PRESCRIPTION AUDITING IN REGARD WITH THE PRESCRIPTION PATTERNS IN A TERTIARY CARE TEACHING HOSPITAL

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ABSTRACT

Objective: The study was undertaken to know the prescription patterns and to evaluate the rationality of prescriptions in regard with different parameters in a tertiary care teaching hospital.

Methods: This project was a non-interventional, cross-sectional, and observational study conducted at GIMSR Hospital after obtaining permission from Institutional Ethics Committee. A total of 500 prescription forms of the patients who visited the Outpatient Departments of GIMSR hospital (GITAM University, Visakhapatnam) were recorded and evaluated for different parameters in consonance with the World Health Organization prescribing indicators. Results were analyzed and tabulated using simple statistical measures such as percentages and averages.

Results: We collected the data of 500 prescription forms of the patients who visited the hospital during July–August months of the year-2017. In this study, we observed that a total of 1127 drugs were prescribed. Therefore, average number of drugs prescribed per patient was found to be 2.25. Results of prescription profile of the patients results are as follows, drugs prescribed by generic names only in 7.98% of cases, fixed-dose combinations were used in 15.7% cases, more than one antibiotic was prescribed in 04% cases, and 87% prescriptions were legible, 73% of prescriptions with complete diagnosis, and only 65.5% prescriptions were complete in terms of dose, route, strength, and frequency and dosage forms.

Conclusion: Our study suggests that there is an immense scope of improvement in prescription patterns in the hospital. Majority of drugs (92.07%) were prescribed by the branded names, hence, there is an urgent need for prescription of drugs by generic names. Other parameters such as complete diagnosis and legibility of prescriptions need to be improved.

Keywords: Prescription patterns, Polypharmacy, Generic drugs, Fixed-dose combinations.

INTRODUCTION

Medicines play an important role in health-care delivery and disease prevention. The availability and affordability of good quality drugs along with their rational use is needed for effective health care [1]. However, irrational drug use is prevalent, especially in the developing countries which have been considered as one of the most important factors for development of drug resistance. Furthermore, the World Health Organization (WHO) reports that more than half of all medicines are prescribed, dispensed or sold inappropriately, and that half of all patients fail to take their medicine correctly [6]. Irrational prescribing is a global problem. The rationality of prescribing pattern is of utmost importance because bad prescribing habits including misuse, overuse and underuse of medicines can lead to unsafe treatment, exacerbation of the disease, health hazards, and economic burden on the patients, and wastage of scarce resources. Therefore, prescription auditing plays an important role in evaluation/analysis of the prescriptions or case records of health-care setup. It is not only prevent further irrational prescribing habits but also makes prescribers accountable to their commissions and omissions. Hence, there is an immense scope for prescription auditing/auditors in different health-care settings.

METHODS

This project was a non-interventional, cross-sectional, and observational study conducted at GIMSR Hospital after obtaining permission from Institutional Ethics Committee. A total of 500 prescription forms of the patients who visited the Outpatient Departments of GIMSR Hospital (GITAM University, Visakhapatnam) were recorded and evaluated for different parameters in consonance with the WHO prescribing indicators [7].

Selection criteria

• Inclusion: Only the prescription forms of outpatients were included in the study.
• Exclusion: The admitted patient’s prescriptions or case records were excluded from the study, and also patients who were not willing to share their prescriptions were excluded.

The selected prescription forms were evaluated for prescribing patterns in consonance with the WHO indicators and other parameters.
such as age wise distribution of diseases and incidence. The WHO indicators are average number of drugs per encounter, percentage of drugs prescribed by generic names, number of fixed-dose combinations (FDCs), percentage of drugs prescribed from essential medicine list and different drug formulations, etc. All the prescription forms were analyzed accordingly; and results were tabulated using simple statistical measures such as percentages and averages. The WHO prescribing indicators were calculated as shown below.

Prescribing indicators
1. Average number of drugs per prescription: Average, calculated by dividing the total number of drugs prescribed by total number of prescriptions.
2. Percentage of drugs prescribed by generic name: Percentage, calculated by dividing the number of drugs prescribed by generic name by the total number of drugs prescribed, multiplied by 100.
3. Percentage of antibiotics prescribed: Percentage, calculated by dividing the number of antibiotics prescribed by the total number of drugs prescribed, multiplied by 100.
4. Percentage of injections prescribed: Percentage, calculated by dividing the total number of injections prescribed by total number of drugs prescribed, multiplied by 100.
5. Percentage of drugs prescribed from essential drugs list: Percentage, calculated by dividing the number of products prescribed which are listed on the essential drugs list or local formulary by total number of products prescribed multiplied by 100.
6. Percentage of prescription with complete diagnosis, legibility with the signature of doctor present on the prescriptions.

OBSERVATIONS AND RESULTS
We collected the data of 500 prescription forms of the patients who visited the hospital during July–August months of the year-2017. Our study shown the following results, when we observed the demographic profile of the patients the study revealed that female patients were more in number (58%) compared to male patients (42%). With regard to age group majority of prescriptions (56.4%) were belonged to 16–30 years age group, then 14.4%, 11%, 11% belonged to 31–45 years, 46–60 years, and 1–15 years age group, respectively (Table 1 and Fig. 1 and Table 2 and Fig. 2), explain the aforementioned observations.

The observed disease pattern was variable. Diseases of the respiratory system were maximum 36% followed by diseases of gastrointestinal system 27% and diseases of musculoskeletal system 15.6%. Diseases of cardiovascular system were 8%, diseases of central nervous system were 6%, diseases of endocrine system were 4%, and infectious and parasitic diseases were 3.4% (Table 3 and Fig. 3) explain the above results.

If we observe the prescription profile of the patients the results are as follows, drugs prescribed by generic names only in 7.98% of cases. FDCs were used in 15.7% cases. More than one antibiotic was prescribed in 4% cases. Around 87% prescriptions were legible, 73% of prescriptions with complete diagnosis, and only 65.5% prescriptions were complete in terms of dose, route, strength, frequency, and dosage forms (Table 4 and Fig. 4) explain the above-mentioned parameters.

In this study, we observed that a total of 1127 drugs were prescribed. Therefore, average number of drugs prescribed per patient was found to be 2.25. With regard to dosage forms, it was found that majority of drugs prescribed were oral (92.19%) followed by injections (3.37%) and topical (4.43%). Drugs prescribed from the National List of Essential Medicine 2015 were 97.07% (Table 5 explains about the dosage formulations). The most common drug groups prescribed were multivitamins, minerals, and enzymes 26.79%, nonsteroidal anti-inflammatory drugs (NSAIDs) 21.29%, antilucre drugs 19.69%, antibiotics 12.42%, antihistamines 10.64%, antipsychotic and antifungals 4.88%, and expectorants and bronchodilators 1.15% (Table 6 and Fig. 5) explain about these details.

### Table 1: Gender wise distribution of patients

| Sex distribution | Number of prescriptions (%) |
|------------------|----------------------------|
| Males            | 210 (42)                   |
| Females          | 290 (58)                   |

### Table 2: Age wise distribution of patients

| Age group (years) | n (%) |
|-------------------|-------|
| 1–15              | 55 (11)|
| 16–30             | 282 (56.4)|
| 31–45             | 72 (14.4)|
| 46–60             | 55 (11)|
| 61–75             | 25 (05)|
| Above 75          | 11 (2.2)|

### Table 3: Disease pattern in patients

| Disease pattern               | Number of prescriptions (%) |
|-------------------------------|-----------------------------|
| Diseases of respiratory system| 180 (36)                    |
| Diseases of digestive system  | 135 (27)                    |
| GIT                            | 78 (15.6)                   |
| Diseases of musculoskeletal system| 40 (08)                    |
| Diseases of cardiovascular system| 30 (06)                    |
| Diseases of central nervous system| 20 (04)                    |
| Diseases of endocrine system   | 17 (3.4)                    |

GIT: Gastrointestinal tract

### Table 4: Prescription profile of the patients

| Parameters                                      | Number of prescriptions (%) |
|------------------------------------------------|----------------------------|
| Drugs were prescribed by generic names          | 90 (7.98)                  |
| FDCs used                                      | 177 (15.7)                 |
| More than one antibiotic prescribed             | 20 (04)                    |
| Complete diagnosis written                      | 365 (7.3)                  |
| Legibility                                     | 435 (87)                   |
| Complete prescription in terms of dose, route, strength, frequency and dosage forms | 327 (65.4) |
| FDCs: Fixed-dose combinations                   |                            |

### Table 5: Drug dosage formulations profile

| Parameters                                      | Number of drugs (%) |
|------------------------------------------------|---------------------|
| Drugs on EML (2015)                            | 1094 (97.07)        |
| FDCs used                                      | 177 (15.7)          |
| Dosage forms                                   | 1039 (92.19)        |
| Oral                                           | 38 (3.37)           |
| Injectable                                     | 50 (4.43)           |

EML: Essential medicines list, FDCs: Fixed-dose combinations

DISCUSSION
The rationality of the scripts prescribed by physicians is of critical importance, since bad prescribing habits lead to ineffective and unsafe treatment, causing exacerbation or prolongation of disease and distress or harm to the patient, which adds an extra burden to health budgets of family and government.

The demographic profile of the patients of our study revealed that female patients were more in number (58%) compared to male patients (42%). With regard to age group majority of prescriptions (56.4%) were belonged to the 16–30 years age group, then 14.4%, 11%, and
11% belonged to 31–45 years, 46–60 years, and 1–15 years age group, respectively.

In our study, the total number of drugs in 500 prescriptions analyzed was 1127. Therefore, average number of drugs/prescription is 2.25. This number is almost equal to the WHO recommended a limit of 2.0 [7].

Increase in the number of average drugs per prescription may increase the risk of drug interactions, may lead to unwanted side effects and also increases the prescribing and dispensing errors. However, in certain conditions like cardiovascular problems, the patients may require more than one drug.

The recently published Seventh Report of the Joint National Committee on prevention, detection, evaluation, and treatment of high blood pressure guidelines also permit polypharmacy in hypertension [8].

Drugs were prescribed by generic names in only 7.98% of cases. This figure is very low as compared to other Indian studies many of which have even reported up to 73.4% usage of generic name [9]. This clearly shows how our prescribing habits are being directly influenced by the representatives of the drug companies for undue favors. Generic prescribing reduces the chances of dispensing errors which may be due to misinterpretation of sounding names of drugs and also decreases the economic burden on the patients. Hence, we should encourage generic prescribing by educational intervention methods and strict compliance to the WHO drug policies. We should organize seminars and other programs to sensitize the prescribing clinicians/health-care professionals.

Drugs prescribed from National List of Essential Medicines were about 97.07%. It was higher when compared to other studies [10,11]. Around 92% of drugs were prescribed as oral formulations, 3.37% of drugs as injectables, and 4.43% as topical formulations. Prescription of injectables was less when compared to other two Indian studies which reported 7% and 6.8% use of injectables, respectively [12,13]. We need to reduce the unnecessary use of injectables to prevent HIV and other blood-borne infections [14].

FDCs of antibiotics are highly popular in the Indian pharmaceutical market. Studies are showing extensive use of a fixed dose of antimicrobials in developing countries. Though WHO has approved only 25 FDC in the 15th edition of the WHO essential drugs list [15,16]. In our study, overall FDCs used were in 15.7% of prescriptions. This figure is comparatively similar with other studies [17]. Increased use of FDCs may warrant inappropriate use of unwanted drugs which can lead to adverse effects and drug interactions. Use of FDCs should be discouraged unless strictly necessary.

Antibiotics prescribed were 12.42% of total drugs. This result is acceptable and as compared to a study by Gupta et al. in which half of the

| Category of drugs                      | Number of drugs (%) |
|----------------------------------------|---------------------|
| NSAIDs                                 | 240 (21.29)         |
| Opioid analgesics                      | 35 (3.1)            |
| Antibiotics                            | 140 (12.42)         |
| Anti-ulcer drugs/GIT                   | 222 (19.69)         |
| Antihistaminics                        | 120 (10.64)         |
| Anti-parasitic and antifungals         | 55 (4.88)           |
| Multivitamins, minerals, and enzymes   | 302 (26.79)         |
| Expectorants and bronchodilators       | 13 (1.15)           |

*GIST: Gastrointestinal tract, NSAIDs: Nonsteroidal anti-inflammatory drugs*

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**Fig. 1: Gender wise distribution of patients**

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**Fig. 2: Age wise distribution of patients**

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**Fig. 3: Disease pattern in patients**

In our study, the total number of drugs in 500 prescriptions analyzed was 1127. Therefore, average number of drugs/prescription is 2.25. This number is almost equal to the WHO recommended a limit of 2.0 [7].
patients, i.e., 50% received more than one antibiotic this figure is much lower [18]. According to the WHO, in developing countries, 15–25% of prescriptions with antibiotics are expected when infectious diseases are prevalent [19]. Previous studies reported that the use of antibiotic was 78% in Bangladesh, whereas it varied from 40 to 80% in India. In one study, the percentage of prescriptions with antibiotics was 54% which is less but do not comply the WHO standard [20]. Appropriate use of antibiotics is absolutely necessary to prevent the emergence of drug resistance and should be mostly used after culture sensitivity testing. Most of the acute respiratory and acute gastroenteritis cases are viral in nature and may not need antibiotics. An antibiotic policy should be formulated so that the clinicians can use them judiciously according to patients need.

Completeness in terms of dose, route, strength, and frequency and dosage forms was seen only in 65.4% of prescriptions and with complete diagnosis 73%. All these information should be complete in all respects. Only 87% of prescriptions were legible. Therefore, proper training and education of physicians are necessary regarding legibility and completeness of prescriptions in all aspects. The most common disease pattern seen in patients attending our hospital was diseases of respiratory system accounting for 36% of cases followed by diseases of gastrointestinal system which were 27 %, and diseases of musculoskeletal system were 15.6 % of cases.

The most common categories of drugs prescribed were multivitamins, minerals, and enzymes, i.e., 26.82% followed by NSAIDs which were 21.28%, antiulcer drugs 19.73%, antibiotics 12.41%, and antihistamines were 10.64%. Doctors should not prescribe unnecessary medicines such as multivitamins, minerals, and enzymes unless absolutely required by the patient. They should adhere and prescribe from the National List of Essential Medicines.

CONCLUSION

The present study suggests that there is an immense scope of improvement in a prescription pattern in the hospital. Majority of drugs (92.07%) were prescribed by the branded names, hence, there is an urgent need for prescription of drugs by generic names. Polypharmacy was not observed antibiotic usage, use of dosage formulations, FDCs, prescription of drugs from National List of Essential Medicines, etc., were almost in line with the WHO recommendations. Other parameters such as complete diagnosis and legibility of prescriptions need to be improved.

To improve the quality of care, an action plan should be formulated with recommendations for changing the present prescribing practices by providing the hospital doctors with the standard treatment guidelines, National Essential Medicine List, and antibiotic policy.

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AUTHORS CONTRIBUTIONS
Dr. A Naveen raised the idea, designed the study and participated in statistical analysis and drafted the manuscript; Dr. B Ramesh participated in the study conception and manuscript revision; Ms. Teki siwani, collected the data from the hospital and also involved in statistical analysis.

CONFLICT OF INTERESTS
All authors have none to declare.

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