Research Article

Pattern of drug utilization in surgical outpatient department of a teaching hospital located in western India

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Abstract

Background: Drug utilization studies should be regularly conducted to increase therapeutic efficacy, decrease adverse effects, and provide feedback to prescribers to promote the rational use of drugs. Systematic audit of prescriptions among surgical outpatients are very few in India.

Objective: To obtain information on drug prescribing patterns, analyze the drug use with the help of the World Health Organization (WHO)/International Network for the Rational Use of Drugs (INRUD) indicators.

Materials and Methods: The study was carried out over a 6-month duration (from January to June 2014) at the Gujarat Adani Institute of Medical Sciences attached with GK General Hospital, Bhuj, Gujarat, India. We collected 661 prescriptions from the surgical outpatient department for analysis. The age, sex, and diagnosis of the patients were noted. The percentage of the drugs prescribed from the essential drug lists and the average cost of drugs per prescription was calculated.

Result: Of the total 661 patients, 351 were men and 310 were women. Injections and antibiotics were prescribed in 5.1% and 31.6% of encounters, respectively. Only 19.6% drugs were prescribed by generic name. Antimicrobials were most commonly prescribed, followed by nonsteroidal anti-inflammatory drugs and antiulcer drugs. More than one error or problem was noted with 18.1% prescriptions. The average cost of drugs per encounter was 178.20 Indian Rupees.

Conclusion: Antimicrobials should be used rationally. Prescribing by generic name and from the essential drug lists should be encouraged. Training sessions, especially for junior doctors, on the correct method of writing prescriptions are needed.

KEY WORDS: Drug utilization, prescribing patterns, WHO/INRUD drug use indicators

Introduction

A "drug," as per the World Health Organization (WHO), is a chemical substance used for the treatment, cure, prevention, or diagnosis of a disease in human beings for the benefit of recipient. Drug utilization has been defined as the marketing, distribution, prescription, and the use of drugs in a society with special emphasis on the resulting medical and social consequences. Essential medicines are those that satisfy the priority health care needs of the population. They are intended to be available at all times, in adequate amounts, in appropriate dosage forms, with assured quality, with adequate information, and at a price the individual and community can afford.[1]

Clinical audit is a method of ensuring quality care and basically depends on the data gathered in retrospect from the medical records. A British government white paper for patients defines audit as a systemic, critical analysis of the quality of medical care including the procedures used for diagnosis and treatment, the use of resources, and the resulting outcome of the patients.[2]

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Third-world countries spend 30–40% of their total health budget on drugs, some of which are useless and expensive.[2] In these countries, funds are not optimally used; hence, there is a scarcity of essential medicines in both urban hospitals and rural health-care centers. Many people throughout the world cannot obtain the drugs they need. Health insurance plans are very few in third-world countries, and most of the patients in these countries pay from their pocket to procure drugs. There are also many people who have access to drugs but do not get the right drug in the right dosage when they need it. There is a need to prescribe drugs rationally so that the funds allocated for health care are utilized optimally.

Irrational drug combinations, banned drugs, and withdrawn drugs are still being prescribed by both qualified physicians and quacks.[4] Irrational prescription of drugs is of common occurrence in clinical practice; the important reason being the lack of knowledge about the drug and unethical drug promotion. Many new drugs are being added to pharmacies every day, as many new pharmaceutical companies are coming up and launching new drugs in the market. Hence, there has been an increase in the number of drugs prescribed to patients.

Monitoring of prescription and drug utilization patterns should be done periodically to increase the therapeutic efficacy, decrease the adverse effects, and provide feedback to the prescriber to ensure rational use of medicines. Previous studies among dental and surgical patients had shown a considerable scope for improvement in the prescribing of drugs.[4,5] Studies on drug prescribing patterns and systematic audit of prescriptions among surgical outpatients are very few in hospitals of western India; hence, this study was carried out. The objectives of the study were the following:

1. To obtain information on the prescribing patterns of drugs in the surgical outpatient department (OPD) during the study period.
2. To analyze the patterns of drug use using the WHO/INRUD indicators. [6]
3. To calculate the average cost of drugs per encounter.
4. To analyze critically the prescriptions using predetermined criteria.

Materials and Methods

The study was carried out over a 6-month duration (from January to June 2014) at the surgical OPD of Gujarat Adani Institute of Medical Sciences attached with GK General Hospital, Bhuj, Gujarat, India. The Institute Human Ethics Committee approval was obtained before the initiation of the study.

All new prescriptions were included in the study. Prescriptions of patients on follow-up (following discharge after operation) and attending the surgical OPD were also included in the study. The prescriptions written by principal and coinvestigators of the study were excluded to avoid the possibility of bias during analysis. The prescriptions were collected during the first and third weeks of every month from January to June 2014. A specially designed pro forma was used to record the required information from each patient. The age and sex of the patients were recorded. The number of drugs per prescription was observed, and the average was calculated. The number of patient encounters where an injection and an antibiotic were prescribed was obtained.

The percentage of drugs prescribed by generic name and the parenteral route was calculated. The diagnosis written on the prescription was noted. The median duration of prescription was determined. The duration of the drug prescribed for the longest time period in each prescription was taken as the duration of the prescription.

The percentage of drugs prescribed from the Essential Drug list of India and the WHO List of Essential drugs was calculated.[7,8] The percentage of drugs, which were fixed dose combinations (FDCs), was determined.

The cost of drugs was determined using the price list supplied by the hospital pharmacy and Indian Drug Review.[9] The mean cost of drugs was determined in Indian Rupees (INR) and United States dollars (USD).

The prescription auditing was done in consultation with a pharmacologist. The prescriptions were audited for the presence of dose, frequency, and duration of prescribed drugs, age, sex of the patient, and legibility of handwriting. The presence of the name and signature of the prescribing doctor was looked into. Absence of any of these parameters was taken as indicative of a problem with the prescription.

Sample Size

The WHO recommendation on sample size is that there should be at least 600 encounters included in a cross-sectional survey describing the current treatment practices.[6]

Result

We collected 661 prescriptions from the surgical OPD on the first and third weeks of each calendar month from January to June 2014 and recorded them in a specially designed pro forma.

Of 661 cases, 351 (53%) patients were men and 310 (47%) were women. The age distribution of the patients is shown in Table 1. We observed that 195 (29.6%) patients aged between 20 and 30 years, whereas 117 (17.6%) were in the age group of 30–40 years.

The duration of prescriptions in surgical OPD is shown in Table 2. The median duration of prescription was 7 days. Of 661 patients, 69 (10.4%) experienced swellings at different sites, 34 (5.1%) were on follow-up after surgery, 27 (4.1%) had hernia, whereas 22 (3.7%) revealed hemorrhoids or fissure-in-ano. The other common diagnoses were hydrocele, lump in the breast, circumcision, laparotomy, amputation, urinary tract infection, and cellulitis. The diagnosis was not written in 31 (4.7%) prescriptions.

Of the total 1,058 drugs prescribed, 449 (42.4%) were prescribed from the Essential Drug List of India, whereas 376 (35.5%) were prescribed from the WHO List of Essential Drugs. Three hundred fifteen (29.8%) drugs were FDCs.

Table 1: Age distribution of patients attending the surgical OPD (*n*=661)

Age (in years)	Number of patients (%)
0-10	35 (5.3)
10-20	107 (16.2)
20-30	195 (29.6)
30-40	117 (17.6)
40-50	79 (12.0)
50-60	64 (9.7)
60-70	51 (7.7)
>70	13 (2.0)
Total	661(100)

Table 2: Duration of prescription in surgical OPD (*n*=661)

Duration of prescription (days)	Number of patients (%)
0	131 (19.9)
1	9 (1.4)
2	23 (3.5)
3	31 (4.7)
4	19 (2.9)
5	129 (19.6)
7	105 (15.9)
10	22 (3.3)
>10	111 (16.8)
Not written	81 (12.3)
Total	661 (100)

Ibuprofen and paracetamol combination was the most commonly prescribed drug, followed by the combination of ampicillin and cloxacillin.

The most commonly prescribed individual drugs in the surgical OPD are shown in Table 3. Of the total 1,058 drugs prescribed, antimicrobials were the most common group of drugs 338 (31.9%) prescribed. The FDC of ampicillin and cloxacillin was the most commonly prescribed antibiotic 93 (8.8%) in our study. Ciprofloxacin 53 (5.0%), metronidazole 52 (4.9%), and amoxicillin + clavulinic acid 24 (2.3%) were the other commonly prescribed antibiotics.

The second most commonly prescribed drugs were nonsteroidal anti-inflammatory drugs (NSAIDs) and anti-inflammatory enzymes [279 (26.4%)]. Antiulcer drugs [140 (13.2%)] and laxatives [89 (8.4%)] were also commonly prescribed. Among the individual drugs or FDCs, diclofenac sodium was the most frequently prescribed drug [121 (11.4%)], followed by ibuprofen–paracetamol combination [109 (10.3%)], and ampicillin–cloxacillin combination [93 (8.8%)].

In our study, 1,058 drugs were prescribed to the 661 patients. Average number of drugs per prescription was 1.60 in our study. Of the total 661 prescriptions, injections were prescribed in 34 (5.1%) encounters. An antibiotic was prescribed in 209 (31.6%) encounters. It was observed that 207 (19.6%) of the 1,058 drugs were prescribed by generic name. The values are shown in Table 4.

It may be mentioned that a single antimicrobial was prescribed in 125 (18.9%) encounters, while, in 84 (12.7%) encounters, more than one antimicrobial was prescribed. The

Table 3: Commonly prescribed drugs in surgical OPD (*n*=1058)

Group of drug	Drug(s)	Number of drugs prescribed (%)
Antimicrobials 338 (31.9%)	Ampicillin+Cloxacillin	93 (8.8)
	Amoxicillin	61 (5.8)
	Ciprofloxacin	53 (5.0)
	Metronidazole	52 (4.9)
	Cephalosporins	37 (3.5)
	Amoxicillin+Clavulanic acid	24 (2.3)
	Others	18 (1.7)
Analgesics, antiinflammatory enzymes	Diclofenec sodium	121 (11.4)
279 (26.4%)	Ibuprofen+ Paracetamol	109 (10.3)
	Serratiopeptidase	21 (2.0)
	Others	28 (2.7)
Antiulcers	Ranitidine	83 (7.8)
140 (13.2%)	Omeprazole	57 (5.4)
Topical preparations 93 (8.8%)	Povidone iodine	38 (6.5)
	Lignocaine gel	55 (3.6)
Laxatives	Milk of magnesia+Liquid Paraffin	89 (8.4)
Miscellaneous	Vitamin preparations	68 (6.4)
	Antispasmodics	14 (1.3)
	Others	37 (3.5)
Total		1058 (100)

Table 4: Values of core prescribing indicators of WHO in surgical OPD

Core prescribing indicator of WHO	Value
Average number of drugs per encounter (*n*=661)	1.6
Percentage of encounters with an antibiotic prescribed (*n*=661)	31.6 %
Percentage of encounters with an injection prescribed (*n*=661)	5.1 %
Percentage of drugs prescribed by generic name (*n*=1058)	19.6 %
Percentage of drugs prescribed from essential drug list or formulary (*n*=1058)	42.4 %

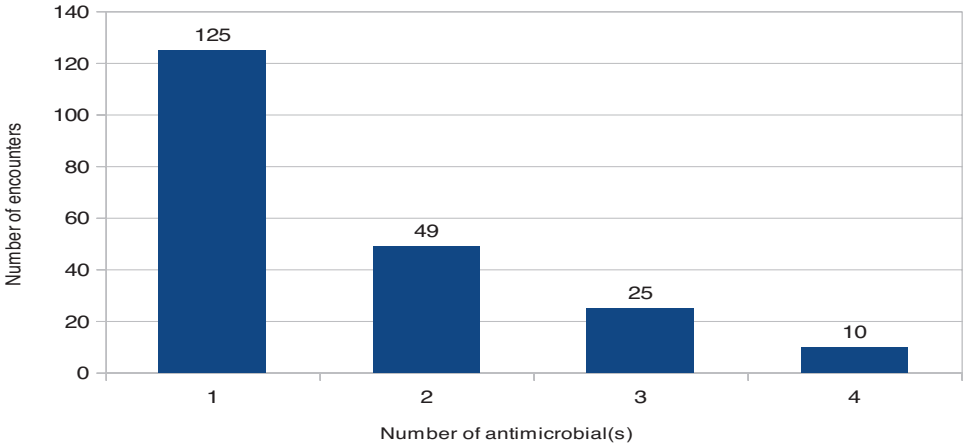

Figure 1: Encounters with one or more antimicrobials prescribed (*n* = 661).

Table 5: Common errors or problems noted with prescriptions in surgical OPD (*n*=661)

Error/problem encountered	Number of prescriptions (%)
Prescriptions with errors	121 (18.3)*
Duration of treatment not written	81 (12.3)
Diagnosis not written	31 (4.7)
Dose of drug not written	13 (2.0)
Signature of doctor absent	11 (1.7)
Frequency of drug not written	10 (1.5)
Handwriting not legible	4 (0.6)

*More than one problem may have been present in a single prescription

details are shown in Figure 1. More than one error or problem was noted with 121 (18.3%) prescriptions. The common problems noted are shown in Table 5. The duration of treatment was missing in 81 (12.3%) prescriptions, whereas the diagnosis was not written in 31 (4.7%) prescriptions.

The cost of drugs in each individual prescription was calculated. The mean cost of drugs per prescription was 178.20 INR, equivalent to 2.88 USD (1 USD ≈ 62 INR).

Discussion

The commonly affected patients who visited surgical OPD were in the age group of 20–30 years [95 (29.6%)] in our study. A study in Pakistan mentioned that a majority of patients were in the age group of younger than 40 years.[10]

The average number of drugs per prescription is an important index of the standard of prescribing and the scope for review and educational intervention in prescribing practice. The average number of drugs per prescription was 1.6 in our study. Our results were comparable with a study from Nepal mentioned that 1.55 drugs were prescribed per patient.[11] A previous study from Nepal had reported that the majority of medical outpatients were prescribed one or two drugs.[12]

An injection was prescribed in 34 (5.1%) of the encounters, whereas an antibiotic was prescribed in 209 (31.6%). The percentage is less than that reported in a study conducted in Pakistan.[13] However, the number is more than that reported from two tertiary-care hospitals in Delhi.[14] Excessive use of injections adds to the cost of sterilization and nursing resources and increases problems such as pain and local edema.

Antibiotics were the most commonly prescribed [338 (31.9%)] group of drugs. An antibiotic was prescribed in 209 (31.6%) encounters. A single antimicrobial was prescribed in 125 (18.9%) prescriptions, and more than one antimicrobial was prescribed in 84 (12.7%) of the prescriptions. The number of antibiotics should be prescribed only for bacterial infections and as low as possible. The prolonged use of antimicrobials for prophylaxis in surgery should be avoided, because it increases the chances of antimicrobial resistance and adverse effects.

Excessive usage and irrational use of antimicrobials was a major problem in all the studies. Most of the antimicrobials were prescribed empirically. The common problems observed were the use of the FDC of ampicillin and cloxacillin (which

contained inadequate doses of each constituent antibiotic). Combining two antibiotics acting through the same mechanism or having same spectrum cannot be justified. The other problems were the use of use of newer and more expensive cephalosporins. FDC of amoxicillin and clavulanic acid was used for minor skin infections. The use of expensive drugs where cheaper ones are equally effective should be avoided, because it adds to the cost of therapy.

Only 207 (19.6%) drugs were prescribed by generic name. In a study conducted in Nepal, 32.6% drugs were prescribed with a generic name, which is much higher than what our study reported.[12] The number is, however, marginally higher than that reported from three teaching hospitals in Pakistan.[15] Prescribing by generic name can reduce the cost incurred on drugs and the risk of medication errors. Vigorous promotional activities by pharmaceutical companies have been found to increase the number of prescriptions with brand names.

Around 315 (29.8%) drugs prescribed were FDCs. The percentage of FDCs prescribed in our study was less than that reported in previous studies.[16,17] The advantage of FDCs is the lesser number of drug doses to be taken by the patient and an improved compliance. However, the FDC may not contain the required amount of individual drugs. The combination may not be synergistic, and it would only add to the cost of the therapy. Cotrimoxazole (a single prescription) and amoxicillin + clavulanic acid [24 (2.3%)] of the total drugs used were the only FDCs prescribed from the WHO approved list.[18]

The percentage of drugs prescribed from the essential drug lists was 376 (35.5%), which was low compared with that reported in the literature.[14,15,19] Although the essential drug list was mainly developed for primary health-care facilities, prescribing of essential drugs should be encouraged. Efforts should be made to develop a hospital formulary.

The mean cost of drugs per prescription was 178.20 INR (2.88 USD). The cost is lower than that reported in a previous study.[12] In a study from Pakistan, the average daily cost of prescribed drugs ranged from 26.1 Pakistani rupees (0.44 USD) to 133.41 Pakistani rupees (2.26 USD).[20] The cost in our study is higher than that reported in these studies. Cost is an important factor influencing patient compliance with treatment in a developing country such as India.

More than one error or problem was noted in 121 (18.3%) prescriptions. Our results are similar to a previous audit of prescriptions among patients attending the surgical OPD in Nepal that reports 18% of the prescriptions revealed more than one error. The duration of treatment was absent in 81 (12.3%) prescriptions, while the diagnosis was absent in 31 (4.7%) prescriptions. In a previous study, diagnosis was mentioned in only 22.25% of prescriptions.[16] In a study conducted in Pakistan, the duration of treatment was not specified in 73.4% of prescriptions.[15] An educational intervention was effective in improving some aspects of prescribing in a dermatology OPD in a tertiary-care hospital in Nepal.[21]

Limitations

Our study had limitations. The duration of the study was only for 6 months. The patients were not interviewed for their knowledge of the correct dose. The rationality of the prescriptions was not looked into.

Conclusion

There is a clear need for the development of prescribing guidelines and educational initiatives to encourage the rational and appropriate use of drugs in surgery. Clinicians need to comply with hospital guidelines, especially on antimicrobial prescribing. There should be an antimicrobial policy for the hospital. Drug information services including side effects and drug interactions for professionals and consumers at the hospital are highly desirable. Efforts must be made to encourage prescribing by generic names and to increase prescribing from the essential drug lists. Polypharmacy should be discouraged, because it is an economic burden to the nation and makes health care unaffordable to the poor. The use of FDCs that are not approved by the WHO should be discouraged. Continuing medical education workshops should be organized for clinicians. The importance of legible handwriting, recording of age and sex of patient, the outdoor or indoor number, diagnosis, and dose, frequency, and duration of prescribing of various drugs should be emphasized in these workshops.

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