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RESEARCH ARTICLE

# Drug utilization pattern in outpatient departments of a tertiary care rural teaching hospital, Central Gujarat

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## ABSTRACT

**Background:** Drug utilization studies would benefit to measure various dimensions such as medicine use and drug prescribing pattern. **Aim and Objective:** This study aims to study drug utilization pattern in the outpatient departments of a tertiary care rural teaching hospital in Central Gujarat. **Materials and Methods:** This prospective, cross-sectional, observational study was conducted in the 500 outdoor patients of any age and either sex from various departments of Dhiraj Hospital, Piparia. Various aspects of drug utilization were studied. **Results:** In total, 811 drugs were prescribed. Of the 811 drugs, 87.79% drugs were prescribed by brand names while only 12.21% were prescribed by their generic names. Only 30.01% prescribed drugs belonged to the essential medicine list and 35.55% were rational. Of the drugs prescribed, 89.14% were fixed-dose drug combinations. Out of all drugs, 56.75% were found to be most appropriate for dose, frequency of administration, and duration of therapy, whereas 33.40% and 9.85% were found to be appropriate and inappropriate, respectively. In dosage form and route of administration, 90.15% were found to be appropriate and 9.85% were inappropriate, respectively. **Conclusion:** Drug utilization studies would help rational use of medicines and provide better patient health care.

**KEY WORDS:** Drug Utilization Brand Name; Essential Medicine; Fixed-dose Drug Combinations; Appropriateness

## INTRODUCTION

An important aspect of patient care is the assessment of the drug prescription pattern, which also serves as a measure of the quality of care given. A new systemic review has shown that prescription consistency is a factor that needs continuous assessment.[1] Effective medication usage is essential for a successful and productive health-care program. However, inappropriate medication use, considered a global threat, is particularly common in many developing countries along with irrational (IR) medication prescription, dispensing, and administration.[2] These inappropriate prescriptions are illegal and dramatically decrease the quality of medication treatment in addition to contributing to widespread safety risks such as increased occurrence of adverse effects, drug reactions, and the rise of drug resistance, in particular with antimicrobial therapy.[3] The World Health Organization (WHO) estimated that more than half of all drugs are administered, dispensed, or priced improperly.[4]

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Prescription pattern advancement of structured information is tools for assessing the prescription, dispensing, and distribution of prevailing medicines at a given location. Such studies mainly aim to facilitate the rational use of medicines. The drug usage measures were created by the WHO in conjunction with the international substance usage rational network in an attempt to assess the level of appropriate prescribing.[5,6] According to the WHO, key substance use measures are classified into three groups, including the

prescribing indicators, patient safety indicators, and the standard of treatment indicators.

These are indicators that are readily available and do not require national adaptation. While not measuring all aspects of drug use requiring intensive methodologies, extensive and varied data sources, the core drug use indicators provide a simple tool for quickly and reliably evaluating a few critical aspects of pharmaceutical use in health care. Indicators of drug use obtained in a cross-sectional survey or analyzed at various times to assess performance change are usually determined within a designated geographical or administrative area, either to characterize drug use at a given instant of time or to evaluate changes that occur.

This research was designed to analyze drug treatment activities in our tertiary care facility, which is a medical college hospital, using the five WHO pharmacy metrics including the total number of medications per patient experience, the proportion of medications treated by generic label, the proportion of antibiotic encounters administered, and the percentage of antibiotic encounters. Such WHO metrics will be instrumental in determining the degree of polypharmacy, the magnitude of the generic prescribing, if the use of antibiotics and parenteral medications is sufficient in addition to calculating conformity to the list of necessary drugs.[6,7]

## MATERIALS AND METHODS

The study protocol was accepted by the Institutional Ethics Committee, the study was performed as a cross-sectional study in our tertiary care teaching hospital's OPD. We selected a sample size of 500 based on the WHO criteria for drug utilization studies. On receiving a written informed consent, this analysis was conducted prospectively from the patients as they appeared for consultation at the OPD. For the WHO prescribing indicators over 8 months from September 2016 to April 2017, prescriptions were randomly selected to be analyzed. Two well-trained professional pharmacists collected data on prescribing measures. For measuring the necessary criteria, each medication was deemed to be a single-patient experience. Regardless of the comorbidities, prescriptions were included of patients attending medical OPD and being treated outpatient for their ailments. Data were collected regarding the demographic details of age, gender, diagnosis, and recommended care listed in the prescription.

- Average number of drugs per encounter: The average number of encounters examined was determined by calculating the total number of specific prescription drug items. Whether the patient actually got the drug was not considered important when measuring this measure
- The percentage of prescribed medications by generic name: The percentage was determined by dividing the number of drugs prescribed by generic name, by the number of drugs prescribed and expressed as a percentage
- The percentage of fixed-dose combination drugs
- Percentage of drugs prescribed as a rational and from essential drugs list or formulary: Percentage was calculated by dividing the number of products prescribed which were on the essential drugs list or local formulary, by the total number of products prescribed and multiplied by 100.

## RESULTS

The data were transcribed in Microsoft Excel 2007 and assessed to determine the prescription parameters as frequency distributions and percentages. A total of 500 prescriptions from September 2016 through April 2017 were evaluated over 8 months.

### Number of Patients Recruited and Department-wise Distribution Thereof

A total of 500 patients who met the inclusion criteria were included in the study. Of these, 500 were those who attended to outdoor departments. Department-wise distribution of these patients is shown in Table 1.

### Age of the Patients

The age of OPD patients ranged from 18 to 83 years with a mean of 45.61 ± 13.41 years. Majority of patient (60.00%) were had age between 18 and 50 years followed by 20% had age between 51 and 65 years and 20% had age more than 65 years.

### Disease Distribution Pattern

The disease distribution pattern for which drugs were prescribed to patients in various departments is shown in Table 2.

All 500 patients were prescribed drugs, culminating into a total of 811 drugs used. Of these, majority of the drugs were prescribed using brand names (712, 87.79%). Only

**Table 1:** Department-wise distribution of these patients

| Name of the department | OPD patients | | Total |
|---|---|---|---|
| | Male | Female | |
| Medicine | 54 | 21 | 75 |
| Surgery | 49 | 26 | 75 |
| Orthopedics | 59 | 16 | 75 |
| Obstetrics and gynecology | 0 | 75 | 75 |
| Pediatrics | 48 | 27 | 75 |
| ENT | 17 | 8 | 25 |
| Ophthalmology | 12 | 13 | 25 |
| Skin and V.D. | 7 | 18 | 25 |
| Psychiatry | 11 | 14 | 25 |
| Respiratory medicine | 13 | 12 | 25 |
| Total | 270 | 230 | 500 |

**Table 2:** Department-wise disease distribution pattern

| Department | Outpatient department | | |
|---|---|---|---|
| | **Disease** | **No. of patients** | **%** |
| Medicine | Hypertension | 30 | 40.00 |
| | Angina pectoris | 5 | 6.67 |
| | CCF | 3 | 4.00 |
| | Cardiac arrhythmias | 2 | 2.67 |
| | Diabetes mellitus | 20 | 26.67 |
| | Others | 15 | 20.00 |
| Surgery | Stone | 20 | 26.66 |
| | Burning micturition | 15 | 20.00 |
| | Gallbladder calculi | 10 | 13.33 |
| | UTI | 15 | 20.00 |
| | Acute cholecystitis | 5 | 6.67 |
| | Fibroadenoma | 10 | 13.33 |
| Orthopedics | Rheumatoid arthritis | 05 | 6.66 |
| | Osteoarthritis | 10 | 13.33 |
| | Muscle pain | 20 | 26.67 |
| | Severe low back pain | 20 | 26.67 |
| | Cervical spondylitis | 12 | 16 |
| | Trapezitis | 08 | 10.66 |
| Obstetrics and gynecology | Chronic pelvic inflammatory disease | 10 | 13.33 |
| | Cervical fibroid | 6 | 8.00 |
| | Dysmenorrhea | 6 | 8.00 |
| | Ca. cervix | 6 | 8.00 |
| | Others | 47 | 62.67 |
| Pediatric | Common cold with cough | 30 | 40.00 |
| | Diarrhea | 20 | 26.67 |
| | Pneumonia | 10 | 13.33 |
| | Lack of appetite | 5 | 6.67 |
| | Vomiting | 10 | 13.33 |
| ENT | Otitis media | 10 | 40.00 |
| | Pharyngitis | 2 | 8.00 |
| | Laryngitis | 1 | 4.00 |
| | Tonsillitis | 10 | 40.00 |
| | Others | 2 | 8.00 |
| Ophthalmology | POAG | 2 | 8.00 |
| | Conjunctivitis | 7 | 28.00 |
| | Stye | 5 | 20.00 |
| | Chalazion | 1 | 4.00 |
| | Foreign body | 4 | 16.00 |
| | Diabetic retinopathy | 3 | 12.00 |
| | CRAO | 2 | 8.00 |
| | CRVO | 1 | 4.00 |
| Skin | Acne vulgaris | 12 | 48.00 |
| | Psoriasis vulgaris | 5 | 20.00 |
| | Lice | 3 | 12.00 |
| | Urticaria | 3 | 12.00 |
| | Tinea versicolor | 2 | 8.00 |

(*Contd...*)

**Table 2:** (*Continued*)

| Department | Outpatient department | | |
|---|---|---|---|
| | **Disease** | **No. of patients** | **%** |
| Psychiatrics | Schizophrenia | 12 | 48.00 |
| | Insomnia | 7 | 28.00 |
| | Bipolar disorder | 3 | 12.00 |
| | MDD | 1 | 4.00 |
| | Other | 2 | 8.00 |
| Respiratory medicine | Asthma | 6 | 24.00 |
| | COPD | 3 | 12.00 |
| | Cough and cold | 12 | 48.00 |
| | Bronchitis | 2 | 8.00 |
| | Other | 2 | 8.00 |

99 (12.21%) medicines were prescribed by their official International Nonproprietary Names or Generic [Table 3].

### Status of Fixed-dose Drug Combinations (FDCs)

In our study, it was found that out of 811 drug formulations prescribed, 723 were FDCs [Table 4].

Out of all drugs, 56.75% were found to be most appropriate for dose, frequency of administration, and duration of therapy, whereas 33.40% and 9.85% were found to be appropriate and inappropriate, respectively. In dosage form and route of administration, 90.15% were found to be appropriate and 9.85% were inappropriate, respectively [Table 5].

From the drugs used in OPD, a varying number of drugs were used in 500 patients during their hospital visit as well hospital stay culminating into 811 drug uses. From these, 30.02%, 8.10%, and 61.88% drug uses were by essential, substituted essential, and non-essential drugs, respectively. Use of rational drug was in 35.55% drug uses leaving only 64.45% as by IR drugs [Figure 1].

**Table 3: Branded versus generic** drug distribution

| Department | Outpatient department | | | | |
|---|---|---|---|---|---|
| | **Branded** | **%** | **Generic** | **%** | **Total** |
| Ortho | 92 | 91.09 | 9 | 8.91 | 101 |
| Obs. and Gynec. | 98 | 98.00 | 2 | 2.00 | 100 |
| Surgery | 107 | 86.29 | 17 | 13.71 | 124 |
| Medicine | 154 | 88.51 | 20 | 11.49 | 174 |
| Ophthal. | 38 | 100.00 | 0 | 0.00 | 38 |
| ENT | 36 | 90.00 | 4 | 10.00 | 40 |
| Pediatrics | 90 | 74.38 | 31 | 25.62 | 121 |
| Psychiatrics | 27 | 77.78 | 4 | 22.22 | 31 |
| Res. Med. | 32 | 75.00 | 5 | 25.00 | 38 |
| Skin | 38 | 75.00 | 7 | 25.00 | 45 |

**Table 4:** Fixed-dose drug combinations

| Department | OPD | % |
|---|---|---|
| Ortho | 90 | 12.45 |
| Obs. and Gynec. | 99 | 13.69 |
| Surgery | 110 | 15.21 |
| Medicine | 159 | 21.99 |
| Ophthal. | 30 | 4.15 |
| ENT | 38 | 5.26 |
| Pediatrics | 99 | 13.69 |
| Psychiatrics | 30 | 4.15 |
| Respiratory medicine | 30 | 4.15 |
| Skin | 38 | 5.26 |
| Total | 723 | 100 |

## DISCUSSION

In our study, a total of 500 prescriptions were analyzed prescribed to outdoor patients. Average number of medicines prescribed per prescription was 1.62. Around 30.02% of drugs were prescribed from the WHO model list of essential medicines. Approximately 87.79% of drugs were prescribed by their branded name and 12.21% of drugs were prescribed by their generic names. Out of all drugs, 56.75% were found to be most appropriate for dose, frequency of administration, and duration of therapy, whereas 33.40% and 9.85% were found to be appropriate and inappropriate, respectively. In dosage form and route of administration, 90.15% were found to be appropriate and 9.85% were inappropriate, respectively. In our study, it was found that out of 811 drug formulations prescribed, 723 were in the form of FDCs. Among the OPD patient out of all drugs, 35.55% were rational and 64.456% were irrational.

Providing the correct medication to the correct individuals at the right time could be a central priority of health care. The way to ensure this is often through the effective implementation of the WHO's recommendation on rational drug policies. Rational drug use could be an operate of prescription

**Table 5:** Appropriateness of various parameters

| Appropriateness parameters | Most appropriate | | Appropriate | | Inappropriate | | Total | |
|---|---|---|---|---|---|---|---|---|
| | *n* | % | *n* | % | *n* | % | *n* | % |
| Dose | 460 | 56.75 | 271 | 33.40 | 80 | 09.85 | 811 | 100.00 |
| Frequency of administration | 460 | 56.75 | 271 | 33.40 | 80 | 09.85 | 811 | 100.00 |
| Duration of therapy | 460 | 56.75 | 271 | 33.40 | 80 | 09.85 | 811 | 100.00 |
| Dosage form | 0 | - | 731 | 90.15 | 80 | 09.85 | 811 | 100.00 |
| Route of administration | 0 | - | 731 | 90.15 | 80 | 09.85 | 811 | 100.00 |

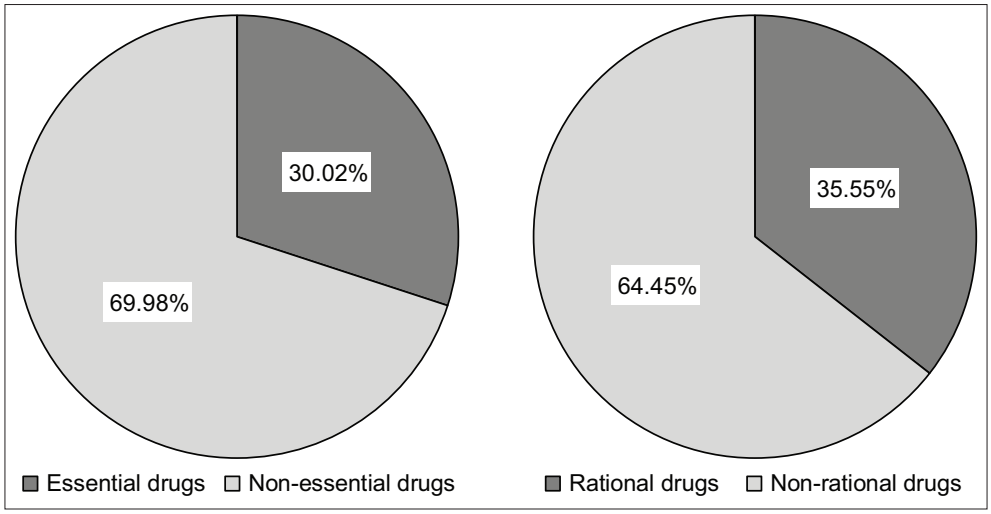


**Figure 1:** Extent of the usage of essential and rational drugs

practices having medical, social, and economic implications. Prescription auditing is that the mainstay of quality assurance in hospitals. They ought to address issues that have serious consequences for patients if correct treatment is not given which might minimize the misuse of medicine, plan essential drug choice, and estimate the drug desires of the community.

In the present study, we have enrolled total 500 number of patient's data of drug utilization. We have gathered data from different 10 departments of SBKS MI & RC, Sumandeep Vidyapeeth. In the present study, there were total 53.73% were male and 46.27% were female. In Kaur *et al*. study, 66.90% were male whereas 33.10% were female. In Chaudhary *et al.* study, 55.00% were male and 45.00% were female.

Mean age of our patient was 44.58 ± 19.87 years which similar to Kaur *et al*. study in which mean age of the study participant was 46.00 ± 17.40 years.

In the present study, average number of drugs per patient was found to be 1.61. In OPD, the average number of drug per patient was found to be 1.62. It was found that in medicine department, average number of drug was 3.52 followed by 2.41 in orthopedics department, 2.25 in surgery department, 2.15 in Obs. and Gynec. department, 2.03 in pediatrics department, 1.65 in ENT department, 1.64 in ophthalmology department, 1.52 in skin and VD department, 1.32 in respiratory department, and 1.28 in psychiatry department. Similar results were found for medicine department in study carried out by Ajapuje *et al*. and Simpson *et al*. In Ajapuje *et al*. and Simpson *et al*. study, they found that 3.42 and 3.28, respectively, average number of drugs was used per patients. In Bhagawati *et al*. study, it was found that 3.40 drugs were used per patient.

In the present study, drugs were prescribed by generic names only in 12.00%. Abidi *et al*. study in which they have found that only in 3.79% cases generic medicine were prescribed. In Bhagawati *et al*. study, it was found that in 36.00% of cases, they have prescribed generics medications. Whereas Karande *et al*. study shows that in 73.00% of cases, they have prescribed generic medication. It shows that in our hospital how our practitioners are directly influenced by medical representative of different pharma companies for undue favor. Generic prescribing reduces the chances of dispensing errors which may be due to misinterpretation of like sounding names of drugs and also decreases the economic burden on the patients.

In the present study, we have found that 30.01% of drugs were essential and 69.99% were non-essential. About 35.55% were rational and 64.456% were irrational.

In our study, it was found that out of 811 drug formulations prescribed, 723 were FDCs among OPD patients, respectively.

There are very few FDCs in essential medicines list. Out of the total 433 medicines listed under the 20$^{th}$ edition of the WHO

list of essential medicines issued in August 2017, only 37 are FDCs. Similarly, the Indian list of National Essential List of Medicines (NLEM 2015) lists only 24 FDCs out of the total 376. A majority of these FDCs are aimed at improving treatment adherence and preventing drug resistance among the diseases of public health importance such as TB, HIV, and malaria.

Possible limitations of the present study include the small sample size, more studies involving large population are required and the lack of inclusion of patients from indoor patient department. Despite the limitations in our study, strength of the study is that it has generated baseline data for comparison with similar studies at state, national, and international level and similar type of studies in the future at this institution. It is evident that this study will help to establish rational prescribing guidelines in a tertiary care set up and will boost prescription by generic name and from essential list of medicines.

## CONCLUSION

There is a vital need for prescribers to stress reasonable use of drugs. We concluded from this research that we should perform drug use analysis in a tertiary care hospital to raise knowledge of the use of appropriate drugs, prescribing drugs by brand name. Continuous educational substance use intervention is needed to improve the appropriateness and fair use of the substance by clinicians.

IR use of medicines excessive use of medicines, failure to prescribe necessary or generic medicines, etc., can contribute to the problem of drug interactions that lead to adverse incidents, increase the cost of treatment, and indirectly affect the compliance of patients with medicines.

Therefore, it takes an hour to see that physicians, as prescribers and dispensers, constantly update patients as users to stress the meticulous use of medications.

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