



DRUG PRESCRIPTION PATTERN IN INTENSIVE CARE UNITS AT TERTIARY CARE HOSPITAL, RAJASTHAN (INDIA).

Pharmacology

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ABSTRACT

Introduction: Measurement of drug use in health facilities not only describes drug use patterns and the behavior of prescribers but also helps in the identification of polypharmacy and the problems associated with it. **Objective:** The objective of present study was to evaluate drug prescription patterns among patients admitted to intensive care units. **Material And Methods:** This prospective observational study was conducted over a period of eight months and data was collected from trauma, surgical and medical intensive care units. **Results:** Study population comprised 100 participants in each ICU. In this study we found that maximum number of patients admitted in all ICUs belongs to age group of 35-60 (years) was more than 49%. More than 65% patients were male those admitted in trauma and surgical ICU. Almost equal number of male and female patients admitted in medical ICU 53% and 47% respectively. Significant difference was observed in the stay of ICU, average number of antibiotics used and average duration of antimicrobial used in different ICUs. **Conclusion:** This study reveals that antimicrobials are widely prescribed in critically ill patients and form a significant proportion of the total drugs consumed in the ICUs. There was also difference in the use of antibiotics in different ICUs.

KEYWORDS

Prescription pattern, Intensive care unit, Trauma, Surgical, Antibiotics.

INTRODUCTION:

Measurement of drug use in health facilities not only describes drug use patterns and the behavior of prescribers but also helps in the identification of polypharmacy and the problems associated with it.¹ Intensive Care Unit (ICU) provides critical care which is fast-paced, complex and commonly requires urgent high-risk decision-making, often with incomplete data, leading to use of a large number of drugs making the cost of hospitalization and drug treatment high.² The incidence of medication errors in ICUs is also high owing to the huge workload. In a prescription analysis study in adult ICUs, 73.26% drug formulation and 40% dosage strength-related omissions were revealed in the prescriptions.³ In a multicentric study in adult ICUs in the USA, it was reported that around half of the antibiotic prescriptions were administered for a prolonged duration than indicated thereby predisposing to increased risk of resistance.⁴ Drug utilization studies conducted in ICU settings reported antimicrobials as the most commonly prescribed agents.^{5, 6} The assumed average maintenance dose per day for a drug used for its main indication in adults is called defined daily dose.⁷⁻⁹

The present study aimed to evaluate drug prescription patterns among patients admitted to ICUs

MATERIAL AND METHODS:

This was a prospective observational study conducted by the department of Pharmacology, Dr. S.N. Medical College & Hospital, Jodhpur and Medical, Surgical and Trauma ICUs which is attached to Mathura Das Mathur Hospital Jodhpur Rajasthan. The study was started after the approval taken by the Ethics Committee of Dr. S.N. Medical College & Hospital, Jodhpur. A total of 100 prescriptions were collected from each facility (Trauma Intensive Care Unit, Medical Intensive Care Unit and Surgical Intensive Care Unit (ICU)s of Mathura Das Mathur Hospital Jodhpur Rajasthan. Patients of all age of either sex getting admitted in included ICUs during the study period, who have been prescribed with antibiotics and were willing to participate, were included in the study. Patients in which the antibiotics were not prescribed and those were not fulfilling the criteria as WHO defined for drug utilization study were excluded.

The study was conducted over a period of eight months from August 2022 march 2023. During this period, all the included patients were

followed up for their entire duration of stay in ICUs.

Data Collection And Management

The data were collected during regular ICUs round participation in the Trauma Intensive Care Unit, Medical Intensive Care Unit and Surgical Intensive Care Unit (ICU)s. Standard data entry format was designed as per WHO guidelines and used to enter all the patient details collected during rounds. The prescriptions were individually screened to assess the prescribing pattern of antibiotics. Various drug utilization metrics were analyzed in accordance with the World Health Organization Anatomical Therapeutic and Chemical Classification/ Defined Daily Dose (WHO ATC/DDD) methodology.¹¹

Statistical Analysis

Data was expressed as Mean $\pm$ SD. All the data were entered into a master chart using a Microsoft Excel sheet and subjected to statistical analysis. All the analyses were carried out using SPSS software. A P-value < 0.05 was considered statistically significant.

RESULTS:

During the study period, 100 patients were included in study admitted in ICUs all of whom consented to participate. Hence, the study population comprised 100 participants in each ICU.

Table 1: Demographic data of patients in different ICUs.

		TICU (n=100)	SICU (n=100)	MICU (n=100)
Age (Years)	< 35	32	26	21
	35-65	54	57	50
	> 66	14	17	29
Gender	Male	75	68	53
	Female	25	32	47

The above table is showing the comparison of demographic data in between trauma, surgical and medical ICUs. In our study we found that maximum number of patients admitted in all ICUs belongs to age group of 35-60 (years) was more than 49%. More than 65% patients were male those admitted in trauma and surgical ICU. Almost equal number of male and female patients admitted in medical ICU 53% and 47% respectively.

Table 2: Data of drug prescription of patients in different ICUs.

	TICU (n=100)	SICU (n=100)	MICU (n=100)	P- value
Total Mortality	54	31	69	
Mortality before 07 days	29 [*]	21 [*]	06	P<0.05
Mortality after 07 days	25	10	63 [*]	P<0.05
Transfer to ward	46	69	31	
Average Duration of stay in ICU (Mean ± SEM)	8.58±6.21 [*]	7.18±8.05 [*]	4.52±3.02	P<0.05
Average no. of drugs prescribed (Mean ± SEM)	8.98±2.80 [*]	6.2±1.37	9.71±2.23 [*]	P<0.05
Average duration of Antimicrobial agents (Days)		6.97±2.45	4.90±2.23	P<0.05
Number of antimicrobial agents	1	14 [*]	4	P<0.05
	2	20	36	P<0.05
	3	61 ^s	45	P<0.05
	>3	5	3	

P<0.05 (Z test) is considered significant. *p<0.05 (Z test) significantly higher as compared to medical ICU; ^p<0.05 (Z test) significantly higher as compared trauma and surgical ICU; #p<0.05 (Z test) significantly higher as compared to surgical ICU; \$p<0.05 (Z test) significantly higher as compared surgical and medical ICU.

The above table is showing the data of drug prescription in between trauma, surgical and medical ICUs. In our study we found that mortality rate after 07 days was significantly high (P<0.05) in medical ICU (63%) as compared to surgical (10%) and trauma (25%) ICU. Mortality rate before 07 days was significantly high (P<0.05) in surgical (21%) and trauma (21%) ICU as compared to medical (6%) ICU. Average duration of stay was more than 7 days in trauma and surgical ICU which are significantly high (P<0.05) as compared to medical ICU. In surgical ICU, less number of antibiotic drugs prescribed in each prescription compares to trauma and medical ICU (P<0.05). Average number of drugs was more than 7 days in trauma and medical ICU which are significantly high (P<0.05) as compared to medical ICU. 72% patients were prescribed only two antimicrobial drugs in medical ICU in each prescription which was significantly high (P<0.05) as compared to trauma (20%) and surgical (36%) ICU respectively. Trauma (61%) and surgical ICU (45%) patients were prescribed three antibiotics in each prescription which was significantly high (P<0.05) in compare to medical ICU (19%). Trauma (14%) and surgical ICU (16%) patients were prescribed only one antibiotic in each prescription which was significantly high (P<0.05) in compare to medical ICU (4%). Collectively in each prescription average more than 8 drugs were prescribed in trauma and medical ICU. Whereas mean number of drugs prescribed to patients was 8.98±2.80 in trauma ICU and 9.71±2.23 in medical ICU which was significantly higher (P<0.05) in compare to surgical ICU 6.2±1.

DISCUSSION:

In our study we found that maximum number of patients admitted in all ICUs belongs to age group of 35-60 (years) was more than 49%. This age distribution was different from studies conducted in other parts of India.¹¹ Higher average age of patients leads to longer stay may be related to more elderly admissions. Our study's age group (35-60 years) prevalence was higher than a study done at Kuwait.¹² More than 65% patients were male those admitted in trauma and surgical ICU. Almost equal number of male and female patients admitted in medical ICU 53% and 47% respectively. In contrast, a study done by Smythe et al. in Detroit showed an equal proportion of male and female admitted to the ICU.¹³ These findings suggest that in Indian settings more males are admitted to the ICU. The most likely reason for this finding could be that in India male population has more access to medical facility compared to females, who even in critical illnesses are reluctant to utilize health care facilities, especially in those of lower socioeconomic strata.¹⁴

In our study we found that mortality rate after 07 days was significantly high (P<0.05) in medical ICU (63%) as compared to surgical (10%) and trauma (25%) ICU. Mortality rate before 07 days was significantly high (P<0.05) in surgical (21%) and trauma (21%) ICU as compared to medical (6%) ICU. Average duration of stay was more than 7 days in trauma and surgical ICU which are significantly high (P<0.05) as compared to medical ICU. Villar et al. identified a crossing point between cumulative survival and death in the ICU at 7 days.¹⁵ Moitra et al. found that long-term mortality rates increase with ICU length of

stay regardless of whether or not patients experienced surgery or mechanical ventilation.¹⁶ Similarly Blot et al. found that mortality after 14 days was significantly high in medical ICU (57%) as compared to surgical (21%) ICU.¹⁷

In surgical ICU, less number of antibiotic drugs prescribed in each prescription compares to trauma and medical ICU (P<0.05). Average number of drugs was more than 7 days in trauma and medical ICU which are significantly high (P<0.05) as compared to medical ICU. 72% patients were prescribed only two antimicrobial drugs in medical ICU in each prescription which was significantly high (P<0.05) as compared to trauma (20%) and surgical (36%) ICU respectively. But contrarily, Shelat et al. found that average 11 drugs were prescribed in all ICUs.¹⁸ Polypharmacy was common in ICU due to critical and comorbid illness. Trauma (61%) and surgical ICU (45%) patients were prescribed three antibiotics in each prescription which was significantly high (P<0.05) in compare to medical ICU (19%). A study conducted at Puducherry where only 17% patients were given a more than 2 antibiotics.¹⁹ Trauma (14%) and surgical ICU (16%) patients were prescribed only one antibiotic in each prescription which was significantly high (P<0.05) in compare to medical ICU (4%). Prescribing more than two antimicrobials may be due to critical illness and longer duration of stay. Collectively in each prescription average more than 8 drugs were prescribed in trauma and medical ICU. Whereas mean number of drugs prescribed to patients was 8.98±2.80 in trauma ICU and 9.71±2.23 in medical ICU which was significantly higher (P<0.05) in compare to surgical ICU 6.2±1. In our study average duration of antibiotics used was 5.91±1.66 in TICU, 6.97±2.45 in SICU and 4.90±2.23 in MICU. Similarly it was 6 days in study conducted at Mangalore.²⁰ Patients of critical illness required longer duration of antimicrobial therapy. Previous study also reported an association between various demographic variables and drug classes prescribed with the outcome as well as the duration of stay in the ICUs, longer the stay in ICU related to longer the duration of antibiotic use and increased average use of antibiotics.

CONCLUSION:

In conclusion, our study reveals that antimicrobials are widely prescribed in critically ill patients and form a significant proportion of the total drugs consumed in the ICUs. There was also difference in the use of antibiotics in different ICUs.

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