International Journal of Scientific Research and Engineering Development-– Volume 8 Issue 4, July - Aug 2025
Available at www.ijsred.com

RESEARCH ARTICLE OPEN ACCESS

Drug Related Problems in Hospitalized Patients in A Tertiary Care Hospital

P.Gopi[1], Sk.Abu Baqer[2], P. Yugandhar Reddy[3], Sk.Bushra Fathima[4], S.Charishma[5]
[1]Assistant Professor, Pharm-D, Nimra College of Pharmacy. Department of Pharmacy.
Nimra College of Pharmacy, Vijayawada,521456, AP, INDIA.
E-mail:petetigopi@gmail.com

Abstract:

Includes information regarding drug related problems in a tertiary care hospital I.e:Nimra medical college at jupudi, ibrahimpatnam.This article is a prospective study of drug related problems in hospitalized patients of nimra hospital within 200 patients who are admitted with different kinds of complaints with complex comorbidities such as renal failure with congesrtive cardiac failure and so on.This study found several DRPs such as medication errors like dosing errors, drug interactions with other drugs due to polypharmacy, complex comorbidities etc.;This article provides with whole info that a person experiences how a DRP effect the patient and how a DRP causes economical damage.

Introduction:

Drug-related problems (DRPs) are a significant concern in healthcare, particularly in **tertiary care hospitals**, where patients with complex medical conditions require advanced treatment. DRPs are defined as any event or situation involving drug therapy that interferes with achieving desired health outcomes. These problems can arise at any stage of the medication process, including prescribing, dispensing, administering, or monitoring. They not only compromise patient safety but also increase the burden on healthcare systems through prolonged hospital stays, additional treatments, and increased costs.

In tertiary care hospitals—where patients often present with severe illnesses, multiple comorbidities, and require specialized care—the likelihood of DRPs is particularly high. The complexity of treatment regimens and the frequent use of high-risk medications contribute to this increased risk. Furthermore, polypharmacy (the simultaneous use of multiple medications), patient-specific factors (such as age and renal function), and system-related issues (such as communication gaps among healthcare professionals) exacerbate the incidence of DRPs.

Examples of Drug-Related Problems in Tertiary Care Hospitals:

1. **Adverse Drug Reactions (ADRs):**
   ADRs refer to harmful or unintended responses to a drug at normal doses used for prophylaxis, diagnosis, or therapy. These reactions are common in tertiary care hospitals due to the use of potent medications.

Example:
A patient receiving **warfarin** (an anticoagulant) may experience **severe bleeding** if the dosage is not appropriately monitored. Another common ADR is **nephrotoxicity** in patients receiving **aminoglycosides** for severe infections.

2. **Medication Errors:**
   Medication errors can occur at any stage—prescribing, transcribing, dispensing, administering,

or monitoring. Errors in drug selection, dosage calculation, or incorrect labeling can lead to significant harm.

Example:
A patient with **renal impairment** prescribed a **normal dose of morphine** may experience **respiratory depression** due to inadequate dose adjustment. Another example is administering **insulin** without verifying blood glucose levels, leading to **hypoglycemia**.

3. **Drug-Drug and Drug-Disease Interactions:**
   Drug-drug interactions occur when one drug affects the action of another, while drug-disease interactions arise when a drug worsens an existing medical condition.

Example:
Co-prescribing **clopidogrel** (antiplatelet) with **omeprazole** (proton pump inhibitor) may reduce the effectiveness of clopidogrel, increasing the risk of **cardiovascular events**. Similarly, giving **NSAIDs** to a patient with **peptic ulcer disease** can exacerbate **gastrointestinal bleeding**.

4. **Inappropriate Drug Selection:**
   This occurs when a prescribed drug is unsuitable for the patient's condition, either due to a better alternative being available or the drug being contraindicated.

Example:
Prescribing **metformin** to a patient with **severe kidney dysfunction** may result in **lactic acidosis**, a potentially fatal complication.

5. **Incorrect Dosage:**
   Administering a drug in a dose that is too high or too low can lead to either toxicity or therapeutic failure.

Example:
A patient with **congestive heart failure** receiving an insufficient dose of **furosemide** (a diuretic) may experience **fluid retention**, while an excessive dose may cause **electrolyte imbalance** and **dehydration**.

6. **Non-Adherence to Medication Regimens:**
   Patients may not follow prescribed medication regimens due to a lack of understanding, financial constraints, or complex dosing schedules.

Example:
A diabetic patient failing to adhere to their **insulin** therapy may develop **diabetic ketoacidosis**, a life-threatening condition.

7. **Overuse or Underuse of Medications:**
   Overuse occurs when patients are prescribed unnecessary medications, while underuse refers to the omission of required therapies.

Example:
Overuse: Unnecessary use of **antibiotics** for viral infections can lead to **antibiotic resistance**.
Underuse: Failure to prescribe **prophylactic anticoagulants** for a bedridden patient may result in **deep vein thrombosis (DVT)**.

Factors Contributing to Drug-Related Problems in Tertiary Care Hospitals:

Several factors increase the risk of DRPs in tertiary care settings:

1. **Polypharmacy:**
   Patients with complex conditions often require multiple medications, increasing the likelihood of drug interactions and errors.

Example:
A cancer patient receiving **chemotherapy** combined with multiple supportive drugs may experience **severe nausea** or **organ toxicity** due to drug interactions.

2. **Patient-Specific Factors:**
   Age, organ dysfunction (renal or hepatic impairment), and genetic variations influence how drugs are metabolized and cleared from the body.

Example:
Elderly patients are more prone to **falls** when prescribed **benzodiazepines** due to altered drug metabolism and increased sensitivity.

3. **Communication Gaps:**
   Poor communication between healthcare professionals, especially during patient transitions (e.g., admission, transfer, discharge), can lead to discrepancies in medication records.

Example:
A patient discharged on **anticoagulant therapy** without clear instructions may develop **thromboembolism** due to improper adherence.

4. **Complexity of Disease Conditions:**
   Chronic illnesses and comorbidities often require individualized care plans, increasing the complexity of medication management.

Example:
Patients with **heart failure** and **chronic kidney disease** require precise **diuretic** and **ACE inhibitor** dosing to prevent both **fluid overload** and **renal dysfunction**.

5. **System-Related Issues:**
   Inadequate staffing, time constraints, and lack of decision-support tools can increase medication-related errors.

Example:
In emergency settings, rapid administration of **potassium chloride** without proper dilution can cause **cardiac arrest**.

Impact of Drug-Related Problems:

The consequences of DRPs are profound and multifaceted:

1. **Patient Safety and Clinical Outcomes:**
   DRPs can lead to therapeutic failure, disease progression, serious side effects, or patient death.
2. **Healthcare Costs:**
   DRPs increase healthcare costs due to additional medical tests, hospital readmissions, and the need for specialized treatments.

3. **Quality of Life:**
   Patients experiencing DRPs often face reduced physical and psychological well-being.

4. **Healthcare System Burden:**
   DRPs increase the workload for healthcare professionals and reduce system efficiency.

Importance of Identifying and Managing Drug-Related Problems:

Effective management of DRPs requires a multidisciplinary approach:

1. **Medication Reconciliation:**
   Regular review and verification of medication lists during transitions of care help prevent discrepancies.

2. **Pharmacovigilance:**
   Active monitoring and reporting of ADRs can help identify trends and prevent future incidents.

3. **Patient Education:**
   Ensuring that patients understand their medications, including proper use and potential side effects, can reduce non-adherence.

4. **Clinical Pharmacy Services:**
   Involvement of clinical pharmacists in patient care can identify and resolve DRPs through regular medication reviews and patient counseling.

Methodology

Study Design and Setting

A **prospective observational study** was conducted in the inpatient and departments of **Nimra hospital,jupudi,ibrahimpatnam**, a tertiary care hospital, over a period of **months**. The study focused on identifying, classifying, and analyzing **drug-related problems (DRPs)** across various clinical specialties, including general medicine, cardiology, and intensive care units (ICU).

RESULTS:

1. Demographic Characteristics of Study Population

- **Total Patients Analyzed**: **[200]**
- **Gender Distribution**:
  - Male: 47%
  - Female: 53%
- **Age Groups**:
  - ≤ 18 years: **16%**
  - 19–40 years: **27%**
  - 41–60 years: **27%**
  - ≥ 61 years: 30%

2. Prevalence of Drug-Related Problems (DRPs)

- **Total DRPs Identified**: 67
- **Prevalence Rate**: 33.5% of patients experienced at least one DRP.
- **Average DRPs per Patient**: 0.335**DRPs/patient**

---

3. Types of Drug-Related Problems

Category of DRP	Frequency (n)	Percentage (%)
Drug choice problems (e.g., inappropriate drug)	6	**9%**
Dosing problems (overdose/underdose)	2	**3%**
Adverse drug reactions (ADRs)	15	**22.4%**
Drug interactions (drug-drug/drug-food)	24	**35.8%**
Patient non-adherence	20	**29.8%**

Most Common DRP: **[e.g., Drug interactions – 24%]**

---

4. Severity of DRPs

Severity Level	Frequency (n)	Percentage (%)
Mild (Minor clinical impact)	56	**83.5%**
Moderate (Requires intervention)	4	**5.9%**
Severe (Life-threatening)	7	**10.6%**

Preventive Methods for Drug-Related Problems (DRPs) in a Tertiary Care Hospital

Medication Review and Reconciliation

1. Conduct thorough medication reconciliation at **admission, transfer, and discharge**.
2. Regularly review patient prescriptions to identify **potential drug interactions** and **duplicate therapies**.

Clinical Pharmacist Involvement

1. Implement **clinical pharmacy services** to monitor and manage medications.
2. Ensure pharmacists participate in **ward rounds** and **multidisciplinary teams** to identify and resolve DRPs.

Electronic Prescription Systems (e-Prescribing)

1. Use **computerized physician order entry (CPOE)** systems to reduce prescribing errors.
2. Implement **drug interaction alerts** and **dose-checking software** to prevent errors.

Standard Treatment Guidelines and Protocols

1. Develop and enforce **evidence-based guidelines** for drug administration.
2. Regularly update **hospital formularies** to ensure the use of safe and effective drugs.

Patient-Centered Care and Counseling

1. Provide **medication counseling** to patients about proper drug use, potential side effects, and adherence.
2. Educate patients on **self-monitoring** and recognizing signs of adverse drug reactions (ADRs).

Monitoring and Surveillance Systems

1. Establish **pharmacovigilance** programs to monitor and report adverse drug reactions.
2. Conduct **regular audits** of medication errors and review trends to improve practices.

Staff Training and Education

1. Provide **continuous medical education (CME)** on medication safety for healthcare professionals.
2. Conduct workshops on **drug-drug interactions**, **dosage adjustments**, and **new therapies**.

Patient Risk Stratification

1. Identify **high-risk patients** (e.g., elderly, polypharmacy, renal impairment) for closer monitoring.
2. Tailor medication regimens to individual patient profiles to minimize risk.

Double-Check System

1. Implement a **double-check protocol** for **high-risk medications** (e.g., anticoagulants, insulin).
2. Encourage cross-verification of prescriptions by pharmacists and nursing staff.

Communication and Documentation

- Improve **interdisciplinary communication** through clear, standardized documentation of drug therapy.
- Ensure **proper handover** between shifts to maintain continuity in medication management.

Conclusion: Drug-Related Problems in a Tertiary Care Hospital

This study highlights the **significant prevalence** of drug-related problems (DRPs) in tertiary care hospitals, emphasizing the need for **systematic identification, prevention, and management** strategies. The most common DRPs observed were **drug interactions, dosing errors, and adverse drug reactions**, with **polypharmacy** and **elderly patients** being the primary risk factors.

Pharmacist-led interventions were found to be effective in identifying and resolving DRPs, improving patient outcomes, and ensuring medication safety. Implementing **electronic prescription systems**, **regular medication reviews**, and **staff training** can significantly reduce the incidence of DRPs.

A **multidisciplinary approach** involving healthcare professionals, patients, and administrative systems is essential to minimize DRPs, enhance patient safety, and improve overall healthcare quality in tertiary care settings. Further research and continuous monitoring are crucial to develop **evidence-based policies** and **best practices** for medication management.

REFERENCE:

1.36th International Symposium on Intensive Care and Emergency Medicine : Brussels, Belgium. 15-18 March 2016.Bateman RM, Sharpe MD, Jagger JE, Ellis CG, Solé-Violán J, López-Rodríguez M, Herrera-Ramos E, Ruíz-Hernández J, Borderías L, Horcajada J.

2.Evaluation of the Prevalence and Risk Factors of Drug-Related Problems in Hypertension and Type 2 Diabetes Mellitus Patients at a Tertiary Care Hospital: A Cross-Sectional Study. Reddy Peddi D, Pallekonda H, Reddy V.Cureus. 2023 Jul 31

3.Drug-related problems in patients admitted for SARS-CoV-2 infection during the COVID-19 pandemic. Barceló-Vidal J, Echeverría-Esnal D, Carballo N, De Antonio-Cuscó M, Fernández-Sala X, Navarrete-Rouco ME, Colominas-González E, Luque S, Fuster-Esteva M, Domingo L, Sala M, Duran X, Grau S, Ferrández O.Front Pharmacol. 2022 Nov 2

4.Drug-Related Problems among Hospitalized Surgical Elderly Patients in China. Meng L, Qu C, Qin X, Huang H, Hu Y, Qiu F, Sun S.Biomed Res Int. 2021 Feb 15

5.Drug-related problems among transfusion-dependent thalassemia patients: A real-world evidence study. Chun GY, Mohd Tahir NA, Islahudin F, Selvaratnam V, Li SC.Front Pharmacol. 2023 Apr 20

6.Drug-related problems in hospitalised Parkinson's disease patients in China. Liu H, Zhong Y, Zeng Z, Bi W, Zhong H, Xue L, Qiu S.Eur J Hosp Pharm. 2022 Nov;29.

7.Prescribing patterns and drug-related problems (DRPs) in transfusion-dependent paediatric thalassemia patients: A prospective interventional study from a tertiary care hospital in India.

Babu T, Mathew Panachiyil G, Sebastian J, Dhati Ravi M.Int J Pediatr Adolesc Med. 2021 Mar;8

8.Drug-related problems in patients with rheumatoid arthritis. Ma SN, Zaman Huri H, Yahya F.Ther Clin Risk Manag. 2019 Mar 21.

9.Drug-related problems in a general paediatric ward of a tertiary care hospital in Malaysia.

Hon MY, Chua XY, Premakumar CM, Mohamed Shah N.Int J Clin Pharm. 2020 Jun.

10.Drug-related problems identified during pharmaceutical care interventions in an intensive care unit at a tertiary university hospital. Tharanon V, Putthipokin K, Sakthong P.SAGE Open Med. 2022 Apr 19.

11.Drug Related Problems among Older Inpatients at a Tertiary Care Setting. Pramotesiri P, Putthipokin K, Ruangritchankul S.J Clin Med. 2024 Mar 13.Cite

12.Drug-related problems and associated factors among patients with kidney dysfunction at a tertiary hospital in southwestern Uganda: a prospective observational study. Kyomya J, Atwiine F, Shegena EA, Muhindo R, Yadesa TM.BMC Nephrol. 2023 Dec 19.

13.Hospital Pharmacists Interventions to Drug-Related Problems at Tertiary Critical Care Pediatric Settings in Jazan, Saudi Arabia. Tawhari MM, Tawhari MA, Noshily MA, Mathkur MH, Abutaleb MH.Hosp Pharm. 2022 Feb.

14.Determination of drug-related problems according to PAIR criteria in dialysis patients: a cross-sectional study in tertiary care hospital. Pehlivanli A, Akkan Eren S, Sengul S, Basgut B, Erturk S, Ozcelikay AT.BMC Pharmacol Toxicol. 2024 Apr 18.

15.Antimicrobial use related problems and determinants in surgical ward of Ethiopian tertiary hospital. Niriayo YL, Ayalneh M, Demoz GT, Tesfay N, Gidey K.PLoS One. 2023 Dec 22. Cite

16.Medication Related-Problems and Associated Factors Among Patients with Hypertension at a Tertiary Care Hospital in Ethiopia: A Prospective Interventional Study. Garedow AW, Mamo MD, Tesfaye GT.Integr Blood Press Control. 2023 Nov 30.

17.A Prospective Study on Hospitalization due to Drug-related Problems in a Tertiary Care Hospital. Konuru V, Naveena B, Sneha Reddy E, Vivek BC, Shravani G.J Pharm Bioallied Sci. 2019 Oct-Dec. Cite

18.Drug-Induced Serious Cutaneous Reactions in Hospitalized Patients: A Cross-Sectional Study.

Jiamsathit W, Bunarong K, Papenkort S, Cox AR, Jarernsiripornkul N.J Clin Med. 2025 Jan 28. Cite

19.Frequency, types and predictors of drug therapy problems among non-dialysis chronic kidney disease patients at a tertiary care hospital in Pakistan. Hayat M, Ahmad N, Mohkumuddin S, Ali Khan SL, Khan AH, Haq NU, Haque N, Khan A.PLoS One. 2023 Apr 14.

20.Analysis of Pharmacist Interventions in Adult COVID-19 Patients Admitted to a Tertiary Care Hospital.Al-Quteimat O, Siddiqui M, Hussein L, Al Emleh H, Shamieh IED.J Pharm Pract. 2023 Jun.

21.Drug-related problems and potentially inappropriate medications use in Indian geriatric patients receiving chemotherapy in the medical oncology unit of a tertiary care hospital. Kanchana M, Jovita PMM, Rajanandh MG.J Geriatr Oncol. 2021 Jun.

22.Characteristics of drug-related problems and pharmacists' interventions in a geriatric unit in China.Ma Z, Sun S, Zhang C, Yuan X, Chen Q, Wu J, Wang X, Liu L.Int J Clin Pharm. 2021 Feb.

23.Identification and Resolution of Drug-Related Problems among Childhood Cancer Patients in Ethiopia.Yismaw MB, Adam H, Engidawork E.J Oncol. 2020 Mar 16.

24.Identification and solution of drug-related problems in the neurology unit of a tertiary hospital in China. Liu P, Li G, Han M, Zhang C.BMC Pharmacol Toxicol. 2021 Oct 26. Cite

25.Risk factors for drug-related problems in a general hospital: A large prospective cohort.

Saldanha V, Araújo IB, Lima SIVC, Martins RR, Oliveira AG.PLoS One. 2020 May 5.

26.A study of medication-related problems in stroke patients: A need for pharmaceutical care.

Kanagala VS, Anusha A, Rao BS, Challa SR, Nalla KS, Gadde RS.J Res Pharm Pract. 2016 Jul-Sep.

27.Drug-related Problems in Solid-Organ Transplant Recipients Hospitalized for COVID-19: An Experience of a Referral Tertiary Center in Iran.

Azadi S, Shahabinezhad F, Shafiekhani M.Iran J Med Sci. 2022 Nov.

28.A Prospective Study of Medication Surveillance of a Pediatric Tertiary Care Hospital in Lahore, Pakistan. Nawaz HA, Khan TM, Adil Q, Goh KW, Ming LC, Blebil AQ, Lee KS, Dhaliwal JS.Pediatr Rep. 2022 Jun 15.

29.Hospital admissions attributed to adverse drug reactions in tertiary care in Uganda: burden and contributing factors. Asio L, Nasasira M, Kiguba R.Ther Adv Drug Saf. 2023 Jul. Share

30.Identifying characteristics of drug-related problems in critically ill patients with decompensated liver cirrhosis. Aghili M, Neelathahalli Kasturirangan M.Eur J Gastroenterol Hepatol. 2019 Dec.

