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Drug utilization study in post-operative patients in surgical ward of a tertiary hospital attached with medical college

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ABSTRACT

Drugs in postoperative state are used for analgesia, prevention of infection, nausea and vomiting, intravenous infusions etc. Also a larger availability of various drugs in the market can lead to irrational prescribing and increase in the health care cost. We therefore decided to undertake the following study in the postoperative patients who underwent surgery in a tertiary care hospital attached with the medical college. We collected data from 720 postoperative patients in the surgery ward of a tertiary care hospital over a period of 12 months. We analyzed the data using the various drug use indicators given by the WHO. The average number of drugs per encounter was 9.03. Analgesics, antibiotics, intravenous fluids accounted for majority of the drugs prescribed. 100% of encounters were prescribed an antibiotic. Average number of injections prescribed was 5.70. Out of 35 different drugs prescribed 16 (45.71%) were from the National list of essential drugs, India. And 17 (48.57%) were prescribed by their generic name. Average drug cost per encounter in a postoperative patient in our study was 1090.40 INR. The present study gives us an idea about the overall pattern of drug use profile in postoperative patients in the surgical unit of a tertiary care hospital rol drug in case of the antimicrobial agents. Prescribing for antimicrobial agents was without evidence and for the purpose of prophylaxis only. Prescribing according to the national essential list of medicines is very low.

Key Words: drug utilization study, postoperative patients, surgical ward.

INTRODUCTION

WHO defines drug utilization as "the marketing, distribution, prescription and use of drug in a society with special emphasis on resulting medical, social and economic consequences". The principal aim of drug utilization research is to facilitate rational use of drugs in the populations. Without knowledge, how drugs are being prescribed and used it is difficult to suggest measure to change prescribing habits for better [1].

A growing number of pharmaceutical products are available on the world market and there has been an increase both in the consumption of the drugs and in expenditure on them. In spite of this, many people throughout the world cannot obtain the drugs they need. 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. Irrational prescription of drug is of common occurrence in clinical practice, important reason being lack of knowledge about drug, unethical drug promotion.

Rational use of drugs is quite a usual practice. Monitoring of prescriptions and drug utilization studies could identify the associated problems and provide feedback to prescribers [2]. Developing countries have limited funds available

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for healthcare and drugs and it becomes very important to prescribe drug rationally so that the available funds can be utilized optimally [3].

Essential drugs are those that satisfy the health care needs of the majority of the population; they should therefore be available at all times in adequate amounts and in appropriate dosage forms and at a price that individuals and the community can afford. This concept is intended to be flexible and adaptable to many different situations; exactly which drugs are regarded as essential remains a national responsibility [4].

Postoperative utilization of drugs is very much marked. Drugs are prescribed for the purpose of analgesia, prevention of infection, nausea and vomiting, intravenous fluids so forth and so on. Also there are very few studies which describe the utilization of drugs postoperatively. Therefore we decided to conduct this study in which we studied the utilization pattern of drugs postoperatively and their cost.

MATERIALS AND METHODS

Our study was a prospective and non interventional conducted at Surgery department of Guru Gobind Singh General Hospital, Jamnagar attached with the M. P. Shah Medical College, Jamnagar, Gujarat, India. The study was carried out for 12 months duration from December 2009 to November 2010. Prior permission of the Institutional Ethics Committee and Head of Surgery department was obtained for conducting the study.

Selection criteria of patients

Inclusion Criteria:

1. All post-operative patients till discharged, in Surgery Department of hospital, only adults of either sex including pregnant/lactating mothers were taken.

2. Drugs used post-operatively were only considered and not the drugs that are already going on.

Exclusion Criteria:

- 1. Any patient who dies post-operatively before being discharged
- 2. Patient who absconded/discharged against medical advice
- 3. Patient referred to higher centre
- 4. All paediatric patients

Sample Size

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

Collection of Data

Data of patients matching inclusion criteria were only recorded. Data like name, age, sex, diagnosis, ongoing treatment was recorded from patient's case file. This data was recorded in previously prepared case record form.

Data Analysis

The generic name of the drugs and the generic contents of formulation were obtained from the Indian Drug Review March – April, 2011 [5].

Data was further analyzed as under:

- 1. Age and sex wise distribution
- 2. Morbidity pattern
- 3. Average number of drugs per encounter
- 4. Percentage of encounters with an antibiotic prescribed
- 5. Prescribing frequency of antibiotic
- 6. Percentage of encounters with an injection prescribed
- 7. Percentage of drugs prescribed by generic name
- 8. Average drug cost per encounter
- 9. Percentage of drug prescribed from Essential drug list formulary

RESULTS

The age and sex distribution of the sample population of our study is as shown in the Table 1.

Age Group(years)	No.		Percentage (%)	Total
	Male	Female		
15-40	150	100	34.72	250
40-60	246	165	57.08	411
>60	36	23	8.20	59
Total	432	288	100	720

Table 1: Age and Sex Wise Distribution

Different type of surgeries included in our study with their mean duration of stay postoperatively in the ward is as shown in Table 2.

Type of Surgery	No. of surgeries done (%)	Mean stay (days)
Inguinal Hernia	204(28.33)	7.33
I & D ^{\$}	120(16.67)	6.00
Appendicectomy	66(9.17)	8.20
SSG [*]	56(7.78)	9.00
Laparotomy	43(5.97)	15.50
Hydrocoele	35(4.86)	9.80
Amputation	26(3.61)	6.00
Cystolithotomy	26(3.61)	7.00
Breast Surgeries	26(3.61)	9.00
Circumcision	22(3.06)	3.00
Ano-rectal Surgeries	15(2.08)	15.00
Pyelolithotomy/Nephrolithotomy	10(1.39)	11.50
Thyroid Surgeries	10(1.39)	8.50
Miscellaneous	61(8.47)	7.00
Total	720(100)	Mean = 8.77
¢		

Table 2: Morbidity Pattern with their mean duration of stay

The average number of drugs per encounter is 9.03 in our study. Total number of drugs per encounter ranges from a minimum of 4 drugs to 15 drugs, which is shown in the Table 3.

No. of drugs	No. of encounters	Percentage (%)
4	30	4.17
5	78	10.83
6	50	6.94
7	55	7.65
8	141	19.58
9	91	12.64
10	101	14.03
11	10	1.38
12	72	10.00
13	20	2.78
15	72	10.00

Table 3: Total number of drugs per encounter

Majority of patients were prescribed 8 to 10 different drugs. Most frequently prescribed drugs in decreasing frequency are shown in the Table 4.

Name of drug	No. of encounters	Percentage
Tab. Diclofenac sodium	646	89.72
Tab. Ranitidine	493	68.47
Tab. Cefixime	464	64.44
Inj. Ringer's Lactate	459	63.75
Inj. Dextrose with Normal Saline	459	63.75
Inj. Dextrose (5%)	430	59.72
Inj. Diclofenac sodium	404	56.11
Inj. Ondansetron	361	50.14
Inj. Ceftriaxone	317	44.03
Inj. Amikacin	264	36.67

Table 4: Most frequently prescribed drugs with percentage

In our study total encounters with an antibiotic prescribed are 720 and percentage of encounters with an antibiotic prescribed is 100%. Number of antibiotics prescribed in an encounter is shown in the figure 1. Most of the encounters contain a minimum of 2 antibiotics to a maximum of 5 antibiotics.



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All 720 encounters contain an injection prescribed either an injectable antibiotic, or an injectable analgesic or intravenous fluid. Thus the percentage of encounters with an injection prescribed is 100% in our study. Average number of injections prescribed in a prescription was 5.70.

A total of 35 different drugs were prescribed in different prescriptions. Out of these 35 drugs 16 were prescribed from the National Model List of essential medicines, India 2003 [6]. So, 45.71% drugs were prescribed from the list. Also out of the 35 different drugs prescribed 17 were prescribed by their generic name and 18 were prescribed by various brand names. So, 48.57% drugs were prescribed by generic name and 51.43% were prescribed by brand name.

In our study we calculated the cost of all the drugs, intravenous fluids. We have chosen not to calculate the cost of disinfectants, anti-septic and other materials used for wound dressing. Cost of blood transfusion, oxygen, any laboratory test incurred postoperatively was also not analyzed.

Average drug cost per encounter in a postoperative patient in our study was 1090.40 INR. The cost was calculated according to the minimum price of that drug in Indian Drug Review [5]. Discussion

We had collected data of 720 patients matching inclusion criteria that underwent surgery and were in their postoperative period till they were discharged, in the surgery ward of our hospital. Largest proportion of patients was male (60%) which was in accordance with the study done by Ali SA et al in which 58.85% of patients were male [7]. Also the study done by Khan M L et al shows percentage of male undergoing surgery was 59.86%, which is almost similar to our data [8].

In our study, a total of 411 patients were in the age group of 40-60 years, which is comparable to 70.02% in the study done by Ali S A et al [7]. However this finding differs with that of Khan M L et al, Alam S N et al, Javaid M et al where majority of patients were in the age group of less than 40 years [8-10]. But this may be because our inclusion criteria do not include children in our study. Hence the findings may be different. The mean duration of postoperative stay in our study was 8.77 days and a range of 4 - 15 days, which is consistent with the findings of Ali S A et al, their range, was from 1- 10 days [7].

In our study surgery for inguinal hernia was very common and accounted for a total of 204 patients, which was 28.33%. This finding is consistent with the findings of Ali S A et al, where it was 33.47% [7]. Also in a study conducted by Khan M L et al inguinal hernia repair surgery was very common and accounted for 10.4% of all surgeries [8]. However, Bhatti G et al and Qureshi et al reported that appendicectomy was most common surgery in their audit, which is third most common in our list and accounted for 9.17% of our subjects [11, 12]. The second most common procedure done was incision and drainage of abscesses at various sites, accounting for 16.67% of total patients, which is comparable with the 12% obtained in study conducted by Khan ML et al [8].

The average number of drugs per encounter was 9.03 in our study with range of 4 to 15. This is higher in comparison to the finding of Salman MT et al which was 4.8 [13]. 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.

Most commonly prescribed drugs were Tablet Diclofenac sodium (89.72%), Tablet Ranitidine (68.47%), Tablet Cefixime (64.44%), Injection Ringer's Lactate (63.75%), Injection Dextrose with Normal Saline (63.75%), Injection Dextrose 5% (59.72%), Injection Diclofenac (56.11%), Injection Ondansetron (50.14%), Injection Ceftriaxone (44.03%), Injection Amikacin (36.67%).

We could compare these findings with the study conducted by Salman MT et al, which showed that Injection Ceftriaxone was the most common drug used in postoperative patients, followed by Diclofenac sodium in its various forms [13]. Also Injection Amikacin was frequently used.

In our study all 720 patients received anti-microbial agents making it 100%. The purpose of antibiotic usage in postoperative patients is prophylactic to prevent post-operative infection at the surgical site. However, the use of antimicrobials in combination often was irrational and without any evidence. For example the interesting combination of Injection Ceftriaxone and Injection Amikacin, despite the known fact that both these drugs have spectrum of action that covers mostly gram negative organisms. The other example was that of Ampicillin + Cloxacillin (Ampilox) which is irrational; because the dose is often inadequate and both of the combination belongs to same class namely Beta lactam acting at the same site by same mechanism offering no synergism or additive effects when combined. Moreover combining two antibiotics acting through the same mechanism cannot be justified [14].

The average no. of antibiotics used in our study came out to be 2.95, which is comparable with 2.18 found in a study conducted by Abula T, Kedir M [15]. This was relatively higher than those in other reports [16, 17].

The higher number of antibiotics per patient indicates that more and more antibiotics were used for prophylaxis purpose rather than definitive treatment purpose. It is used more as a blanket therapy to prevent any or all types of infection. This not only leads to the increased cost of therapy, but also to increased incidence of adverse drug reactions and to the selection of drug resistant bacterial strains. Beta-lactam and aminoglycosides were the most commonly used antibiotics. This is consistent with the findings of the study conducted by Abula T, Kedir M, who showed that ampicillin and gentamicin were commonly used [15].

Amongst the analgesics Diclofenac sodium 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. The most commonly used analgesic was diclofenac which is consistent with the findings of Salman MT et al [13]. However, the use of NSAIDs particularly Diclofenac for the management of postoperative pain is controversial [18].

Intravenous fluids were also amongst the most commonly used drugs. The different type of fluids used included Injection Ringer's Lactate (63.75%), Injection Dextrose plus Normal Saline (63.75%) and Injection Dextrose 5% (59.72%). These findings are consistent with that of the study conducted by Gyawali S et al [19]. Their findings were Injection Ringer's lactate (83.44%), Injection Dextrose plus Normal Saline (69.94%) and Injection Dextrose 5% (25.77%). Administration of intravenous fluids may be one of the reasons causing increase in the average no. of drugs per patient. In our study the average no. of injection prescribed per encounter was 5.70 which were comparable to the study conducted by Gyawali S et al, which was 6.58 [19]. But this was considerably higher as compared to 2.3 obtained in the study conducted by Salman MT et al [13]. This may be due to the fact that they have not taken into consideration the intravenous fluids.

Out of total 35 drugs used, 16 drugs were prescribed from the National Model List of Essential Medicines, India 2003 [6]. So, 45.71% drugs were prescribed from the list. This is much lower than the findings of Salman MT et al, which is 62.20% in their study [13]. In our study a total of 17 out of 35 drugs were prescribed by generic name. So, 48.57% drugs were prescribed by generic name and 51.43% were prescribed by brand name. This indicates that almost half of the drugs were prescribed by brand names which add to the increased cost of therapy. Increasing generic prescribing would rationalize the use and reduce the cost of drugs [20].

In our study the average drug cost per encounter was 1094.40 INR, which is much higher. In the study conducted by Salman MT et al the average cost of drug per encounter was 246.10 INR per day, which is quite comparable to our study, where the cost of total stay is calculated [13]. Postoperative state commonly requires the need for a very few classes of drugs. The most common amongst them are antimicrobials, analgesics, intravenous fluids, anti-emetics and antacids. All these drugs add a lot to the cost of therapy. In particular the cost of injectable drugs is very high. Direct non medical cost i.e. cost incurred by 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 different individual. It has been reported that the doctors have suboptimal awareness of drug cost [21]. The situation can be improved if the drug cost is given greater emphasis during their medical training programme [22].

CONCLUSION

To conclude, although this study had a small sample size it gave us an overall pattern of drug use profile in postoperative patients in the surgical unit of a tertiary care hospital. 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 surgical wards of a teaching hospital. Also we found that

poly-pharmacy was very common, particularly in case of the antimicrobial agents. The prescribing according to the National Essential Drug List was low and needs improvement. Also prescribing by brand name was very common which leads to increase cost of the drug therapy.

REFERENCES

[1] WHO, Expert Committee Report: The use of Essential Drug. WHO TRS 770, 1998.

[2] DG Shewade, SC Pradhan. Indian J. Pharmacol. 1998, 30, 408-410.

[3] PR Shankar, P Partha, AK Dubey, P Mishra, VY Deshpande. Univ Med J. 2005, 3,2,130-7.

[4] 9th Report of the WHO expert committee: The use of Essential Drugs. WHO TRS 895, 2000.

[5] S Desai. Editor. Indian Drug Review-triple i. CMP Medica India Pvt Limited, Bangalore, India; 2011. Issue 1.

[6] National list of essential medicines of India. 2011.

http://www.cdsco.nic.in/National%20List%20of%20Essential%20Medicine-%20final%20Copy.pdf. Accessed on 4th November 2012.

[7] SA Ali, AG Soomro, SM Tahir, AS Memon. Prospective basic clinical audit using minimal clinical data set. J Ayub Med Coll Abbottabad. **2010**, 22, 1, 34-36.

[8] MLZ Khan, A Arain, FA Qureshi. Patient's selection in limited resources a stimulus for improving care. PJS **2008**, 24, 4, 35-8.

[9] SN Alam, S Rehman, SMR Zaidi, S Manzar. Audit of general surgical unit: Need for self evaluation. PJS **2007**, 23, 2, 141-144.

[10] M Javaid, Z Masood, SA Iqbal, T Sultan. Pak J Med Sci 2004, 20, 4, 311-314.

[11]G Bhatti, J Haider, F Zaheer, SQ Khan, MT Pirzada, TM Khan. Surgical audit of Unit II, Department of Surgery, Abbasi Shaheed Hospital, Karachi. Ann Abbasi Shaheed Hosp Karachi Med Dent Coll **2006**, 11, 2, 54-8.

[12] WI Qureshi, KM Durrani. Surgical Audit of Acute Appendicitis. Proceeding Shaikh Zayed Postgrad Med Inst **2000**, 14, 1, 7-12.

[13] MT Salman, MF Akram, S Rahman, FA Khan, MA Haseen, SW Khan. Drug prescribing pattern in surgical ward of a teaching hospital in North India. 2008, 5, 2, 5-6.

[14] A Poudel, S Palaian, PR Shankar, J Jayasekera, MIM Izham. Kathmandu Univ Med J 2008, 6, 3, 399-405.

[15] T Abula, M Kadir. Ethiop J Health Dev. 2004, 18, 1, 35-38.

[16]T Abula, Z Desta. Drug prescribing in surgical and gynaecological wards of a teaching hospital. 1994/95(unpublished data).

[17] WA Durbin, B Lapides, DA Goldma. Improved antibiotic usage following introduction of novel prescription system. JAMA; **1981**, 264, 16, 1776-1800.

[18] A Souter, B Fredman, PF White. *Anaesth Analg* **1994**, 79, 1178-90.

[19] S Gyawali, PR Shankar, A Saha, L Mohan. MJM 2009, 12, 1, 13-20.

[20] JD Quick, HV Hogerzeil, G Velasquez, L Rago. Twenty-five years of essential medicines. Bull: WHO 2002, 80, 11, 913-14

[21] DR Lowy, L Low, RS Warner. Am J Educ. 1972, 47, 349-55.

[22] BL Brody, J Stokes. Am J Public Health. 1972, 62, 2, 181-185.