

Prospective observational study of drug prescribing patterns in elective surgeries: A hospital-based analysis

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Abstract

Aim and Objectives: The aim of the present study was to evaluate the prescribing patterns of drugs in elective surgery in the Department of General Surgery at Integral Institute of Medical Sciences and Research, Integral University.

Subject and Methodology: This is a type of prospective observational study conducted using the sample size of 100 patients with different surgeries. The study span was a period of six months.

Results: A total of one hundred prescriptions were collected, and the medications prescribed for surgical patients were examined. Out of all 100 patients, men made up the majority of cases (59%) compared to women (41%). Ages 21 to 40 accounted for 52% of the cases. Cholelithiasis (30%) was the most common reason hospitalisation occurred, followed by hernias (19%). The most often prescribed medications were antimicrobials (21%), analgesics (11%), anti-ulcer (10%), and anti-emetic (4%) medication. Metronidazole (17%) and Cephalosporin (47%) were the two most often used antimicrobials. The most widely used analgesic was paracetamol (41.2%), which was followed by tramadol (34.2%). The most often prescribed medications from the anti-emetic and anti-ulcer categories were ondansetron (82%) and pantoprazole (77%).

Conclusion: This study, which included 100 patients, produced important information about the prescription practices for medications used in the surgery department. The kinds of information that people evaluate while deciding whether to have elective surgery vary widely. Patient case sheets are the most often used source of health information. Post-operative patients are frequently prescribed four or more medications, depending on the inclination and frequency. The majority of medications prescribed were GIT-related, AMAs, analgesics, multivitamins, and trace elements. Among antimicrobials, third-generation cephalosporins were the most frequently administered. The most commonly used analgesic was paracetamol. The anti-emetic and anti-ulcer medications that were most frequently administered were ondansetron and pantoprazole, respectively. Improvements in the prescribing pattern are required in accordance with worldwide norms; in particular, preventive prescribing of cephalosporin antibiotics and the use of generic medications and the Essential Medicines List (EML) to lower treatment costs are necessary. The most frequent reason for hospitalisation was cholelithiasis.

Keywords: Essential Medicine List, Post-Operative Medication, Antimicrobial Agents, Elective Surgery.

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I. Introduction

Drug utilization study is “the marketing, distribution, prescription and use of a drug in society with special emphasis on resulting medical, social and economic consequences” [1]. Main aim of such study is to promote rational use of drugs in society. If a drug is prescribed in a rational way, it will help us in reducing the patient's expenditure, lower adverse drug reactions, drug interactions and extra burden on medical as well as paramedical staff [2,3,4]. Therefore, prescription audit/monitoring or drug utilization study 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 [5,6].

Surgery is a medical operation wherein a patient's tissues are cut or a previously incurred wound is closed. Surgery is the definition of treating bodily injuries or illnesses by incision or manipulation, often with tools [7].

Elective surgery, often called planned surgery is a term used to describe non-emergency surgery which is medically necessary, but which can be delayed for at least 24 hours [8]. Common examples of elective surgery include hip replacement, cataract extraction, ligament repairs, gall bladder surgery and hernia. There are three categories of elective surgery- Non-urgent admission within 365 days is appropriate for a condition that is unlikely to deteriorate rapidly. Ex-Septoplasty.

Semi-urgent - Admission within 90 days is preferred for a condition that is unlikely to deteriorate fast. Ex-Colposcopy, amputation of the digit. Urgent - Admission within 30 days is preferable for a condition with the potential to develop rapidly and become an emergency. Ex-Heart valve replacement, amputation of limb [9].

The study of drug prescribing trends in elective surgeries is an important undertaking that improves the quality and efficiency of healthcare services in the Department of General Surgery [10]. Present research focuses on which drugs are most regularly prescribed, why they are chosen, and how this information might assist patients and the healthcare system.

Such an analysis is essential to ensure patient safety and optimize healthcare outcomes. We can identify potential issues such as overuse, underuse, or inappropriate use of medications, thereby mitigating the risks associated with drug-related complications. Additionally, this research provides an evidence-based foundation for future clinical guidelines and protocols, ultimately benefiting both healthcare providers and patients [11].

II. Subjects and Methodology

The study was a six-month prospective observational study conducted in IPD and OPD departments General Surgery at Integral Institute of Medical Sciences and Research, Integral University. The CRF form was designed which includes the following information: name, age, gender, diagnosis, on-going treatment of operation, drugs received by the patient, dosage, frequency of administration, and drugs recommended (generic/brand name) [12].

After interview of patient and review of case paper data regarding demographic details, clinical status, operative procedure, medication prescribed till discharge result of culture and sensitivity test, etc. were recorded in case record forms [13].

The study used a sample size of 100 patients who freely participated from general surgical wards and met the specified inclusion and exclusion criteria. Data collection during the study period was done manually [14]. Patients of either sex over 14 years of age, patients who had been through a surgery, patients with co-morbid condition, patients undergoing re-operation and patients visiting the OPD after surgery (day care surgery) were included in the study while patients who were below 14 years of age, pregnant and lactating women, cancer patients who were on chemotherapy and outpatients with minor ailments were excluded [15]. The data collected was analysed with the help of MS excel using descriptive statistics to determine drug use indicators and utilization pattern of drugs [16]. Ethical considerations were strictly followed, with complete adherence to WHO rules and permission from the Institutional Research and Ethics Committee (IEC/IIMSR/2023/46).

III. Result

Demographics (age and gender)

Total 100 cases were collected. Among 100 patients, 59 were males and 41 were females. This shows a higher proportion of male patients in comparison to female patients. Patients were grouped into 4 groups based on their age. Most of the cases noted were between 21-40 (52 cases) years of age followed by 41-60 (30 cases) years of age, 61-80 (12 cases) years of age. Least number of cases were found in <20 (6 cases) years of age. (Table 1).

Table 1: Demographics distribution of patients' gender and age.

Demographics	Frequency
Gender	
Male	59
Female	41
Total	100
Age group (years)	
<20	06
21-40	52
41-60	30
61-80	12

Disease conditions in general surgery

There were patients who had undergone surgical procedures of different diseases likecholelithiasis, hernia, fibroadenoma, appendicitis, hydrocele and haemorrhoid. Among these Cholelithiasis (30%) was the most

common cause of hospitalisation followed by hernias (19%), fibroadenoma (13%), appendicitis (10%), haemorrhoid (8%) and hydrocele (6%). (**Table 2**).

Table 2: Disease conditions in general surgery

Type of surgical procedure	Number of surgeries
Hernia	19
Cholelithiasis	30
Breast lumps/ Fibroadenoma	13
Appendicitis	10
Hydrocele	06
Hemorrhoid / Anal disease	08
Other	14
Total	100

Categories of drugs prescribed in general surgery

In 100 cases total 93 drugs of different classes have been prescribed and almost all prescription contains antimicrobial drugs (100%), Analgesics (96%), Anti-ulcer & anti-spasmodic (92%), multivitamin (88%), antiemetic (76%) and laxative (28%) followed by others (**Table 3-4**).

Table 3: Drugs prescribed in general surgery patients.

Parameters	Total no of prescription containing drug	Types of drugs
Antibiotics	100	20
Anti-ulcer and anti-spasmodic	92	09
Antiemetic	76	04
Laxative	28	03
Analgesics	96	10
Multivitamin	88	12
Others	70	35
TOTAL		93

Table 4: Drugs Commonly Used in Surgical Patients

Types of drugs prescribed	Total no of drugs	Percentage	Name of drugs
Anti-ulcer and anti-spasmodic	09	10	Pantoprazole, Rabeprazole, Ranitidine, Drotaverin, Hyoscine, Esomeprazole, Pepsin, Lansoprazole, Domperidone
Analgesics	10	11	Diclofenac, Acelcofenac, Tramadol, PCM, Ibuprofen, Naproxen, Chymotrypsin, celecoxib, Etoricoxib, Aspirin
Antibiotics	20	21	Ceftriaxone, Metronidazole, amoxicillin, Clavulanic acid, Amikacin, Clindamycin, Piperacillin + Tazobactam, Norfloxacin, Cefixime, Ciprofloxacin, Meropenem, Linezolid, Azithromycin, Doxycycline etc.
Multivitamin	12	13	Vitamin B complex, Vit. A, C, E, D, Zinc, Fatty acids, Carbohydrate
Antiemetics	03	04	Ondansetron, Metoclopramide, Domperidone
Laxatives	03	03	Lactulose, Liquid Paraffin, Milk of Magnesia
Others (Comorbidities)	35	38	Respiratory, DM, steroids, UTI, HTN, CAD related drugs

Generic versus brand name prescription comparison

Out of 100 prescriptions 13 (13%) of the prescriptions are by their generic names and 87 (87%) by brand name. This shows a higher proportion of drug is prescribed by their brand name. (**Figure 1**).

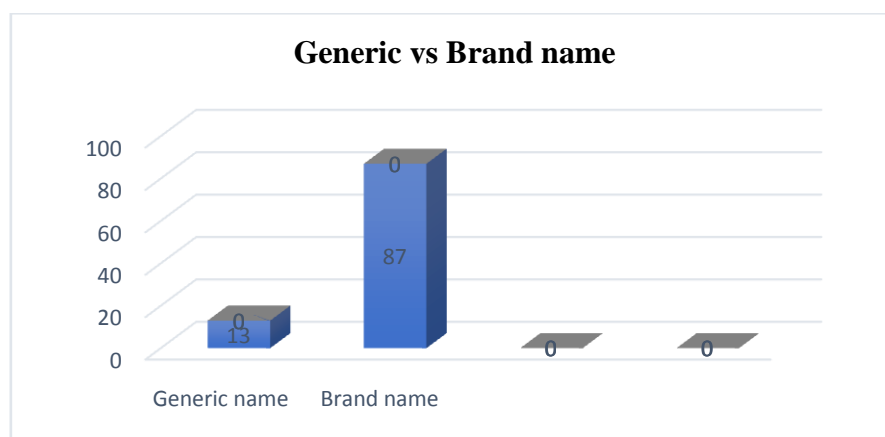


Figure 1: Comparison of drugs prescribed by generic versus brand name.

Categories of Antimicrobials Prescribed

The most commonly used antimicrobials drugs were Cephalosporin (47%), Penicillin (15%), Anti-amoebic (Metronidazole 17%) and others (21%). Among cephalosporin, first generation was used for about 2%, second generation 8.8%, third generation 83.6% and fourth generation about 5.4% (**Figure 2**).

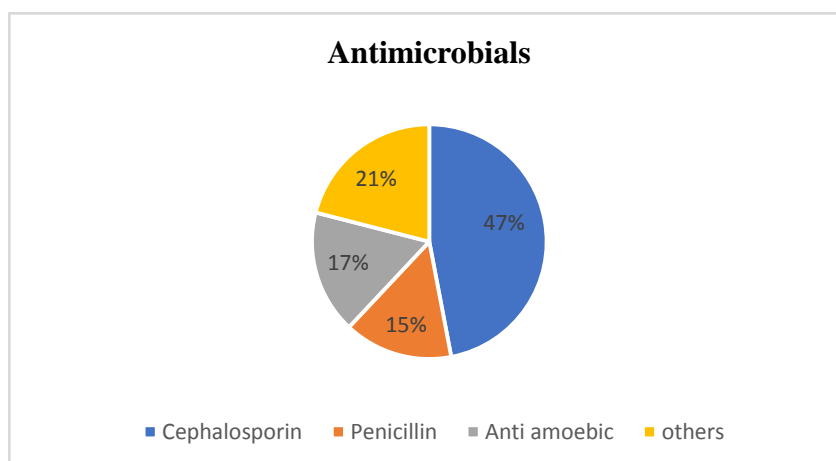


Figure 2: Categories of antimicrobials drugs prescribed

Combination of antibiotics drug prescribed

Fixed-dose combinations (FDCs) were given in which 1 Antibiotic was prescribed to 14 patients, 2 Antibiotics in 59, 3 Antibiotics in 23 and >3 Antibiotics in 04. Ceftriaxone was the most commonly used single antibacterial. Piperacillin + Tazobactam and Amoxicillin + Clavulanic acid was the most commonly used FDC combinations. This shows most of the prescriptions contain double antibiotics (**Table 5**).

Table 5: Combination of antibiotics drug prescribed.

Combination	Total no.
Single antibiotic	14
Double antibiotics	59
Triple antibiotics	23
More than three antibiotics	04

Type of analgesics drug prescribed

In the study among analgesics, most commonly was used, Paracetamol (41.2%), Tramadol (34.2%), Diclofenac (10%), Chymotrypsin (7%), Aspirin (5.7%) and others (1.6%) (**Figure 3**).

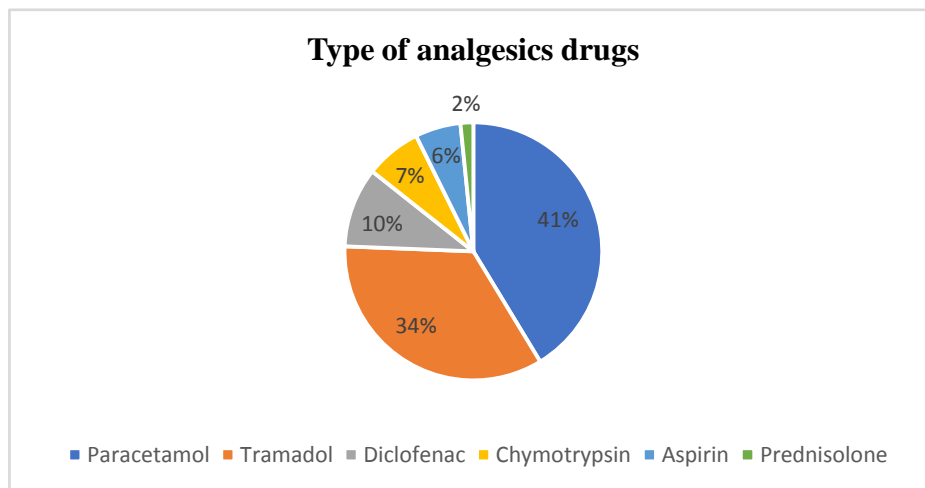


Figure 3: Type of analgesics drug prescribed.

Types of anti-emetics drug prescribed

Most commonly used Anti-emetic were, Ondansetron (82%), Domperidone (13%) and Metoclopramide (5%) (Figure 4).

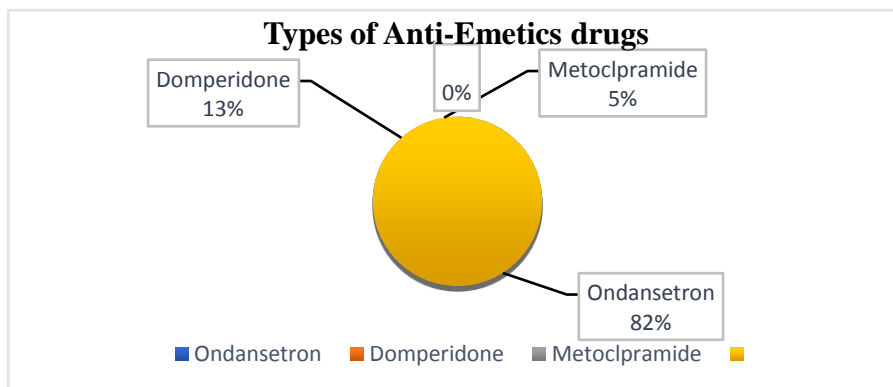


Figure 4: Types of anti-emetics drug prescribed

Anti-ulcer drugs prescribed

Anti-ulcer drugs prescribed mainly include, Pantoprazole (77%), Ranitidine (20%), Rabeprazole (2%) and Esomeprazole (1%) (Figure 5).

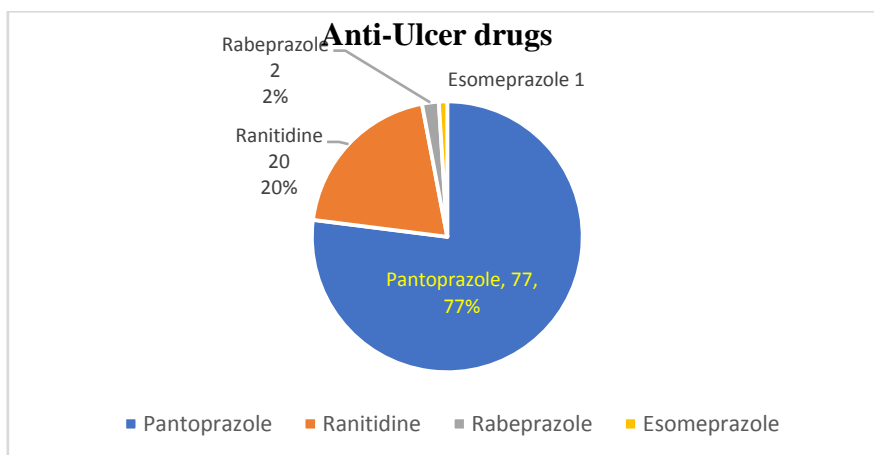


Figure 5: Anti-ulcer drugs prescribed.

IV. Discussion

Prescription reflects the physician's attitude towards the disease and treatment. It also provides a detailed image of the healthcare delivery system. Antibiotics are the primary treatment for infectious infections. In this study, we found that males accounted for 59% of the cases and females for 41%. Research found a similar preponderance [17-18]. The majority of the cases were between the ages of 21 and 40 (52 cases), followed by 41 to 60 (30 cases) and 61 to 80 (12 cases). The fewest cases were found among people aged 20 (6 cases).

In this study, disease patterns included cholelithiasis (30%), hernia (19%), breast lumps / fibroadenoma (13%), appendicitis (10%), haemorrhoids / anal disease (8%), and others (14%). Antimicrobials (100%) were the most widely used medications in the study population, followed by analgesics (96%), anti-ulcerative (92%), anti-emetics (76%), multivitamins (88%), and others. The prescribing pattern for medications was consistent with other research [19].

Cephalosporins (47%) and metronidazole (17%) were the most widely used antimicrobials, followed by others. Other research reported similar findings. The most commonly utilised cephalosporins (83.6%) were third generation; comparable findings were reported in one investigation. For surgical prophylaxis, worldwide guidelines suggest using first- and second-generation cephalosporins rather than third- and fourth-generation cephalosporins, as well as other higher antimicrobials. The use of two antimicrobial drugs was also widespread, which corresponded to the findings reported by Khade et al. [20]. The use of one, two, and three antimicrobial agents was prevalent, in that order. The most often used antimicrobial combination was Ceftriaxone + Amikacin + Metronidazole, which was followed by Amoxicillin + Clavulanic acid, Piperacillin + Tazobactam, and Ceftriaxone + Amikacin + Metronidazole [20]. It was typical practice to combine penicillin with beta-lactamase inhibitors, then fluoroquinolones and third-generation cephalosporins. The older age group in this study is more involved, which increases the likelihood of morbidity. This supports the use of stronger, more general-purpose antibiotics as well.

Antibiotic over prescription and improper use raise the risk of drug resistance, adverse drug responses, and therapy costs. Parenteral route usage excessively is a prevalent practice in the majority of developing nations. This corresponds with the study's findings on all intravenous antibiotics. Few (13.4%) antibiotics were prescribed under their generic names, with the majority (86.6%) being prescribed under brand names [21]. Ceftriaxone was the most commonly used single antibacterial. Piperacillin + Tazobactam and Amoxicillin + Clavulanic acid was the most commonly used FDC combinations. Overall, beta lactam antibiotics, particularly Piperacillin were the most often administered antibiotics both pre- and post-surgical procedures [22]. Approximately 81% of the antimicrobials prescribed had approval from drug regulatory organisations and were listed in both the WHO-EML and NLEM [23].

V. Conclusion

Most of the patients with surgical diseases require surgical intervention; therefore, they require more than one medication post-operatively to prevent wound infections and to relieve pain. There is a high tendency and frequency to prescribe more than four drugs, but less is prescribed from the National EML. Most of the drugs prescribed are generally AMAs, GIT related and Analgesics. There is an urgent need to develop proper prescription writing skills in budding doctors for the use of EML and generic medicines to reduce the cost of treatment and better compliance of the patients. The research carried out was an observational study conducted to assess the surgery diseases, surgical procedures and pattern of drug prescription. Patient with surgical diseases require more than one medication post operatively to prevent wound infection and to relieve pain. Cholelithiasis (30%) was the most common surgical disease noted, followed by Hernia (19%) and appendix (13%) was the most common surgical procedure done. Majority of drugs prescribed were mainly Antimicrobials (21%) followed by Analgesics (11%), Anti-ulcer (10%) and Antiemetic (9%). Among Antimicrobial agents, cephalosporin (47.5%) was mainly prescribed. Paracetamol (41.2%) was the most commonly used analgesic followed by Tramadol (34.2%), Ondansetron (82%) and Pantoprazole (77%) were the leading drugs used among anti emetic and anti-ulcer drugs. International guidelines indicate the use of 1st and 2nd generation cephalosporin rather than 3rd and 4th generation. There is a need to take steps to improve prescribing pattern as per international guidelines, especially cephalosporin antibiotics which is prescribed prophylactically.

VI. Limitations

This study had a small sample size and was done in the patients admitted in the Department of Surgery. We did not enroll patients from Orthopedic, ENT, Eye/Ophthalmology, Obstetrics and Gynae Departments. Therefore, it gave us a limited pattern of drug use in post-operative patients in the surgical ward only. A prospective study, with large sample size in all the operative cases need to be done to evaluate the prescribing pattern and cost analysis in a better way.

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Conflict of interest

None declared.

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