British Journal of Bio-Medical Research Vol.02, Issue 05, Pg.598-620, September-October 2018

Available Online at http://www.bjbmr.org

BRITISH JOURNAL OF BIO-MEDICAL RESEARCH

Cross Ref DOI: https://doi.org/10.24942/bjbmr.2018.347 Volume 02, Issue 05, Sept -October 2018

ISSN:2456-9739

Research Article

Evaluation Of Drug Utilization Pattern In Post-Operative Patients In Surgery Ward Of A Teaching Hospital

Dr. Bombay Silvya Grace[1], Dr Divya Jyothi[1], P Bhavya[2], K.C.Prasanna, Dr.S.Balaiah[1]

[1]Assistant Professor, Department of Pharmacy Practice, Nirmala College of Pharmacy, Atmakur, Mangalagiri Mandal, Guntur District, Andhra Pradesh.

[2]V1/V1-Pharm.D, Nirmala College of Pharmacy, Atmakur, Mangalagiri Mandal, Guntur District, Andhra Pradesh.

ARTICLE INFO

Article History:
Received on 02nd Sept 2018
Peer Reviewed on 16th Sept 2018
Revised on 07th October 2018
Published on 28th October 2018

Keywords:
Drug utilization, Post-operative care, Antibiotics, Epidemiology, Polypharmacy, Rationality.

ABSTRACT

Objective: The main objective of our study is to determine the prescribing pattern of drugs, study the indications for which the drug was prescribed, determine the average drug encounter per prescription, assess the average cost per encounter, analyse the drug use using WHO/INRUD (World Health Organization /International Network for Rational Use of Drugs) indicators and how much it conforms to standard treatment guidelines.

Methods: A hospital based non-interventional, prospective and observational study was carried out in post-operative patients. A total of 339 patients from the in-patient wards of department of general surgery who were prescribed with drugs after the major or minor surgery and those who fulfilled the exclusion and inclusion criteria were selected for the study.

Results: Total 339 case records were collected and were analysed for epidemiologic profile, disease spectrum and drug prescription patterns. The mean age of the study population was 42.37 ±32.59 years. Out of 339 patients studied, 47.78% were male and 52.21% were female .In the study population 59.29% were from low socio-economic status and 40.71% were from middle class.4-6 (12.97%) of the study population, followed by 7-9 drugs (40.41%), 10-12 (27.72%), 13-15 (12.38%), 16-18 (4.42%) and>19 (2.06%).The most common disease affected is Hernia (20.35%), followed by Appendicitis (8.55%), Thyroid disorder & Miscellaneous (7.96%), Cancers (7.37%), Cholelithiasis (6.78%), Cellulitis (5.01%), Hydrocele (4.12%) and least common condition was RTA/Gangrene (1.76%).Antibiotics (96.19%), Analgesics (51.03%), Anti-ulcer (46.90%), Vitamins (36.57%), Anti-diabetics (21.23%) and least common prescribed was Anti – allergies (1.76%)%.

Conclusion: This drug utilization study reflects the common disorders for which surgeries are performed in our hospital. This report is intended to be a step in the broader evaluation of safety and efficacy of drug prescription in general surgery wards of a teaching hospital.

Corresponding Author: *Dr. Bombay Silvya Grace, Assistant Professor, Department of Pharmacy Practice, Nirmala College of Pharmacy, Atmakur Mangalagiri Mandal, Guntur District, Andhra Pradesh.*

INTRODUCTION

Drug Utilization Reviews (DUR), also referred to as Drug Utilization Evaluations (DUE) or Medication Utilization Evaluations (MUE), are defined as an authorized, structured, ongoing review of healthcare provider prescribing, pharmacist dispensing, and patient use of medication. DURs involve a comprehensive review of patient's prescription and medication data before, during, and after dispensing to ensure appropriate medication decision making and positive patient outcomes. The main principle is to facilitate the rational use of the drugs in populations.[1]

For the individual patient, the rational use of a drug implies the prescription of a well-documented drug at an optimal dose. 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 prescribers to ensure rational use of medicines, to make estimates of the number of patients exposed to drugs within a given time period, to describe the extent of drug use at a certain moment in a certain area, to estimate to what extent drugs are properly used, overused or under-used, to decrease the pattern or profile of drug use, assessing which alternative drugs are being used for particular conditions and to what extent, and to compare observed patterns of the drug use with currently recommended guidelines for the treatment.[2]

The development of drug utilization as a research area made it possible to study drug prescribing and drug usage in a scientific and formal manner. The WHO stated that rational use of the drugs requires that patients receive medications appropriate to their clinical needs in doses that meet their own individual requirements for an adequate period of time and at the lowest cost to them and community.[2] In contrast, irrational use of drugs refers to the distribution ancommunity.[2]

Pharmacotherapy with multiple agents before, during and after surgery is marked in present day indoor hospital setting. Drugs like antimicrobial agents [AMAs], non-steroidal anti-inflammatory drugs [NSAIDs], gastrointestinal tract [GIT] related drugs, anti-emetics, stool softeners, diuretics, Intravenous fluids etc. are prescribed, but the Antimicrobial agents are most frequently prescribed to prevent infections at the surgical sites. As the micro-organism developed resistance to these antimicrobial agents with the passage of time, therefore, a drug (or AMA) must be used in a rational way for the treatment of disease or to prevent infections because it is of utmost importance for the success of treatment and well-being of patient.[2,5] Hence postoperative utilization of drugs is very much marked; prescription audit should be periodically performed in Department of Surgery to analyse the present scenario of drugs prescribed for the surgical/post-operative patients. This will help us to use the medicines rationally and decrease the adverse effects in surgical patients.[3,4,6]

METHODOLOGY:

Study Site:

This study was conducted at NRI General Hospital, Guntur. It is a 1000 bed multi-specialty tertiary care teaching hospital. It consists of various departments like general medicine, surgery, pediatrics, pulmonology, psychiatry, obstetrics and gynecology (OBG), gastroenterology, neurology, ophthalmology, nephrology, orthopedics, ENT, skin and sexually transmitted diseases (STD), and radiology. Approximately 350-400 patients are being treated in General Surgery department per month and patients are being usually referred to this hospital by general practitioners. The patients who visit this hospital are usually from in and around the districts of Guntur and Krishna.

Study design:

A hospital based non-interventional, prospective and observational study was carried out in post-operative patients.

Sample size:

A total of 339 patients from the in-patient wards of department of general surgery who were prescribed with drugs after the major or minor surgery and those who fulfilled the exclusion and inclusion criteria were selected for the study.

Study duration:

The study was conducted over a period of 6 months from December 2015 to May 2016.

Ethical approval:

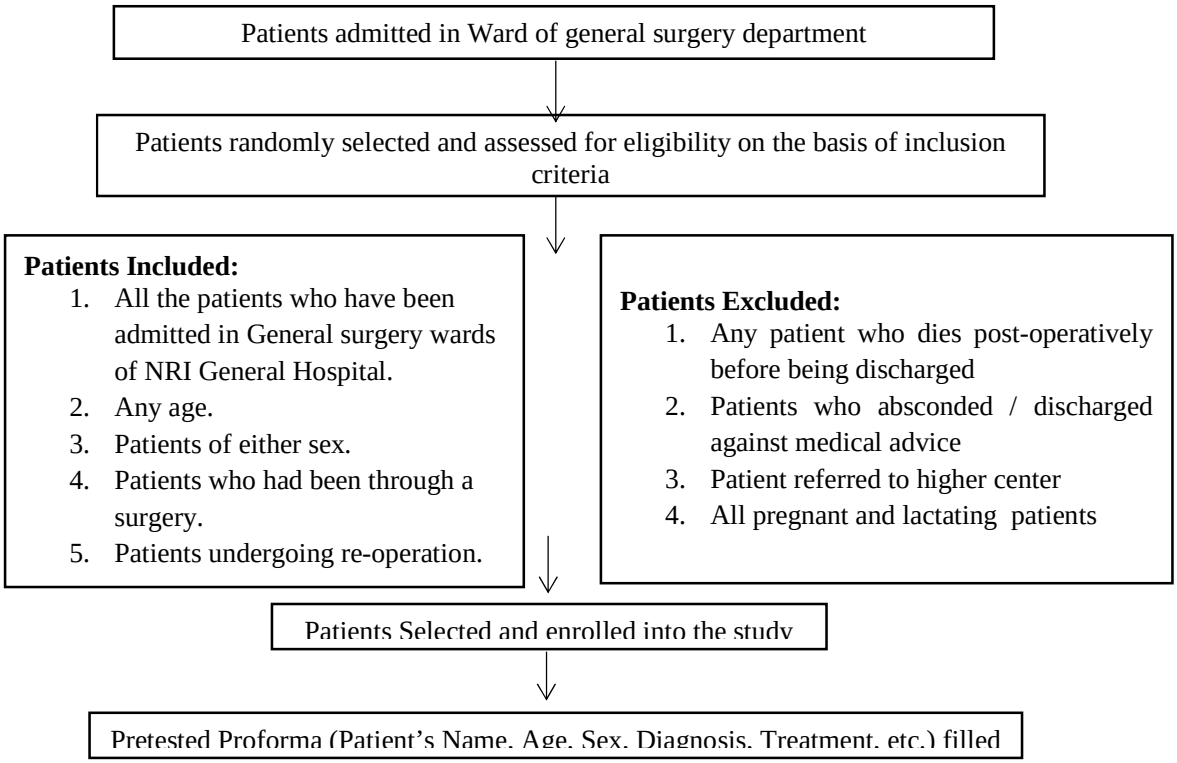
This study was approved by the Institutional Human Ethical Committee of Chebrolu Hanumaiah Institute of Pharmacy, Guntur.

Source of data:

The patients demographical data, clinical data, therapeutics data and various other relevant and necessary data were obtained every day from the clinical assessment records, including medical records and other relevant information sources are documented, including laboratory investigations.

Study procedure:

A suitable data collection form was designed (Appendix-I) to collect all the necessary and relevant information. A personal visit was made to all the patients who were included in the study to collect any further information. Their medications were crosschecked with the treatment chart. All the patients were monitored from the day of admission till the day of discharge. During the treatment the enrolled patients were evaluated clinically every day to assess the clinical outcome.



Prescriptions were analysed for WHO- Prescribing Indicators as below:

1. Average number of drugs per prescription (encounter)
2. Percentage of drugs prescribed by generic name
3. Percentage of encounters for antibiotic prescriptions
4. Percentage of encounters for prescribing injections
5. Percentage of drugs prescribed from an Essential Medicines List /Drugs List (EML)
6. Average drugs cost per prescription or encounter

Other parameters: Percentage of other drugs viz. NSAIDs, Multivitamins & trace elements, GIT related, etc. were also analysed.

RESULTS:

The present non-interventional prospective observational study was done at General Surgery department NRI academy of sciences general hospital, for a period of 6 months (from Dec 2015 to May 2016).

Total 339 case records were collected and were analysed for epidemiologic profile, disease spectrum and drug prescription patterns.

Age distribution: Table 1: Age wise distribution of patients studied

Age in years	Number of patients	Percentage (%)
<25	40	11.78
26-35	50	14.74
36-45	82	24.18
46-55	91	26.84
56-65	54	15.92
66-75	16	4.71
76-85	6	1.76
Total	339	100

Mean ±SD: 48.42 ±31.34

Table 1 shows the age wise distribution of patients admitted in surgery ward. The mean age of the study population was 42.37 ±32.59 years

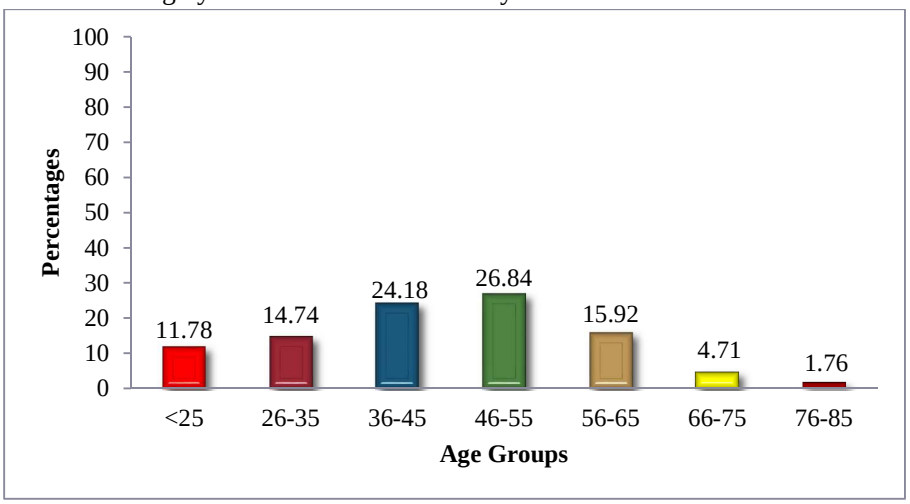


Figure 1: Age distribution of patients studied

Gender wise distribution: Table 2: Gender distribution of patients studied

Gender	Number of patients	Percentage (%)
Male	162	47.78
Female	177	52.21
Total	339	100

Table 2 shows the gender wise distribution in the study population. Out of 339 patients studied, 47.78% were male and 52.21% were female.

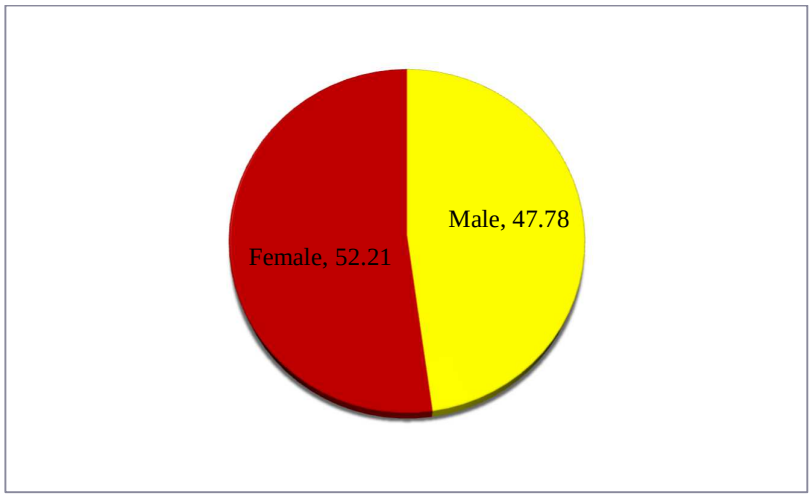


Figure 2:Gender distribution of patients studied

Socio-economic status: Table 3: Socio-economic status of patients studied

Socio-economic status	Number of patients	Percentage (%)
Low	201	59.29
Middle	138	40.71
High	0	0
Total	339	100

Table 3 shows the socio-economic status of patients studied. In the study population 59.29% were from low socio-economic status and 40.71% were from middle class.

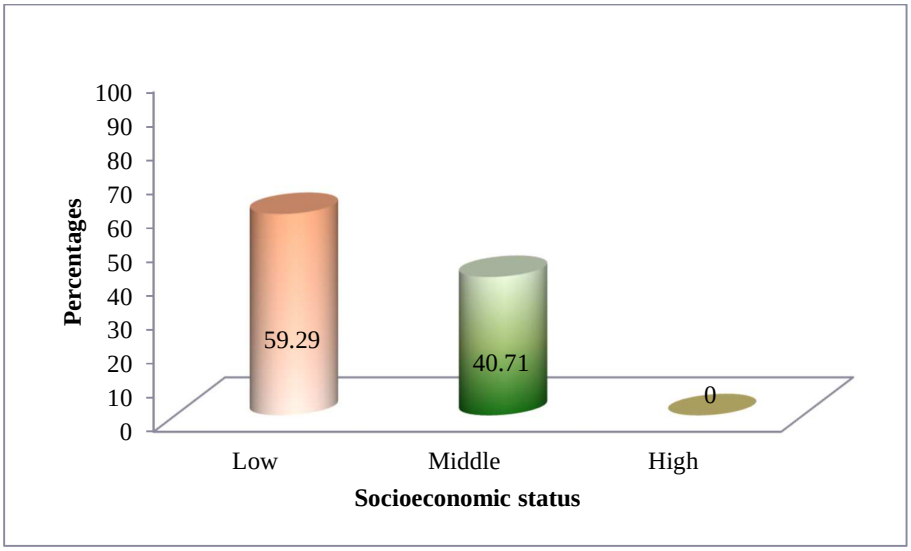


Figure 3:Socioeconomic status of patient studied

Total no of drugs per encounter: Table 4: Total no of drugs per encounter studied

No of drugs	No of prescriptions	Percentage (%)
4-6	44	12.97
7-9	137	40.41
10-12	94	27.72
13-15	42	12.38
16-18	15	4.42
>19	7	2.06
Total	339	100

Table 4 shows the distribution of no of drugs per encounter. 4-6 (12.97%) of the study population, followed by 7-9 drugs (40.41%), 10-12 (27.72%), 13-15 (12.38%), 16-18 (4.42%) and>19 (2.06%)

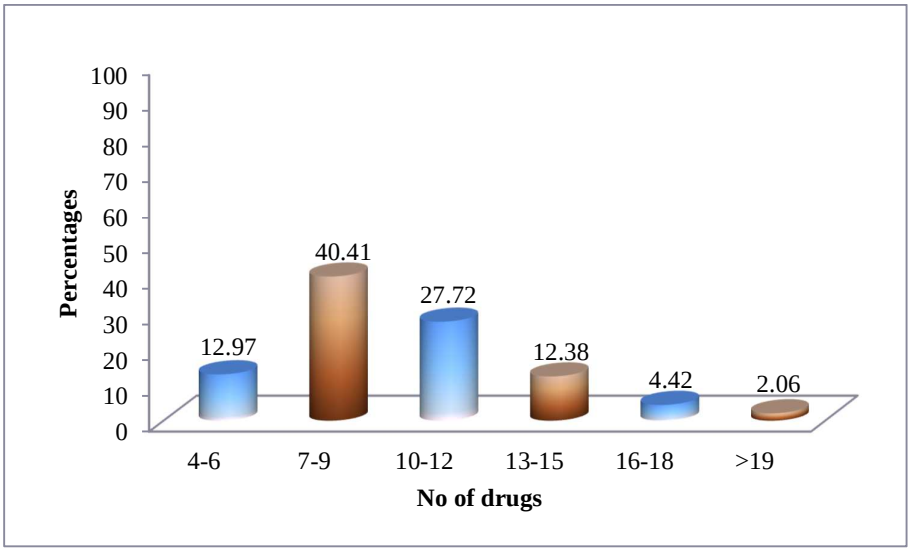


Figure 4: Incidence of polypharmacy in prescriptions

Disease pattern distribution: Table 5: Disease pattern distribution in the study subjects

Clinical condition	No. of patients (339)	Percentage (%)
Cholelithiasis	23	6.78
Hernia	69	20.35
Appendicitis	29	8.55
Intestinal obstruction	15	4.42
Cellulitis	17	5.01
Cancers	25	7.37
Cyst or lump	22	6.48
Varicose veins	16	4.71
Gangrene	6	1.76
Fistula	8	2.35
Ulcers	13	3.83
Thyroid disorders	27	7.96

Abscess	10	2.94
Diabetic foot	12	3.53
Hydrocele	14	4.12
RTA	6	1.76
Miscellaneous	27	7.96

Table 5 shows the distribution of various disease patterns of the study population. The most common disease affected is Hernia (20.35%), followed by Appendicitis (8.55%), Thyroid disorder & Miscellaneous (7.96%), Cancers (7.37%), Cholelithiasis (6.78%), Cellulitis (5.01%), Hydrocele (4.12%) and least common condition was RTA/Gangrene (1.76%).

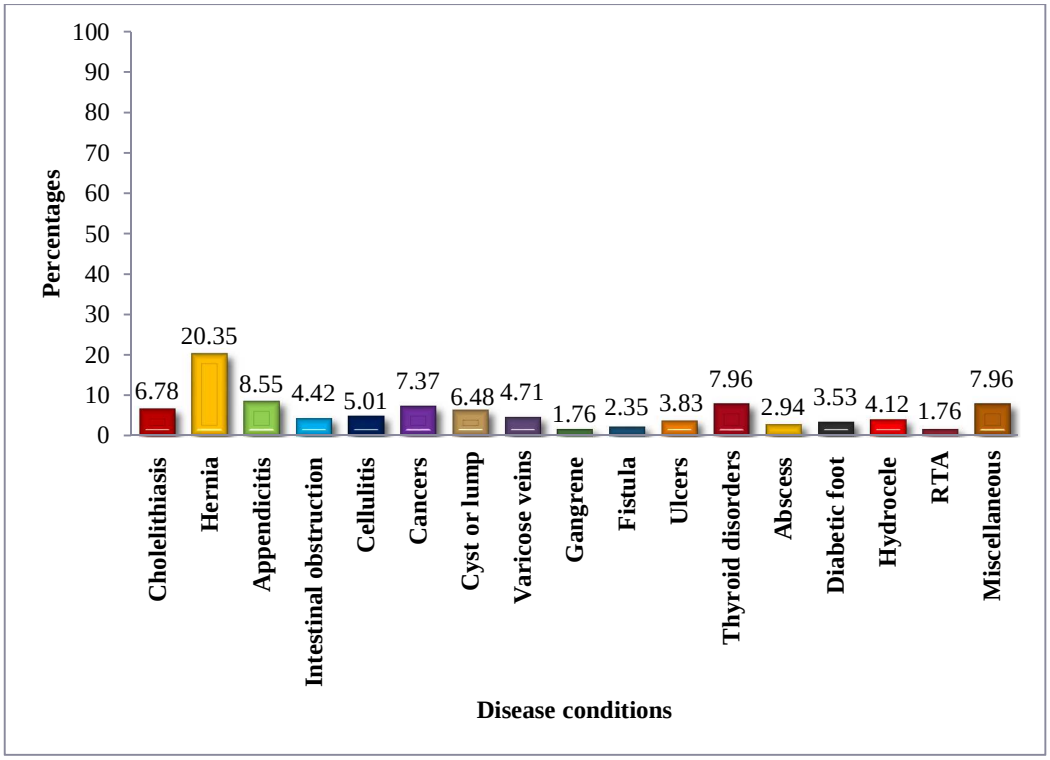


Figure 5: Disease pattern in the study population

Pattern of usage of drugs in pre-operative patients: Table 6: Drugs prescribed in pre-operative patients

Class of drugs	Number of patients (339)	Percentage(%)
Antibiotics	326	96.19
Anti-ulcer	159	46.90
Anti-emetics	26	7.66
Analgesics and anti-pyretics	173	51.03
IV Fluids	45	13.27
Neuronal	4	1.17
Vitamins and mineral supplements	124	36.57
Anti-allergics	5	1.47
CNS drugs	6	1.76

CVS drugs	71	20.94
Respiratory drugs	26	7.66
Blood and blood products	58	17.10
Anti-diabetics	72	21.23
Phlebetics& Varicose preparations	5	1.47
Electrolytes	4	1.17
Enzymes	9	2.65
Laxatives & Purgatives	49	14.45
Anti-thyroid	19	5.60
Ointments	11	3.24
Others	26	7.66

Table 6 shows the drugs prescribed in the study population during pre-operative stage in the descending order, Antibiotics (96.19%), Analgesics (51.03%), Anti-ulcer (46.90%), Vitamins (36.57%), Anti-diabetics (21.23%) and least common prescribed was Anti – allergics (1.76%).

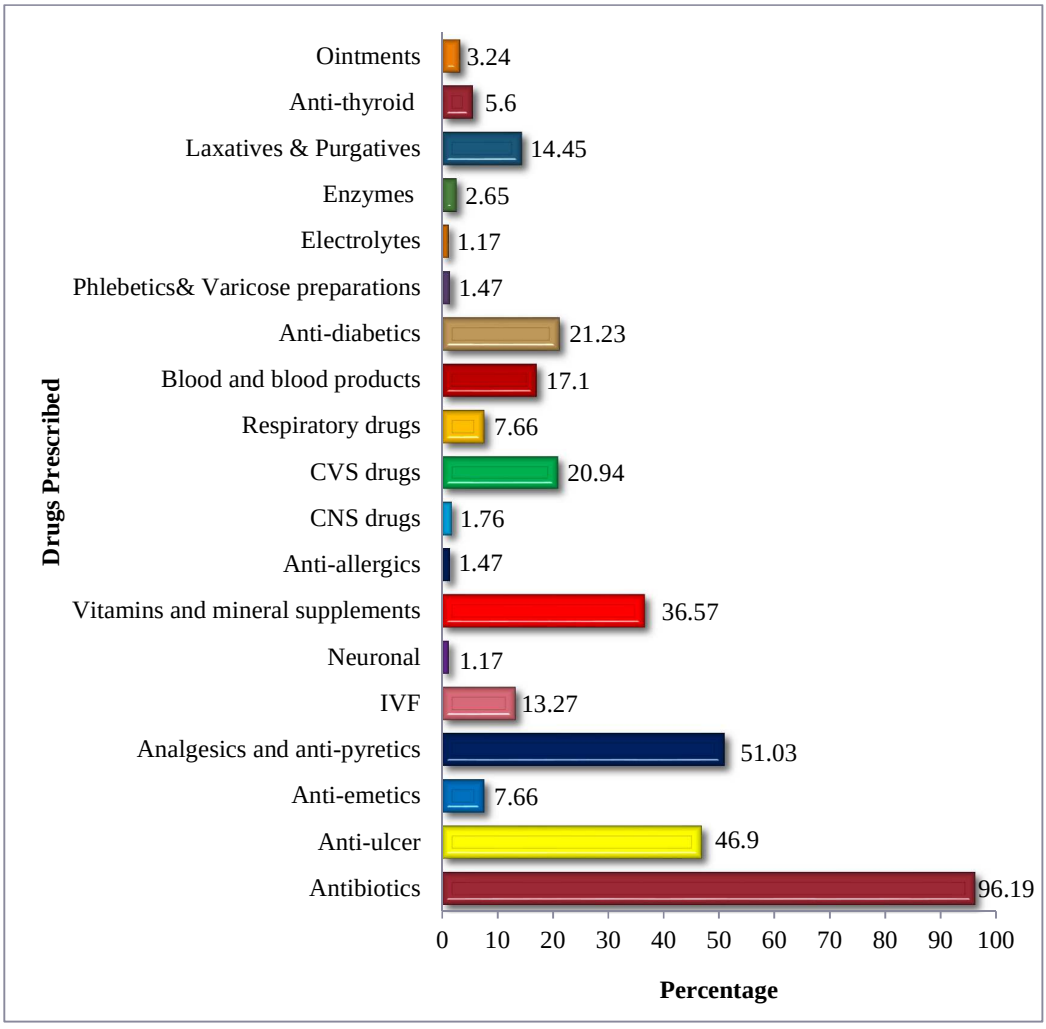


Figure 6:Drugs prescribing pattern in pre-operative patients

Pattern of usage of drugs in post-Operative patients: Table 7: Drugs prescribed in post-operative patients

Class of drugs	Number of patients	Percentage(%)
Antibiotics	339	100
Anti-ulcer	332	97.93
Anti-emetics	70	20.64
Analgesics and anti-pyretics	339	100
Vitamins and mineral supplements	188	55.47
Anti-allergics	14	4.12
CNS drugs	21	6.19
CVS drugs	87	25.66
Respiratory drugs	47	13.86
Blood and blood products	70	20.34
Anti-diabetics	82	24.18
Electrolytes	37	10.91
Neuronal supplements	25	7.37
IVFluids	138	40.70
Enzymes	73	21.53
Laxatives & Purgatives	113	33.33
Anti-thyroid	18	5.30
Ointments	40	11.79
Miscellaneous	41	12.09

Table 7 shows the drugs prescribed in the study population during post-operative stage in the descending order, Antibiotics (100%), Analgesics (100%), Anti-ulcer (97.93%), Vitamins (55.47%), IV Fluids (40.70%) and least common prescribed was Anti –allergics (4.12%).

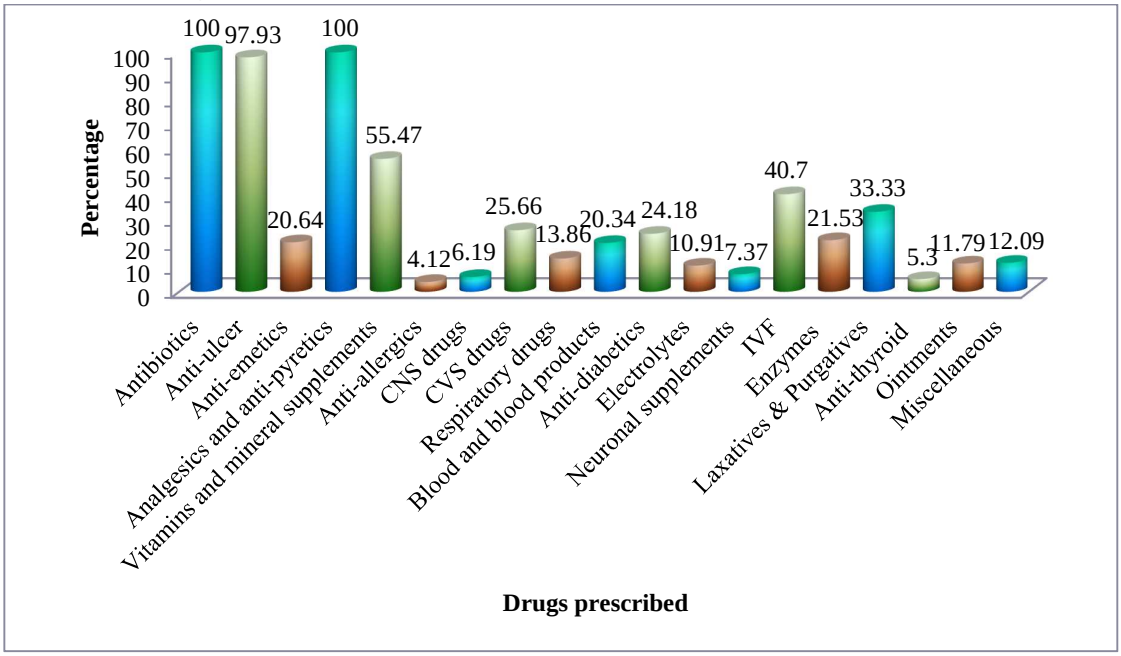


Figure 7:Drugs prescribing pattern in post-operative patients

Pattern of usage of systemic antibiotics: Table 8: Class of systemic antibiotics prescribed

Class of antibiotics	No of prescriptions	Percentage (%)
Pencillins	49	14.45
Cephalosporins	304	89.67
Fluoroquinolones	5	1.47
Oxazolidinoes	8	2.35
Aminoglycosides	22	6.48
Macrolides	3	0.88
Carbepenems	5	1.47
Lincosamides	20	5.89
Nitroimidazoles	134	39.52
Sulfonamides	1	0.29
Nitrofurantoin	2	0.58

In our study, cephalosporin class of antibiotics was found to be the most frequently prescribed (88.49%). The pattern of usage of different classes of systemic antibiotics in surgery department is presented in the figure-8.

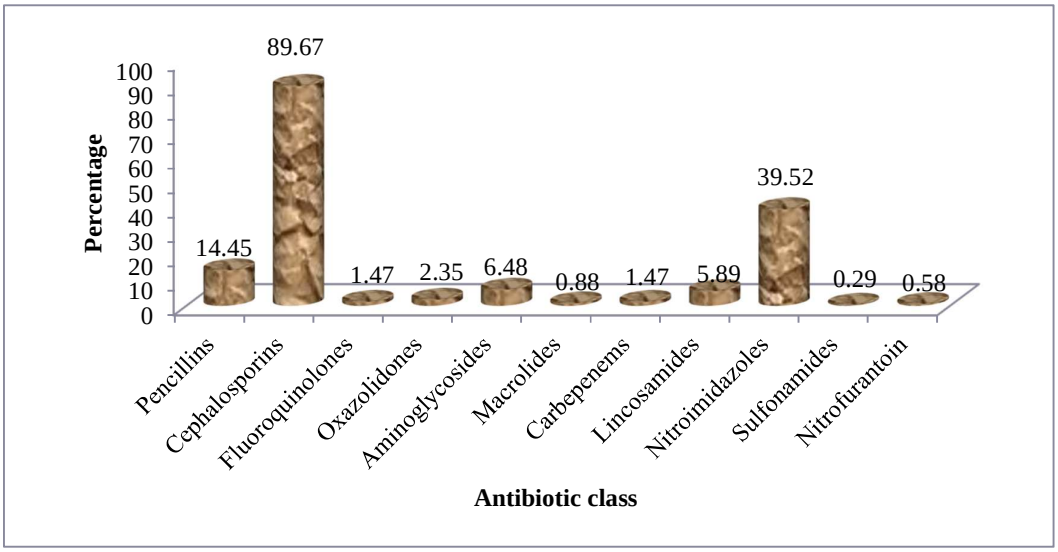


Figure 8: Class of Antibiotics used in surgery department

Pattern of usage of systemic analgesics: Table 9: Class of systemic Analgesics prescribed

Class of analgesics	No of prescriptions	Percentage (%)
NSAIDs	160	47.19
Non-Opioid analgesics	215	63.42
NSAIDs + Non-Opioids	249	73.45

NSAIDS + Non-Opioid analgesics were found to be the most frequently prescribed (73.45), followed by Non-Opioid Analgesics (63.42) in all study population. The pattern of usage of analgesics as mono and combination therapy in surgery department is presented in the figure-9.

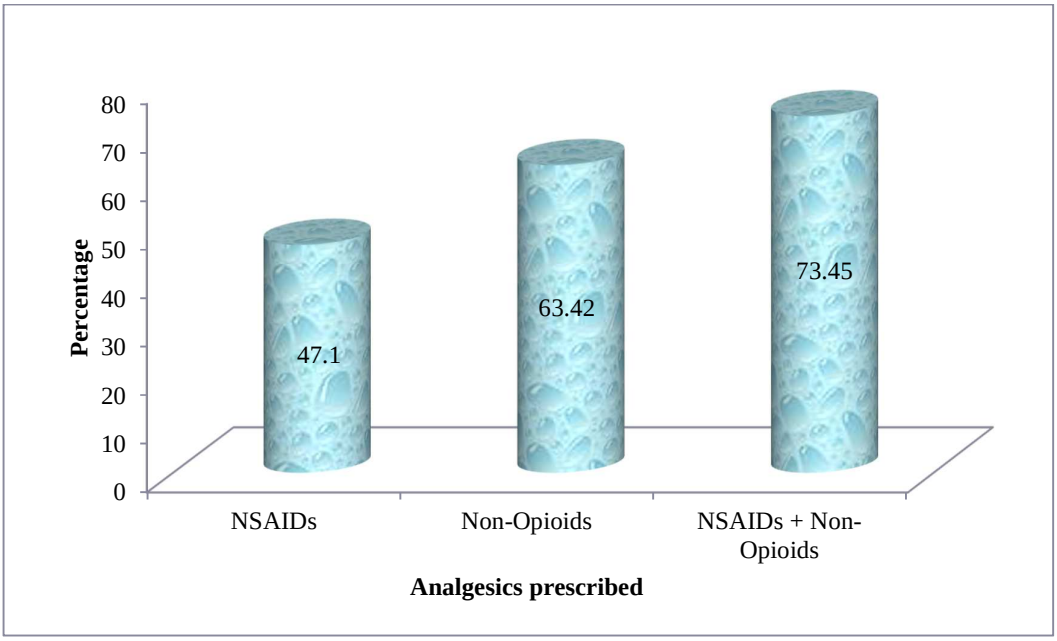


Figure 9:Class of Analgesics used in surgery department

Pattern of usage of systemic anti-emetics: Table 10: Class of systemic anti-emetics prescribed

Class of anti-emetics	No of prescriptions	Percentage (%)
Serotonin antagonists	66	19.46
Prokinetic agents	2	0.58
Anti-cholinergics	2	0.58

Table 10 shows the no of different anti-emetic drugs prescribed in the study population in the descending order Serotonin antagonists (19.46%), Prokinetic agents (0.58%), and Anti-cholinergics (0.58%).

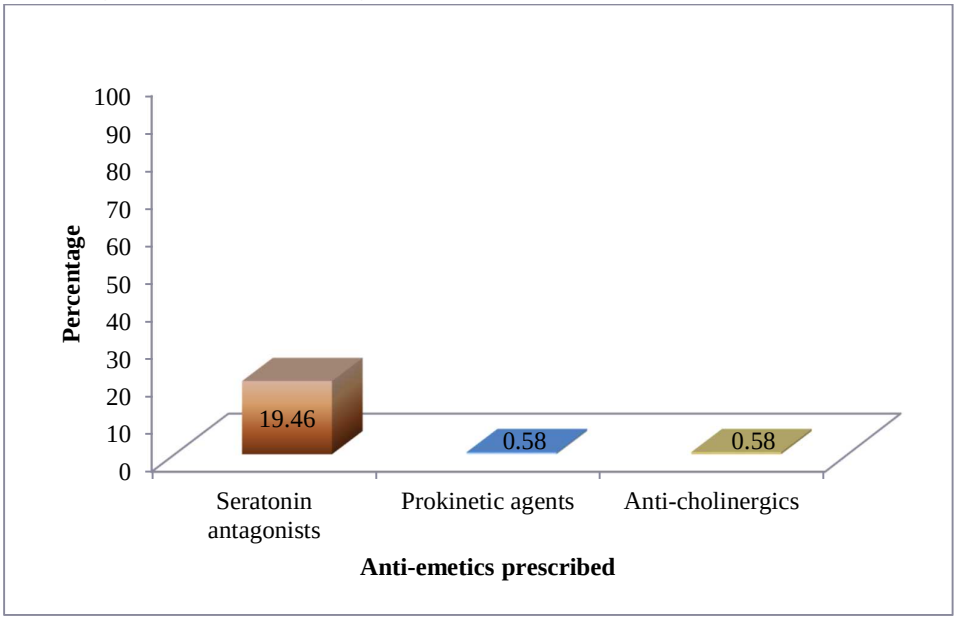


Figure 10: Class of anti-emetics used in surgery department

Pattern of usage of systemic anti-ulcers: Table 11: Class of systemic anti-ulcers prescribed

Class of anti-ulcers	No of prescriptions	Percentage (%)
Proton pump inhibitors	314	92.62
H2 receptor antagonists	30	8.84
Antacids	8	2.35
Ulcer-protective agents	5	1.47

Proton pump inhibitors are the commonly prescribed anti-ulcer agent in the study population followed by H2 blockers (8.84%), Antacids (2.353%), and Ulcer-protective agents (1.47%).

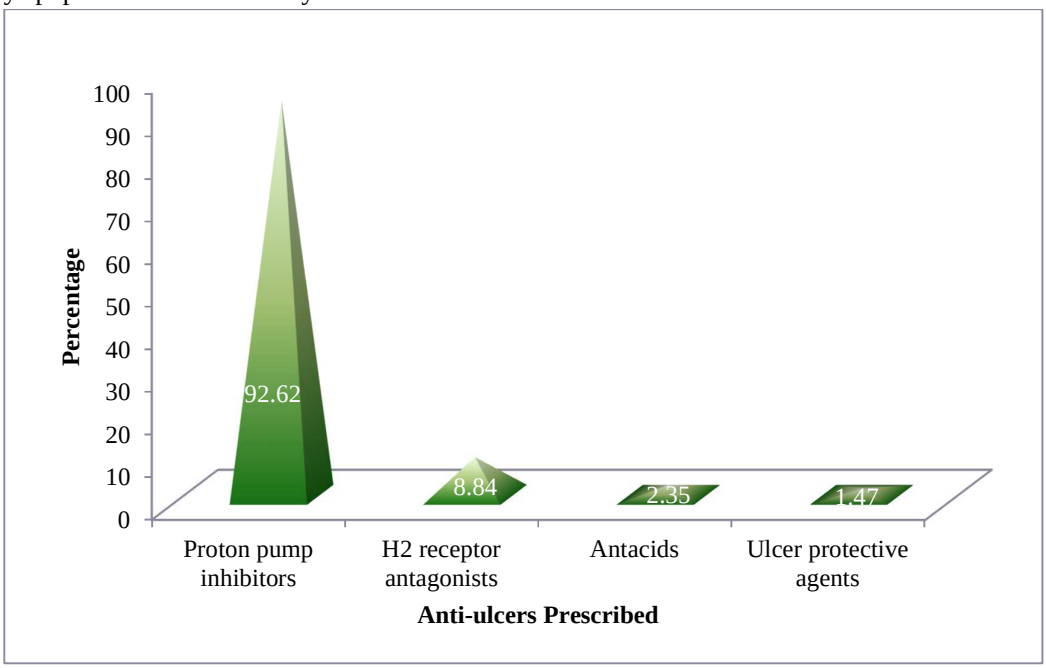


Figure 11: Class of anti-ulcers prescribed

Table 12: Pattern of usage of individual systemic antibiotics

Name of the antibiotic	Number of prescriptions	Percentage (%)
Ceftriaxone	226	66.66
Cefotaxime	135	39.82
Metronidazole	135	39.82
Ofloxacin	19	5.60
Ciprofloxacin	29	8.55
Cefuroxime	7	2.06
Cefpodoxime	62	18.28
Clindamycin	20	5.89
Moxifloxacin	4	1.17
Ceftazidime	2	0.58
Faropenem	2	0.58
Linezolid	8	2.35
Meropenem	4	1.17

Erythromycin	2	0.58
Nitrofurantoin	3	0.88
Amikacin	14	4.12
Cefixime	1	0.29
Cefipime	2	0.58
Clarithromycin	1	0.29
Imipenem	2	0.58

Among patients, times systemic antibiotics were prescribed; ceftriaxone (68.14%) was the most frequently used, followed by both Cefotaxime and metronidazole (39.82%) and Cefpodoxime (18.28%). The pattern of usage of individual antibiotics is presented in Table-12.

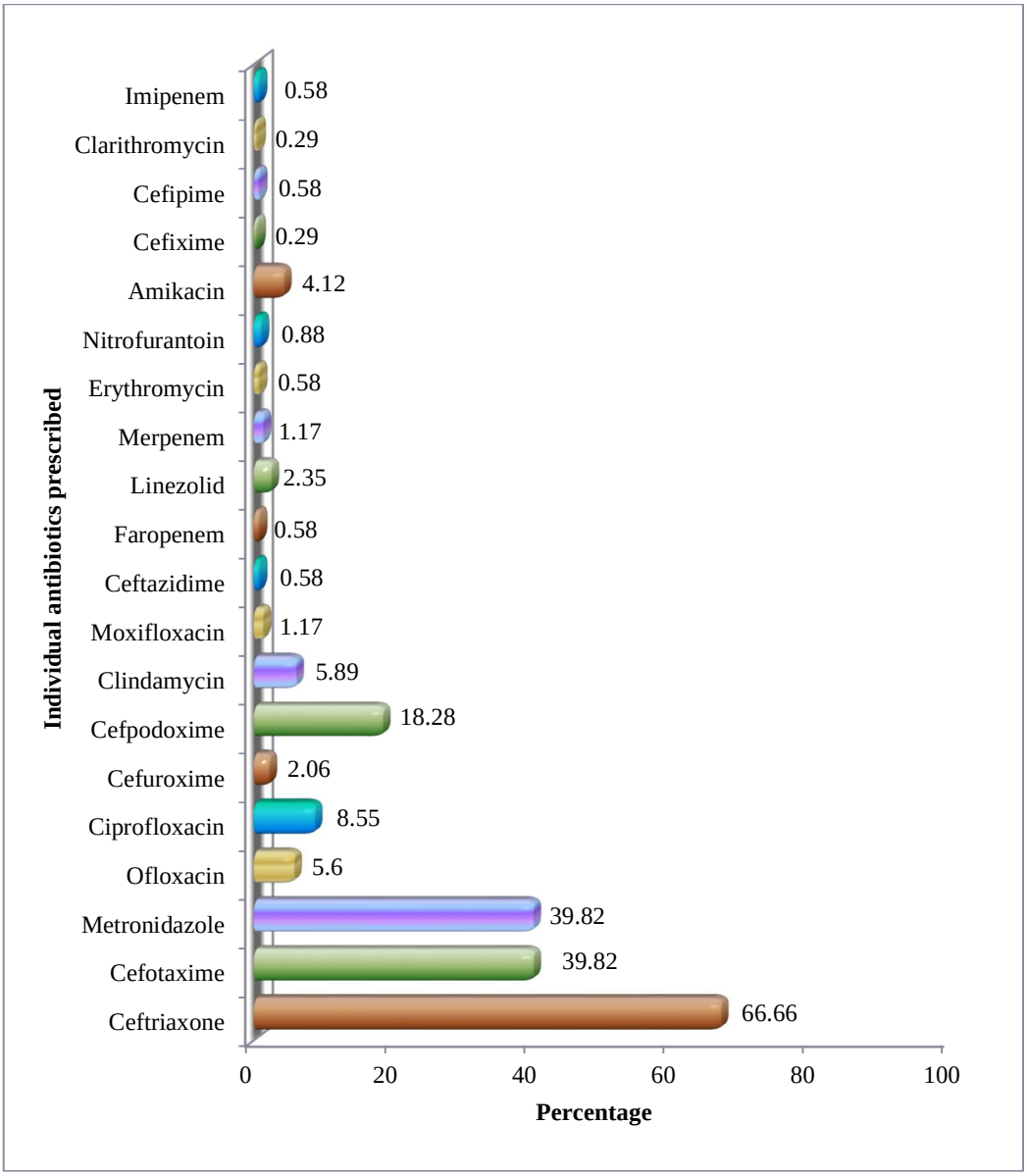


Figure 12: Usage of individual antibiotics in surgery department

Table 13: Pattern of usage of individual systemic Analgesics

Name of the analgesic	Number of prescription	Percentage (%)
Tramadol	212	67.08
Paracetamol	52	16.45
Diclofenac	49	15.50
Piroxicam	2	0.63
Combiflam	1	0.315

Among patients, times systemic analgesics were prescribed; Tramadol (68.14%) was the most frequently used, followed by Paracetamol (16.45%) and Diclofenac (15.50%). The pattern of usage of individual analgesics is presented in Table-13.

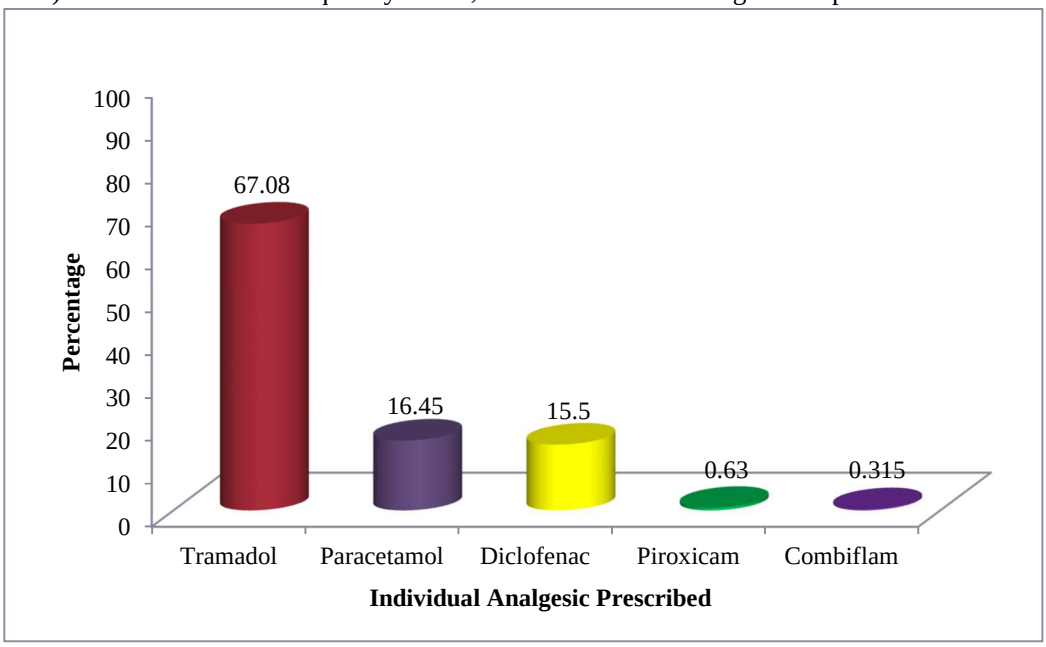


Figure 13: Usage of Individual Analgesics in Surgery department

Table 14: Antibiotics prescribed in combinations

Name of the antibiotic combination	No of prescriptions	Percentage (%)
Cefoperazone + Sulbactam	44	12.97
Amoxicillin + Clavulanate	36	10.61
Piperacillin + Tazobactam	17	5.01
Ceftriaxone + sulbactam	9	2.65
Trimethoprim + Sulfamethoxazole	1	0.29

Table 14 shows the no of different combinations of antibiotics prescribed in the study population in descending order, Cefoperazone + sulbactam (12.97), Amoxicillin + clavulanate (10.61), followed by Piperacillin + Tazobactam (5.01)

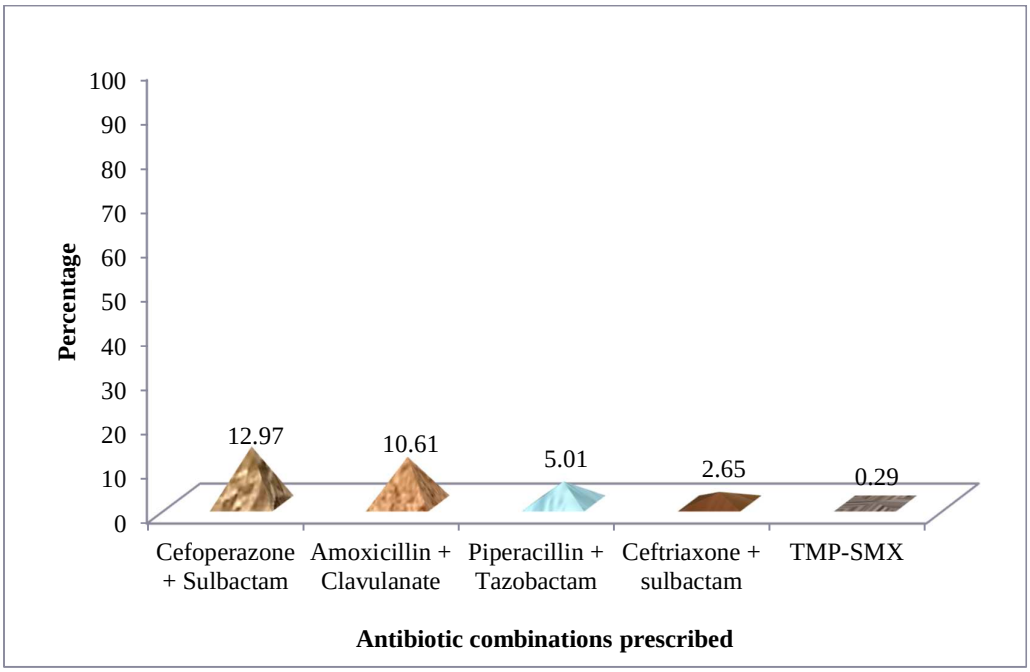


Figure 14: Combinations of antibiotics prescribed in surgery department

Table 15: Analgesics Prescribed in combinations

Name of the analgesic combination	No of prescriptions	Percentage (%)
Tramadol + Acetaminophen	258	75.21
Aceclofenac + Paracetamol	78	22.74
Aceclofenac + Seratiopeptidase	7	2.04

Table 15 shows the no of different combinations of analgesics prescribed in the study population in descending order, Tramadol + Acetaminophen (75.21), Aceclofenac + Paracetamol (22.74), followed by Aceclofenac + Seratiopeptidase (2.04)

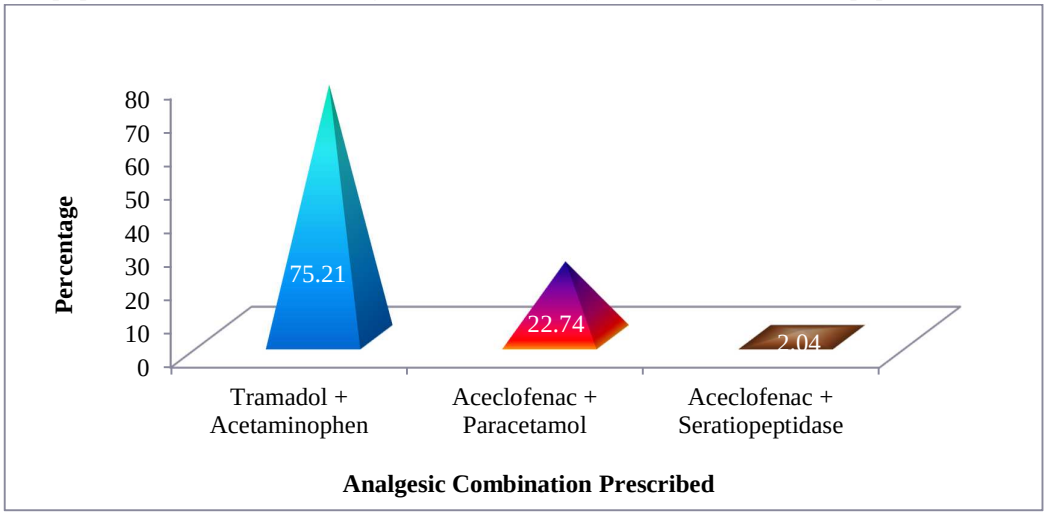


Figure 15: Combination of Analgesics prescribed in surgery department

Table 16: Pattern of use of antibiotics

No of antibiotics	No of Prescriptions	Percentage (%)
1	69	20.35
2	131	38.64
3	72	21.23
4	44	12.97
5	19	5.60
6	4	1.17

Table 16 shows no of antibiotics per prescription in the study population in descending order, 2 antibiotics (38.64), 3 antibiotics (21.23), 1 antibiotic (20.35) and more than 4 antibiotics (19.74)

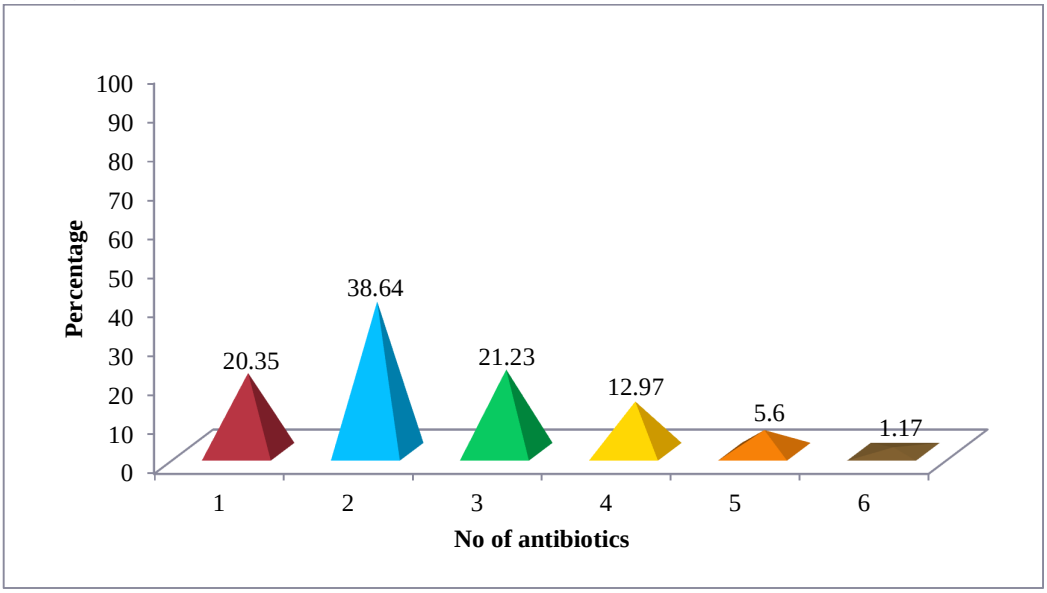


Figure 16: Encounters with one or more antibiotics in surgery department

Table 17: WHO Indicators

Indicators	Data
Prescribing Indicators	
Average number of drugs (n=3336)	9.84
Percentage of drugs prescribed by the generic name (n=273)	8.17%
Percentage of encounters with an antibiotic (n=842)	100%
Percentage of encounters with an injection (n=1327)	94.69
Percentage of drugs prescribed from the essential drug list (n=2194)	65.70%
Patient care indicators	
Average consultation time	9-10minutes
Average dispensing time	7-10 minutes
Percentage of drugs which were actually dispensed	87%
Facility indicators	
Availability of the copy of the essential drug list (EDL)	Yes
Availability of “key drugs”	82%
Complimentary indicators	

Percentage of patients treated without drugs	0%
Average drug cost per encounter	1745.26
Percentage of drug costs which were spent on injections	60.38%

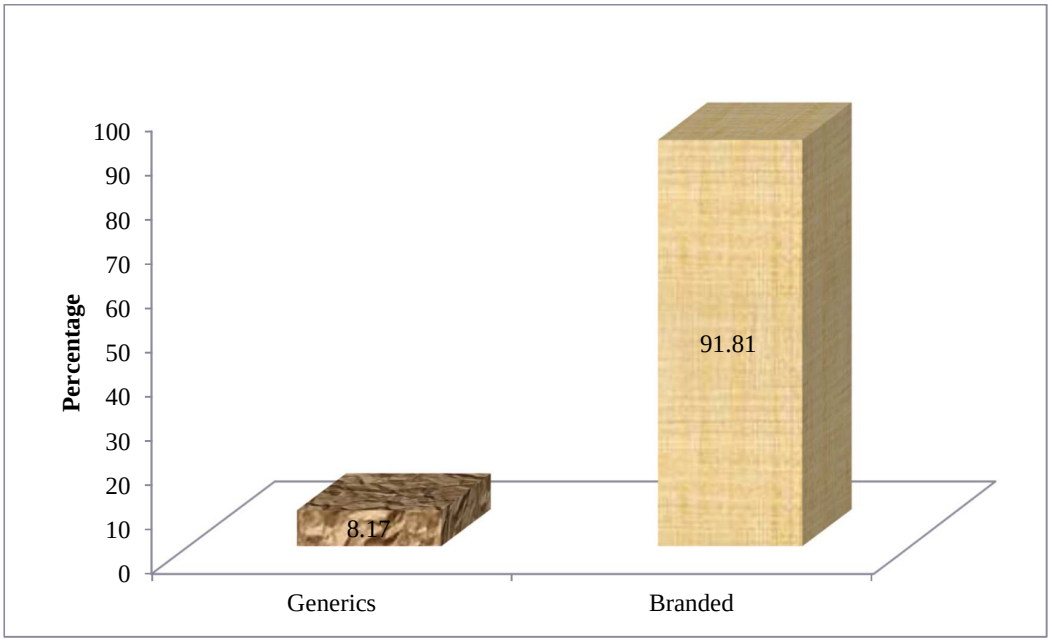


Figure 17: Percentage of drugs prescribed by generic and brand names

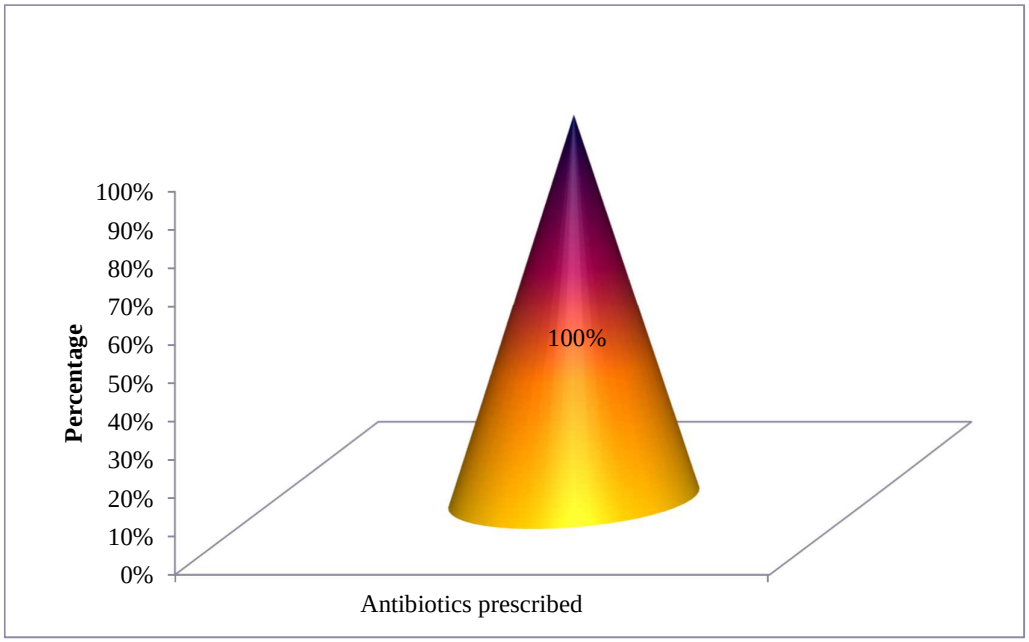


Figure 18: Percentage of encounters with antibiotics

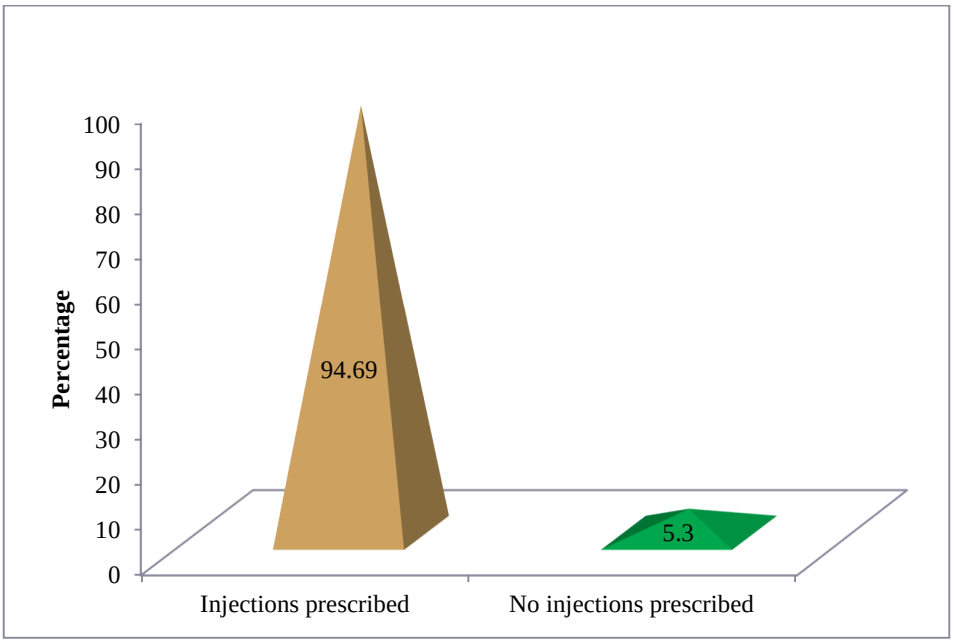


Figure 19: Percentage of encounters with Injections

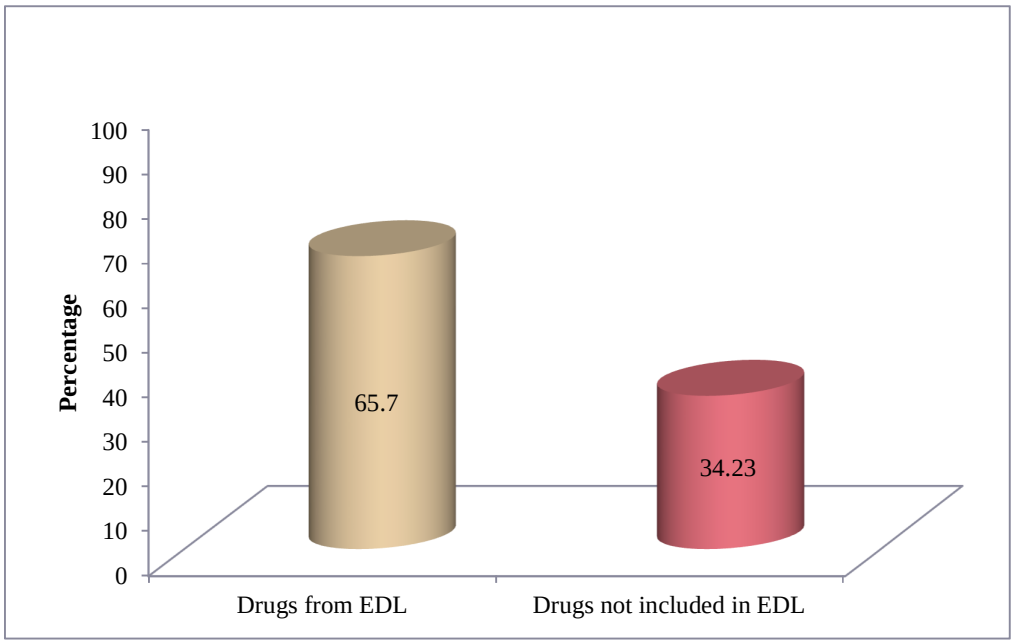


Figure 20: Percentage of drugs prescribed from the essential drug list

DISCUSSION:

In general practice, the therapeutic approach for surgical disease conditions is primarily empirical and the main aim of the physicians is to treat as specifically as possible. The present study was focused on evaluating the prescribing pattern of drugs in post-operative patients of the surgery department.

We had collected data of 339 patients matching inclusion criteria that underwent surgery and were in their postoperative period till they were discharged, in the surgery ward of our hospital. The Largest proportion of patients

were female (52.21%) which was in accordance with the study done by Ram Nagina Sinha[185] in which 58.5% of patients were female which is almost similar to our data.

In our study, a total of 91 (26.84%) patients were in the age group of 46-55 years, which is comparable to 57.08% in the study done by Bhansali NB et al.153 Also the study done by P. Bhabhor et al.157 shows 49% of patients are in between the age group of 40-60yrs. However, this finding differs with that of Khan S et al.189, where a majority of patients were in the age group of less than 40 years. In the study population, 59.29% were from low socio-economic status and 40.71% were from the middle class.

The average number of drugs per encounter was 9.84 in our study with a range of 4 to 20. This finding is consistent with findings of Bhansali NB et al.[153] where it was 9.03. This is higher in comparison to the finding of Salman MT et al.[180] which was 4.8. But it may be due to the fact that we have considered intravenous fluids also in our study. Use of poly-pharmacy is quite common in postoperative patients.

In our study surgery for a hernia was very common and accounted for a total of 69 patients, which was 20.35%. This is lower in comparison to the finding of Venkateswarlu B et al.[159] which was 29 (27.10%), Bhansali NB et al.[153] which was 204 (28.33%) and Bangari Anil Kumar et al.[174] which was 20 (21.7%). Also in a study conducted by Khan S et al.[189] hernia repair surgery was very common and accounted for 10.4% of all surgeries. The second most common procedure done was appendectomy, accounting for 8.55% of total patients, which is comparable to the 14% obtained in study conducted by Venkateswarlu B et al.[159]

Of the total 339 prescriptions, antimicrobials and analgesics were the most common group of drugs prescribed in 339 (100%). The second most commonly prescribed class was Antiulcer drugs, 332(97.93%), vitamins and mineral supplements 188 (55.47%), IV fluids 138 (40.70%) and Laxatives & purgatives 113(33.33%) were also commonly prescribed. Of total 3336 drugs, 842 (25.23%) antibiotics were prescribed which is consistent with findings of Raj Kumar et al.[168] where it was 1398 (37.9%).

The most frequently administered group of antibiotics were cephalosporins 304 (89.67%), which is lower in findings to the comparison of Ram Nagina Sinha.[185] where it was 382 (95.5%) and higher in findings to the comparison of Sapna Patil L et al.[158] where it was 67 (82.7%). The second most commonly prescribed class of antibiotics was Nitroimidazoles, 134 (39.52%) which is higher in findings to the comparison of Ram Nagina Sinha[158] where it was 264 (66%). The other groups prescribed commonly were aminoglycosides 22 (6.48%), Lincosamides 20 (5.89) and Oxazolidinoes 8 (2.35%) and Miscellaneous 16 (4.69%) which included Fluoroquinolones, macrolides, Carbepenems, sulfonamides and nitrofurantoin. All the indoor patients selected for the study received antibacterial drugs, irrespective of whether an operative procedure was carried out or not, or whether the patients had any impending infection which required treatment with antibiotics. Thus all patients received an antimicrobial drug at one time or the other. The use of antibiotics in indoor patients was more on account of relatively poor operation theatre conditions and a greater concern for hospital acquired infections.

In our study among cephalosporins and Nitroimidazoles, ceftriaxone 226 (66.66%) was most commonly prescribed followed by metronidazole 135 (39.82%). These results are similar to the findings of Sapna Patil et al.158 where ceftriaxone and Metronidazole are the most frequently prescribed antibiotics. In a study done by Siddhartha Mondal et al.154 Ceftriaxone is second commonly prescribed and Metronidazole is fourth commonly prescribed drug. Due to their wide spectrum of activity, good pharmacokinetics, established clinical efficacy and high tolerability, cephalosporins are among the most widely used antibiotics worldwide. The third generation

cephalosporins are predominantly parenteral agents, administered two or three times daily, used prophylactically or therapeutically. Ceftriaxone, a third generation cephalosporin, is unique in exhibiting an unusually long elimination half-life that allows for once-daily administration and exhibits the widest antibacterial spectrum of third generation cephalosporins and this is reflected in clinical responses. The cephalosporins are well tolerated, with few and generally transient adverse effects. Metronidazole was also prescribed to combat the anaerobic infections.

From the total 160 antibiotic combinations of all the prescribed antibiotics, the most common prescribed antibiotic drug combination was found to be cefoperazone + Sulbactam i.e. 44 (12.97), next is amoxicillin + clavulanic acid i.e. 36(10.61%) followed by Piperacillin + Tazobactam i.e. 17 (5.01%). The least prescribed combinations were ceftriaxone + Sulbactam and TMP-SMX i.e., 9 (2.65) and 1 (0.29). These findings are similar in consistent with the study of Ram Nagina Sinha[185] where cefoperazone + sulbactam and Amoxicillin + clavulanate are most frequently used but Piperacillin + Tazobactam is least frequently prescribed.

Out of 339 prescriptions included in our study, 69 prescriptions had one antibiotic, 131 prescriptions had 2 antibiotics, 72 antibiotic prescriptions had 3 antibiotics and 67 prescriptions had more than 4 antibiotics. These results are similar to the findings of Ram Nagina Sinha[185] where Single antibiotic was prescribed to 92 patients, two antibiotics were given to 194 patients, three for 90 patients and four antibiotics were prescribed for 24 patients per prescription.

NSAIDS + Non-Opioid analgesics were found to be the most frequently prescribed (73.45), followed by Non-Opioid Analgesics (63.42) in all study population. Amongst the analgesics, Tramadol was the most commonly used analgesic. As post-operative pain is one of the major problems after surgery, use of an analgesic has almost become mandatory following surgery. In our study, the most commonly used analgesic was Tramadol, 212 (67.08%). It was consistent with the findings of Samina Farhat et al.[182] and Allam Roshini et al.[184] where it was second commonly used 27 (9.03%) & 70 (33.81%).

In our study Combination of tramadol + acetaminophen 258 (75.21%) is the commonly prescribed analgesic followed by aceclofenac + paracetamol 78 (22.74%) which is similar to the findings of Allam Roshini et al [184] 99 (38.37), 85 (33.94).

In 97.93% of prescriptions additional drugs were prescribed to prevent the adverse effects of analgesics. Of them, 30 (8.84%) of prescriptions had H2 blockers and 314 (92.62%) of prescriptions had proton pump inhibitors. Proton pump inhibitors were the drugs used maximally to prevent adverse effects in the hospital. Moreover, Allam Roshini et al.[184] and Samina Farhat et al.[182] founded that the proton pump inhibitors were the drugs used maximally.

In our study, 20.64% of prescriptions received anti-emetics, among which Serotonin antagonists 66 (19.46%) was most frequently prescribed among which Ondansetron was commonly prescribed which is similar in consistent with the findings of Samina Farhat et al.[182] where 39.5% of the study group had received anti-emetics in the form of Ondansetron.

In every one of the 339 encounters, only 321 encounters are prescribed with one or more injections i.e., 94.69%. This is lower in consistent with the findings of Siddhartha Mondal et al.[154] where percentage of the injections prescribed was 100%. Among all the drugs prescribed, 2194 (65.70 %) were on the WHO Model List of Essential Medicines (EML). This is higher in comparison with the findings of Siddhartha Mondal et al.[154] and Sharma Neha et al.[155] where it was 54.89% and 57%. This is also lower in comparison with the findings of Sneha Bhataia et al [181] where it was 72.67%.

In our study total number of drugs prescribed by generic name was 273 (8.17 %) which is similar in consistent with the findings

of Raj Kumar et al.[162] where it was 192 (5%) but there is a wide variation in the study of Siddhartha Mondal et al.[154] where it was 68.51%.

In our study, the average drug cost per encounter was 1745.26 INR, which is much lower in the study conducted by Bhansali NB et al.153 where it was 1094.40 INR. A post-operative condition commonly requires a very few class of drugs which include antimicrobials, analgesics, intravenous fluids, antacids, and anti-emetics. All these drugs increase the cost of therapy. Among which the cost of injections is very high. Direct non-medical cost i.e. cost incurred by a patient in receiving medical care e.g. transportation to and from hospital and lodging of family members were not taken into account. Indirect cost like income loss of family due to absenteeism from work and intangible cost i.e. pain, worry, stress, anxiety due to the disease were also neglected as these costs are difficult to measure and variations are bound to occur when interpreted by the different individual. It has been reported that the doctors have a suboptimal awareness of drug cost. The situation can be improved if the drug cost is given greater emphasis during their medical training program.

Only limited studies were published in respect to patient care, facility, and complementary indicators and the present study was successful in this aspect. The average consultation time and dispensing time was found to be 9-10 and 7-10 min respectively and percentage of drugs actually prescribed was 87%. During the assessment of facility indicators, it was found that there was an availability of EDL and key drugs were available at a percentage of 82%. With respect to complimentary indicators, none of the patients are treated without drugs and percentage of drug costs which were spent on injections was 60.38%.

CONCLUSION:

In this study, a total of 339 case records of post-operative were collected. In the study population, male to female proportion was almost equal with a majority of the study subjects from low socioeconomic status. This drug utilization study reflects the common disorders for which surgeries are performed in our hospital. This report is intended to be a step in the broader evaluation of safety and efficacy of drug prescription in general surgery wards of a teaching hospital. Also, polypharmacy was found to be very common which is mostly observed in the case of antibiotics. Lack of generic drugs prescribing and low incidence of drugs prescribing from essential medicines list are the concerns that are to be addressed in order to maintain rational drug therapy.

ACKNOWLEDGEMENT:

I genuinely acknowledge my gratefulness to Dr.Sk.Abdul Rehaman , Professor, Principal, Nirmala College Of Pharmacy, Mangalagiri, India and for his valuable guidance , constant encouragement, support and inspiration throughout the period of research work

REFERENCES:

1. Navarro, Robert, Drug Utilization Review Strategies. In Managed Care Pharmacy Practice, 2008; 215 – 229.
2. P D Sachdeva et al, Drug utilization studies - Scope and future perspectives International Journal on Pharmaceutical and Biological Research, 2010;1(1); 11-17.
3. U.S. Department of Health & Human Services. Centers for Medicare & Medicaid Services. 2009. 2010 Call Letter for Prescription Drug Plan Sponsors. Centers for Medicare & Medicaid Services, 2009.
4. World Health Organization Collaborating Centre for Drug Utilization Research and Clinical Pharmacological Services. Introduction to Drug Utilization Research, 2003.
5. Academy of Managed Care Pharmacy. Concept in Managed Care Pharmacy Series: Pharmaceutical Care, 2003.
6. Erwin WG. The Definition of Drug Utilization Review: Statement of Issues.

Clinical Pharmacology &Therapeutics 1991; 50(5, part 2, November): 596-599.
7. Lunde PK, Baksaas I. Epidemiology of drug utilization basic concepts and methodology. Acta Med Scand Suppl 1988; 721: 7-11.
8. Strom BL. Pharmacoepidemiology. Fourth edition: John Wiley & Sons, Ltd 2005. Costa J, Rosa MM, Ferreira JJ, Sampaio C, Vaz Carneiro A. [Cardiac effects of acute poisoning with tricyclic antidepressants: systematic review of the literature. Part I]. Rev Port Cardiol 2001; 20: 671-8.
9. Strom BL, Melmon KL, Miettinen OS. Postmarketing studies of drug efficacy. Arch Intern Med 1985; 145: 1791-4.
10. Bergman U et al. Drug utilization 90% - a simple method for assessing the quality of drug prescribing. European Journal of Clinical Pharmacology, 1998; 54:113-118.
11. Rajesh Kumar Suman, N.C Mohanty, Ipseeta Ray Mohanty, Y A Deshmukh. The Study of Drug usage Patterns in pediatric Patients in at MGM Hospital. World journal of Pharmaceutical Research.2014; 3(4):734-743.
12. Andersen M. Is it possible to measure prescribing quality using only prescription data? Basic Clinical Pharmacological Toxicology 2006; 98:314-319.
13. Einarson T. Pharmcoepidemiology. In: Parthasarathi G, Hansen KN, Nahata MC, editors. A Text book of Clinical Pharmacy Practice essential concepts and skills. 1st ed., Hyderabad: Universities Press (India) Limited; 2008. p. 405-23.
14. What are Drug Utilization reviews (DUR) [Online]; PRxN DUR October 2009. Available from: https://www.prxn.com/docs/PRxN%20DUR.pdf
15. Drug Utilization review, Academy of Managed care pharmacy [Online]; 2009. Available from:http://www.amcp.org/WorkArea/DownloadAsset.aspx?id=9296
16. American Society of Health-System Pharmacists. ASHP Guidelines on Medication Cost Management Strategies for Hospitals and Health Systems, 2008. Vol. 65: 1368-84.
17. Sjoqvist F, Birkett D. Drug Utilization. In: Bramley DW editor. Introduction to Drug Utilization Research. (WHO booklet) New York: WHO office of publications; 2003. P.76-84.
18. Wettermark B, Hammar N, MichaelFored C, Leimanis A, Otterblad Olausson P, Bergman U, et al. The new Swedish Prescribed Drug Register--opportunities for pharmacoepidemiological.
19. Research and experience from the first six months. Pharmacoepidemiological Drug Safety 2007; 16: 726-35.
20. Naqvi SH, Dunkle LM, Timmerman KJ, Reichley RM, Stanley DL, O'Connor D. Antibiotic usage in a pediatric medical center. JAMA 1979; 242: 1981-4.
21. Scheckler WE, Bennett JV. Antibiotic usage in seven community hospitals. JAMA1970; 213: 264-7.
22. Moore TJ, Cohen MR, Furberg CD. Serious adverse drug events reported to the Food and Drug Administration. Arch Intern Med 2007; 167: 1752-9.
23. Sunol R, Abello C & Cels IC. Studies in Utilization of Drugs: a Review of Different Methods. Quality Assurance in Health Care 1991; 3(1):63-72.
24. Norell SE. Methods in Assessing Drug Compliance. Acta Medica Scandinavica Supplementum. 1984; 683:35-40.
25. Griffiths K, McDevitt DG, Andrew M, et al. Therapeutic Traditions in Northern Ireland, Norway and Sweden: I. Diabetes. European Journal of Clinical Pharmacology 1986; 30: 513-519.

How to cite this article:
Dr. Bombay Silvya Grace, Dr Divya Jyothi, P Bhavya, K.C. Prasanna, Dr. S. Balaiah. ***Evaluation Of Drug Utilization Pattern In Post-Operative Patients In Surgery Ward Of A Teaching Hospital.*** **Br J Bio Med Res , Vol.02, Issue 05, Pg.598 - 620, September - October 2018. ISSN:2456-9739 Cross Ref DOI : https://doi.org/10.24942/bjbmr.2018.347**

Source of Support: Nil **Conflict of Interest:** None declared.