

# A Retrospective Cross-Sectional Study of Drug Utilization and Prescription Pattern in Intensive Care Unit at Multispecialty Hospital

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## ABSTRACT

**Background:** Drug usage studies and prescription pattern monitoring in the Intensive Care Unit (ICU) play a pivotal role in optimizing patient care, ensuring safety, managing resources effectively, improving quality, and advancing medical knowledge and practice. The purpose of the study was to generate data on drug utilization patterns and determine the rationality of prescriptions using WHO core indicators. **Materials and Methods:** A record-based, cross-sectional, observational study was carried out at the ICU of Shradha Hospital, Borsad, Gujarat. The demographics of the patients, drug usage patterns, and Defined Daily Dose (DDD)/100-bed days of frequently utilized medication in the ICU department were investigated. **Results:** A total of 178 patients were analyzed, with a mean age of  $52.06 \pm 17.5$  years and male predominance (67%). The most common concurrent illnesses were hypertension and diabetes mellitus. A total of 2,352 prescription drugs have been prescribed. The mean number of drugs for each prescription seemed to be  $13.21 \pm 5$ . Parenteral administration was the most used route, accounting for 61.18%. Ondansetron was the most prescribed medication, followed by pantoprazole, furosemide, ceftriaxone, budesonide, and aspirin. **Conclusion:** There were too many prescription drugs prescribed for each patient on average; however, polypharmacy may be unavoidable during the patient's stay in the intensive care unit due to various illnesses. Improving prescribing trends involves reducing the quantity of drugs per prescription and emphasizing the use of generic medications. This approach not only enhances the efficacy of prescriptions but also alleviates the financial burden on patients.

**Keywords:** Daily defined dose, Drug utilization, Intensive care unit, Prescribing pattern.

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## INTRODUCTION

In 1977, the World Health Organization defined drug usage study as the examination of the marketing, distribution, prescription, and utilization of drugs within a society, with particular attention to the resulting medical, social, and economic impacts.<sup>1</sup>

Patients in Intensive Care Units (ICUs) are typically dealing with severe and complex medical conditions. They often have multiple chronic illnesses and may require a variety of medications to address their health issues. The patients in the ICU department are more likely to receive multiple treatments of different classes, which may cause polypharmacy, inappropriate drug uses, high consumption of antibiotics, and high-alert medication, which can result in drug-drug interactions, increased drug side effects, medication errors, and high costs. As a result, the appropriateness

of polypharmacy in the ICU and its impact on patient outcomes is a frequently debated matter among healthcare professionals. Studying drug utilization in this setting allows for a better understanding of the specific needs and challenges associated with these patients.<sup>2-4</sup>

ICU patients often receive a wide range of medications to manage critical conditions, including antibiotics, analgesics, sedatives, and cardiovascular drugs. Monitoring the utilization of these drugs helps healthcare providers ensure that they are prescribed judiciously, avoiding unnecessary medications and potential adverse effects. The objective of drug utilization and prescription pattern research is to enable the sensible application of drugs. The World Health Organization's 1985 definition of rational drug use emphasizes that patients should receive medications tailored to their clinical requirements, in suitable doses, for an appropriate duration, and at the most economical expense to them and their community. The primary goal and objective of drug utilization research are to describe drug usage trends, indicators of irrational medication usage, initiatives to enhance drug usage, and drug use quality control.<sup>1</sup>



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Medication utilization studies in Intensive Care Units (ICUs) are crucial in optimizing resource allocation, ensuring effective treatments, and minimizing unnecessary costs. These studies help identify patterns of adverse reactions, enabling the development of strategies to reduce risks. Additionally, they assess healthcare providers' adherence to clinical guidelines, promoting evidence-based prescribing and improving patient outcomes. The data from drug utilization studies also contribute to pharmaco-economic analyses, evaluating the cost-effectiveness of different drug regimens, especially in resource-constrained environments. The findings can inform quality improvement initiatives in ICUs, such as educational programs, standardized treatment protocols, and monitoring systems, ultimately enhancing patient care within these critical settings.

This study aimed to estimate the drug usage and prescribing trends in the ICU of a multi-specialty hospital in Borsad, Gujarat. The objective of the study was to generate data on drug utilization patterns and determine the rationality of prescriptions using WHO prescribing indicators.

## MATERIALS AND METHODS

### Study design and Data collection

The study was carried out at Shraddha Hospital in Borsad, Gujarat, focused on the ICU department. It is a retrospective observational study with data collected from 178 patients' medical records who were admitted to the ICU for the past two years. The study examined various factors, including age, gender, medical history, comorbid conditions, ICU stay duration, and confirmed diagnoses. Detailed drug information, including names, dosages, and treatment durations, was also collected from medical records. Ethical considerations and patient confidentiality were presumably addressed during data collection.

### Ethical Consideration

In this study paper, the data had been collected from a Gujarat-based hospital, so before starting the study, a draft proposal was submitted to the institutional ethics committee-Charusat, Charotar University of Science and Technology, Changa-388421. The committee then thoroughly checked the proposal and granted their permission to conduct further studies (Approval No: IEC/CHARUSAT/21/5).

### Study Criteria

Detailed information on prescribed medications throughout the entire hospital stay was obtained from medical records for patients older than 18 years. This data includes the number of drugs per prescription, the use of antibiotics and injections, the preference for generic or brand names, and the duration of treatment. Patients who opted for discharge against medical advice within 24 hr of admission were excluded from the analysis.

## Data Evaluation

Data evaluation was done by using WHO prescribing indicators and Defined Daily Dose (DDD)/100-bed days. The commonly prescribed drugs have been categorized based on ATC and their DDD has been calculated. The formula used to calculate DDD/100 bed days was as follows:

$$\text{DDD/100 bed days} = \frac{\text{Total dose in mg during study period} \times 100}{\text{DDD of the drug} \times \text{study duration(days)} \times \text{Bed strength} \times \text{average bed occupancy rate}}$$

The average bed occupancy rate has been calculated using the following formula:

$$\text{Average bed occupancy rate} = \frac{\text{Total no. of inpatient days for a given period} \times 100}{\text{Available beds} \times \text{No of days in the period}}$$

## Statistical Analysis

The information was gathered and put into an MS Excel spreadsheet, and verified. The findings were summarized using descriptive statistics. Continuous variables are presented as mean±S.D., while nominal data is shown as percentages.

## RESULTS

Data from 178 patients hospitalized in the ICU throughout the research period was collected according to specific criteria and then reviewed. The study found that male patients received hospitalization in the ICU more frequently than female patients. The demographic data shows that out of 178 patients hospitalized in the ICU, 119 (67%) were males and 59 (33%) were females. So, the majority of the drug usage was for male patients compared to females. The average age of the patients admitted to the ICU was 52.06±17.5 years. The ICU had the most patients aged 41-60 years ( $n=72$ , 40.45%), followed by those aged 61-80 years ( $n=52$ , 29.21%), and those over 80 years old ( $n=4$ , 2.25%). The minimum age was 18 years, while 91 years was the maximum age for admission to the ICU.

The minimum duration of stay for a patient in the ICU was one day, and the longest duration was fourteen days. The average stay for patients in the ICU was three days. 84% of patients stay in the ICU for 1-5 days, 14% for 6-10 days, and only 2% of them stay for more than 10 days. Hypertension (36.84%) and diabetes mellitus (26.32%) were the most prevalent concurrent conditions, followed by cardiovascular disease (13.45%), chronic obstructive pulmonary disease (11.70%), and kidney disease, which accounted for 5.26%; others were epilepsy, liver disease, and thyroid disorder.

The most common reason for ICU admission was circulatory/ cardiovascular system involvement (28.65%,  $n=55$ ), followed by the respiratory system (27.08%,  $n=52$ ), digestive and excretory systems (16.15%,  $n=31$ ), endocrine system (10%,  $n=20$ ), and renal/urinary system (8.33%,  $n=16$ ). The least affected system was the exocrine system (0.52%,  $n=1$ ). As shown in Table 1, the most common admitting diagnosis was chronic obstructive

**Table 1: Diagnosis in ICU.**

Diagnosis	Number of patients(n)
Chronic obstructive pulmonary disease.	17
Respiratory tract infection/Respiratory failure.	12
Anemia	10
Myocardial Infraction.	9
Sepsis with septic shock.	8
Cerebral infarct	7
COVID-19	7
Fracture	6
Left ventricular failure.	6
Epilepsy/Seizure.	5
Encephalopathy	5
Hemorrhage	5
Hypertension(uncontrolled/accelerated/urgency/emergency).	5
Acute respiratory distress syndrome.	4
Acute gastritis	4
Pneumonia	4
Midline shift and secondary hemorrhage.	4
Diabetic ketoacidosis /neuropathy.	4
Alcoholic liver disease.	4
Acute febrile illness.	3
Atypical chest pain.	3
Others (less than 2).	46

pulmonary disease in 17 cases, followed by respiratory tract infection or respiratory failure in 12 cases, anemia in 10 cases, and myocardial infarction in 9 cases.

Out of 178 patients admitted to the ICU, a total of 108 patients (61.02%) had conditions improved; 18 (10.17%) were referred to another hospital; 35 (19.77%) left against medical advice; and death occurred in the other 16 (9.04%). Male patients ( $n=11$ ) had a greater death rate than female patients ( $n=50$ ). During the study period, a total of 2352 medications were administered, averaging 13.21±5 medications per patient. Table 2 shows that the greatest number of medications per prescription was 35, while the lowest was 5.

Out of a total of 2352 prescribed medications, 621 (26.40%) were prescribed by generic name, while 1731 (73.60%) were prescribed by brand name. The drug prescribed by the fixed-dose combination was 75.85% ( $n=1884$ ), and the single content was 24.15% ( $n=568$ ). As shown in Table 3, the most popular administrative route was

**Table 2: Details of prescription.**

Details of prescriptions	Number of drugs (n)
Total no. of drugs.	2352
Maximum no. of drugs/prescription.	35
Average no. of drugs /prescription.	13.21±5
Minimum no. of drugs/prescription.	5

**Table 3: Route of administration.**

Route of administration	Number of drugs (n)	Percentage
Intravenous	1426	60.63%
Intramuscular	1	0.04%
Oral	767	32.61%
Subcutaneous	12	0.51%
Nebulise	138	5.87%
Topical	8	0.34%

the parenteral route for around 61.18% of drugs, followed by the oral route (32%), and nebulizing (5.87%).

The most frequently prescribed drug was ondansetron, followed by pantoprazole, furosemide, budesonide, hydrocortisone, atorvastatin, and aspirin. Normal saline was the most commonly administered fluid (20.50%), followed by ringer lactate and dextrose normal saline. Atorvastatin, a lipid-lowering drug, was prescribed in 40 cases, followed by Clopidogrel, an antiplatelet drug ( $n=29$ ), tramadol, an analgesic ( $n=29$ ), paracetamol, mannitol, amlodipine, diclofenac, and labetalol ( $n=14$ ), as shown in Table 4.

As shown in Table 5, Emset (ondansetron), Pantin (pantoprazole), Lasix (furosemide), Xone (ceftriaxone), Optineuron (vitamins), Duolin (salbutamol+ipratropium bromide), Budecort (budesonide), and Hydrocort (hydrocortisone) were commonly prescribed drugs by brand name to several patients (169, 168, 72, 67, 65, 62, 44, 40), respectively.

In the antimicrobial class prescribed, the most common were cephalosporin antibiotics ( $n=84$ ), followed by penicillin+beta-lactamase inhibitor antibiotics ( $n=61$ ), cephalosporin+beta-lactamase inhibitors ( $n=59$ ), macrolide antibiotics ( $n=29$ ), and nitroimidazole antibiotics ( $n=19$ ), as shown in Table 6.

As depicted in Table 7, the commonly given fixed-dose combinations were beta-agonists+anticholinergics ( $n=66$ ), analgesics+antipyretics ( $n=62$ ), penicillin+beta-lactamase inhibitor antibiotics ( $n=61$ ), cephalosporin+beta-lactamase inhibitor antibiotics ( $n=59$ ), and antihistamine+leukotriene receptor antagonists ( $n=23$ ). Proton pump inhibitors were the most regularly recommended pharmacological groups, followed by 5-HT<sub>3</sub> antagonists, vitamin supplements, corticosteroids,

**Table 4: Commonly prescribed drugs/fluids by generic name.**

Drugs prescribed by generic name	No of prescription (n)	Percentage
Normal saline	74	20.50%
Atorvastatin	40	11.08%
Ringer lactate	33	9.14%
Clopidogrel	29	8.03%
Tramadol	25	6.93%
Dextrose normal saline	24	6.65%
Paracetamol	23	6.37%
Mannitol	19	5.26%
Amlodipine	18	4.99%
Diclofenac	18	4.99%
Labetalol	14	3.88%
Nitro glycerine	13	3.60%
Thiamine	11	3.05%
Ambroxol+salbutamol	10	2.77%
Human insulin	10	2.77%

cephalosporin antibiotics, and antiplatelet medicines, as displayed in Table 8.

Table 9 displays the anatomical therapeutic chemical classification and DDD per 100-bed days for the most often given medications. During our study period, our ICU had 10 beds with an average occupancy rate of 0.08. Based on WHO prescribing indicators shown in Table 10, the mean number of medicines for each encounter seemed to be  $13.21 \pm 5$ . A total of 2352 drugs were used to treat 178 patients. The percentage of drugs prescribed under generic names was 26.20%. The drugs prescribed from the essential medicine list accounted for 72.8%. Drugs given from the essential medication list accounted for 72.8%. Antibiotics accounted for 13.43% of the prescriptions. The percentage of drugs administered parenterally was 61%.

## DISCUSSION

Medical documentation for 178 patients hospitalized in the ICU over two years was reviewed to establish prescription and drug usage trends, with a focus on WHO drug use indicators. The mean ages of patients were  $52.07 \pm 17.5$  years, identical to the studies undertaken in Eastern India.<sup>5</sup> Among the patients, 67% were male and 33% were female, with males predominating over females, aligning with research done by Anitta Thomas *et al.* and Al-Zakwani *et al.* in Oman.<sup>6,7</sup>

In this study, 72 patients were aged between 41-60 years, contrasting with Ujwala P. Gawali *et al.*, where most of the patients were in the age bracket of 21-40 years.<sup>8</sup> The mean period of stay for the patients in the intensive care unit was three

**Table 5: Commonly prescribed drugs by brand name.**

Drugs prescribed by brand name	No of prescription(n)	Percentage
Emset	169	19.01%
Pantin	168	18.90%
Lasix	72	8.10%
Xone	67	7.54%
Optineuron	65	7.31%
Duolin	62	6.97%
Budecort	44	4.95%
Hydrocort	40	4.50%
Ecosprin	38	4.27%
Augmentin	34	3.82%
Sulbacef	31	3.49%
Dynapar	29	3.26%
Febrinil	25	2.81%
Montair-LC	23	2.59%
Duphalac	22	2.47%

days, which was near the research published by Al-Zakwani *et al.* but shorter than Biswal, S., Mishra, *et al.*<sup>7,9</sup> Prolonged stays in the ICU increase overall expenses, consume more drugs, and also raise the possibility of unfavorable medication responses.

The most prevalent underlying co-morbid conditions were hypertension (36.74%) and diabetes mellitus (26.23%). This was similar to the investigation conducted by Anitta *et al.*, which highlighted the burden of this illness.<sup>6</sup> Pre-existing co-morbidities and advanced age in critically ill patients may influence the choice to give ICU care, the types and intensity of ICU treatment options, and the results.<sup>10</sup> Chronic obstructive pulmonary disease, respiratory failure, myocardial infarction, and sepsis with septic shock were the most common admitting diagnoses, which were identical to a study in Nepal.<sup>11</sup>

Patients were hospitalized, with the most prevalent organ system involvement in the ICU appearing to be the cardiovascular/circulatory system (28.65%,  $n=55$ ), followed by the respiratory system (27.08%,  $n=52$ ), and the digestive and excretory systems (16.15%,  $n=31$ ), which was similar to the study undertaken by Rajathilagam T *et al.*<sup>2</sup> The mean number of medications administered to each patient turned out to be  $13.21 \pm 5$ , which was comparatively higher than other studies and similar to some studies.<sup>5,6,12</sup> An average amount of drugs should be minimized as much as feasible in order to reduce the probability of drug interaction, overall medical expenses, and bacterial resistance development.<sup>13</sup>

Patients in the ICU are often in critical condition, necessitating the administration of medications via parenteral routes to

**Table 6: Antibiotic class prescribed in ICU.**

Antibiotic Class	No of prescription(n)
Cephalosporin antibiotic.	84
Penicillin+beta-lactamase inhibitor antibiotic.	61
Cephalosporin+beta-lactamase inhibitor.	59
Macrolide antibiotic.	29
Nitroimidazole antibiotic.	19
Fluoroquinolone antibiotic.	17
Carbapenem antibiotic.	11
Aminoglycoside antibiotic.	10
Glycopeptides antibiotic.	9
Tetracycline antibiotic.	8
Cephalosporin+fluoroquinolones.	2
Penicillin+semisynthetic antibiotic.	2
Cephalosporin+Macrolide antibiotic.	1
Lipopeptide antibiotic.	1
Polymyxin antibiotic.	1

**Table 7: Commonly prescribed fixed-dose combination**

Fixed-Dose Combination	No. of prescription (n)
Beta agonist+anticholinergics.	66
Analgesic+antipyretic.	62
Penicillin+beta-lactamase inhibitor antibiotic.	61
Cephalosporin+beta-lactamase inhibitor.	59
Antihistamine+leukotriene receptor antagonist.	23
Loop diuretic+potassium sparing diuretics.	19
Antiplatelet+statin.	14
Mucolytic+bronchodilators.	10
Beta agonist+corticosteroids.	8

address life-threatening issues promptly. In the current study, 61.18% of the medications were prescribed parenterally, which aligns with findings from a study in Eastern India where 63.3% of medications in an ICU were administered intravenously.<sup>5</sup> This high prevalence of intravenous administration in ICUs is due to the need for immediate therapeutic effects, which parenteral routes effectively provide.

During the study, fixed-dose combinations were used by 75% (1784) of patients, while single-drug utilization was 24% (568). This contrast with Ujwala *et al.*'s research, which reported 427

**Table 8: Top 20 class prescribed in ICU.**

Class	No. of prescription (n)	Percentage
PPI	179	7.63%
5-HT <sub>3</sub> antagonist	169	7.21%
Vitamin supplement.	161	6.87%
Corticosteroids	108	4.61%
Cephalosporin antibiotic.	84	3.58%
Antiplatelet	80	3.41%
Fluids and electrolyte solution.	80	3.41%
Loop diuretics	78	3.33%
Beta agonist+Anticholinergic.	66	2.81%
NSAIDs	64	2.73%
Analgesic+Antipyretic.	62	2.64%
Penicillin+beta-lactamase inhibitor antibiotic.	61	2.60%
Cephalosporin+beta-lactamase inhibitor.	59	2.52%
Alkalinizing agent	53	2.26%
Statin	49	2.09%
Anticonvulsant	48	2.05%
Glucose elevating agent.	39	1.66%
Beta-blocker	38	1.62%
Calcium channel blocker.	34	1.45%
Nitrate vasodilators	33	1.41%

PPI=Proton pump inhibitors, 5-HT<sub>3</sub>=5-Hydroxytryptamine, NSAIDs=Non-Steroidal Anti-Inflammatory Drugs.

fixed-dose combinations and 715 single-drug utilizations.<sup>8</sup> Adjusting doses in fixed-dose combinations to evaluate therapeutic impact and adverse reactions is challenging. Our study's higher use of fixed-dose combinations indicates a trend toward irrational drug use. In the course of our findings, 621 medications were administered under their chemical name, while 1731 were given under their trade name. In contrast, Ujwala *et al.*'s research showed 1235 medications were prescribed by generic designation and 174 by the trademarked name, highlighting a difference as our study had a higher prescription of the trade name than the generic name.<sup>8</sup>

In our present study, the broadly prescribed drugs were ondansetron and pantoprazole, which corresponded to the study done by Anitta *et al.*<sup>6</sup> Ondansetron was given to almost all patients during our study to prevent nausea and vomiting caused by therapy and surgery. Pantoprazole, a proton pump inhibitor, effectively restricts gastric acid secretion, reduces upper gastrointestinal bleeding, and promotes mucosal healing, making

**Table 9: ATC and DDD/100 bed days.**

Drugs	Composition	No. of prescription	ATC code	DDD WHO (mg)	DDD/100 bed days
Emset	Ondansetron	169	A04AA01	16	41.95
Pantlin	Pantoprazole	168	A02BC02	40	154.11
Lasix	Furosemide	72	C03CA01	40	32.53
Xone	Ceftriaxone	67	J01DD04	2000	40.07
Optineuron	Vitamin B6, B1, B2, B3, B12	65	-	-	-
Duolin	Salbutamol+ Ipratropium bromide.	62	R03AL02	-	-
Budecort	Budesonide	44	R03BA02	1.5	1.83
Hydrocort	Hydrocortisone	40	C05AA01	-	-
Atorva	Atorvastatin	40	C10AA05	20	82.62
Ecosprin	Aspirin	38	N02BA01	3000	0.88

**Table 10: WHO prescribing indicators.**

Indicator	Result	Optimal value
Average number of medicines per encounter.	13.21	<2
Percentage of medicines prescribed by generic name.	26.20%	100%
Percentage of encounters with an antibiotic-prescribed.	13.43%	<30%
Percentage of encounters with an injection prescribed.	61%	<20%
Percentage of medicines prescribed from the Essential medicines list.	72.8%	100%

it suitable for ICU patients who often develop stress-related mucosal disease within 24 hr of admission. Therefore, administering acid suppression therapy is crucial for preventing gastrointestinal bleeding in these patients.<sup>6</sup> Our study found that antibiotics were used at a rate of 13.35%, similar to Anitta *et al.*'s findings.<sup>6</sup> Ceftriaxone was the most prescribed antimicrobial, aligning with Ujwala *et al.*'s study, due to cephalosporins' broad-spectrum action and lower toxicity.<sup>8</sup> Antibiotics are often used as prophylactics for ICU nosocomial infections.

The define daily dose of pantoprazole and furosemide were 154.11 and 32.53, respectively; this was significantly greater than the research published by Anitta *et al.*<sup>6</sup> The DDD/100 bed days for ceftriaxone was 40.07, surpassing Eastern India's finding.<sup>5</sup> WHO drug use indicators revealed an average of 13.21±5 drugs per patient, higher than the study conducted at Puducherry.<sup>14</sup> The percentage of drugs per patient was to a lesser extent when compared to other studies (13.54±1.6).<sup>13</sup> Despite being polypharmacy, it cannot be considered irrational, as first-hand therapy with multiple medications is often necessary in the ICU for managing acute and chronic life-threatening illnesses, multiple illnesses, and co-morbid conditions to achieve better outcomes.<sup>3</sup>

The proportion of drugs administered under standard terms was 26.20%, lower than Maharani B *et al.*'s study.<sup>14</sup> Instead, generic drug prescriptions far surpassed other studies by around 17.9%.<sup>15,16</sup> Adhering to more generic medicine prescriptions helps reduce drug costs. Sixty-one percent of encounters had an injection prescribed that was higher compared to the optimal significance of <20% via the WHO but better when compared with the study in Kerala, which was 73%.<sup>15</sup> Antibiotic prescription (13.4%) was within an optimal range and better when compared to the study in Kerala, which was 37.2%. Medications from hospital formulary were 72.8%; that is comparable with a study in Kerala, where it was 40%.<sup>15,16</sup> The improvement in the patient's condition was 61.02%, which indicates better diagnosis and treatment in the hospital compared to 57% in a study conducted in Himachal Pradesh. The percentage of people who left on medical advice was higher when compared with other studies.<sup>17</sup> The mortality was 9.04%, which was lower when compared to other studies where it was 27.77%.<sup>18</sup>

## CONCLUSION

In our drug usage study conducted in an intensive care unit at a multispecialty hospital, there was a male preponderance. The patients hospitalized in the ICU were mostly adults rather than geriatric patients. Hypertension and diabetes mellitus are common comorbid conditions in the ICU due to their greater prevalence among the general population. The patients' primary reasons for being admitted to the ICU were respiratory illnesses. The average amount of medicines prescribed per patient was excessive; however, polypharmacy might be unavoidable in the treatment of patients admitted to the ICU for numerous disorders, which can be statistically reduced by continuous medication review and following evidence-based guidelines. The drugs prescribed by FDCs were higher. The most commonly classified drugs are PPIs, 5-HT<sub>3</sub> antagonists, and vitamin supplements. Brand-name drugs were prescribed more than generic drugs. The prescription trend can be enhanced by lowering the number of medications per prescription and providing drugs by generic name to minimize patients' financial expenses. Drug utilization has a substantial

influence on statistics for intensive care unit patients and should be performed regularly to better understand drug consumption and implement protocols to improve health care quality.

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## CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

## ABBREVIATIONS

**ATC:** Anatomical Therapeutic Chemical; **ADRs:** Adverse Drug Reactions; **DDD:** Defined Daily Dose; **FDCs:** Fixed Dose Combinations; **ICU:** Intensive Care Unit; **IEC:** Institutional Ethics Committee; **NSAIDs:** Non-Steroidal Anti-Inflammatory Drugs; **PPI:** Proton Pump Inhibitor; **S. D:** Standard Deviation; **WHO:** World Health Organization; **5-HT<sub>3</sub>:** 5-Hydroxytryptamine.

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