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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 terms – 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 [1-21 11 ADRs in participants ≥ 65 years, 11 ADRs in age 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 number of diagnoses ≥3 at baseline) was reported in 9 and present in 8 studies.

ADR Rates

22 Studies reported ADR incidence ~ 2168 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 = 13127, 1403 ADR presentations). 20% (283) metabolism and nutritional disorders; 17% (246) nervous system disorders; 15% (210) cardiovascular 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 = 13171; reported ADRs ≥ 547). 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 adverse drug reaction identification, assessment and reporting 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-arrhythmics 14%
- Antimicrobials 12%
- Opioids 11%
- Systemic corticosteroids 3%
- Drugs used in obstructive airway disease 3%
- ACE-I, ARBs 4%
- Systemic antihypertensives 3%

1 in 4 in-hospital ADRs is severe

At least 2 of 3 in-hospital ADRs are preventable

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