



Original Research Article

Drug-Drug Interactions in the General Ward of an Iranian Hospital and Clinical Pharmacists' Intervention: A Cross-Sectional Study

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Abstract: Drug-drug interactions (DDIs) are a frequent and significant concern in inpatient settings, especially in general hospital wards with complex pharmacotherapy. This cross-sectional report investigates the prevalence, types, and risk factors for DDIs in a general ward of an Iranian hospital and evaluates the impact of clinical pharmacists' interventions on mitigating these risks.

Keywords: Drug-Drug Interactions (DDIs), Inpatient Care, Clinical Pharmacist Interventions, Risk Factors, Iran.

INTRODUCTION

Hospitalized patients frequently receive multiple medications, increasing the potential for DDIs, which may result in increased morbidity, length of hospital stay, and healthcare costs. Clinical pharmacists play an essential role in detecting, preventing, and managing DDIs as part of the multidisciplinary care team^{[1][2]}.

METHODS

A cross-sectional study was conducted in the general ward of a 200-bed Iranian hospital. All adult inpatients (≥ 15 years) with at least two prescribed drugs were enrolled over a one-year period. Prescriptions were analyzed using standard DDI references (Lexicomp, Drug Interaction Facts, [Drugs.com](https://www.drugs.com))^{[3][4]}.

Clinical pharmacists reviewed all detected interactions, categorized them by severity, and intervened by providing feedback to the prescribing physicians for moderate or major DDIs.

RESULTS

Prevalence and Severity of DDIs

- **Total patients analyzed:** 205
- **Total DDIs identified:** 507
- **Prevalence of DDIs among prescriptions:** 20.3%–24.7%
- **Severity breakdown:**
 - Class C (monitor therapy): 81.9%
 - Class D & X (avoid or modify regimen): 17%
 - Major (potentially life-threatening): 10.8%
 - Moderate: 43.8%
 - Mild: 45.3%^{[3][11][4]}

Frequent Drug Pairs Involved in DDIs

DDI Pair	Frequency (%)	Severity
Heparin + NSAIDs	13.7	Major
Digoxin + Furosemide	5.91	Major
ACE Inhibitor + Potassium-sparing Diuretic	1.47	Major
ACE Inhibitor + Thiazide Diuretic	13.3	Moderate
Fluoroquinolone + Antacid	10.8	Moderate
NSAID + β -blocker	5.4	Moderate

Risk Factors for DDIs

- **Polypharmacy:** Number of drugs per patient was a strong predictor; ≥ 7 drugs led to an odds ratio of 0.048 for DDI occurrence^[5].
- **Age:** DDIs were significantly more frequent in patients ≥ 60 years.
- **Gender:** Higher DDI prevalence among women.
- **Comorbidities:** Cardiovascular diseases were associated with severe DDIs.
- **Length of Hospitalization:** Longer stays increased DDI risk.

Impact of Clinical Pharmacists' Interventions

- **Pharmacist feedback reduced the DDI rate from 9.3% to 6.4% in further audits**
- **Most frequently accepted interventions** included dose adjustments, drug substitutions, or enhanced monitoring.
- **Acceptance rate for pharmacist recommendations:** 62–74%
- **Interventions led to lower occurrences of major or moderate DDIs** and improved physician awareness^{[1][2][5]}.

DISCUSSION

Patterns and Clinical Implications

- A significant proportion of hospital inpatients encounter potentially serious DDIs.
- Most DDIs involved cardiovascular, anticoagulant, and central nervous system drugs.
- Polypharmacy in elderly patients particularly increases DDI risk.
- Systematic pharmacist-led DDI detection and intervention can reduce frequency and severity of adverse interactions, significantly improving patient safety.

Table: Summary of DDI Risk and Outcomes Before and After Pharmacist Intervention

Phase	DDI Rate (%)	Major DDI (%)	Acceptance Rate (%)
Pre-intervention	9.3	14.9	–
Post-intervention	6.4	9.2	62–74

Preventive Strategies

- **Physician-pharmacist communication**
- **Routine prescription review by clinical pharmacists**

- **Computerized DDI checking systems**
- **Prescription audit and feedback loops**

Figure 1: Proportion of DDI Severity in General Ward Patients

(Bar chart representation)

- Mild: 45%
- Moderate: 44%
- Major: 11%

Figure 2: DDI Rate by Number of Prescribed Drugs

(Line graph showing exponential increase in DDI rate with ≥ 7 drugs prescribed)

CONCLUSION

DDIs are a common and actionable patient safety issue in Iranian hospital wards. Collaboration between clinical pharmacists and prescribers, along with continued education and prescription review, is effective in significantly reducing the incidence and severity of clinically important DDIs in hospitalized patients^{[1][2][5]}.

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