**DRUG UTILIZATION PATTERN AT THE EMERGENCY DEPARTMENT OF A TERTIARY HEALTH FACILTY IN “COUNTRY”**

**ABSTRACT:**Drug utilization studies ensure patient safety by assessing the safe and effective use of drugs, optimising treatment strategies for better outcomes and contributing to overall quality improvement in emergency care. This study was conducted in the Emergency In-Patient department after the approval of the Ethical Committee. Patients were selected based on inclusion and exclusion criteria. The patient’s data was collected and distributed on the basis of age, gender, comorbidities, disease and drug class in which the patients were observed for 6 months, and the conclusion was obtained with a sample size of 100 patients. Where the result was obtained according to the gender, in which males (64%) were more prone to disease than females (36%). The age group 51-60 years were more prone to disease, i.e. 28% than the 61-70 years (24%), and the least age group that visited the Emergency department were those 91-100 years (3%). The most common comorbidities which were observed during the study were hypertension (56 Patients), diabetes mellitus (45 Patients), hypothyroidism (10 Patients), and coronary artery disease (15 Patients), while 10 patients had no comorbidities. The common diseases which were observed in ER were acute ischemic stroke (%), traumatic brain injury (%), encephalopathy (%), CKD (%), ADHF (%), Parkion’s disease (%), pneumonia (%), bronchitis???, and CVA (%). The class of drugs which were commonly used were proton pump inhibitors (%), multivitamins (%), antiemetics (%), antibiotics (%), analgesics (%), anticonvulsants (%), and antiplatelet (%). The common drugs used in ER are Pantoprazole, Ondansetron, Optineuron and Acetaminophen. In this, the findings highlight the need for promoting rational drug therapy by encouraging the prescription of essential drugs using their generic names to improve health care outcomes and also in optimising drug therapy in the Emergency department.

**INTRODUCTION:**

Drug utilisation review is an authorised, systematic, continuous assessment of the prescription, dispensing, and use of medication. DUR includes a review of drugs based on pre-established criteria, and if these are not satisfied, modifications to medication therapy are implemented. In order to guarantee effective pharmaceutical decision-making and favourable patient outcomes, it entails a thorough evaluation of patients’ prescriptions and drug data before, during, and after distribution. DUR programs include corrective action, prescriber feedback, and additional evaluations as a quality assurance measure.[1]

**Importance of DUR:**

The prescription, administration, and use of pharmaceuticals can be better understood, interpreted, evaluated, and improved with the use of DUR programs, which are essential to manage health care systems.. Because of their knowledge in the field of pharmaceutical therapy management, chemists are essential to this procedure. The managed care pharmacist can use DUR to find patterns in patient prescribing, whether it is based on drug-specific criteria or disease-state criteria like high blood pressure, diabetes, or asthma. Subsequently, chemists could work with prescribers and other members of the healthcare team to improve drug therapy.[2]

It gives the doctors insightful input regarding the prescription rationality by analysing the results of various intervention types offered to enhance rationality in drug use. It also evaluates the intervention's influence on drug use in the population. Drug use research can be conducted using a variety of techniques that are qualitative or quantitative. The comprehension of numerous facets, diverse design and who criteria for carrying out drug use research is highlighted in this study.[3]

**Steps involved in conducting Drug Evaluation-**

• Identify/determine optimal use

• Measure actual use

• Evaluate

• Intervene

• Evaluate the DUR program

• Report the DUR found

Problems related to drug prescriptions are common worldwide, with medication errors and adverse drug events being the primary causes. In the Emergency department, patients are admitted without any prior appointment by themselves own/with an ambulance for the examination of urgent or emergent conditions requiring after-hours medical attention. Doctors in the ED deal with serious, urgent cases that require prompt, effective care. This makes it difficult for doctors to start and choose the right medications for their patients. Because of that, patients suffering from a wide range of diseases in a variety of acute or high drug use, the ED are an important place for conducting drug utilization studies.[4] It assesses the initial stages of the disease and diagnoses it. These mostly consist of Adverse drug events and medication errors. Medication errors accounted for 5.7% of all drug administration episodes, according to a meta-analysis of 35 studies published between 1990 and 2005, whereas adverse drug events impacted 6.1 patients out of every 100 hospitalised patients.[5-8] Prescription errors are influenced by many factors, including polypharmacy, lack of adequate pharmacological knowledge, errors in patient records or nursing documentation, inadequate pharmacy staffing, female gender, age > 65 years, renal excretion of drugs, drugs with a narrow therapeutic index, and usage of Anticoagulants and diuretics.[9] Moreover, adverse medication events ranging from 3% to 12% have been routinely recorded in several studies.[10] Based on this research, the emergency department (ED) sees 1.5–3% of all adverse medication occurrences. On the other hand, the EDs had the greatest percentage of avoidable error prevalence (70–82%).

**TRIAGE PROCESS:**

Triage is a system used to prioritise patient treatment according to illness/injury, severity, prognosis, and resource availability. Identifying patients in need of emergency resuscitation, placing them in a designated patient care area to prioritise their care, and starting diagnostic or therapeutic interventions are the goals of triage.[11]

The process of triage, which typically involves taking vital signs and assigning a "chief complaint" (e.g., chest pain, abdominal pain, difficulty breathing, etc.), is the first step a patient goes through. The majority of emergency rooms have a specific space set aside for this procedure, and they may employ personnel whose sole responsibility is triaging patients. Most departments assign a triage nurse to this position, although other medical personnel, including paramedics and physicians, may also be tasked with triage sorting, depending on training standards in the nation and region.[12]

**RED – EMERGENCY**

 A life-threatening medical condition. Expect to receive Immediate attention.

**ORANGE - VERY URGENT**

A serious medical condition. Expect attention after red patients have been stabilised

**YELLOW - URGENT**

Expect attention after red and orange patients have been stabilised.

**GREEN – ROUTINE**

You can function withoutimmediate care and will beattended to as soon as Possible.

**MATERIALS AND METHODS:**

**Participants**

**A Minimum of 100 patients were included in this study.**

1. **Inclusion criteria:**
* All patients, irrespective of diagnosis admitted to the emergency department.
* Patients above 18 years.
* Patients, irrespective of gender.
1. **Exclusion criteria:**
* Incomplete and illegible data were excluded.
* The patients who are from the non-emergency department.
* The drug that where already being taken by the patient due to their concomitant
* illnesses were excluded.
* Pregnant/lactating females and individuals aged less than 18 years.
* Patient who refuses to give consent.

**STUDY TYPE:**

A Prospective Observational study.

**STUDY DURATION:**

6months.

**STUDY PROCEDURE:**

• Identifying the need for the study.

• Designing of the study proforma.

• After receiving approval from the Institutional Ethical Committee. The study was conducted in the Emergency department.

• This study was observational and prospective in the Emergency Department.

• All case sheets were reviewed, and the cases which met the inclusion and exclusion criteria were selected.

• A proforma was designed in which the demographic details like age, gender, past medical history, present history, final diagnosis, and medication chart are included. In which Patient data will be collected during the study period.

• After collecting the data, a proforma patient treatment chart will be studied.

• Then will observe the commonly reported cases and drugs being prescribed for the particular disease in the ER.

• All the prescribed drugs will be noted along with all the data being given in a proforma.

**STATISTICAL ANALYSIS**: Data was entered in Microsoft Excel 201,6, and also data was presented by using descriptive statistics, i.e. Count and percentage. Data was visually represented by the pie diagram and bar graph. Data analysis was carried out by SPSS software version 22.

**RESULTS:**

It was a prospective observational study. This study includes 100 patients.

**Table 1: Distribution of the Patients according to Gender (N=100)**

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| **Gender** | **No. of Patients** | **Percentage** |
| MALE | 64 | 64% |
| FEMALE | 36 | 36% |



**Fig. 1**: **Distribution Of Patients According to Gender.**

**ILLUSTRATION:** Among the 100 patients,ts 64% are male and 36% are female. It was observed that the male population are more compared to females in the emergency department.

**Table 2: Distribution of Patients according to age:**

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| **Age** | **No. of Patients** | **Percentage** |
| 20-30 | 5 | 5% 5% |
| 31-40 | 4 | 4% |
| 41-50 | 8 | 8% |
| 51-60 | 28 | 28% |
| 61-70 | 24 | 24% |
| 71-80 | 15 | 15% |
| 81-90 | 13 | 13% |
| 91-100 | 3 | 3% |

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  **Fig. 2: Distribution of Patients According to Age**

**ILLUSTRATION:** Figure indicates that in 100 patients 05 patients are under 20-30 age group, 04 patients are under 31-40 age group, 08 patients are under 41-50 age group, 28 patients are under 51-60 age group, 24 patients are under 61-70 age group, 15 patients are under 71-80 age group, 13 patients are under 81-90 age group, 03 patients are under 91-100 age group. In our present study, it was found that patients between 50 years and 90 years are more reported to the ER.
**Table 3: Distribution according to Comorbidities:**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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| **Comorbidities** | **No of Patients** |
| HTN | 56 |
| DM1 | 1 |
| DM-2 | 45 |
| LA cervix stage 4 Hemorrhagic | 1 |
| Hypothyroidism | 10 |
| CAD | 15 |
| Seizures | 2 |
| Post-stroke epilepsy | 4 |
| ADHF | 7 |
| Pyelonephritis | 1 |
| Asthma | 4 |
| CVA | 10 |
| Cardioembolic stroke | 1 |
| Psychiatric disorder | 2 |
| Epilepsy | 3 |
| Parkinsonism | 7 |
| Schizophrenia | 1 |
| Aspiration pneumonia | 1 |
| Type 2 respiratory failure | 1 |
| hypoglycemia | 1 |
| Bradycardia | 2 |
| Ischemic stroke | 4 |
| Old Kochs disorder | 1 |

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| Cirrhosis of the liver | 1 |
| Tuberculosis | 1 |
| Vertigo | 1 |
| CKD | 7 |
| Splenectomy | 1 |
| Pancreatitis | 2 |
| Hepatic jejunum | 1 |
| PAD | 1 |
| Tibial occlusion | 1 |
| Thrombolysis | 1 |
| Ileostomy | 1 |
| Ppb | 1 |
| Acute Myocarditis | 1 |
| SNHL | 1 |
| PTCA with stunt | 3 |
| Anemia | 1 |
| Acs NSTEMI | 3 |
| Psoriasis | 1 |
| MCTD | 1 |
| ICD | 1 |
| PCOD | 1 |
| Hyperthyroidism | 2 |
| Hyponatremia | 1 |
| Old PTB | 1 |
| Circulation Stroke | 1 |
| Tracheostomy | 1 |
| Hemiparesis | 3 |
| DVT | 2 |
| Acute Cardiogenic Pulmonary Oedema | 2 |
| Moderate ARDS | 2 |
| Moderate LV Dysfunction | 2 |
| Acs TVD | 1 |
| Dry Gangrene | 1 |
| Grade 2 Prostomegaly | 1 |
| CNS lymphoma | 1 |
| Hypertriglyceridemia | 1 |
| Dementia | 2 |
| UTI | 1 |
| Portal HTN | 1 |
| Intracranial SDL | 1 |
| Ild | 2 |
| Nil | 10 |

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| **Fig. 3: Distribution of Patients According to Comorbidities** |  |
| **ILLUSTRATION-**Figure indicates that out of 100 patients 56 patients consisted Hypertension, 45 consisted diabetes mellitus, 10 Hypothyroidism, 15 CAD, 7 ADHF, 10 CVA, 7 Parkinson, 7CKD, 4 Post stroke epilepsy, 4 Asthma, 4 Ischemic stroke, 3 Epilepsy, 3 PTC and STUNT,3 asc NSTEMI, 3 Hemiparesis, 2 Acute Cardiogenic Pulmonary Edema, 2 Moderate ARDS, 2 Moderate LV Dysfunction, 2 Dementia, 2 Ild, 2 Seizure, 2 Psychiatric disorder, 2 Bradycardia, 2 Pancreatitis, 2 Hyperthyroidism, 2 DVT,2 Acute cardiogenic and others like Acs TVD, Schizophrenia, DM1, Hypertriglyceridemia, vertigo, old Kochs disorder Type 2 respiratory failure, Hypoglycemia etc. and also there are 10 patient who is not having any past medical history.**TABLE 4: DISTRIBUTION OF PATIENTS ACCORDING TO DISEASE:**

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| **DISEASES** | **NO OF PATIENTS** |
| Pneumonia bronchitis | 8 |
| Acute ischemic stroke | 14 |
| Hemorrhagic stroke | 4 |
| Traumatic brain injury | 2 |
| Seizures | 14 |
| CVA | 8 |
| Encephalopathy | 11 |
| LRTI, Type III | 6 |
| Septic shock | 2 |
| COPD | 1 |
| CAD | 7 |
| CKD | 10 |
| AKI | 6 |
| Hemiparalysis | 2 |
| Acute gastric shock | 1 |
| DKA | 2 |
| Fractures | 4 |
| Neurogenic shock | 1 |
| Febrile illness | 4 |
| Cholelithiasis | 1 |
| Parkinsonism | 8 |
| Vertigoz | 1 |
| ADHF | 9 |
| Gallstones in the bladder | 1 |
| Altered mental state | 1 |
| UTI | 4 |
| Asthma | 1 |
| Electric burns | 1 |
| Hernia | 1 |
| Anaemia | 3 |
| AWMI | 1 |
| Myasthenia gravis | 2 |
| Arnold chiarinflammation | 1 |
| Hypoglycaemia | 1 |
| Hyponatremia | 1 |
| Cirrhosis | 1 |
| Cerebral edema | 1 |
| Old SAH with IVH | 1 |
| IC bleed | 2 |

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| **Fig. 4: Distribution of Patients According to Disease** |  |
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| **ILLUSTRATION-** From the above figure we conclude that out of 100 patient 14 were affected with Acute ischemic stroke, 14 Traumatic brain injury, 11 encephalopathy, 10 CKD, 9 ADHF ,8 Parkinson’s, 8 Pneumonia bronchitis, 8 CVA, 6 LRTI type-3, 6 AKI, 4 hemorrhagic strokes, 4 fracture, 4 febrile illness, 4 UTI, 3 Anemia and other diseases like septic shock, COPD, neurogenic shock, electric burn, asthma, hypoglycemia, hernia, altered mental state, hyponatremia, cirrhosis, cerebral edema, old SAH with IVH and IC bleed. |  |
| TABLE 5: DISTRIBUTION ACCORDING TO DRUG:

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| **DRUGS** | **NO OF PATIENTS** |
| Sodium Chloride | 13 |
| Furosemide | 10 |
| Pantoprazole | 90 |
| Ondansetron | 46 |
| Mannitol | 4 |
| Dexamethasone | 1 |
| Optineuron | 45 |
| Clopidogrel | 5 |
| Aspirin | 10 |
| Acetaminophen | 28 |
| Duolin | 7 |
| Budesonide | 12 |
| Calcium gluconate | 11 |
| Dextrose | 4 |
| Etomidate | 2 |
| Phytonadione | 7 |
| Tetanus toxoid | 2 |
| Cefuroxime | 1 |
| Levetiracetam | 16 |
| Levothyroxine | 2 |
| Magnesium sulphate | 4 |
| Hydrocortisone | 9 |
| Salbutamol | 11 |
| Ceftriaxone | 2 |
| Ursodeoxycholic Acid | 1 |
| Heptagon | 1 |
| Nor adrenaline | 5 |
| Syndopa | 2 |
| Vasopressin | 1 |
| Insulin | 3 |
| Metoprolol Succinate | 1 |
| Nico Malone | 1 |
| Torsemide | 1 |
| Tramadol | 5 |
| Nicorandil | 2 |
| Telmisartan | 1 |
| Ranolazine | 1 |
| Nitro-glycerin | 1 |
| Carvedilol | 1 |
| Lactulose | 1 |
| Magnex forte | 10 |
| Sodium bicarbonate | 1 |
| Dobutamine | 1 |
| Enoxaparin | 3 |
| Meropenem | 4 |
| Silver sulfadiazine | 1 |
| piperacillin | 4 |
| Atorvastatin | 7 |
| Alteplase | 1 |
| Ipratropium bromide | 1 |
| Escitalopram | 1 |
| Clonazepam | 1 |
| Clindamycin | 7 |
| Apixaban | 1 |
| Neurobionforte | 1 |
| Metoprolol | 1 |
| kcl+mgso4 | 1 |
| Hyoscine butyl bromide | 1 |
| Fenofibrate | 1 |
| Doxycycline | 1 |
| Erythropoietin. | 1 |
| Atrovent | 1 |
| Tranexamic Acid | 1 |
| Rosuvastatin | 1 |
| Tenecteplase | 1 |
| Amiodaron | 1 |
| Lysergic acid Diethylamide | 1 |
| levocarnitine | 1 |

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**Fig. 5: Distribution of Patients According to Drug**

**ILLUSTRATION-**
Out of 100 patients we observed that 90 patients were given with Pantoprazole, 46 with Ondansetron, 45 with Optineuron, 28 with Acetaminophen, 16 with Levetiracetam, 13 with Sodium Chloride, 12 with Budesonide, 11 Calcium gluconates, 11 with Salbutamol, 10 with Aspirin, 10 with Magnex forte, 10 with Furosemide, 9 with Hydrocortisone, 7 with Phytonadone,7 with Atorvastatin, 7 with Clindamycin, 7 with Duolin, 5 with Tramadol, 5 with Noradrenaline, 5 with Clopidogrel, 4 with mannitol, 4 with Dextrose, 4 with Magnesium sulphate, 4 with Meropenem, 4 with Piperacillin, 3 with Insulin, 3 with Enoxaparin and others like Dexamethasone, Tetanus toxoid, Cefuroxime, Levothyroxine, Ceftriaxone, levocarnitine, Rosuvastatin, Doxycycline, Metoprolol, Clonazepam, Alteplase, Nitro-glycerine, Telmisartan, Ipratropium bromide etc.

**TABLE 6: DISTRIBUTION OF DRUGS ACCORDING TO CLASS:**

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| **DRUGS CLASS** | **NO OF PATIENTS** |
| Anticonvulsant | 16 |
| Corticosteroid | 12 |
| Bronchodilator | 11 |
| Hepato Protective Agent | 1 |
| Nutritional Supplement | 1 |
| Adrenoceptor Agonists | 5 |
| Dopamine Agonist | 2 |
| Anti Diuretic | 11 |
| Anti Diabetic | 3 |
| Beta Blocker | 3 |
| Anticoagulant | 3 |
| Loop Diuretic | 2 |
| Opioid Analgesic | 5 |
| Potassium Channel Activator | 2 |
| Arbs | 1 |
| Metabolic Modulator | 1 |
| Vasodilator | 1 |
| Antilipemic | 1 |
| Laxative Agent | 1 |
| Tetracyclines | 1 |
| Antibiotics | 29 |
| Anticholinergic Agents | 2 |
| Erythropoiesis Stimulating Agents | 1 |
| Antifibrinolytics | 2 |
| Hmgco-A REDUCTASE INHIBITORS | 8 |
| Antiarrhythmic Agents | 1 |
| Psychedelics | 1 |
| Electrolytes | 13 |
| Anta Acids | 90 |
| Antiemetics | 46 |
| Diuretics | 4 |
| Multivitamins | 47 |
| Antiplatelet | 15 |
| NSAIDS | 10 |
| Analgesics | 28 |
| Calcium Supplements | 11 |
| Glucose-Elevating Agent | 4 |
| Anaesthetic Agent | 2 |
| Immune Booster | 1 |
| Antithyroid Drugs | 1 |
| Alkalizing Agent | 1 |
| Sulphonyl Ureas | 1 |
| Thrombolytics | 2 |
| SSRIS | 1 |
| Factor-Xa Inhibitors | 1 |
| Cns Depressents | 2 |
| Tissue Plasminogen Activator | 1 |
| Ltras | 1 |
| Vitamine Supplements | 7 |

  **Fig. 6: Distribution of Drugs According to Class**

**ILLUSTRATION-**

From the above figure we conclude that out of 100 patients 90 patients were using the class of proton pump inhibitor, 47 multivitamins, 46 antiemetic, 29 antibiotics, 28 analgesics, 16 anticonvulsants, 15 antiplatelet, 13 electrolytes, 12 corticosteroids, 11 bronchodilator, 11 antidiuretics, 11 calcium supplements, 10 NSAIDs, 8 HMG CO-A reductase inhibitor, 7 vitamin supplements, 6 diuretics, 5 Adreno-receptor agonists,5 opioid analgesic, 4 glucose elevating agent, 3 antidiuretics, 3 antidiabetic, 3 beta blockers, 3 anticoagulant, 2 anesthetic, 2 thrombolytic, 2 CNS depressants, 2 dopamine agonist, 2 potassium channel activator, 2 anticholinergic agents, 2 antifibrinolytics and other classes like hepatoprotective agents, nutritional supplement arbs, vasodilator, antilipemic, laxative agent, metabolic modulator, erythropoiesis stimulating agent, antiarrhythmic agent, psychedelics agents, factor X-A inhibitor, thyroid drugs, immune booster, etc.

**DISCUSSION:**

Analysing the drug utilisation pattern in a care hospital involved by thorough examination of prescribing practices, therapeutic classes, and adherence to formulary guidelines. By assessing factors such as generic versus brand usage and the duration of therapy, healthcare professionals can gain insights into the appropriateness and efficiency of medication regimens.

Our study is a prospective observational study in which 100 patients were examined for around 6 months throughout the study period,100 medication charts in total were examined and the patients’ chief complaints regarding the symptoms were observed, and a stabilising treatment was provided in the ER according to a particular diagnosis. In which we have observed that-

* The male population are more recruited for this study compared to females in the emergency department. About 64% were male and 36% were female.
* Also, as per the data, patients under 51-90 are more prone to disease; approximately 80% of the patients are under this age group.
* The most common diseases which were observed were Acute ischemic stroke, Seizures, Encephalopathy, CAD, CKD, ADHF, Parkinson's, hypoglycemia Anaemia.
* As per ur study, some common comorbidities associated with the diagnosis are- HTN, DM 2, Hypothyroidism, CAD, ADHF, CVA, Parkinsonism, CKD, Post stroke epilepsy, Asthma, Ischemic stroke, Epilepsy, PTC and STUNT, asc NSTEMI, Hemiparesis.
* Also, we observed the common class of drugs which were commonly used in ER to stabilise the patients were proton pump inhibitors, multivitamins, antiemetics, antibiotics, analgesics, anticonvulsants, antiplatelet, electrolytes, corticosteroids, bronchodilators, antidiuretics, calcium supplements, NSAIDs, HMG-CoA-A reductase inhibitors or diuretics.

**CONCLUSION:**

Antibiotics, antacids, proton inhibitors, analgesics, antiplatelets, NSAIDS and multivitamins were the most frequent classes of drugs administered to patients. As per our study highest number of drugs was prescribed the diseases like Seizures, Acute ischemic stroke, Encephalopathy, CAD, ADHF, Pneumonia, bronchitis and followed by Parkinsonism and CKD.

There is a need for promotion of rationalised therapy in terms of increasing prescription of drugs from the essential drug list by generic name.

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