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# DRUG UTILIZATION EVALUATION OF ANTIBIOTICS USED IN INPATIENTS AT A TERTIARY CARE HOSPITAL IN TELANGANA STATE

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## ABSTRACT

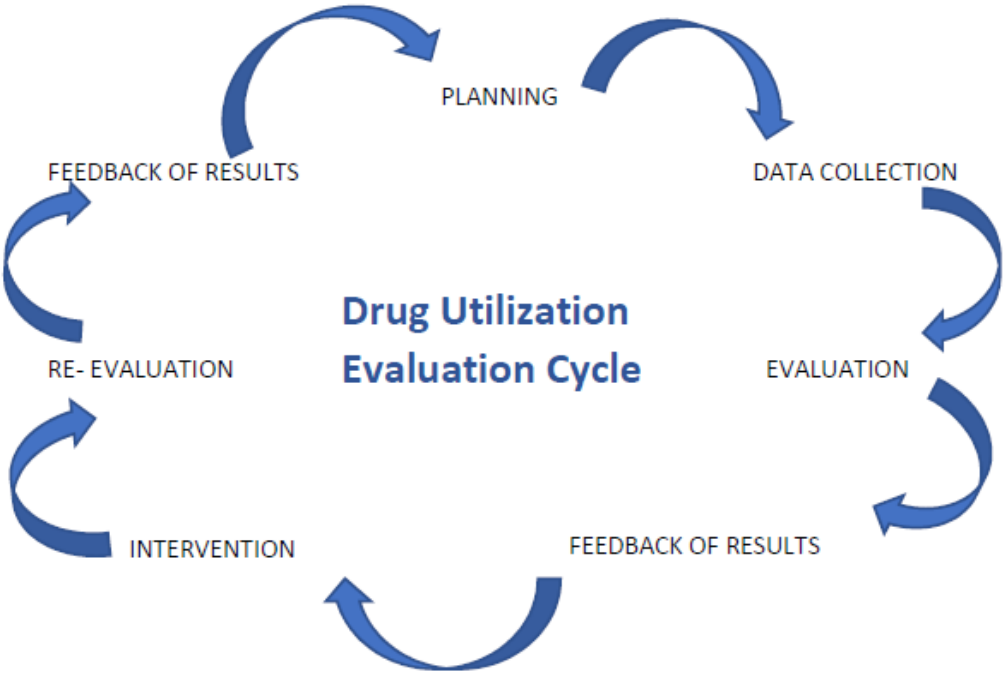
**Introduction:** Antibiotics are a boon to mankind, which saves a person from dreadful infections. They are the most frequently used drugs with the highest probability of developing resistance. The prevalence of antibiotic use is very high in India and ranges from 24 to 67%. Being the country with highest burden of infectious diseases, India has highest rate of antibiotic prescriptions which leads to their irrational and indiscriminate use, resulting in rapid increase of antibiotic resistance. Hence, it is very important to follow the optimal usage and to perform Drug Utilization Reviews to prevent resistance and cost burden of antibiotics. **Methodology:** This is a prospective study with 514 samples, carried out for 6 months. The data was collected in a specially designed form which contains details like indication for treatment, dose, duration of therapy, dose interval etc., and is entered in MS Excel sheets, followed by the analysis. **Results:** Males were predominant in the study with 65.36% and male to female ratio is 2.3: 1.7. 21-60 years of age group were the population that were mostly prescribed antibiotics. Ceftriaxone, a third-generation cephalosporin was the commonest antibiotic prescribed. The average number of drugs per prescription was 3.59%. **Conclusion:** The prescribing patterns of antibiotics by physicians with standard regimens can decrease the drug resistance and financial burden on the patients. Clinical Pharmacists who serve as bridge between physicians and nurses can strive for the betterment of rational prescription of antibiotics.

**KEYWORDS:** DUE, Antibiotics, Clinical Pharmacist, Cephalosporins and Penicillins.

## INTRODUCTION

According to WHO, Drug Utilization Evaluation is defined as the marketing, distribution, prescription and use of drugs in society, with special emphasis on the resulting medical, social and economic consequences.[1] It is an important component of a Clinical Pharmacy service by Clinical Pharmacists.

Antibiotics are a boon to mankind, which saves a person from dreadful infections. They are the most frequently used drugs with the highest probability of developing resistance. The prevalence of antibiotic use is very high in India and ranges from 24 to 67%.[2] Being the country with highest burden of infectious diseases, India has highest rate of antibiotic prescriptions leading to their irrational and indiscriminate use which has resulted in rapid increase of antibiotic resistance.[3] Hence, it is very important to follow the optimal usage and to perform Drug Utilization Reviews to prevent resistance and cost burden of antibiotics. Although there are good number of studies on drug utilization of antibiotics in developed countries, only few were reported in rural parts of South India. The two main reasons to conduct this study are the irrational prescribing patterns by the physicians and the usage of antibiotics as OTC medications in rural areas.



## METHODOLOGY

- **Study site**: Malla Reddy Hospital.
- **Study design and Sample size**: Prospective study with 514 samples.
- **Study duration**: Six months (from December 2017 to May 2018).
- **Study details:** DUE study was carried out in inpatients prescribed with all types of antibiotics. The study period of 6 months was divided into 2 phases. Phase 1 from December 2017 to February 2018 and Phase 2 from March 2018 to May 2018.
- **Mode of Analysis** - The data includes: indication for treatment, dose, duration of therapy, dose interval etc., are collected, entered in MS Excel and the analysis was performed.
- **Tools used:** Data collection form and MS Excel.

**Inclusion and Exclusion Criteria:**

- Patients willing to participate in the study and with antibiotics in their prescriptions were included in the study.
- Patients above 80 years of age were excluded.

### Plan of work

**Phase 1**

Step 1: Approval was obtained from Institutional Human Ethics Committee.

Step 2: Literature review was done.

Step 3: Antibiotic prescribed patients were identified and the data was recorded.

Step 4: Recorded data was evaluated.

Step 5: Obtained data was compared with that of Standard guidelines.

**Phase 2**

Step 6: Patients prescribed with antibiotics were identified and the data was recorded again.

Step 7: Recorded data was evaluated.

Step 8: Feedback of results was given to Physicians and other Healthcare Providers.

## RESULTS AND DISCUSSION

- A total of 514 prescriptions were taken into the study. Majority of the patients were from General Medicine and General Surgery departments accounting for 205 and 172 respectively. The other departments involved in the study were Gynaecology and Obstetrics, Paediatrics, ENT, Ophthalmology, Pulmonology and Dermatology.

**Table 1: Distribution of antibiotic usage in the Inpatient wards.**

| Department | Number of Patients | Percentage |
|---|---|---|
| General medicine | 205 | 39.8% |
| General surgery | 172 | 33.4% |
| Gynaecology and Obstetrics | 49 | 10% |
| Paediatrics | 30 | 5.83% |
| ENT | 19 | 3.69% |
| Ophthalmology | 17 | 3.30% |
| Pulmonology | 13 | 2.5% |
| Dermatology | 09 | 1.75% |

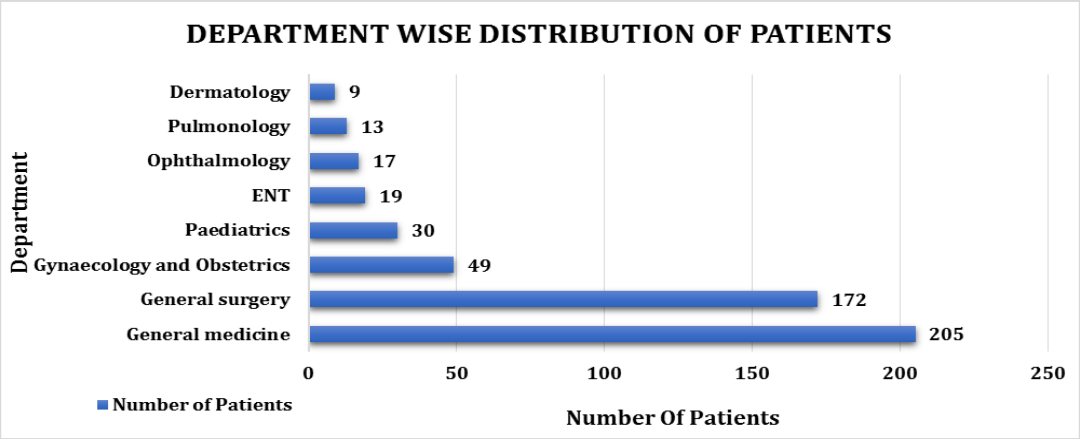



**Figure 1: Department wise distribution of the patients.**

❖ Among the total population, 336 were males and 178 were females as in table 2. And the male to female ratio is **2.3 : 1.7** or 1.8 (approximately) which is higher than 1.14 which is obtained in study conducted by ***Kanishk Kala et. al., 2017.***[4]

**Table 2: Gender wise distribution of patients.**

| Gender | Number |
|---|---|
| Males | 336 (65.3%) |
| Females | 178 (34.63%) |

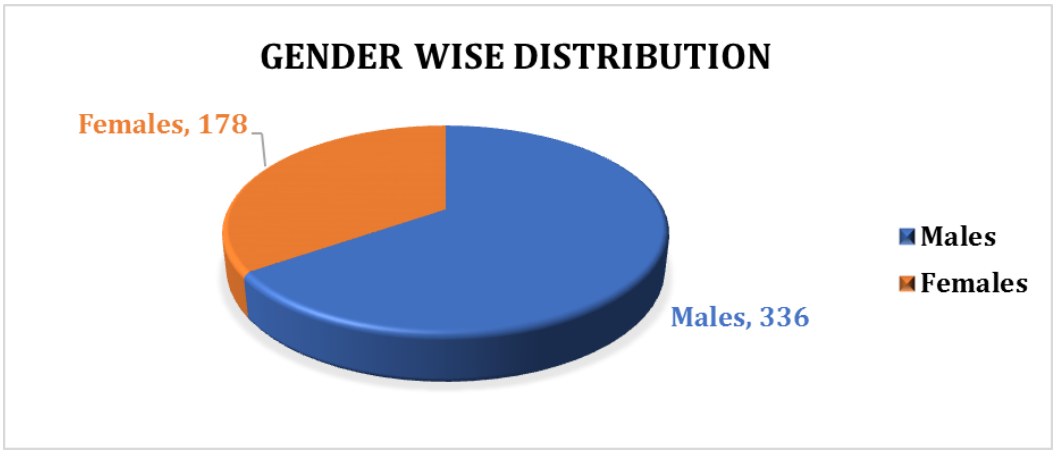



**Figure 2: Gender wise distribution of patients.**

- The highest usage of antibiotics was in the age group of 21-60 and least in 61-80 this is similar to ***Khade et al., 2013***[5] who said that majority of cases in his study were between the age group of 21 and 50 years. In contrast ***Kanishk Kala et. al.,***[4] the majority of patients were of the age group of 60 -80 years.

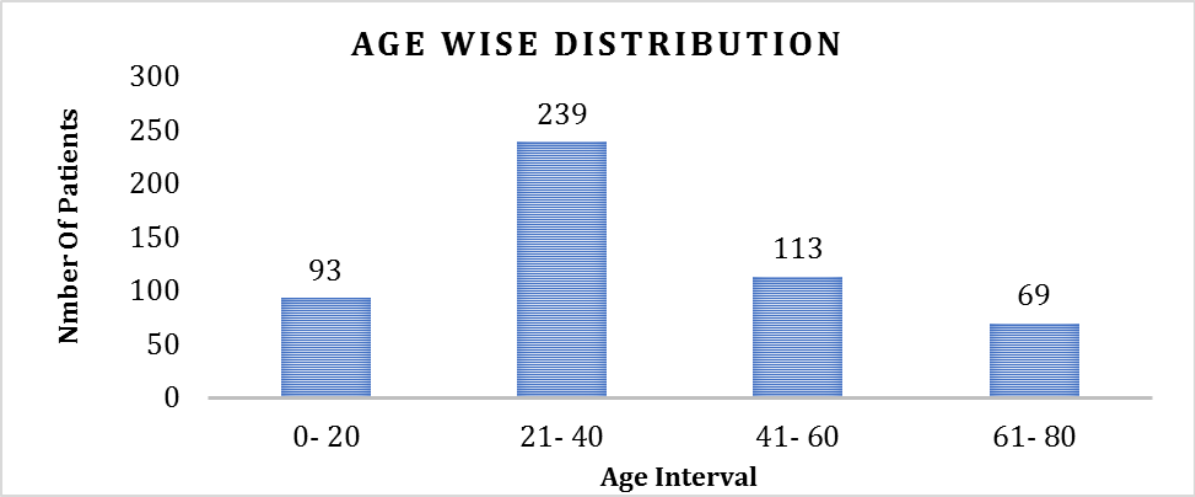



**Figure 3: Age wise distribution of patients.**

- The highest number of antibiotics prescribed among all the patients was 6 and the least was 1. Most people were prescribed with 4-5 antibiotics followed by 2-3 antibiotics in their prescription. The number of antibiotics prescribed were similar to ***Gowthami et.al., 2016.***[6]

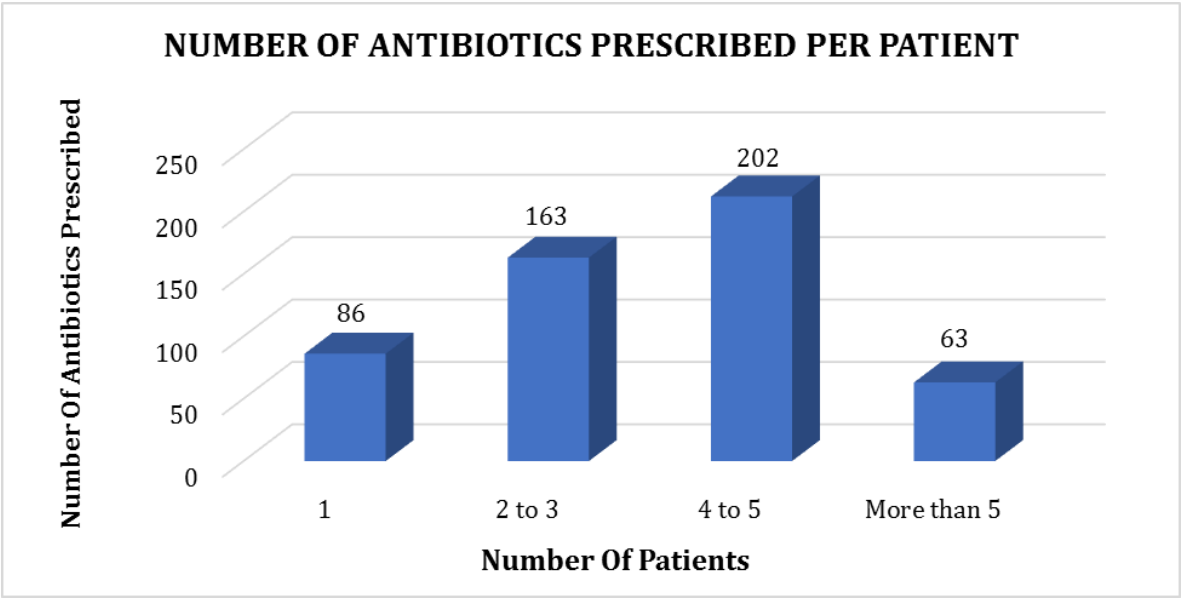



**Figure 4: Graph showing number of antibiotics prescribed per patient.**

- Among all the classes of antibiotics prescribed in the subjects, the highest were Beta-Lactam antibiotics, followed by Quinolones and Aminoglycosides. Of total 275 (53.5%) prescriptions of cephalosporins, Ceftriaxone, a third-generation cephalosporin was highly prescribed, which is about 86.21%. A similar study, done by ***G.L Revathysaravanan*** in a tertiary care level hospital in Erode, Tamilnadu showed that of 95.85% of hospitalized patients received third generation cephalosporin.[4]

**Table 3: Showing number of prescriptions with specific category of antibiotics.**

| Category of Antibiotics | Number of Prescriptions | Percentage |
|---|---|---|
| **Beta- Lactam Antibiotics** | | |
| • Cephalosporins | 275 | 53.5% |
| • Penicillins | 151 | 29.37% |
| **Quinolones** | 52 | 10.11% |
| **Macrolides** | 24 | 4.66% |
| **Aminoglycosides** | 12 | 2.33% |

- The appropriateness of usage of antibiotics in the study are as follows: 53.1% of prescriptions were rational for indication of treatment, 56.6% for dose, 60% for number of days the antibiotics should be used and 64.7% rationality was seen in dose interval. This is similar to that of ***Mohd. Mahmood et.al.***[7]

**Table 4: Showing appropriateness of antibiotic therapies when compared to standard guidelines.**

| Variable | Number of Prescriptions that were Appropriate | Percentage |
|---|---|---|
| Indication for treatment | 273 | 53.10% |
| Dose | 291 | 56.61% |
| Duration of Therapy | 312 | 60% |
| Dose Interval | 333 | 64.70% |

- The average number of drugs per prescription was 3.59%, percentage of drugs prescribed in generic names was about 21.5% and that of brand names was 78.4% as shown in the figure 5. But a similar study conducted by ***Kanishk Kala et. al.,***[4] concluded that number of drugs per prescription value was 4.73% and percentage of drugs by generic names was 28.16%.

**Table 5: Number of prescriptions in Generic and Brand names.**

| Number of prescriptions with drugs prescribed in Generic names | Number of prescriptions with drugs prescribed in brand names |
|---|---|
| 111 (21.5%) | 403 (78.4%) |

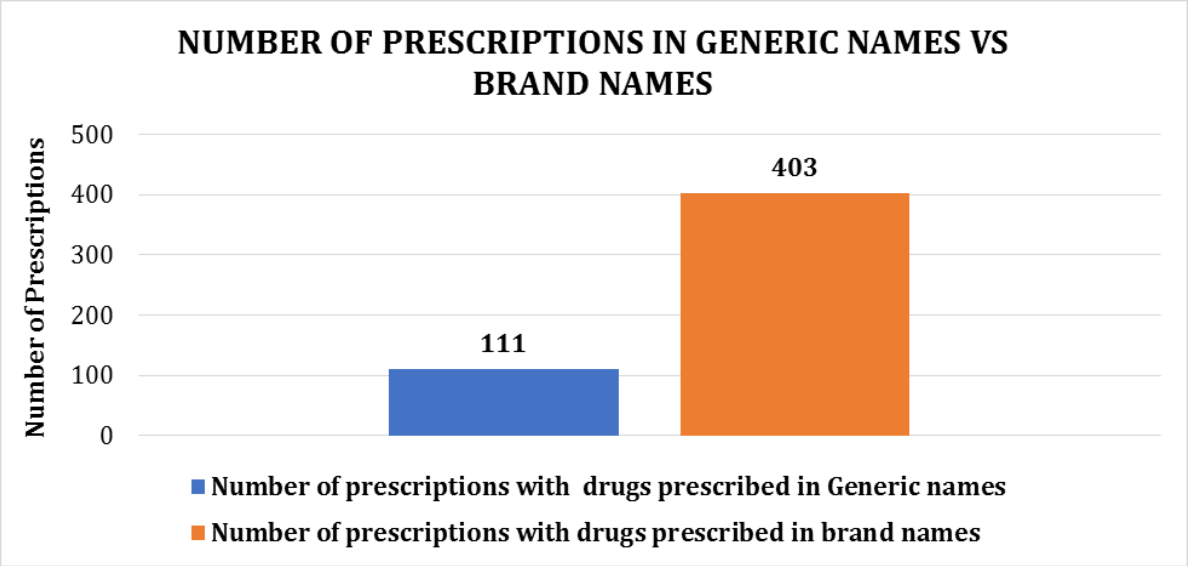



**Figure 5: Graph showing number of prescriptions in Generic and Brand names.**

## CONCLUSION

Finally, we conclude that the prescribing pattern of antibiotics by Physicians, following the standard regimens can decrease the drug resistance and financial burden on the patients. Clinical Pharmacists who serve as bridge between physicians and nurses can strive for the betterment of rational prescription of antibiotics.

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