Prescription pattern study of the drugs used in the emergency department of a tertiary care hospital

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ABSTRACT

Emergency department is a place where the patients need immediate care and treatment. Hence, the rationality of choosing the drugs in the limited time frame is very important. The objective of this study was to assess and evaluate the rationality of prescribing pattern in the emergency department. Data was collected from the case sheets of the patients who visited our hospital emergency department in the duration of the study. Out of 322 patients, 177 (54.96%) were males and 145 (45.03%) were females mostly belonging to 51-60 (26.7%) and 41-50 (23.29%) age groups. The most common reasons for admission were road traffic accidents, respiratory problems, abdominal pain, workplace injury, chest pain, high grade fever, loose stools, poisoning, cerebrovascular accidents (stroke), animal bite, foreign body removal and infection of eye and ear. The most commonly prescribed drugs are i.v fluids (316), Pantoprazole (302), Ondansetron (192), Paracetamol (174), Tramadol (97), Lignocaine (83), Drotaverine (81), Tetanus toxoid (80), Cephalosporins (74), Flouroquinolone (69), Budesonide (58), Salbutamol (58), calcium channel blockers (29), Diclofenac (28), Metronidazole (26), Hydrocortisone (25), Aspirin (22), Clopidogrel (22), Angiotensin Receptor Blockers (18) and Isosorbide dinitrate (18). Percentage of drugs prescribed by generic name is 41% and percentage of drugs prescribed from list of essential drugs is 68% which is low compared to the WHO ideal value of 100%.

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Physicians should be encouraged to prescribe generic drugs from essential medicine list as recommended by WHO which will help the hospital pharmacists to avoid confusions in dispensing and duplication of products and will also help the patients by reducing the cost of therapy.

KEYWORDS: emergency department, rationality, prescribing pattern, essential medicine.

INTRODUCTION

Emergency medicine is the specialty that cares for the patient at the riskiest and endangered moments of their life. Difficulty lies in evaluating the initial stages of the biological behaviour of the illness. Urgency, unpredictability and the need to acquire skills to assess the severity and the pathology of the disease are the most important hallmarks of this speciality [1]. The need for better and organized emergency care led to the advent of emergency medicine as a specialty around the seventies in the western world. Emergency medicine is considered to be a speciality in nearly 50 countries around the world among which India is one [2, 3].

The challenges, difficulties and practices of emergency medicine are globally similar [4]. Initiating the necessary therapy is indispensable in obtaining a favourable outcome for the patient and to decrease mortality and morbidity. Doctors often face problems and challenges in rationalising, choosing and initiating appropriate drug therapy for patients admitted in the emergency medicine

ward [5]. Hence, a prescription-based survey (drug utilization study) is considered to be one of the most effective methods for analysing the prescribing pattern of drugs and prescribing behaviour of physicians [6, 7].

Due to the changing and evolving trends of the diseases around the world, the drug-prescribing patterns differ from country to country, hospital to hospital and sometimes even within the same medical institution [8].

Conducting periodic drug utilisation studies in various patient populations is therefore necessary to analyse and understand the hospital drug policies currently used, in order to make recommendations based on various guidelines to improve the drug-prescribing pattern in the future accordingly. Various drug utilisation studies have been conducted in India [9-11]. However, very few have been done in the Emergency Department [12, 13].

Drug utilization studies conducted in the emergency settings are crucial as the patients who are admitted with a wide range of diseases are usually critical and the drugs used for them are quite extensive.

Patients are brought to the emergency department with critical and life endangering conditions for medical care. Furthermore, the procedures and tasks of emergency department makes it prone to errors namely medication errors, errors in factors such as alertness, precision, high decision making skills, high levels of diagnostic uncertainty, inexperience of physicians and nurses, distractions, narrow time window, shift work and adverse drug events [14].

Hence, studying the drug-prescribing patterns in the casualty of emergency department of a hospital has the potential of determining the rationality of drug therapy being given in the particular region on a wider scale. Keeping this in view, we conducted a drug utilization study in our tertiary care hospital with the objective of studying the prescription pattern.

OBJECTIVES

1) To determine the drugs and prescribing trends of patients visiting the emergency department of a Tertiary care hospital.

2) To assess and evaluate the rationality of prescriptions using core drug prescribing indicators.

METHODOLOGY

Study design: Prospective, Cross-Sectional, Observational Study.

Study duration: The study was conducted from April 2020 to August 2020 for a total period of 4 months.

Study place: The study was conducted at the casualty and emergency department of Saveetha Medical College and Hospital.

Study size: The sample size required for our study was calculated from a previous similar study using the formula based on margin of error, confidence interval and population proportion [15].

Study Population:

- **Inclusion criteria:** Data of all the patients who attended the emergency department of Saveetha medical college and hospital during the study period were included in the study.

- **Exclusion criteria:** Incomplete and illegible data were excluded. The drugs that were already being taken by the patient due to their concomitant illness were excluded.

Procedure:

- After getting approval from the Institutional Ethics Committee and HOD of the emergency department all the patients who visited the emergency department during the study period were included in the study after obtaining informed consent.

- Details regarding the age and gender of patient, reason for admission, diagnosis made, treatment given, were collected. The rationality of the prescriptions was assessed and evaluated using WHO core drug prescribing indicators.

Statistical analysis: Data collected was coded and checked for completeness and uniformity, after which they were entered and analysed using Microsoft Excel. Descriptive statistics was used and results were presented as tables or expressed as percentages according to the type of information

collected. For categorical variables, frequencies and percentages were used. For continuous variables, means and standard deviations (±SD) were calculated.

RESULTS

The data of 322 patients who were admitted in the emergency department of our hospital were included in the study based on inclusion and exclusion criteria. Out of 322 patients, 177 (54.96%) were males and 145 (45.03%) were females. The male female ratio was 1.22:1. The patients admitted most commonly belonged to 51-60 (26.7%) and 41-50 (23.29%) age groups. The demographic details pertaining to the study are presented in Table 1.

The most common reasons for admission were road traffic accidents, respiratory problems, abdominal pain, workplace injury, chest pain, high grade fever, loose stools, poisoning, cerebrovascular accidents (stroke), animal bite, foreign body removal and infection of eye and ear. The reasons for admission of patients in the emergency department are presented in Figure 1.

The average duration of stay in the emergency department is 2.65 ± 0.75 days.

A total of 2259 drugs were prescribed for the 322 patients included in our study. Hence the average number of drugs prescribed per patient is 7.015± 1.765. (mean ± standard deviation).

The most commonly prescribed drugs are i.v fluids (316), Pantoprazole (302), Ondansetron (192), Paracetamol (174), Tramadol (97), Lignocaine (83), Drotaverine (81), Tetanus toxoid (80), Cephalosporins (74), Flouroquinolone (69), Budesonide (58), Salbutamol (58), calcium channel blockers (29), Diclofenac (28), Metronidazole (26), Hydrocortisone (25), Aspirin (22), Clopidogrel (22), Angiotensin Receptor Blockers (18) and Isosorbidedinitrate (18). The most commonly prescribed drugs are presented in Figure 2.

The most common routes of administration of drugs is intravenous (1025), oral solid (537), intramuscular (238), topical (208), inhalation (116), subcutaneous (84) followed by oral liquids (51). They are presented in Figure 3.

The percentage of total drugs given through each route is summarised in Table 2.

The pattern of drug prescribing using the WHO drug-prescribing indicators is summarized in Table 3.

Table 1. Demographic details showing age and sex distribution.

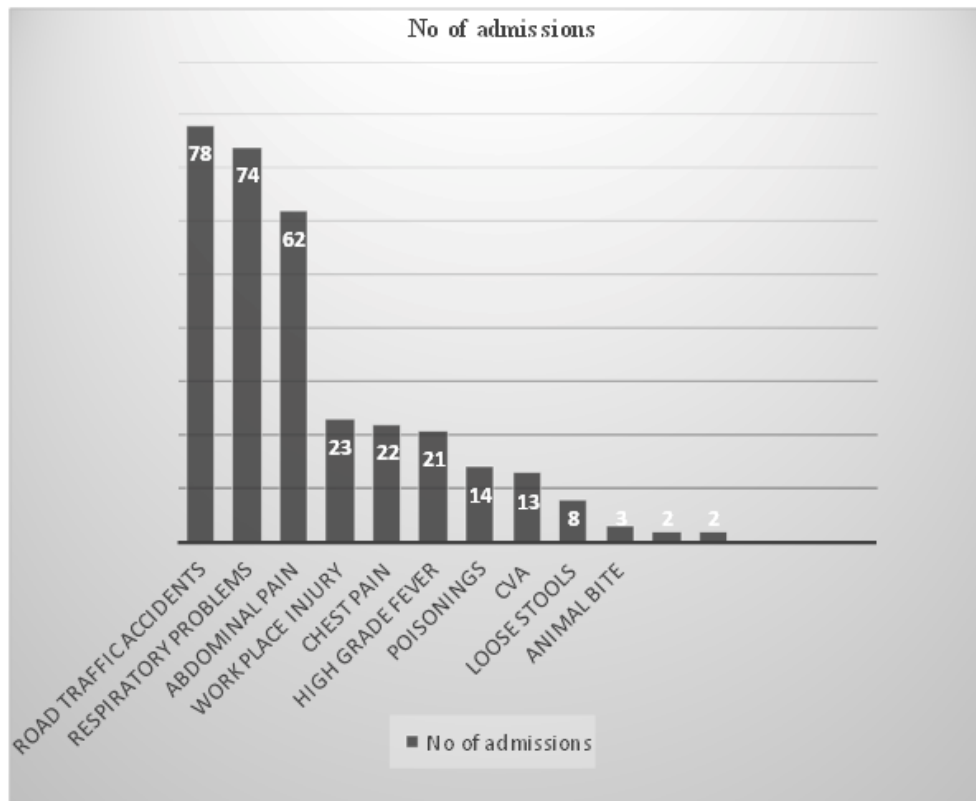| Age	Frequency	Gender	Percentage (%)
<18 years	24	Male - 7 Female - 17	7.45
18-30 years	57	Male - 35 Female - 22	17.7
31-40 years	49	Male - 29 Female - 20	15.2
41-50 years	75	Male - 41 Female - 34	23.29
51-60 years	86	Male - 48 Female - 38	26.7
61-70 years	24	Male - 13 Female - 11	7.45
>70 years	7	Male - 4 Female - 3	2.17

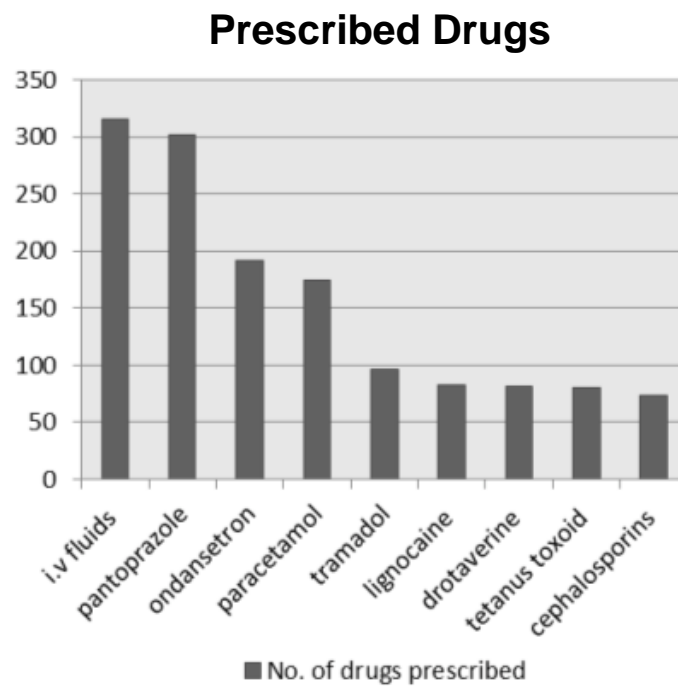**Figure 1.** Reason for admission in the emergency department.

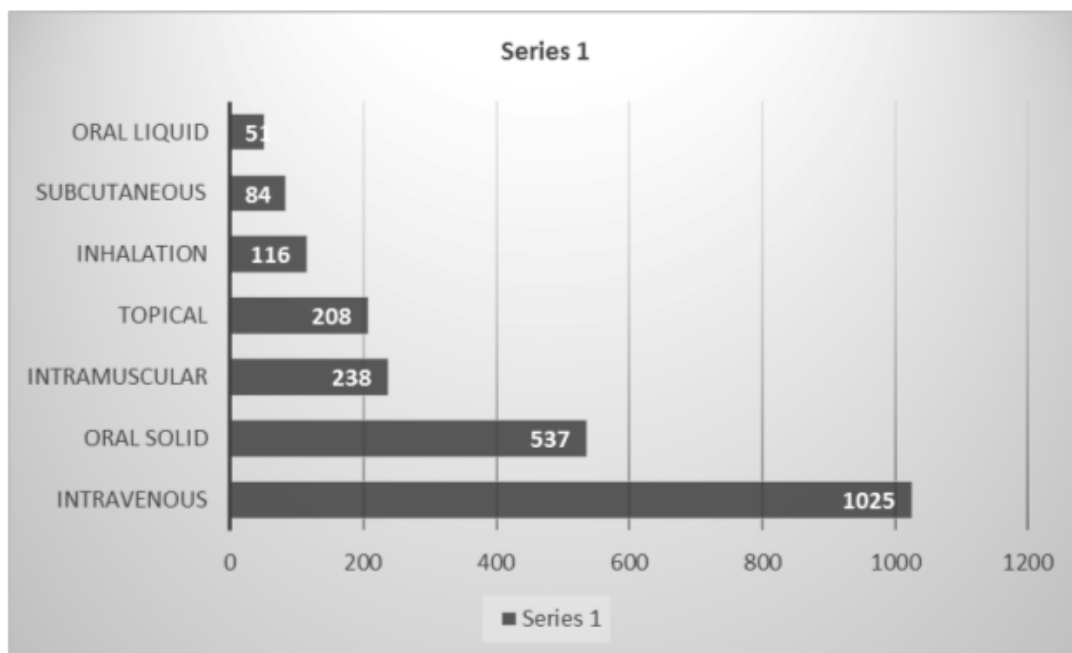**Figure 2.** List of most commonly prescribed drugs.

Figure 3. List of most common routes of administration of drugs.

Table 2. Percentage of total drugs given through each route.

Route of administration	Percentage of total drugs
Parenteral	1347 (59.62%)
Oral	588 (26.02%)
Topical	208 (9.2%)
Inhalational	116 (5.13%)

DISCUSSION

Our hospital, being the core tertiary care centre in the locality, usually has good patient load. The study on drugs prescribed in the emergency department will help the general practitioners and emergency physicians to gain knowledge and implement rationalised prescribing pattern of drugs as they are the first responders to patients seeking emergency attention. The patients who visited the causality and emergency department of our hospital during the study period were included in the study based on inclusion and exclusion criteria. Out of 322 patients, 177 (54.96%) were males and 145 (45.03%) were females mostly belonging to 51-60 (26.7%) and 41-50 (23.29%) age groups. The slight increase in male population corresponds to similar studies conducted by Al Balushi *et al*. and Pandey, K. *et al*. [13, 15]. The increased male predominance in our study particularly at this subset of population may be due to maximum productivity at this age, increased work pressure and indulgence in various socio-economic activities, stressful job situations resulting in lack of proper self-care and increased incidence of metabolic disorders landing them finally to a critical stage to the emergency department.

The five most important reasons for admission were road traffic accidents, respiratory problems,

Table 3. WHO drug-prescribing indicators.

Prescribing indicators	Number
Average number of drugs prescribed per encounter	7.015 ± 1.765
Percentage of encounter with antibiotics	51.03%
Percentage of encounter with injections	98.9%
Percentage of drugs prescribed by generic name	41%
Percentage of drugs prescribed from list of essential drugs	68%

abdominal pain, workplace injury and chest pain. This may again be due to the aforementioned reasons. Road traffic accidents as the top most cause for admission noted in our study is similar to the study conducted by Mishore, K. M. *et al.* in the emergency department [16]. It is unlike the study conducted by Pandey, K. *et al.* and Mamatha, V. *et al.* where poisoning and cerebrovascular accidents were the most common reasons for admission, respectively [15, 17]. In our study, road traffic accidents are the main cause of admission in emergency department probably because the hospital is situated near the national high way and because of lack of tertiary care centre in the surrounding areas. Hence, owing to close proximity to accident zones and ease of admission all the highway accident cases are brought to our hospital for immediate treatment. The second common reason for admission in our hospital is respiratory problems. This may be due to the current COVID pandemic and availability of beds and admissions for the same.

The average duration of stay in emergency department is 2.65 ± 0.75 days. This is less than that noted in the study conducted elsewhere [15]. This points out the expertise of physicians in the rapid, efficient, and well-structured management of various conditions after which the patients were either transferred to the wards or discharged after treatment. The shorter duration of stay in the hospital may also be the current preference and precaution taken by the physician to reduce the risk of COVID exposure and transmission.

A total of 2259 drugs were prescribed for the 322 patients included in our study. Hence the average number of drugs prescribed per patient is

7.015 ± 1.765. This is more than those reported in similar studies conducted by Mamatha, V. *et al.* (6.76), Kaur *et al.* (4.9) and Cheekavolu *et al.* (4.2). [17, 18] However, it is less than those reported by Barot *et al.* (9.9). [12] Our study shows almost double the number of drugs than the average number recommended by WHO [19]. This could be because, in our study we have also included intravenous fluids besides tetanus toxoid and local anaesthetic injections given before suturing procedures. The maximum numbers of drugs were given to patients with cerebrovascular accidents, angina and myocardial infarction which is inevitable as they need increased number of drugs to reduce overall mortality and morbidity. Nevertheless, it is still high and needs reduction as polypharmacy can result in drug-drug interactions, increase the cost of health care and drug-related adverse effects.

The most commonly prescribed drugs are i.v fluids followed by gastrointestinal drugs like pantoprazole and ondansetron. Analgesics like paracetamol, tramadol, local anaesthetics (lignocaine), vaccines (tetanus toxoid), antibiotics (cephalosporin), fluoroquinolones and inhalers consisting of salbutamol and budesonide were prescribed in the same order. The increased use of gastrointestinal drugs in our study is similar to the study conducted by Ramesh, L. *et al.* and Jung, R. *et al.* [20, 21]. The drug especially pantoprazole acts as a prophylactic agent to protect the gastrointestinal tract as patients admitted are mostly under stress, Nil Per Oral, on treatment with non-steroidal anti-inflammatory drugs and steroids which all predispose to mucosal damage. A study done by Patanwala, A. E. *et al.* also

suggested the use of ondansetron as the first line drug for the treatment of nausea and vomiting in patients admitted in emergency department [22]. The emergency physicians would have started all patients on these gastrointestinal drugs as empirical therapy based on their expertise to prevent further complications. Hence, their usage in our study is justified.

The most common routes of administration of drugs is intravenous followed by oral solid and intramuscular injections. It is obviously due to the fact that for patients brought to emergency department, intravenous route is the fastest route of choice for delivering medications as it directly reaches systemic circulation.

The percentage of encounter with antibiotics is 51.03% which is less compared to that reported in the study conducted by Pandey, K. et al. and Mamatha, V. et al. where it was 93.6% and 76.66%, respectively [15, 17]. Antibiotics especially those covering a wide spectrum of gram positive and gram negative organisms like cephalosporin's were given as empirical therapy till the culture and sensitivity testing is reported. Antibiotics are to be prescribed only when there is a dire need of them and their use should be severely narrowed down after the antimicrobial culture-sensitivity report. Initiatives should be taken by the emergency physicians to avoid overestimating the severity of illness which leads to starting the patient on empirical therapy with antibiotics. Procalcitonin (PCT) which is a surrogate marker for identifying the possibility of bacterial infection can be employed in our hospital which will further reduce the unnecessary use of antibiotics thereby reducing adverse effects, drug resistance and health care costs.

Percentage of drugs prescribed by generic name is 41% and percentage of drugs prescribed from list of essential drugs is 68% which is higher than those found in the study conducted by Mamatha, V. et al. and Sait, M. S. et al. [17, 23]. However, it is still low compared to the WHO ideal value of 100%. Physicians should be encouraged and motivated to prescribe generic drugs from essential medicine list as recommended by WHO which will help the hospital pharmacists by avoiding confusions in dispensing, duplication of products and will also help the patients by reducing the cost

of therapy. Awareness should be imposed on physicians to refrain themselves from promotional strategies employed by pharmaceutical representatives and companies.

CONCLUSION

This study provides an insight on the drug-prescribing pattern in an emergency department of a tertiary care hospital. It emphasises the need to rationalise drug therapy complying with the national drug policies and standard drug prescribing indicators recommended by the WHO. Based on the study findings, it is concluded that physicians should continue to reduce the patient's duration of stay in hospital to prevent hospital-acquired infections and redundant exposure during COVID pandemic. The practitioners should also be emboldened to prescribe more generic drugs from essential medicine list. They should also continue to avoid overuse of antibiotics restricting its use only when deemed necessary. Prescription of specific and appropriate antibiotics after culture sensitivity reports and making use of markers like procalcitonin can aid in the reduced use of antibiotics. The use of gastro intestinal drugs for all patients as prophylactic measure can be cut down to reduce polypharmacy.

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CONFLICT OF INTEREST STATEMENT

None to declare.

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