



Evaluation of Drug-related Risk Factors for Patient-specific Prioritization in Hospitalized Elderly Patients

ASAN
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Background and Importance

Comprehensive Management in Older Adults

- Older adults have a high prevalence of chronic diseases and receive care across multiple specialties, which increases the risk of polypharmacy.
- This complexity increases the risk of drug-related problems (DRPs), including inappropriate medication use and adverse drug reactions.

Burden of Drug-Related Problems(DRPs)

- DRPs are defined as events or circumstances involving medication therapy that actually or potentially interfere with achieving optimal health outcomes.
- DRPs account for approximately 5–15% of hospital admissions, and an estimated 25–75% of these events are preventable.

Prioritization in Pharmacist Interventions

- Pharmacist-led interventions have been shown to significantly reduce hospital readmissions, emergency department visits, and DRPs in older adults.
- However, limited healthcare resources highlight the need for evidence-based prioritization strategies to identify patients at highest risk.

Aim and Objectives

- Elderly patients are vulnerable to drug-related problems due to polypharmacy and comorbidities.
 - Timely identification of high-risk patients is critical for optimizing pharmacist-led interventions.
- **To assess patient-specific risk factors associated with DRPs and establish criteria to identify high-risk patients for targeted pharmacist interventions.**

Materials and Methods

- Study design** : Retrospective, single-center observational study
- Study period** : March 1 - 31, 2025 (1 month)
- Study population** : Patients aged ≥ 65 years who were hospitalized at Asan Medical Center (Exclusion criteria: Discharged within 2 days or admitted to the ICU)
- Predefined risk factors (n=22)**:
 - Age and frailty (Clinical Frailty Scale)
 - Medication-related variables (polypharmacy, high-risk drug use, anticholinergic burden, therapeutic duplication)
 - Laboratory parameters (renal function, electrolytes, glucose, coagulation profile, platelet count)

Outcomes

Assessment of Drug-Related Problems

- Identification and classification of DRPs based on pharmacist-led interventions

Evaluation of patient-specific risk factors

- Incidence of DRPs according to predefined risk factors
- Selection of candidate factors associated with DRP occurrence
- Prioritization of patients based on the strength of associations
- Development of criteria for identifying high-risk patients**

Statistical Analysis

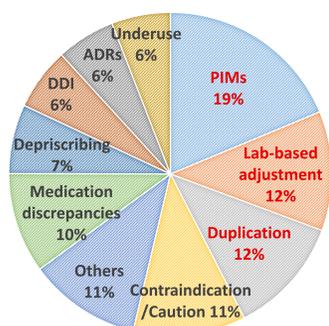
- Descriptive statistics and chi-square tests for initial association analysis
- Multivariable analysis to assess the relative contribution of risk factors to DRP occurrence
- Analyses performed using SPSS software (IBM Corp., Armonk, NY, USA)

Results

Distribution of Prescriptions

- 2574 patients included,
- Group: with DRPs (n=313, 12%), without DRPs (n=2261, 88%)

Assessment of Drug-Related Problems



- A total of 578 pharmacist interventions were recorded**
- Most commonly related intervention:** Potentially Inappropriate Medications (108, 19%)
- Followed by:** Laboratory-based dose adjustments (69, 12%)
Therapeutic duplication (68, 12%)

Figure 1. Distribution of interventions

Evaluation of patient-specific risk factors

Risk factors n (%)	Patients (Total N=2,474)		P-value	
	with DRPs (N=313)	without DRPs (N=2,261)		
Age	65-74	166 (53)	1,525 (59.2)	<0.001
	≥ 75	147 (47)	736 (32.6)	
Clinical Frailty Scale	<5	87 (27.8)	1,796 (79.4)	<0.001
	≥ 5	226 (72.2)	465 (59.4)	
Renal function*	≥ 60	193 (61.7)	1,838 (81.3)	<0.001
	30-59	69 (22)	327 (14.5)	
	<30	51 (16.3)	96 (4.2)	
Inpatient medications	<5	47 (15)	1,113 (49.2)	<0.001
	5-9	96 (30.7)	727 (32.2)	
	≥ 10	170 (54.3)	421 (18.6)	
Pre-admission medications	<5	29 (9.3)	1,025 (45.3)	<0.001
	5-9	96 (30.7)	908 (40.2)	
	≥ 10	188 (60.1)	328 (14.5)	
Therapeutic duplication	Y	102 (32.6)	224 (9.9)	<0.001
	N	211 (67.4)	2,037 (90.1)	

*eGFR (CKD-EPI)

Figure 2. Incidence of DRPs according to predefined risk factor (χ^2 test, $p < 0.05$)

- The incidence of DRPs was evaluated according to predefined risk categories.
 - Among predefined risk factors, frailty(CFS ≥ 5) was associated with the highest DRP frequency, followed by polypharmacy before admission (≥ 5 medications).**
- In univariate comparisons, most predefined risk factors showed differences in DRP occurrence, except for selected laboratory abnormalities.

DRP occurrence Risk factors OR(95% CI)

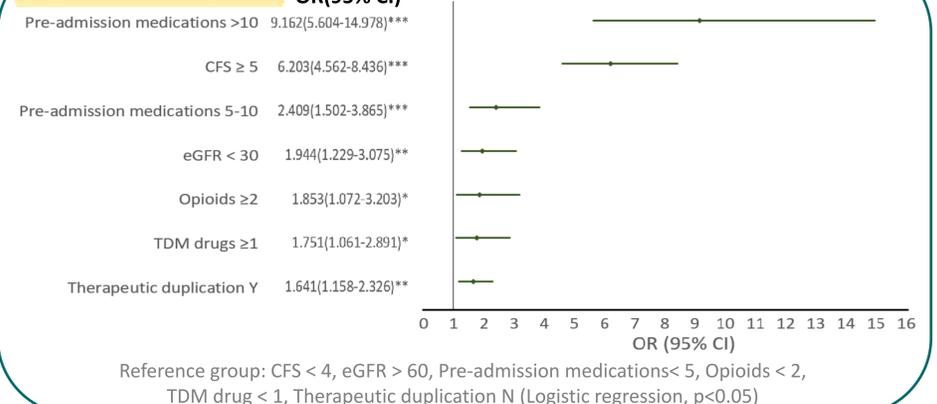


Figure 3. Prioritization of patients based on the strength of associations

- Polypharmacy (≥ 10 medications) showed the strongest independent association with DRPs (OR 9.16).
 - Frailty (CFS ≥ 5) was a major predictor of DRP occurrence (OR 6.20).
 - Severe renal impairment (eGFR < 30) and high-risk medication use (≥ 2 opioids, ≥ 1 TDM drugs, therapeutic duplication) were also independently associated with DRPs.
- **The relative strength of risk factors closely aligned with specific DRP patterns (Figure 1), supporting a risk-based prioritization strategy.**

Conclusion and Relevance

- Frailty, polypharmacy, and renal impairment were key predictors of DRPs in hospitalized older adults.
- These findings support risk-based prioritization for pharmacist-led medication review.
- Further multicenter prospective studies are needed to validate these predictors and strengthen external generalizability.

► **Building on these findings, we aim to develop a simplified and pragmatic risk-scoring formula to enable rapid identification of high-risk patients, especially in resource-limited healthcare settings.**

References

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