

**EVALUATION OF UTILIZATION OF EMERGENCY MEDICATION IN A  
TERTIARY CARE HOSPITAL IN SOUTH INDIA****ELANGO. P<sup>1\*</sup>, MRINAL BORGOHAIN<sup>1</sup>, RAMAKRISHNAN T.V<sup>2</sup>  
AND DARLING CHELLATHAI<sup>1</sup>**<sup>1</sup>*Department of Pharmacology, Sri Ramachandra Medical College & Research Institute, Porur, Chennai-600116, INDIA*<sup>2</sup>*Department of Emergency Medicine, Sri Ramachandra Medical College & Research Institute, Porur, Chennai-600116, INDIA***ABSTRACT**

The objective of the research is to study the prescribing trends, to calculate the consumption of emergency drugs and to evaluate the cost of therapy in the Emergency Department. The emergency drugs used were identified and their amount of consumption was collected from the computer database. Out of 11,273 patients, 300 patients who had received emergency drugs were selected. The average number of drugs per prescription was  $6.2 \pm 2.2$ . Furosemide (49.6%) was the most frequently used emergency drugs followed by Heparin (40%) and Nor-adrenaline (30.3%). The most common indication was acute coronary syndrome. Among the non-emergency drugs, ondansetron (86.6%) and pantoprazole (84.2%) were given very commonly. The average cost of the treatment per patient was INR  $4251 \pm 1641$ . This is to highlight the importance of strategies and to optimize medication use of the Emergency Department.

**KEY WORDS:** emergency drugs, Furosemide, acute coronary syndrome**ELANGO. P**Department of Pharmacology, Sri Ramachandra Medical College &  
Research Institute, Porur, Chennai-600116, INDIA**\*corresponding author**

## INTRODUCTION

Drug utilization research is a component of medical audit that plays an important role in pharmaco-epidemiological studies<sup>1</sup>. It helps in assessing the rational usage and cost control of various medications used in the hospital. There is always a variation in drug utilization among different countries, within different health institutions of the same country, at different points of time, probably because of changing disease trends over a period of time<sup>2</sup>. Pharmaco-epidemiological studies detailing prescribing patterns of physicians are very few from developing countries<sup>3</sup>. Most existing literature on emergency medicine has been brought forth from high income countries. In contrast, 70% of the population exists in low and middle income countries; hence, it is an urgent need of the hour to conduct scientifically sound well-designed study in emergency medicine with a focus on drug utilization in our country<sup>4</sup>. The emergency department represents an important platform for conducting drug utilization studies as patients present with a wide range of diseases in acute form and the drug use is quite extensive. Currently, there is a limited local data on the prescribing habits of doctors at the Emergency Department (ED) in South India. Therefore, the study was undertaken to fulfil the need.

### POLICY ON EMERGENCY MEDICATION

It was designed to develop a standardized policy to evaluate the patients and the management medications as well. Evidence-based protocols have been shown to be cost-effective<sup>5</sup> and improve the recovery of patients<sup>6</sup> in the emergency department setting. The purpose of the policy on emergency medication is to maximize the efficiency in locating medications and their supply needed for emergency situations. All emergency

medications are stored in a movable crash carts and in immovable cupboards in patient care areas of the hospitals. There are two types of crash carts, one for adult and one for paediatric patients. Each type of crash carts contains about 25 emergency drugs. The list of drugs in crash cart is shown table: 1. Though the list of drugs are almost same, the instruments and other materials would differ with respect to the age of the patients. Medication safety teams shall assure that sealed Crash Carts would be located in designated patient care areas at all times for use in medical emergencies and resuscitation procedures to ensure quick access to appropriate emergency medications, when emergency occurs. Physician, registered nurse, floor pharmacists, medication safety nurse and Pharmacy administrator will be responsible to execute quick supply for quality care.

### OBJECTIVE

- To study the prescribing trends in emergency drugs.
- To study the type of emergency patients coming to Emergency Department (ED)
- To calculate the consumption of emergency drugs and
- To analyse the cost of drug therapy in ED of a tertiary care hospital.

### STUDY POPULATION

#### Inclusion criteria

1. All patients >12 yrs of age
2. Patients who presented with acute conditions needed emergency care and continuous monitoring where emergency drugs are used.

**Table 1**  
**List of drugs stored in Crash Carts**

	Paediatric Crash Cart	Adult code Crash Cart
1	Inj. Dopamine 200 mg/ 5 ml	Inj. Dopamine 200 mg/ 5 ml
2	Inj. Dobutamine 250 mg/ vial	Inj. Dobutamine 250 mg/ vial
3	Inj. Heparin (25000 units/5 ml)	Inj. Heparin (25000 units/5 ml)
4	inj. Frusemide (Lasix) 20 mg/2 ml	inj. Frusemide (Lasix) 20 mg/2 ml
5	Inj. Magnesium Sulphate 1 gm/2 ml	inj. Magnesium Sulphate 1 gm/2 ml
6	Inj. Midazolam 5 mg/5 ml	Inj. Midazolam 5 mg/5 ml
7	Inj. Naloxane 400 micro gram/ml	Inj. Naloxane 400 micro gram/ml
8	Inj. Noradrenaline 4 mg/2ml	Inj. Noradrenaline 4 mg/2ml
9	Inj. Nitroglycerine 25 mg/5 ml	Inj. Nitroglycerine 25 mg/5 ml
10	Inj: Tropine 0,6 mg /ml	Inj: Tropine 0,6 mg /ml
11	Inj. Adrenaline 1 mg/ml	Inj. Adrenaline 1 mg/ml
12	Inj. Amiodarone 150 mg/3 ml	Inj. Amiodarone 150 mg/3 ml
13	Inj. Calcium gluconate 10%/10 ml	Inj. Calcium gluconate 10%/10 ml
14	Inj. Dexamethasone 8 mg/2 ml	Inj. Dexamethasone 8 mg/2 ml
15	Inj. Hydrocortisone 100 mg/5 ml	Inj. Hydrocortisone 100 mg/5 ml
16	Inj. Soda bicarbonate 7.5% 25 ml	Inj. Sodium bicarbonate 7.5%/25 ml
17	Inj. Loxicard 2%/50 ml	Inj. Loxicard 2%/50 ml
18	Normal saline – 500 ml	Normal saline – 500 ml
19	Ringer lactate (RL) – 500 ml	Ringer lactate (RL) – 500ml
20	Dextrose Normal Saline	Dextrose Normal Saline
21	Inj. Dextrose 10% - 500 ml	Inj. Dextrose 10% - 500 ml
22	Inj. Dextrose 5% - 25 ml	Inj. Dextrose 5% - 25 ml
23	Inj. Dextrose 25% - 100 ml	Inj. Dextrose 25% - 100 ml
24	Water for injection / Sterile water 10 ml	Water for injection / Sterile water 10 ml
25	inj. Adenosine 6 mg/2 ml	Inj. Ephedrine 30 mg/ ml

*Inj: injection, ml: milliliters, mg: milligrams*

**Exclusion criteria**

1. Patients who came to emergency and left the hospital against medical advice
2. Patients who came to emergency but did not need admission and were discharged as outpatient.

**METHODS**

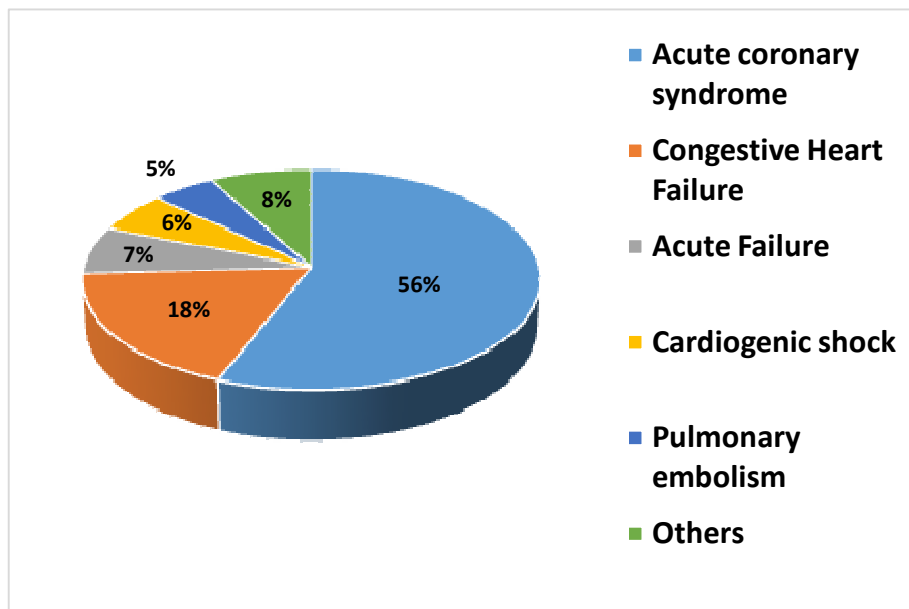
Appropriate permissions had been obtained from The Institution and The Publication Oversight Committee of the institute to conduct and publish the study from the management of the hospital to conduct the study. This retrospective study was conducted over a period of six months from January 2014 to June 2014. Unique Hospital Identification Number (UHID) demographic details of the patients who attended the Emergency Department were first collected from the registry of the Medical Record Department (MRD). The drugs are prescribed by attending Emergency medicine physician. The emergency drugs used for the

emergency patients in the hospital were identified and their amount of consumption was collected from the computer database. The clinical features for which the patients were admitted are evaluated.

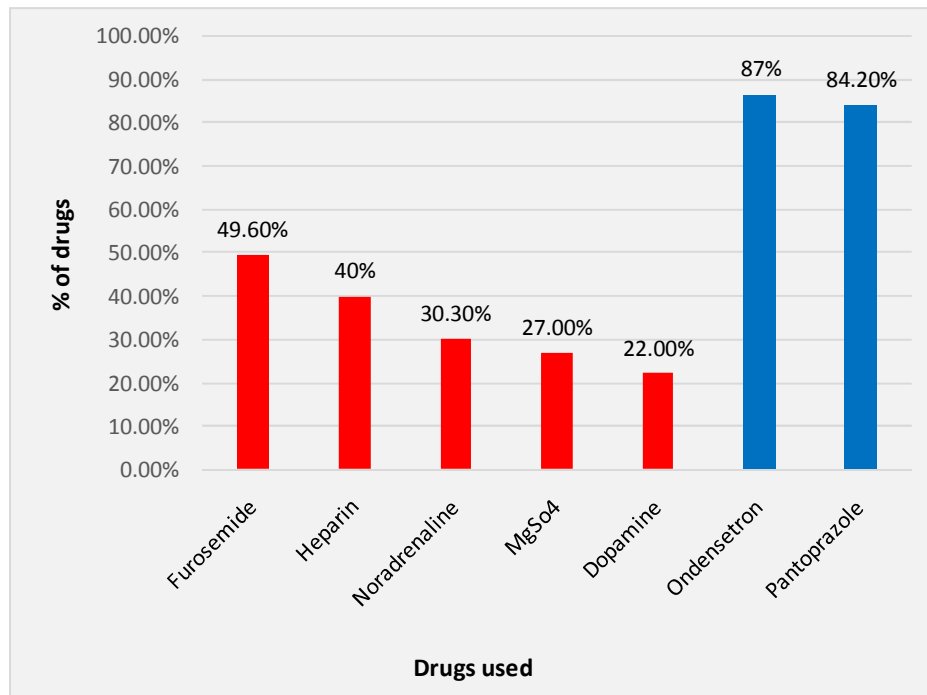
**RESULTS**

Out of 11,273 patients who attended the Emergency Department, 300 patients were selected as per the clinical diagnosis for emergency care in our study. The most common indication for prescribing emergency drug was acute coronary syndrome (Figure: 1). Furosemide (49.6%) was the most frequently used emergency drug followed by heparin (40%) and Nor-adrenaline (30.3%) (Table: 2). Among the non-emergency drugs ondansetron (86.6%) and pantoprazole (84.2%) were used very commonly (Figure: 2). The average number of drugs per prescription was  $6.2 \pm 2.2$ . The average cost of the treatment per patient was  $4251 \pm 1641$  INR (Table: 3)

**Figure 1**  
**Morbidity pattern of cardiovascular emergencies (n=162)**



**Figure 2**  
**Frequently used drugs in emergency medicine department**



**Table 2**  
**Top 10 emergency drugs prescribed for 300 patients**

S.NO	Name of Drug	No of units	Percentage
1	Furosemide	149	49.6
2	Heparin	120	40
3	Noradrenaline	91	30.3
4	Magnesium sulphate	81	27
5	Dopamine	66	22
6	Adrenaline	53	17.6
7	Hydrocortisone	52	17.3
8	Lignocaine	51	17
9	Sodium bicarbonate	50	16.6
10	Atropine	47	15.6

**Table 3**  
**Drug indications and prescription cost in the emergency department**

Indication	No of Patients (n)	Percentage of Patients	Average no of drugs (mean $\pm$ SD)	Average cost/patient (INR) (mean $\pm$ SD) in each indication
Cardio emergencies	162	54	8.12 $\pm$ 3.2	4958 $\pm$ 2431
stroke	41	13.67	7.27 $\pm$ 2.2	4890 $\pm$ 1968
Trauma	37	12.33	6.39 $\pm$ 2.32	3987 $\pm$ 1384
Respiratory conditions	24	8	6.17 $\pm$ 1.60	3867 $\pm$ 1457
Renal system	17	5.67	5.39 $\pm$ 1.49	3927 $\pm$ 1264
Acute Infections	13	4.33	5.11 $\pm$ 1.54	4320 $\pm$ 1341
Others	6	3	5.16 $\pm$ 2.89	3810 $\pm$ 1647

Average no of drugs per prescription: 6.2 $\pm$ 2.2  
Average cost of therapy per patient: 4251 $\pm$ 1641

## DISCUSSION

Different studies conducted in India have given varied results, but all of them point to a higher incidence of multiple drug usage in emergency departments. For example, one reports this incidence to be 3.3, whereas another study has reported the use of drugs to be as high as 9.9  $\pm$  2.5 drugs per prescription<sup>7, 8</sup>. In this study the average number of drugs per prescription was 6.2  $\pm$

2.2. The study showed that cardiovascular emergency was the most common morbidity pattern. Among the 25 emergency drugs furosemide, heparin and noradrenaline were the most commonly used drugs. Majority of the patients was prescribed non-emergency drugs like ondansetron and pantoprazole which contributed to 13.2% and 11.8% of the total drug cost respectively. Furthermore, there was also a significant

association between the hospital cost and emergency care of patients presenting with emergency ailments.

## CONCLUSION

Emergency Department is the life saving area and there would be a flow of drugs intentionally used to save the precious life. The cost of management is a very important concern. The presenting feature of clinical condition, the type of treatment given and the duration of the stay in ED would determine the cost of care. Therefore, an oversight, supervision in selection, storing in patient care areas, dispensing and administration of the drugs after verifying with clinical pharmacists and medical officer in addition to

appropriateness of the prescription written emergency physicians would avoid unnecessary use of drugs. The results of the present study attempts to highlight the importance of strategies like identifying the real emergency patients, selection and administration of cost effective emergency drugs and avoiding the usage of non emergency drugs, have to be implemented to optimize use of drugs in Emergency Department to have cost effective management of the emergency patients and the cost reduction would be useful for such patients to pass through a peaceful rehabilitation period.

## CONFLICT OF INTEREST

Conflict of interest declared none.

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