# In-hospital adverse drug reactions in hospitalised older adults - a systematic review

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In-Hospital Adverse Drug Reactions in Hospitalised Older Adults: A Systematic Review

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Introduction

• Almost ten percent of older-adults experience an adverse drug reaction (ADR) associated with acute hospitalisation.
• Individual studies suggest that up to 1 in 4 experience an ADR in hospital.

This systematic review (SR) aims to evaluate in-hospital ADRs in hospitalised older-adults; frequency, culprit drug classes, severity, and clinical consequence.

Methods

This SR was conducted following the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) (Moher et al., 2009). Two researchers (EJ, KM) screened all papers for inclusion, risk of bias and data extraction independently.

Registration

• PROSPERO registration CRD42018079095

Search Strategy

• Databases – electronic databases (PubMed, Embase and EBSCO-CINAHL, Cochrane Library) and library-hosted academic sources, google scholar, and grey literature.
• Search term stems – aged, ADRs, hospitalized, multi-morbidity, polypharmacy and hospital-acquired [search strategy available on request from author].
• Bibliographic hand searches of relevant editorials and systematic reviews.

Paper Inclusion/Exclusion

• All languages.
• All dates up to and including the date of the final search (15/02/2018) were eligible.
• Any study that reported on ADRs either as a primary or secondary outcome in those aged 65 years or older that were hospitalised at time of ADR occurrence.
• Review articles, systematic reviews, case reports and letters to the editor were subsequently excluded – their bibliography was hand searched for suitable studies.
• When data reported was for all ages, but there was evidence of 65 cohort the author was contacted requesting data for those aged 65 and over.
• A template document for completion was provided.
• Two attempts were made to the listed author, followed by an attempt to contact a co-author.

Study Quality / Risk of Bias Assessment

Included studies were assessed for risk of bias and study quality:
• Cochrane for randomised controlled trials
• STROBE checklist for case cohort studies
• Newcastle-Ottawa Scale for non-randomised studies

Data Extraction

We extracted data to assess percentage of study cohort ≥65 that experienced an ADR, reported presentation of ADRs, Drugs deemed accountable, ADR severity, ADR preventability, any measured outcomes.

Results

Study selection – see PRISMA Diagram [Figure 1.]

1930 abstracts were identified, 1,779 were screened, 228 underwent full-text screening. 23 papers reporting 22 studies were included [1-11]. 11 ADRs in participants ≥65 years, 11 ADRs in non-adults (extractable data for ≥65 available in 5 studies, supplemental data provided by authors in 6 studies).

Characteristics of Included Studies

21,306 patients were included in the 22 studies; 15,769 (74%) were aged ≥65 years. 50% male, 50% female (reported in 18 studies). Polypharmacy reported as a mean/median ≥5 medications at baseline) was reported and present in 12 studies. Multi-morbidity (reported as a mean/median of medical diagnoses ≥3 at baseline) was reported in 9 and present in 8 studies.

ADR Rates

22 Studies reported ADR incidence – 2186 patients ≥65 years experienced ADRs in-hospital. Median 19.77% [IQR 10.44 – 25.35] Min 4.95% Max 42.19%.

Reported ADR Presentation

16 studies reported on ADR presentation (n = 13,217, 1,403 ADR presentations). 20% (283) metabolism and nutritional disorders; 17% (246) nervous system disorders; 15% (210) cardiac disorders; 13% (185) gastrointestinal disorders; 10% (148) renal and urinary disorders; 6% (80) blood and lymphatic system disorders.

ADR Drugs

ADR associated drugs were extractable in 15 papers (1528 reported drugs in 1253 ADR patients). 85% of ADRs were associated with 11 commonly prescribed medications.

ADR Severity

14 studies reported severity (n = 13,171; reported ADRs = 1,947). 72% of reported ADRs were at least of moderate severity. 29% (560 ADRs) were severe.

ADR Preventability

5 studies assessed preventability (n = 3602, reporting 672 ADRs), 69% of reported ADRs were preventable.

Outcomes

5 papers reported on post ADR outcomes [3 length of stay [LOS], 1 LOS-death, 1 functional decline].

Conclusion:

• There is a lack of consistency in methodologies used for ADR investigation, reporting and describing in the literature.
• Incident ADRs occurring in-hospital in older adults (≥65 years) are common, occurring in 1 in 5 hospitalised older adults.
• 11 commonly prescribed drug classes account for 85% of all ADRs.

1 in 5 patients ≥65 years experience a clinically significant ADR in-hospital

11 commonly prescribed drug classes account for 85% of ADRs

- Diuretics 22%
- Anti-thrombotics 14%
- Antimicrobials 12%
- Opioids 11%
- Psychotropic 6%
- Drugs used in diabetes 4%
- ACE-I, ARBs 4%
- Systemic corticosteroids 3%
- Drugs for obstructive airway disease 3%
- Cardiac glycosides 3%
- Anti-hypertensives 3%

1 in 4 in-hospital ADRs is severe

At least 2 of 3 in-hospital ADRs are preventable