

Drug utilization pattern of antimicrobial drugs in intensive care unit of a tertiary care hospital attached with a medical college

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ABSTRACT

Background: A number of antimicrobial drugs are prescribed to the patients in Intensive Care Unit (ICU). Drug utilization research was defined by WHO as the study of marketing, distribution, prescription, and use of drugs in a society, with special emphasis on the resulting medical, social and economic consequences. There is lack of information about the use of antimicrobial agents in the ICU at GGGH till date. So we decided to conduct this type of study.

Methods: A prospective observational study was carried out for 12 months. Patients of age >18 of both sexes who was admitted in ICU were included in the study while pregnant and lactating women excluded. The prescribing pattern was analyzed by using World Health Organization basic drug indicators.

Results: Among 611 patients, 373 (61.04%) were male and 238 (38.95%) were female. The most common emergency was post-operative 204 (33.38%). The most common prescribed antimicrobial drug group and drug was antiamoebic drugs and metronidazole respectively in 437 (24.04%) out of total drugs prescribed. The numbers of antimicrobial drugs prescribed per patient were 2.97. 68% drugs were prescribed from WHO and national EML list. Total 57.26% drugs were prescribed by generic name. Average antimicrobial drug cost per patient was 1805.34 rs.

Conclusions: Despite of limitations of present study it gives important conclusion about how antimicrobial drugs are used in GGGH ICU. This information can be used for improvement of current treatment strategies.

Keywords: Drug utilization, Antimicrobial drugs, Prescribing pattern, Cost analysis

INTRODUCTION

Drug utilization study has been defined by the World Health Organization (WHO) as "The marketing, distribution, prescription and uses of drugs in a society with special emphasis on the resulting medical and social and economical consequences."¹ The interests in drug utilization studies were generated as a result of:

(1) Number of new drug marketed (2) Wide variations in the prescribing pattern (3) Growing concern about delayed adverse effects (4) Increasing concern about the cost of drug as reflected by increase in both sales and the volume of prescription drugs.²

Infectious diseases were the major cause of morbidity and mortality before discovery of antimicrobial agents. After

accidental discovery of penicillin, there was decrease in morbidity and mortality. During the period of 1940-2000, many new antimicrobial agents like streptomycin, chloramphenicol, cephalosporins, fluoroquinolones, extended spectrum penicillin as well as other antimicrobial agents are discovered.³

A number of drugs are prescribed to the patients during their hospitalization in Intensive Care Unit (ICU). Antimicrobial agents are prescribed for treatment of critical illness and for prevention of infections in critically ill patients who are having low immunity, increased susceptibility to virulent micro-organisms as well as during different medical procedures (catheterization) or use of medical devices (ventilator).⁴⁻⁶

Antimicrobial agents are widely prescribed for treatment and prevention of postoperative infections in surgical patients admitted in ICU.⁷ In 2004, World Health Organisation (WHO) reported that 50% antimicrobial agents are used inappropriately all over the world.⁸ Inappropriate use of antimicrobial agents include wrong choice of antimicrobial for empirical as well as treatment against microorganisms, use in case wrong indications, incorrect dosage or duration of treatment.⁹

Present study was undertaken to analyse the pattern of drug utilization of antimicrobial medications in outdoor patients of ICU of a tertiary care teaching hospital in Jamnagar.

METHODS

An observational, prospective antimicrobial drug utilization study was carried out in ICU of Guru Gobind Singh Government Hospital, a tertiary care teaching hospital attached to Shri M. P. Shah Government Medical College, Jamnagar. Prior permission of the medical superintendent of G. G. G Hospital, institutional ethical committee and head of medicine department was obtained for conducting the study. My study duration was 1 year from July 2013 to June 2014.

Development of the protocol

An appropriate study protocol and pro-forma were developed and discussed with teaching staff members of the pharmacology department and head of department.

Selection criteria of patient

Inclusion criteria:

- 1) Adult patients above 18 years of age and of either gender who were admitted in medical, or surgical, Intensive Care Units (ICU) GGGH Hospital, Jamnagar.
- 2) Those patients or their relatives who gave consent and were willing to participate in this study.

Exclusion criteria:

- 1) Lactating and pregnant women. Collection of data.

Total 611 cases were analysed. The WHO drug indicators that were selected to analyze the prescribing pattern included: (1) Average number of the antimicrobial drugs prescribed per encounter. (2) Percentage of the antimicrobial drugs prescribed by generic name. (3) Percentage of the antimicrobial drugs prescribed from essential drug list. (4) Frequency of antimicrobial drugs usage as per patient. (5) Average antimicrobial drug cost per patient. (6) Most common cause for admission in ICU.

RESULTS

Characteristics of study participants

Out of total 611 patients percentage of female and male patients was 61.04% and 38.95% respectively. The relative distribution of different antimicrobial drugs in different age groups and genders is shown in (Table 1).

Table 1: Age & sex distribution.

Age(year)	Male	Female	Total (%)
18-37	131 (35.12%)	99 (41.59%)	230 (37.64%)
38-57	127 (34.08%)	65 (27.31%)	192 (31.42%)
58-77	100 (26.81%)	60 (25.21%)	160 (26.19%)
78-97	15 (4.0250%)	14 (5.88%)	29 (4.74%)
Total	373 (61.04%)	238 (38.95%)	611 (100%)

Pattern of diagnosis of patients admitted in ICU

Majority of the patients were suffering from post-operative complication 204 (33.38%). Other common conditions were Organophosphorus poisoning 164 (26.84%), accidental injuries (7.20%) cerebral malaria (5.56%) and others 27.02% (Table 2).

Table 2: Diagnosis of patients admitted in ICU.

Disease	Post-operative complication	Organophosphorus poisoning	Accidental injuries	Cerebral malaria
No. of patients (%)	204 (33.38%)	164 (26.84%)	44 (7.20%)	34 (5.56%)

Analysis of prescription patterns according to various WHO drug use indicators.

- The average number of drugs per encounter was 2.97 in our study.
- 68% drugs were prescribed from WHO essential drug list (2013) and National essential drug list (2011).
- 57.26% drugs were prescribed by generic name (Figure 3).
- Most commonly prescribed drug was metronidazole 437 (24.04%) followed by ceftriaxone 316 (17.23%) out of total 1816 drug prescribed to 611 patients (Figure 1).
- Most common drug group from which drugs prescribed was antiamoebic drug group 437 (24.04%) followed by penicillin group 398 (21.91%) out of total 1816 drug prescribed to 611 patients (Figure 2).

- Total 287 (46.97%) patients expired and 307 (50.24%) shifted to ward.

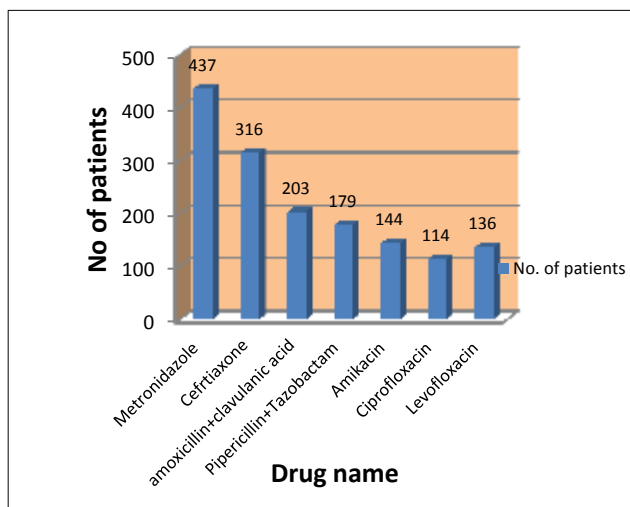


Figure 1: commonly used antimicrobial drugs in ICU.

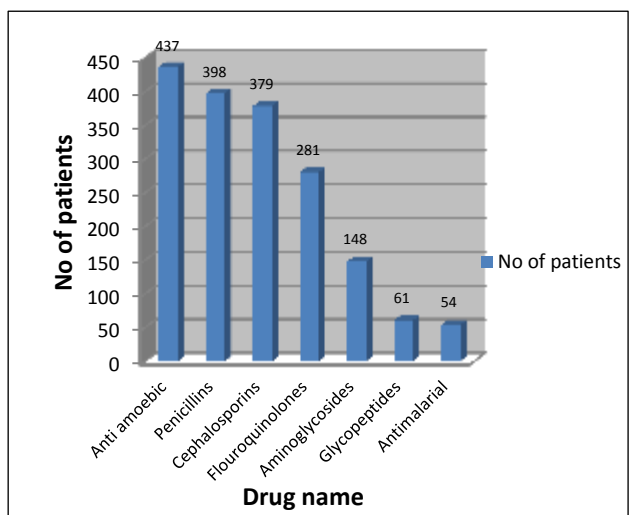


Figure 2: Most common prescribed antimicrobial drug groups.

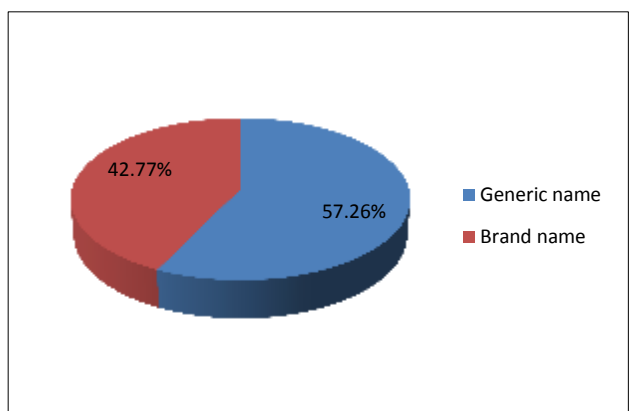


Figure 3: Percentage of antimicrobial drugs prescribed by generic name and brand name.

DISCUSSION

In our study sample size was 611.

In our study male to female ratio was 1.51:1, male were about 373 (61.04%) and female were of 238 (38.95%) which is similar to male 70 (63.63%) and female 40(36.36%) other studies.^{10,11}

Majority of the patients admitted in ICU were due to post-operative complications 204 (33.38%), oragnophosphorus poisoning 164 (26.84%), accidental trauma 44 (7.20%). While other studies were having most common indication for admission was sepsis.^{10,12}

We observed that 287 (46.97%) patients were expired, 307 (50.24%) patients were shifted to ward. While in another studies were having result of 121 (60.50%) discharged, 79 (39.50%) expired and 204 (28%) expired, 526 (70.6%) improved respectively.^{12,13}

It was observed that average number of antimicrobial drugs prescribed per patient was 2.97 ± 1.40 in ICU which was similar to studies where average no. of prescribed antimicrobial drug was 3.36 and 2.09 respectively.^{14,15}

It was observed that in our study 1040 (57.26%) antimicrobial agents were prescribed generically and 776 (42.70%) antimicrobial agents prescribed by brand name in ICU. In contrast to other study, showed that 70% antimicrobial agents were prescribed by brand name.¹⁵ In other study showed 86% of drugs were prescribed by brand name.¹⁷ Our hospital is being tertiary care teaching hospital and medications supplied from central medical store organization, Government of Gujarat. In case of resistance to antimicrobial agent or in case of complication(s) when antimicrobial agents which are not available at hospital, were prescribed from other sources.

Most common group prescribed was antiamoebic drugs 437 (24.05%) in our study followed by penicillin 398 (21.81%) and cephalosporin group 379 (20.87%) which was contrary to other study which shows maximum usage of cephalosporins 409 (27%) followed penicillin group 15.3% and antiamoebic group 12.6%.¹⁸

Most common antimicrobial drug prescribed was metronidazole 437 (24.04%) followed by ceftriaxone 316 (17.23%) and amoxiclav 203 (11.16%) while another study also shows the AMA with maximum consumption was metronidazole (14.3%), followed by ceftriaxone (12.6%) and artesunate (10.8%).¹⁸

In our study average cost per patient for the antimicrobial drug usage is Rs 1805.34. In other study at Uttarakhand revealed average cost per patient for antimicrobial drug is Rs 1995.¹⁸ While the same 1995.05 Rs/patient for antimicrobial drug usage is seen in other study.¹³

Out of 25 drugs 17 (68%) drugs were prescribed according to essential medicine list of WHO, 2013, and National Essential Medicine List (EML) of India (2011). WHO reported that average 60% drugs prescribed from EML on survey of 35 countries in the world which was lower compare to our study.¹⁹

CONCLUSION

Overall, the drugs were prescribed rationally. It gives important conclusion about how antimicrobial drugs are used in GGGH ICU. This information can be used for improvement of current treatment strategies.

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Conflict of interest: None declared

Ethical approval: The study was approved by the Institutional Ethics Committee

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