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SURVEY OF DRUG PRESCRIBING TRENDS IN PATIENTS ADMITTED TO GENERAL SURGERY WARDS IN A TERTIARY CARE TEACHING HOSPITAL

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ABSTRACT

Aims and objectives: The purpose of this study is to analyse drug prescribing patterns in surgery in-patients of Goa Medical College and to give recommendations to improve shortcomings in healthcare facilities, if any, to achieve the ultimate aim of optimum health for all. **Materials and methods:** A prospective, observational study was carried out and a total of 763 case records of in-patients admitted to general surgery ward of Goa Medical College was collected and analysed using MS Excel. The results were expressed in form of numbers and percentages. **Results:** Among the 763 case records analysed, 61.34% were males and 38.66% females. Average age of enrolled patients was 47.52 years. The average duration of hospital stay in surgery wards was 8.4 days. 40.50% of the patients had one or more associated co-morbid conditions in addition to their primary surgical diagnosis. Pancreatitis was the most common diagnosis in 71 (9.30%) patients enrolled in the study. Average number of drugs prescribed per encounter was 13.35 drugs. Out of the total 10184 drugs prescribed, antimicrobials (1836; 18.03%) were the most commonly prescribed class of drugs. The most commonly preferred route of drug administration was injectable for 6511 (57.07%) drugs. 42.96% of the drugs were prescribed using generic name. **Conclusion:** Understanding the drug prescription patterns will help treating physicians to revise their prescribing habits as well as help the policy makers to revise or formulate new guidelines, thus delivering safe, effective and rational healthcare to our patients while reducing the financial burden on a developing economy like ours.

KEYWORDS: Prescribing pattern, Drug utilization, Surgical ward, in-patients, WHO drug use indicators, tertiary hospital.

INTRODUCTION

Surgery is a branch which involves cross-sectoral interventions, with very vaguely and ambiguously defined borders, which has made it very tough to quantify the burden of global surgical diseases. In 2010 it was found that around 30% of the worldwide burden of disease could be attributed to ailments requiring surgical care.[1] Lancet commission on global surgery in 2015 estimated that around 313 million surgical procedures are performed every year worldwide and it is projected that this number is going to increase in the upcoming years.[2]

Surgery forms essential part of emergency care such as in case of bowel perforation and traumatic injuries, elective care such as hernia repair and also management of chronic conditions like peripheral vascular disease (PVD), cancer and diabetic foot.[3] A huge number of surgical patients receive at least 1 drug during their hospital stay in the surgical ward, however, many of them are already receiving some drugs which improves their general condition at presentation for surgery.[4,5] Multiple drugs like antibiotics, analgesics, IV fluids, antacids etc. are prescribed frequently to the patients during pre and post-operative period. Thus, there is a need to understand the probability of variation in pharmacokinetics and pharmacodynamics of drugs following a surgery for prescribing rationally.

To achieve the objective of optimal drug therapy in patient care, it is of prime importance to ensure rational use of drugs. There is an increasing toll on cost of medical care and patient morbidity owing to inappropriate use of drugs.[6] Drug utilization studies form an invaluable tool in evaluation of healthcare system as they create a reliable socio-medical and health economic basis for healthcare decision making.[7,8] Conducting such studies not only helps us to critically analyse current hospital drug policies,[9] but also provide valuable feedback to practicing physicians on how to improve upon their current prescribing habits when compared to standard protocols.[10] WHO in association with International Network for the Rational Use of Drugs (INRUD) has set up specific prescribing indicators to monitor and evaluate drug usage practices.[11]

Periodic review of drug usage pattern especially in a surgical department helps in preventing adverse drug reactions, toxicities, medication errors, drug-drug interactions and therapeutic duplications.[10] Literature search till now has shown very few systematically analysed data that is available on the drug utilization pattern in in-patients of surgery department across India. With all the above points in mind and considering that such a drug utilisation study in surgery department has not been reported from the state of Goa, we felt the need to conduct a study of the prescribing patterns in patients admitted to surgery wards of our institution.

MATERIALS AND METHODS

Study Design

- This was a prospective, observational study conducted in the in-patient wards of Department of Surgery of Goa Medical College and Hospital.
- It lasted from December 2018- March 2020.
- Permission was obtained for conducting this study from the Institutional Ethics Committee.
- Permission from the Head of the department of Surgery was obtained to conduct the study in these wards.

Sample Size

- Sample size was calculated to be 700 patients.

Inclusion Criteria

- Data of all patients above 14 years of age with hospital stay of > 24hrs.

Exclusion Criteria

- Data of patients who expired during the ongoing treatment and those who were discharged against medical advice was not included for this study.
- Patients who are not willing to participate in the study.

Data Collection

- The enrolled patients were followed up till their discharge from the hospital. The treatment received during their hospital stay was recorded.
- The case records of enrolled patients during the study period were reviewed for the following:

Patient Details

Name, age, sex, address, date of admission / discharge, and diagnosis

Details of drugs prescribed during hospital stay

Total number of drugs prescribed, pharmacological classes, routes of administration, total drugs prescribed as per NLEM and WHO list of essential drugs, total number of fixed dose combinations prescribed and drugs prescribed by generic names.

Note: In our study drugs for filariasis, drugs for schistosomiasis, drugs for leprosy, drugs for tuberculosis, drugs for fungal infections, drugs for amoebiasis and giardiasis, drugs for leishmaniasis, drugs for malaria, drugs for trypanosomiasis were classified as antimicrobials.

- Data collected was analysed to assess the following parameters:
- Demographic details of the patients - Age distribution and gender distribution.
- Number of co-morbidities
- Duration of hospital stay – was calculated by using date of admission and discharge.
- Distribution of disease pattern amongst the enrolled patients.
- Frequencies and percentages of:
  - ➢ Pharmacological classes and sub-groups of drugs prescribed
  - ➢ Drugs prescribed by various routes
- Prescribing indicators were calculated referring to the 'WHO prescribing indicators.'
- Number and percentage of fixed dose combinations prescribed.

Statistical Analysis

- Data was compiled and analysed using the Microsoft Office Excel version 2010.
- Results were expressed as numbers and percentage and have been depicted in the form of charts and graphs wherever possible.

RESULTS

A descriptive, quantitative and cross-sectional survey was conducted to determine the drug prescribing pattern in the admitted patients of department of surgery. Case records of 763 patients were reviewed and analysed prospectively during the period of November 2018 to February 2020 for the following parameters:

I. Gender Distribution

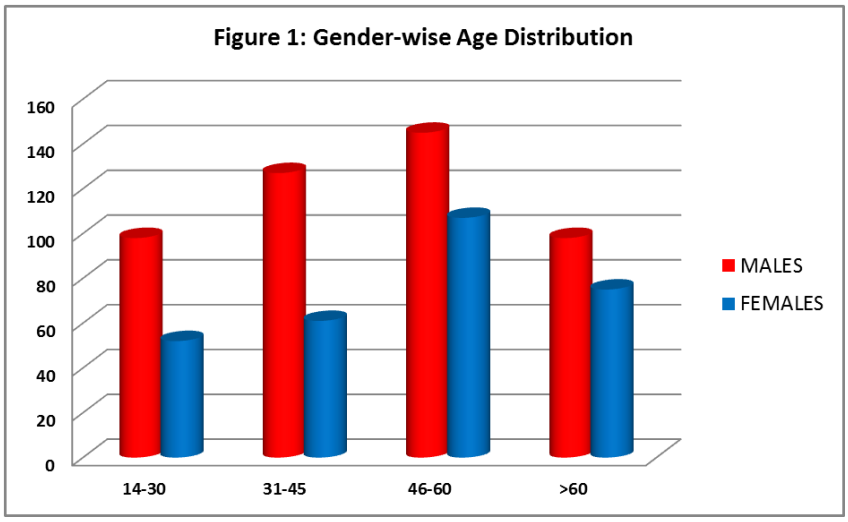
Demographic data revealed that males were more in number and constituted 468 (61.34%) of the enrolled study population while the females were 295 (38.66%) in number.

II. Age Distribution

Average age of enrolled patients in the study was 47.52 years.

One third of patients (252; 33.02%) belonged to age group of 46 to 60 years followed by 188 (24.63%) in the age group of 31 to 45 years and 173 (22.67%) belonging to the age group of >60 years. One-fifth of patients (150; 19.65%) belonged to the age group of ≥14 to 30 years.

Gender-wise age distribution is shown in the Figure 1.



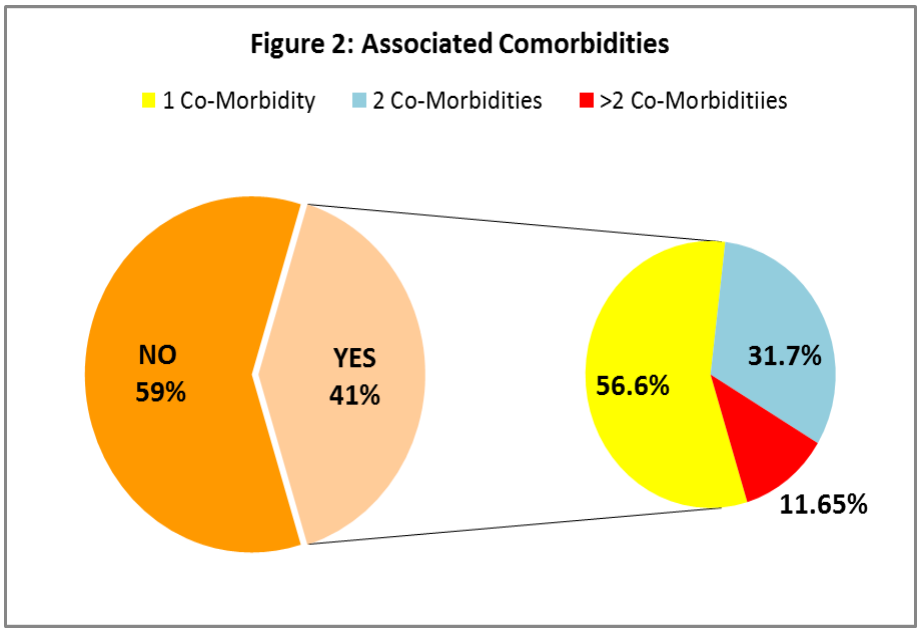
III. Duration of Hospital Stay

The average duration of hospital stay in surgery wards was 8.4 days. We divided the duration of hospital stay into 3 groups - <7 days, 7-14 days and >14 days.

Half of the patients (374; 49.01%) were hospitalised for <7 days and 294 (38.53%) patients were hospitalised for 7-14 days. Ninety five (12.45%) patients required hospitalization for 14 days.

IV. Associated Co-Morbidities

Out of the 763 study patients, 309 (40.50%) had one or more associated co-morbid conditions in addition to their primary surgical diagnosis (Figure 2). The co-morbidities included diabetes mellitus, hypertension, Ischaemic heart disease (IHD), congestive heart failure (CHF), benign hypertrophy of prostate, seizure disorders, psychiatric disorders, thyroid disorders and Peripheral vascular disease (PVD).



V. Types of Ailments

Pancreatitis was the most common diagnosis in 71 (9.30%) patients enrolled in the study. Abscesses was the next most common diagnosis seen in 68 (8.91%) patients followed by breast pathologies (which included cases of Ca breast, fibroadenoma, phylloid tumour, breast lump and breast cysts) in 67 (8.78%) patients. Table 1 summarizes the frequency and percentages of all the diagnosis encountered in the study.

Diagnosis	Number of Patients	Percentage (%)
Pancreatitis (Acute/Chronic)	71	9.30
Abscesses	68	8.91
Breast Pathology (includes Ca breast, fibroadenoma, breast lump, cyst, phylloides tumour)	67	8.78
Gangrene (including Fornier's &small bowel)	51	6.68
Hernia	48	6.29
GI Bleed (Upper/Lower)	42	5.50
Gall Bladder Pathology (includes Gall stones, cholangitis, empyema, perforated GB, mucocoele & adenomyomatosis)	39	5.11
Appendicitis	38	4.98
Diabetic Foot	36	4.72
Blunt chest/abdomen trauma	34	4.46
Cellulitis	26	3.41
Colorectal Carcinoma	23	3.01
Miscellaneous (includes IBD, Colics, Osteomyelitis, Hydrocoele, Foreign Body Granuloma, Retroperitoneal collection, Polyps, Balanoposthitis, Obstructive Jaundice)	19	2.49
Swellings (Includes Lipoma, Hematomas, Sebaceous and Dermoid cysts)	18	2.36
Intestinal Obstruction	18	2.36
Sinus/Fistula/Fissures	16	2.10
Carcinoma stomach/oesophagus	13	1.70
Peritonitis	13	1.70
Necrotizing fasciitis	13	1.70
Burns	12	1.57
Delayed post-op complications (includes wound infection, fever, paralytic ileus)	10	1.31
Pancreatic pathology (Ca Pancreas & pseudocyst)	9	1.18
Acute Gastritis	8	1.05
Carcinoma oral cavity	7	0.92
Infected wounds (ulcers/ bed sores/ infection with maggots)	7	0.92
Lymphadenopathy	6	0.79
Poisonings	6	0.79
Penetrating Injuries (Includes Stab injuries/ bull horn injuries)	6	0.79
PVD/Varicose veins	6	0.79
Necrotic patch	6	0.79
Hepatic/biliary Carcinoma	5	0.65
Haemorrhoids	5	0.65
Goitre	5	0.65
Liver abscess	4	0.52
Abdominal Tuberculosis	4	0.52
Soft tissue sarcoma	4	0.52
TOTAL	763	

VI. Mode of Treatment

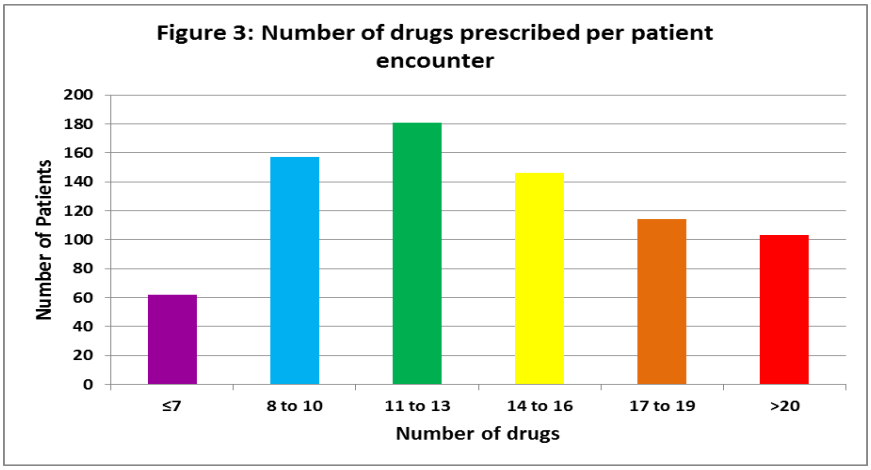
Out of 763 patients enrolled in the study, surgical intervention was carried out in 461 (60.42%) of the patients whereas a conservative approach was preferred in the remaining patients 302 (39.58%).

VII. Details of Drugs Prescribed

A total of 10184 drugs were prescribed to the study population.

Prescribing frequency of drug per patient encounter

The study patients were prescribed drugs in the range of 3 to 33 drugs per encounter. We divided the number of drugs prescribed per encounter into 6 groups: ≤7, 8 to 10, 11 to 13, 14 to 16, 17 to 19 and ≥20. The prescribing frequency of drugs per encounter is depicted in Figure 3.



- **Route of Drug Administration**

The most commonly preferred route of drug administration was injectable for 6511 (57.07%) drugs, followed by oral route for 3972 (34.81%) drugs. Inhalational route was used for 543 (4.76%) drugs, while 208 (1.82%) drugs were prescribed by rectal route. Only 175 (1.53%) drugs were prescribed by topical route. Topical route of administration included topical ointments and creams, transdermal patches, eye drops and nasal sprays.

- **Details of Drug Prescribed**

Antimicrobials (1836; 18.03%) were the most commonly prescribed class of drugs among the patients followed by intravenous fluids (1662; 16.30%), drugs affecting gastro-intestinal system (1406; 13.78%) and NSAIDs (907; 8.91%).

Table 2: Illustrates details of various classes of drugs prescribed.

Classes of Drugs Used	Sub- groups	Number (%)	Total Number (%)
Antimicrobials	Anti-bacterials	1811 (98.64%)	1836 (18.03%)
	Anti-fungals	15 (0.82%)	
	Anti-virals	2 (0.11%)	
	Anti-helminth	8 (0.43%)	
Drugs acting on respiratory system	Anti -asthmatic/COPD	448 (77.11 %)	581 (5.71%)
	Anti-cough	110 (18.93%)	
	Others (nasal decongestants, lozenges, antiseptic)	23 (3.96%)	
NSAIDs	-	-	907 (8.91%)
Drugs acting on central nervous system	Opioids	368 (60.03%)	613 (6.02%)
	Anti-anxiety	155 (25.29%)	
	Sedative/Hypnotics	40 (6.52%)	
	Others (anti-epileptics, anti-parkinsonian, anti-psychotics, anti-depressants)	50 (8.16%)	
Drugs acting on gastrointestinal system	Anti-acidity	850 (60.45%)	1406 (13.78%)
	Anti-emetics	169 (12.02%)	
	Anti-diarrhoeal	43 (3.06%)	
	Drugs for constipation	222 (15.79%)	
	Anti-spasmodic	122 (8.68%)	
Drugs acting on cardiovascular system	Anti-hypertensives	183 (62.67%)	292 (2.87%)
	Anti-ischaemic/anti-anginal	51 (17.47%)	
	Drugs for heart failure/shock	58 (19.86%)	
Anti-histaminics	-	-	14 (0.14%)
Drugs acting on blood and blood formation	Coagulants	409 (46.37%)	882 (8.66%)
	Anti-fibrinolytic	26 (30.04%)	
	Anti-platelet	17 (1.92%)	
	Anti-coagulants	32 (3.62%)	
	Hypolipidemic	77 (8.73%)	
	Iron	39 (4.42%)	
	Folic acid/folinic acid	43 (4.87%)	
Hormones and related drugs	Anti-diabetics (Insulin and OHAs)	358 (75.85%)	472 (4.63%)
	Corticosteroids	72 (15.25%)	

	Thyroid hormones	4 (0.85%)	
	Others (octreotide, SERMs, aromatase inhibitor)	38 (8.05%)	
Anti- cancer drugs	-	-	109 (1.07%)
Intravenous Fluids (NS,RL,DNS dextrose, amino acids, intralipid, nephrosterile)	-	-	1662 (16.30%)
Multivitamins	-	-	770 (7.56%)
Calcium supplements	-	-	16 (0.16%)
Drugs affecting electrolyte and acid-base balance (KCl, $NaHCO_3$, K+ binders, calcium gluconate)	-	-	82 (0.815)
Miscellaneous	-	-	542 (5.32%)
TOTAL			10184

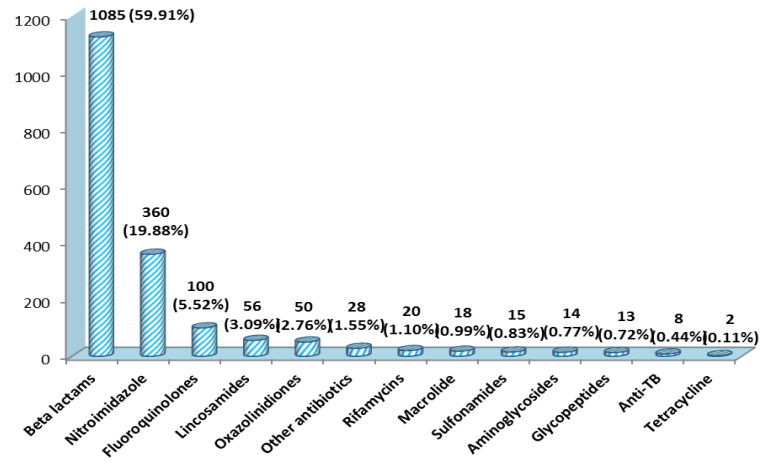
(COPD – chronic obstructive pulmonary disease, OHA- Oral hypoglycemic agents, SERM- Selective estrogen receptor modulator, NS- Normal saline, DNS- Dextrose normal saline, RL- Ringer lactate, Miscellaneous drugs include those drugs which do not belong to the standard classes).

- **Encounter with Anti-microbials**

Out of 1836 antimicrobials prescribed majority (1811; 98.64%) were anti-bacterials followed by anti-fungals (15; 0.82%), anthelminthics (8; 0.43%), and anti-virals (2; 0.11%).

A whopping 92.79% (708) patients were prescribed antibiotics. Amongst those who were prescribed antibiotics, 231 (30.27%) were prescribed a single antibiotic whereas 477 (62.52%) were prescribed more than one antibiotic. Most antibiotics (1381; 70.67%) were prescribed intravenously, while others were prescribed via oral route (528; 27.02%) and as topical ointments (45; 2.31%). Among the antibiotics, beta lactam drugs showed highest prescribing frequency (1085; 59.91%). Nitroimidazoles (360; 19.88%) followed by Fluoroquinolones (100; 5.52%) were the second and third most commonly prescribed antibiotics. Anti-tuberculosis drugs (8; 0.44%) and tetracyclines (2; 0.11%) were the least prescribed drugs. Figure 4 illustrates commonly prescribed antibiotic groups.

Figure 4: Percentages of most commonly prescribed group of antibiotics



Other antibiotic groups included fusidic acid, chloramphenicol, colistin and nitrofurantoin.

VII. WHO Prescribing Indicators

Assessment was done as follows:

➢ Average number of drugs prescribed per encounter

$$\frac{Total\ number\ of\ drugs\ prescribed}{Number\ of\ encounters\ surveyed} = \frac{10184}{763} = 13.35$$

➢ Percentage of drugs prescribed by generic name

$$\frac{Number\ of\ drugs\ prescribed\ by\ generic\ name}{Total\ number\ of\ drugs\ prescribed} \times 100 = \frac{4375}{10184} = 42.96\%$$

➢ Percentage of encounters with an antibiotic prescribed

$$\frac{Number\ of\ encounters\ with\ antibiotic\ prescribed}{Number\ of\ encounters\ surveyed} \times 100 = \frac{708}{763} = 92.79\%$$

➢ Percentage of encounters with an injection prescribed

$$\frac{Number\ of\ encounters\ with\ injection\ prescribed}{Number\ of\ encounters\ surveyed} \times 100 = \frac{758}{763} = 99.34\%$$

➢ Percentage of drugs prescribed from essential drug list

We calculated this value by taking both WHO model list of essential medicines 2019 and National list of essential medicine (NLEM) 2015 into consideration.

$$\frac{Number\ of\ drugs\ prescribed\ from\ WHO\ EDL}{Total\ number\ of\ drugs\ prescribed} \times 100 = \frac{4930}{10184} = 48.41\%$$

$$\frac{Number\ of\ drugs\ prescribed\ from\ NLEM}{Total\ number\ of\ drugs\ prescribed} \times 100 = \frac{7154}{10184} = 70.25\%$$

DISCUSSION

The present study was a prospective cross-sectional study of patients admitted to surgical wards of Goa Medical College. A total of 763 case sheets were analysed.

In this study the demographic data analysis showed a higher number of males 468 (61.34%) admitted to surgery wards than females (295; 38.66%). Similar pattern of male dominant admissions were seen in studies done in various parts of India,[12-16] as well as in Nepal,[17] Kenya,[18] and Pakistan,[19,20]

Average age of patients noted in our study was 47.52% which was higher than those noted by Patel et al,[14] (39.22%) and Talaam et al,[18] (44.8%). Majority of our patients were in the age group of 46-60 years (33.02%) which was similar to that observed by Bhabhor et al,[21] and Bhansali et al.[12]

Average period of hospital stay in our surgery wards was 8.40 days, which is in line with that seen by Bhansali et al.[12] and Alam et al,[20] but higher when compared to the studies done in Rajasthan,[13] and Kerala.[16]

Associated co-morbid condition in addition to their primary surgical diagnosis was seen in 40.50% of our patients. This maybe because most of the patients presenting to surgical unit are in the elderly age group who tend to be suffering from at least one chronic disease. The co-morbidities are also likely to add to the number of drugs used in a patient.

Pancreatitis (9.30%) was the most common surgical indication for admission to the wards followed by abscesses (8.91%). This maybe so as alcohol consumption, the most common risk factor of pancreatitis is very high amongst the Goans. Majority of other studies in India.[12,13,16,21] and one in Pakistan,[19] had hernia as the most common diagnosis, whereas a study in Gujarat,[14] had appendicitis as the most common ailment.

In our study 60% patients underwent some form of invasive surgical intervention whereas the rest were managed conservatively. This is in concordance with a study conducted in Pakistan,[19] which noticed 63.53% of its patients being exposed to surgeries. This signifies the over increasing use of drugs to manage surgical conditions conservatively thereby preventing a patient from going under the knife.

The study patients were prescribed a total of 10184 drugs. Most preferred route of administration was injectable (57.07%). This result was consistent with the finding of Mondal et al,[22] who reported 53% of injectable drugs. Khade et al[23] observed that 68.2% of the drugs in his study were given to patients via injectable route, which was higher than that seen in our study. Heavy use of injectables in surgical wards can be explained by inability of patient take oral medicines owing to decreased gastric motility. Moreover, a number of times, the patients present in acute state of surgical emergency which warrants use of injectable route. However increasing use of injectables can lead to an increasing cost of therapy and higher chances of adverse events due to parenteral administration.

Antimicrobials (1836; 18.03%) was the most frequently prescribed therapeutic class of drugs of which majority were antibiotics (1811; 17.78%). This pattern of prescribing antimicrobials lower in frequency than that documented by Bhataia et al,[13] (28.85%), Kumar et al,[15] (37.90%), Sarraf et al,[17] (34.95%) and Khade et al,[23] (38%). Amongst the classes of antibiotics prescribed, beta lactams (1085; (59.91%) were the most commonly prescribed which was similar to a study conducted in Punjab,[15] (55.01%) and Gujarat,[21] (49.20%). Antibiotics form the backbone of surgical practice, they being prescribed for surgical prophylaxis, as an adjunct to operative treatment and as a treatment of infection. This explains their high percentage of use in surgical unit.

The second most common therapeutic group of drug prescribed was Intra venous (IV) fluids like normal saline (NS), dextrose normal saline (DNS), ringer lactate (RL), amino acids and intralipids used for nutrition and fluid replacement. IV fluids tends to cause an increase in average number of drugs per encounter, number of injectable formulations, and also increase the cost of treatment.

An average of 13.35 drugs were prescribed per patient encounter which was very high compared to other studies reported by Bhansali et al,[12] (9.03), Patel et al[14] (8.94) and Bhataia et al,[13] (8.93). In an in-patient setting, patients are usually presenting with a serious ailment or with associated co-morbid conditions which more often than not warrants usage of multiple drugs.

Although polypharmacy has no standard universal definition, it is generally referred as taking 5 or more

medications together per day. There are wide arrays of numerical definitions of polypharmacy ranging from 2 or more to 11 or more medications. However numerical definitions do not account for specific co-morbidities present and makes it difficult to assess appropriateness of therapy.

A study by Sganga et al,[24] defined polypharmacy as the use of ≥10 drugs during hospital stay. If this criterion is used to define polypharmacy in our study, then an unreasonably high level of prescriptions (593; 77.72%) showed polypharmacy. Interestingly, in a study conducted in surgical department of a hospital in Karnataka,[25] it was noted that odds of polypharmacy increases by 2.5 times with every day that is added to duration of hospital stay and by 2 times with every co-morbidity present. The study also revealed that there is an extra 20% chance of polypharmacy with the increasing complexity of the surgical procedure.

These results thus indicate a need for us to move towards the term 'appropriate polypharmacy' using an integrated approach of assessing medication use, taking into account co-morbidities present, according to best available evidence in order to achieve flawless health outcomes.[26] This will ensure prevention of polypharmacy related complications like antimicrobial resistance, drug interactions, cost burden, adverse drug reactions and non-compliance.[27,28]

In the present study, 42.96% of the drugs were prescribed by generic names which was similar to studies done in Karnataka,[29] (43.93%) and Gujarat,[12] (48.57%), bur lower than those done by Mondal et al[22] (68.51%), Patel et al,[14] (87.27%) and Bhataia et al,[13] (98.51%). Some other studies done in Uttar Pradesh by Salman MT et al,[30] in Punjab by Kumar et al,[15] and in Andhra Pradesh by Khade et al,[23] reported that 0%, 5.25% and 25.5% of the drugs respectively were prescribed using a generic name. A study done in Ireland,[31] revealed that 49% of prescribers used generic names.

Generic drug prescribing and its importance have been highlighted by many studies as it rationalizes the therapy and reduces financial constraints. Nevertheless, there is a lot of misunderstanding when it comes to concept of generic drug versus patented brand drug, and generic name (non-proprietary name) versus brand/trade name. Generic drugs are those that are usually intended to be used interchangeably with an innovator brand drug after the expiry of its patent for exclusive marketing. When it is said that doctors should prescribe generic drugs, it means that they should prescribe drugs manufactured by other companies which are often priced lower than the parent drug of Innovator Company. Thus, all generics have a brand name as well as non-proprietary name but all drugs with non-proprietary name may not be a generic.

In government hospital settings like ours, where hospital pharmacy usually has a single brand of a particular drug, it makes sense to prescribe by generic name because if brand names are used, and that particular brand is not available in drug store, pharmacist will have to refer drug index like CIMS to find out the ingredient and dispense from available stock. This will not only result in wastage of time but may also result in dispensing of the wrong drug which may have detrimental effects on patient's health.

In India, the burden of reducing the health care cost, when it comes to drugs, lies on the doctors. Hence, ideally a doctor should have knowledge about cost of various brands of a particular drug. So, a better way to prescribe would be to write the cheapest brand of a drug and include its generic name in parenthesis, in case that particular brand is not available.

In this study, encounters with an antibiotic prescribed in a prescription was 92.79% which was in agreement with a study done by Patel et al,[14] (92.05%) but lower than that compared by Arshad et al,[29] (99.8%). Majority of patients in our study were given more than one antibiotic (62.52%) which was higher when compared with findings of Khade et al,[23] (54%) and Talaam et al,[18] (55.8%). Rest of the patients in our study received a single antibiotic (30.27%) or no antibiotic (7.21%) at all.

Over prescribing and overuse of antibiotics in hospitals is one of the major causes of producing resistant strains. Even though only 20% of total human antimicrobial usage is accounted for by the hospitals, it is of highest concern as the hospitals are potent hotbeds for drug-resistant bacteria.[32] Thus as prescribers, the onus is on us to reconsider how we use antimicrobials to preserve this precious resource for our future generations. Without an immediate action now, we will once again be moving towards an era where injections and minor injuries could kill a human.[33]

Almost all (99.34%) our patients had an encounter with an injectable drug which was consistent with the finding of Bhansali et al,[12] Patel et al,[14] Mondal et al,[22] and Arshad et al,[29] who all noted that 100% of the prescriptions had an injectable prescribed.

Drugs prescribed from WHO essential drug list was found to be 48.41% in our study which was lower than that observed by Bhataia et al,[13] (61.92%) and Salman MT et al,[30] (62.2%). However when national list of essential medicine (NLEM) was taken into consideration, 70.25% of the drugs were prescribed from the list which was higher than that observed by Bhansali et al,[12] (45.71%) but lower compared to that of Bhataia et al,[13] (78.49%) and Patel et al.[14] (84.22%). In a study done in Nepal,[17] it was observed that 70.61% of the drugs prescribed were from their own national essential drugs list which was similar to what we found in our study using NLEM.

Essential drug list includes drugs that are safe, efficacious and affordable for fulfilling primary healthcare needs of population. WHO EDL should only serve as a guideline for each nation to prepare its own national list. Our variable result on comparing the 2 lists demonstrates the need for every nation to have their own essential drugs list. In fact, every state and preferably every hospital should have its own essential list or formulary so as to meet the medicinal needs of the patient at a local or grass root level.

CONCLUSIONS

This study primarily focussed on surgical disease pattern and use of drugs in surgery in-patients. The results indicated a very high level of polypharmacy. Thus there is a need to prevent prescription cascade, pay attention to drug related issues and identifying the ADRs, and avoiding duplication of drugs. We suggest designing a standard treatment protocol for each department for commonly encountered illnesses, making the resident doctors and consultants aware about the pharmacovigilance programme and avoiding duplication of drugs by writing fresh orders for the patient every day.

Our study also showed high instances of prescriptions with antibiotics prescribed. With the advent of different mechanism of resistance attained by microorganisms, the habit of prescribing antibiotic 'only when needed' and as per the culture sensitivity reports should be followed. Considering that our hospital does not have an antimicrobial policy, we recommend urgently designing one and adhering strictly to it with a periodic review of drugs and their sensitivity from time to time.

The proportion of drugs prescribed by generic name was low prompting us to conclude that the physicians are not convinced about all the available generic drugs/unbranded generics in the market and do not want the brand of the drug changed. We suggest preventing this by keeping a strict manufacturing compliance and improving the quality of the unbranded generics as well as curbing the malpractice of unethical promotions by big pharmaceutical companies.

We also advocate the need for developing a hospital formulary of essential drugs list as it will satisfy the priority health care needs of the local patients while simultaneously optimizing our healthcare system right from the core level.

Lastly considering the importance and immense help of such studies to treating physicians to revise their prescribing habits as well as to policy makers to revise or formulate new guidelines, we recommend streamlining the data collection process by starting an e-filing system of in-patient data and e-prescriptions in pharmacy. This will not only cut down on the time wasted to record from case sheets but will also help in real-time analysis of prescriptions from wards as well those prescribed from OPDs and will put a strong leash on dispensing errors. Periodic scrutiny of the prescribing and dispensing habits will thus be made at ease.

Although all our recommendations sound cumbersome, they are a need of time. The long-term effects of such changes will help in delivering safe, effective and rational healthcare to our patients while reducing the financial burden on a developing economy like ours.

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