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ORIGINAL RESEARCH

Drug prescription pattern in a medical ICU of a tertiary care teaching hospital in Tamil Nadu

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ABSTRACT

Background: Drug prescription pattern monitoring (DPPM) study is an important tool to evaluate, understand and improve the prescribing pattern. **Objective:** To evaluate the prescription pattern of drugs in the Medical ICU using WHO prescribing Indicators. **Materials and Methods:** This was a Cross-sectional study conducted from July 2023 to December 2023 in Government Medical College & Hospital,Kallakurichi, Tamilnadu among case records of 138 patients. Demographic details, diagnosis and drug details recorded from case sheets were documented in the data entry format, analyzed and inference was obtained by applying Descriptive statistics. **Result:** The mean age of the patients was found to be 52.7 approximately and their age range varied from 19 to 85 years. The average stay of patients in the Medical ICU was 4.05 days. 78% of Generic and 14% of Branded drugs were prescribed. The proportion of usage of single constituent drug was 96.5% and fixed dose combination drugs was 3.4%. Diabetes mellitus and coronary artery diseases were the most common comorbid diseases followed by Hypertension. Most of the patients were prescribed oral drugs (56%) followed by parenteral drugs (32%). Ranitidine (62.5%) is the most commonly prescribed drug followed by Atorvastatin (32.6%). Cephalosporins (47.1%) was the most commonly prescribed antibiotic followed by penicillin (21.01%). **Conclusion:** Our study shows that the percentage of antibiotic usage was low as compare to WHO standard value. The average number of drugs prescribed per prescription and parenteral route of administration was higher than that of WHO values. Usage of generic drugs can be improved.

Keywords: Prescribing indicators; Rational drugs; Intensive care unit; Antimicrobial Agent.

INTRODUCTION

In Medical Intensive care unit (ICU), most of the patients were seriously ill and often suffer from chronic illnesses. The patients were administered multiple drugs to stabilize the vitals and for achieving abetter outcome. Health care providers have to deliver the right drugs to the right patients in the right dose and right duration depending on the clinical need. World Health Organization (WHO) shows that around 50% of the drugs are prescribed, dispensed, and sold inappropriately[1]. One of the major problems of irrational drug use in infections is antibiotic resistance [1-5].

Drug prescription pattern monitoring (DPPM) study is an important tool to evaluate, understand and improve the prescribing pattern. The main aim of the study is to facilitate rational use of medicines. As per the World Health Organization (WHO), rational use of drugs is defined as "patient receiving medications appropriate to their clinical needs, in dose that meet their own requirements, for an adequate period of time and at the lowest cost" [1,6]. The WHO core drug use indicators include prescribing indicators, facility specific indicators, and patient care indicators. A major application of the WHO prescribing indicators is to identify drug use problem areas and alerting doctors regarding the judicious use of medicines[7]. Prescription pattern monitoring studies are evaluated for assessing the prescribing, dispensing, and distribution of medicines prevailing in a particular locale[8]. Antibiotic resistance is rising tremendously and it is a major worldwide threat to health care, food safety, and development[9].Some of the researchers conclude that antibiotics are the most frequently

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prescribed drugs in Medical ICU and excessive use leads to Antibiotic resistances[10].Utilization of multiple drugs in ICU also increases the risk of occurrence of adverse drug reactions and drug interactions. Therefore, Prescription pattern analysis is a useful method for assessing prescribing trends which will facilitate the rational use of drugs.

AIM OF THE STUDY

To evaluate the prescription pattern of drugs in the Medical ICU of a tertiary care teaching hospital in Kallakurichi, Tamilnadu, India.

OBJECTIVES

To analyse the pattern of the drugs prescribed in Medical ICU using the following WHO prescribing Indicators.

1. Total number of drugs prescribed.
2. Average number of drugs per prescription.
3. Percentage of drugs prescribed by Generic name.
4. Percentage of patients with an Injection prescribed.
5. Percentage of encounter with an Antibiotics prescribed.

MATERIALSAND METHODS

After getting proper approval from the Institutional Ethics Committee, Government Medical College, Kallakurichi, the study was conducted as a cross-sectional study for a period of 6 months from July2023 to December 2023 in Intensive care unit at Government Medical College& Hospital, Kallakurichi. The study was conducted among case records of 138 patients above 18 years of age. The data collected from the case records were demographic details, education, diagnosis and drug details. The Collected information was documented in the data entry format, was analyzed using WHO prescribing Indicators and the inference was obtained by applying Descriptive statistics.

Inclusion Criteria

Patients above 18 years of age and of both genders admitted in Medical ICU during the study period were included.

Exclusion Criteria

Outpatient, pregnant women and pediatric age group patients were excluded from the study.

Data Collection

Data collection was done using a pre-designed proforma which included patient name, age, gender, education, diagnosis, comorbid diseases, duration of hospitalization, number of drugs prescribed and drug details. Data collection also includes route of administration, use of Generic/Branded drugs and single/FDC prescribed for each patient.

Statistics

All collected data were analyzed by using MS Excel and the inference was obtained by applying Descriptive statistics.

RESULTS

Demographical representation of patients

All the values were analyzed using Microsoft Excel and expressed as percentage. Out of 138 patients who participated in this study, 58.69% were males and the remaining 41.30% were females. The mean age of the patients was found to be 52.7 years approximately and their age range varied from 19 to 85 years. The average stay of patients in the Medical ICU was 4.05 days. The least duration of stay of a patient in the medical ICU was 2days and the maximum duration was 14days. Diabetes mellitus and coronary artery diseases were the most common co morbid diseases followed by hypertension and chronic kidney disease (Table 1).

Table 1: Demographic/clinical characteristics of patients in Intensive care unit

Clinical characteristics	
Total number of prescriptions	138
Total no drug prescribed	812
Mean age of patient	812
Age range	19 to 85
Gender:	
Male	58 % (81)
Female	41% (57)
Duration of Hospital stay	2 to 14 days
Number of drugs prescribed	3 to 14
Comorbidities	
Diabetes mellitus	28.9% (40)
Coronary artery disease	21.01% (29)
Hypertension	17.3% (24)
Chronic kidney disease	15.2% (21)
COPD*	10.1% (14)
Others	8.6% (12)

*COPD – Chronic Obstructive Pulmonary Disease

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In this study, the most frequent health conditions for which the patients were admitted in medical ICU were acute pulmonary edema, acute coronary syndrome and metabolic encephalopathy and the proportion of diseases related to various systems were respiratory system (24%), cardiovascular system (22%) and central nervous system (19%) (Table 2).

Table 2: Involvement of Organ Systems

System	Percentage
Respiratory System	24%
Cardiovascular System	22%
Central Nervous System	19%
Gastrointestinal System	9%
Infections	6%
Renal System	2%
Others	14%

The average number of drugs per encounter was 5.8 approximately. The percentage of drugs prescribed by generic name was 78%. The percentage of encounters with an antibiotic prescribed was 13.64% and 32% of drugs were given by the parenteral route (Table3). We found that 78% of Generic and 14% of Branded drugs were prescribed (Table 4). The proportion of usage of single constituent drug was 96.5% and the fixed dose combination drugs was 3.4% (Table 5).

Table 3: WHO prescribing indicators

Indicators of drug use	Value	WHO optimal values
Average number of medicines per encounter	5.8	1.6-1.8
Percentage of prescriptions with generic name	78%	100%
Percentage of patients with an injection prescribed	32%	13.4%-24.1%
Percentage of encounter with an antibiotic prescribed	13.64%	20%-26.8%

Table 4: Generic Drugs and Branded Drugs utilized in Intensive care unit

Generic Drugs	78%
Branded Drugs	14%

Table 5: Single Drug and FDC utilized in Intensive care unit

Single drug	96.5% (112)
FDC*	3.4% (4)

*FDC -Fixed Dose Combination

Most of the patients were prescribed oral drugs (56%) followed by parenteral drugs (32%) (Figure 1). Ranitidine (62.5%) as the most commonly prescribed drug followed by Atorvastatin (32.6%), Paracetamol (30.4%) and Aspirin (21.7%) (Table 6). Cephalosporins (47.1%) were the most commonly prescribed antibiotic followed by penicillin (21.01%) (Figure 2).

Figure 1: Route of Drug Administration

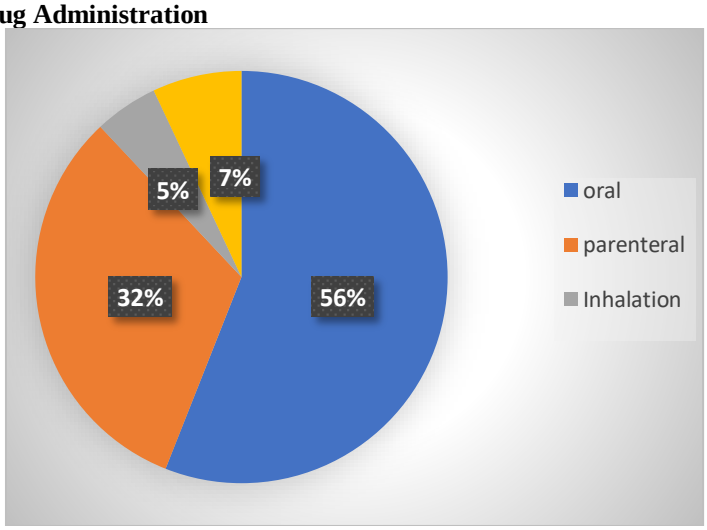

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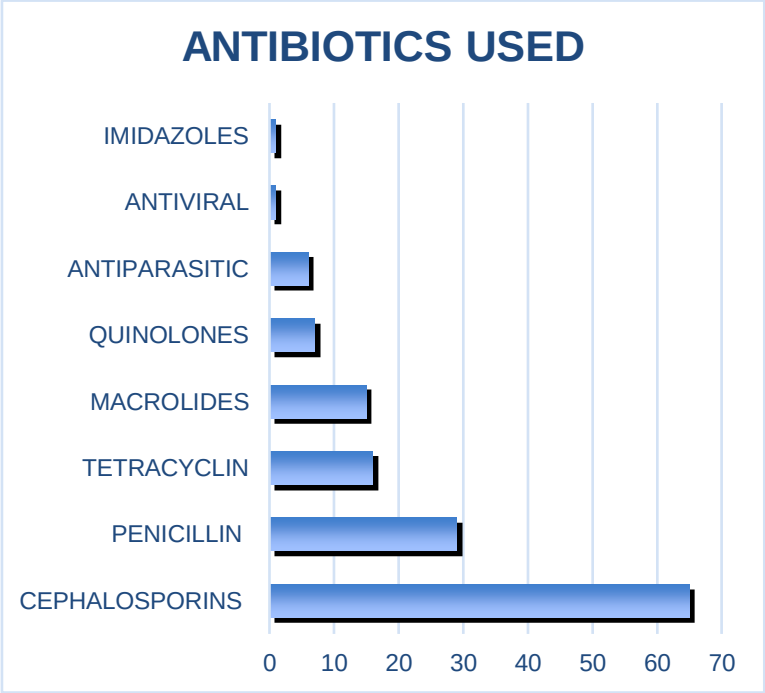
Table 6: List of commonly prescribed drugs in Intensive care unit

NAME OF THE DRUG	PERCENTAGE
Ranitidine	62.5%
Atorvastatin	32.6%
Paracetamol	30.4%
Aspirin	21.7%
Ceftriaxone	21.01%
Human insulin	21.01%
Salbutamol	19.56%
Clopidogrel	19.56%
Lasix	17.39%
Heparin	15.9%

Figure 2: Classes of Antibiotics Prescribed – Expressed in percentage



DISCUSSION

This study analyzed the prescription pattern of 138 patients admitted in the medical ICU over a period of 6 months. It showed male preponderance (58%) in sex distribution of patients which is similar to the previous studies[11-14]. The mean age (52.7 approximately) of the patients included in this study was slightly higher compared to the study done by Ujwala P Gawali, et al[13,19]. An average duration of patients admitted in medical ICU was 4.05 days which was similar to other studies[13,20]. The average number of drugs prescribed was 5.8 which was higher when compared to WHO optimal value (1.6-1.8). Patients who were admitted to the ICU may have more than one disease and treating all of them effectively with multiple drugs can lead to better outcomes[13]. Gopalkrishnan et al. reported that the average number of drugs per prescription in the prescriptions of rural practitioners and urban practitioners was 4.03 and 5.05 respectively[15]. Atif et al. and Mashalla et al. in Botsawna also reported that the average number of drugs per prescriptions was 2.8[16,17].

The present study reveals that the percentage of prescriptions with generic drug was 78%, which is less when compared with the WHO optimal reference value (100%). But it was a reasonable value when compared with another study conducted in South India (42.9%)[18].In our study, though the percentage of injection (32%)was lesser when compared to that oforal route of administration (56%), it was exceeding the WHO optimal reference value (13.4%-24.1%). Paudel et al. reported that oral route (48%) was the most commonly used dosage form in ICU followed by parental route (33%)[22]. In contrast, other studies carried out in India and Nepal documented that parenteral drug were the most frequent routes of administration (51.12%and 53%)[11,20].

The proportion of usage of single constituent drug was 96.5% and the fixed dose combination drugs was 3.4% [11]. Ujwala P Gawali et al.revealed that out of 1142 prescription, 715 were for single drugs and 427 were for fixed dose combination[19]. Mahadeo et al. found that out of the total 499 prescriptions, 259 were for FDCs and 240 were single drug prescriptions.[25]

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The most common target organ system involved was respiratory system followed by cardiovascular system which was similar to the studies done by T. Rajathilagam et al. and Kaur. S et al[13-14]. The most common diseases as the reason for admission in medical ICU were acute pulmonary edema, acute coronary syndrome and metabolic encephalopathy[13-14]. The most common comorbid conditions were Diabetes mellitus and Coronary artery diseases[13-14]. Our study revealed that Ranitidine was the most frequently prescribed medication in the ICU. Another studies like Ujwala P Gawali, et al. and Patel et al. also support that Ranitidine was the most commonly prescribed in the ICU[11,19].

The percentage of encounters with antibiotics prescribed was 13.64% which was less compared with the WHO optimal reference value (20%-26.8%). It was also less when compared with a study conducted in the outpatient department of a hospital in Nepal.

The most frequently prescribed antimicrobial agents (AMAs) were cephalosporins followed by penicillin which was similar to Rajathilagam et al[13].Benjamin et al found that amikacin and clindamycin were the most frequently prescribed antimicrobial agents[26,27]. A Study done by Vandana A Badar et al[28]observed that Cefotaxime (32%) followed by Metronidazole (24.7%) were the most frequently prescribed antimicrobial agent.

Strength of study

Limited research has been conducted on this topic in India and other developing countries. Thefindings will be of great significance for the health care professionals in these regions.

Limitations of study

Despite being necessary for developing countries, this example represents only a minuscule fraction of the overall population. Furthermore, the data collection was restricted to a specific and limited area within the country due to constraints encountered during the process.

CONCLUSION

Analysis of case records for drug utilization pattern in this study revealed that most of the drug classes were prescribed for appropriate indication. Our study shows that the percentage of antibiotic usage was low as compare to that of WHO standard value. The average number of drugs prescribed per prescription and parenteral route of administration was higher than that of WHO values. Though Polypharmacy may be unavoidable in the treatment of certain patients admitted in ICU, the number of drugs per prescription can be reduced to some extent. Utilization of generic drugs can be improved.

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Author contribution

The authors have individually acknowledged their accountability for the conceptualization, methodology, data collection, analysis, interpretation, drafting of the article, discussion of the results and contribution to the final version of the manuscript. Dr.Anusha S supervised the entire study until the manuscript was finalized.

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Conflict of interest

None to declare.

Ethics approval

The study was conducted after getting approval from the Institutional Ethics Committee, Government Medical college, Kallakurichi, Tamil nadu, India.

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