number of generics prescribed was very low which may lead to medication errors. Low adherence was seen in adolescents while infants showed high adherence comparatively.

- Counseling on the importance of adherence to adolescents may be required and education on rational drug use in the pediatric population is necessary. Through the sessions of patient interview, we were able to understand that most of the patients were unaware of the importance of rational use of drugs, including the completion of the antibiotic course. This has enabled us to establish the importance of pharmacists to counsel all the patients during the dispensing of drugs, especially to the vulnerable group to prevent bacterial resistance and recurrent infections.

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