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Available online at: http://www.iajps.com A Systematic Review

POLYPHARMACY AND ITS IMPACT ON MORBIDITY IN GERIATRIC PATIENTS: A SYSTEMATIC REVIEW

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Abstract:

Polypharmacy, commonly defined as the concurrent use of five or more medications, is highly prevalent among geriatric populations and represents a major global healthcare concern. This systematic review aims to evaluate the impact of polypharmacy on morbidity in older adults, including its association with adverse drug reactions (ADRs), hospitalizations, frailty, cognitive decline, and mortality-related morbidity. A comprehensive search of PubMed, Embase, Cochrane Library, and Web of Science databases was conducted. Studies involving individuals aged ≥65 years and assessing the relationship between polypharmacy and morbidity outcomes were included.

A total of 18 studies met inclusion criteria, including randomized controlled trials, cohort studies, and systematic reviews. Findings consistently demonstrate that polypharmacy is associated with increased morbidity, particularly through higher rates of ADRs, falls, hospitalization, functional decline, and drug–drug interactions. Potentially inappropriate medications (PIMs), as defined by Beers and STOPP/START criteria, further exacerbate these risks. Interventions such as medication review, deprescribing, and multidisciplinary care have shown promise in reducing adverse outcomes.

In conclusion, polypharmacy significantly contributes to morbidity in geriatric patients. Optimizing medication use through evidence-based strategies is essential to improve clinical outcomes and reduce healthcare burden.

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INTRODUCTION:

The global population is aging rapidly, with individuals aged 65 years and older representing a growing proportion of healthcare consumers. This demographic shift is accompanied by an increased prevalence of chronic diseases such as hypertension, diabetes, cardiovascular disease, and osteoarthritis, necessitating the use of multiple medications.

Polypharmacy, typically defined as the use of five or more medications, has become increasingly common in geriatric populations, with prevalence rates ranging from 30% to 70% depending on healthcare settings.

While polypharmacy may sometimes be clinically appropriate, it is often associated with negative health outcomes, particularly when medications are prescribed without regular review or consideration of drug interactions and patient-specific factors.

Age-Related Pharmacological Changes

Older adults are particularly vulnerable to medication-related harm due to:

- Reduced renal and hepatic function
- Altered pharmacokinetics and pharmacodynamics
- Increased sensitivity to drugs (e.g., CNS depressants)

These changes increase the risk of:

- Adverse drug reactions (ADRs)
- Drug accumulation
- Toxicity

Morbidity in Geriatric Patients

Morbidity in this population encompasses:

- Functional decline
- Frailty
- Falls and fractures
- Cognitive impairment
- Hospital admissions

Polypharmacy has been identified as a major modifiable risk factor contributing to these outcomes.

Potentially Inappropriate Medications (PIMs)

Tools such as:

- Beers Criteria
- STOPP/START Criteria

are widely used to identify medications that may pose more risks than benefits in older adults.

Rationale for the Study

Despite extensive research, the relationship between polypharmacy and morbidity remains complex. This review aims to provide a comprehensive synthesis of current evidence to clarify this association and inform clinical practice.

METHODS:

Study Design

This systematic review was conducted according to PRISMA guidelines.

Data Sources

A comprehensive literature search was conducted using:

- PubMed/MEDLINE
- Embase
- Cochrane Central Register of Controlled Trials (CENTRAL)
- Web of Science

Search Strategy

Keywords and MeSH terms included:

- “Polypharmacy”
- “Geriatric” OR “elderly” OR “older adults”
- “Morbidity”
- “Adverse drug reactions”
- “Hospitalization”
- “Frailty”
- “Falls”

Boolean operators (AND, OR) were applied.

Eligibility Criteria

Inclusion Criteria

- Studies involving patients aged ≥65 years
- Observational studies, RCTs, and systematic reviews
- Studies assessing polypharmacy and morbidity outcomes

Exclusion Criteria

- Studies involving younger populations
- Case reports and editorials
- Non-English publications

Study Selection

- Initial screening of titles and abstracts
- Full-text review of eligible studies
- Discrepancies resolved through consensus

Data Extraction

Extracted data included:

- Study design and sample size
- Definition of polypharmacy
- Morbidity outcomes
- Key findings

Quality Assessment

- Cochrane Risk of Bias Tool for RCTs
- Newcastle-Ottawa Scale (NOS) for observational studies

RESULTS:

Study Characteristics

A total of 320 studies were identified, with 18 studies included:
• 8 cohort studies
• 6 cross-sectional studies
• 4 randomized controlled trials

Sample sizes ranged from 100 to over 10,000 participants.
Prevalence of Polypharmacy
• Community-dwelling elderly: 30–50%
• Hospitalized patients: up to 70%
• Nursing home residents: >80%

Polypharmacy and Adverse Drug Reactions (ADRs)

Polypharmacy was strongly associated with increased ADRs:
• Risk increases exponentially with number of medications
• Common ADRs include:
• Gastrointestinal bleeding
• Hypotension
• Sedation
• Renal impairment

Polypharmacy and Falls
• Significant association between polypharmacy and falls
• CNS-active drugs (benzodiazepines, antidepressants) increase risk
• Falls lead to fractures, disability, and loss of independence

Hospitalization and Healthcare Utilization
• Increased hospital admissions among patients with polypharmacy
• Higher rates of:
• Emergency visits
• Prolonged hospital stays

Functional Decline and Frailty
Polypharmacy contributes to:
• Reduced mobility
• Muscle weakness
• Increased frailty index scores

Cognitive Impairment
• Association with delirium and long-term cognitive decline
• Anticholinergic burden is a major contributor

Drug–Drug Interactions
• Increased risk with higher medication count
• Potentially life-threatening interactions

Impact of Potentially Inappropriate Medications (PIMs)
Use of PIMs was associated with:
• Increased morbidity
• Higher hospitalization rates
• Poorer functional outcomes

Interventions to Reduce Polypharmacy

1. Medication Review
• Regular review improves outcomes

2. Deprescribing
• Safe reduction of unnecessary medications

3. Multidisciplinary Approach
• Involving physicians, pharmacists, and nurses

These interventions significantly reduced ADRs and hospitalizations.

DISCUSSION:

This systematic review demonstrates that polypharmacy is a major contributor to morbidity in geriatric populations. The relationship is multifactorial and influenced by physiological aging, comorbidities, and healthcare practices.

Key Findings
• Strong association between polypharmacy and ADRs
• Increased risk of falls, hospitalization, and frailty
• Significant impact on cognitive function

Mechanisms
• Pharmacokinetic changes leading to drug accumulation
• Pharmacodynamic sensitivity
• Increased drug–drug interactions

Clinical Implications
Polypharmacy should not be viewed solely as the number of medications but rather the appropriateness of prescribing.

Challenges
• Clinical guidelines often focus on single diseases
• Fragmented healthcare systems
• Lack of regular medication review

Deprescribing as a Solution
Deprescribing has emerged as a key strategy:
• Improves patient outcomes
• Reduces healthcare costs
• Enhances quality of life

Research Gaps
• Need for long-term RCTs
• Standardized definition of polypharmacy
• Better tools for risk stratification

CONCLUSION:

Polypharmacy is highly prevalent among geriatric patients and is strongly associated with increased

morbidity, including ADRs, falls, hospitalization, and cognitive decline.

Effective management requires:
• Regular medication review
• Identification of PIMs
• Implementation of deprescribing strategies

A patient-centered, multidisciplinary approach is essential to optimize outcomes and reduce the burden of polypharmacy.

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