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Beyond the Pillbox- The Burden of Polymedication in Elderly Patients

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ABSTRACT

Polymedication (use of more than 5 medication in daily treatment scheme), commonly referred to as polypharmacy, is highly prevalent among elderly patients due to multimorbidity and age-related physiological changes. While appropriate polypharmacy may improve clinical outcomes, inappropriate schemes increase the risk of adverse drug reactions, drug–drug interactions, hospitalizations, and mortality. This paper reviews current evidence on the epidemiology, determinants, risks, assessment tools and management strategies of polymedication in older adults. Evidence-based interventions such as deprescribing, medication review tools and multidisciplinary approaches are discussed to optimize pharmacotherapy in the aging population.

Keywords: Polypharmacy; Elderly Patients; Adverse Drug Reactions; Deprescribing; Multimorbidity

Background

Polypharmacy prevalence increases with age and healthcare utilization. Factors contributing to polypharmacy include multimorbidity, fragmented care, guideline-driven prescribing and self-medication. Population aging is a global phenomenon, accompanied by an increased prevalence of chronic diseases. Elderly patients often require multiple medications to manage comorbid conditions leading to polymedication. Polypharmacy is commonly defined as the concurrent use of five or more medications, though definitions vary. While medications can be lifesaving, aging-related changes in pharmacokinetics and pharmacodynamics make older adults particularly vulnerable to medication-related harm, so understanding the balance between therapeutic benefit and risk is critical (Table 1).

Table 1: Common Definitions of Polypharmacy in Literature.

Term	Definition	Clinical Relevance
Polypharmacy	Use of ≥ 5 medications	Threshold where ADE risk rises exponentially
Excessive Polypharmacy	Use of ≥ 10 medications	Associated with malnutrition and frailty
Appropriate Polypharmacy	Many meds, but all clinically indicated	Optimization rather than reduction is the goal
Inappropriate Polypharmacy	One or more non-indicated/risky meds	Target for deprescribing (e.g., BEERS Criteria).

Epidemiology of Polypharmacy

A systematic review by Wastesson, et al. [1] reported polypharmacy prevalence ranging from 40% to 65% among community-dwelling older adults and exceeding 80% in long-term care facilities. Excessive polypharmacy (≥10 medications) affects approximately 20–30% of elderly patients in high-income countries [1] (Table 2).

Table 2: Prevalence of Polypharmacy in Elderly Populations.

Setting	Prevalence (%)	Source
Community-dwelling elderly	40–60%	Maher, et al., 2014
Hospitalized elderly	60–80%	Wastesson, et al. [1]
Nursing home residents	>80%	Morin, et al. 2016

Burdens and Implications of Polymedication

Clinical burden (morbidity/mortality) and Economic burden (direct or indirect costs of the medications themselves) are the main problems implied by polymedication.

Physiological Changes Affecting Drug Therapy in Aging

Age-related changes alter drug absorption, distribution, metabolism and excretion:

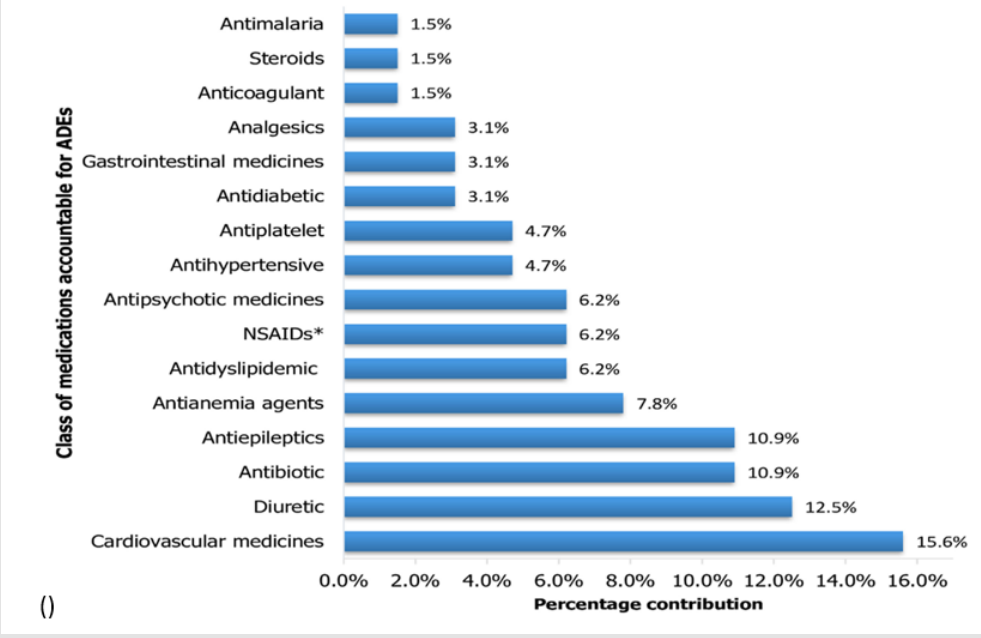
- Decreased renal clearance
- Reduced hepatic metabolism
- Increased body fat and decreased lean mass
- Altered receptor sensitivity

These changes increase susceptibility to adverse drug reactions (ADRs), even at standard doses. Risks and consequences of polymedication can vary from adverse drug reaction to interaction between drugs or influences on clinical status. The risk of drug–drug interactions in older patients increases exponentially with each additional medication.

Clinical Outcomes-Evidence Links Polymedication with Several Negative Outcomes

- Falls and fractures
- Cognitive impairment and delirium
- Hospital admissions
- Reduced adherence
- Increased mortality

The risk of adverse outcomes, including adverse drug reactions (ADRs), hospitalizations and mortality increases exponentially with the number of medications taken, particularly with polypharmacy. With two drugs, the probability of an ADR is 13%, rising to 58% with five drugs and 82% with seven or more (Table 3) (Figure 1). The statements above are all true and clinical practice applicable but we should mention that not all polypharmacy is harmful. We must acknowledge that sometimes appropriate polypharmacy is needed when medications are evidence-based, necessary and optimized while inappropriate polypharmacy includes unnecessary, duplicative or harmful medications. Polymedication is strongly associated with low medication adherence especially in elderly, multimorbid patients. It increases risks of adverse drug reactions, treatment complexity and forgetfulness, with studies showing non-adherence rates around 42.6%–46.5% (Tables 4 & 5).



Note: NSAIDs, Non-steroidal anti-inflammatory drugs [2].

Figure 1: Class of medications accountable for ADEs, WSUTRH, February 2021 to July 2021.

Table 3: Clinical Risks Associated with Polypharmacy.

Risk	Evidence
Falls	Increased odds by 1.5–2×
Hospitalization	Dose-dependent increase
Mortality	Higher risk with ≥10 drugs

Table 4: The "High Risk" Drug Classes in Seniors (BEERS Criteria Summary).

Drug Class	Potential Risk	Evidence Grade	Alternative Strategy
Benzodiazepines	Falls, delirium, sedation	High	CBT for insomnia; SSRIs for anxiety
PPIs (>8 weeks)	C. diff infection, bone loss	Moderate	H2 blockers; lifestyle changes
Anticholinergics	Confusion, constipation, urinary retention	High	Avoid; non-pharmacologic interventions
NSAIDs (Chronic)	GI bleeding, renal failure, worsening HTN	High	Acetaminophen, topical NSAIDs.

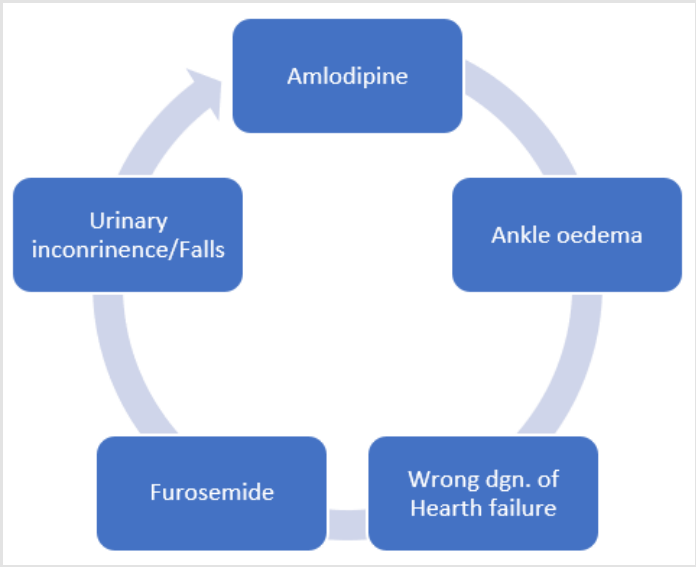
Table 5: The composition of polypharmacy: A register-based study of Swedes aged 75 years and older (from Jonas W. Wastesson, Angel Cedazo Minguez et all).

	Total Population		Polypharmacy, ≥5 drugs5 drugs		Excessive Polypharmacy, ≥10 drugs≥10 drugs		Institution	
	(n=822,619)		(n=367,412)		(n=68,100)		(n=70,500)	
	%	n	%	n	%	n	%	n
Age								
75-84	68.9	566,527	63.3	232,418	61.2	41,648	32.8	23,006
85-94	28.9	237,899	34.2	125,566	36.3	24,701	56.6	39,653
95+	2.2	18,193	2.6	9,428	2.6	1,751	10.6	7,391
Women	58.9	484,498	61.3	225,106	64.8	44,096	71.4	50,028
Institution	8.5	70,050	13.1	47,989	19	12,946	100	70,050
Number of Drugs								
0	13.3	109,498	0	0	0	0	4.8	3,364
1-4	42	345,709	0	0	0	0	26.7	18,697
5-9	36.4	299,312	81.5	299,312	0	0	50	35,043
≥10	8.3	68,100	18.5	68,100	100	68,100	18.5	12,946
Number of Drugs, median (IQR)	4	2 to 7	7	6 to 9	11	10 to 13	6	4 to 9

Drivers of Low Adherence in Polypharmacy are Listed Below

- **Regimen complexity:** Taking multiple drugs at different times of the day leads to confusion and missed doses.
- **Cognitive & physical limitations:** Memory deficits and functional impairments in the elderly hinder proper management of multiple prescriptions.
- **Adverse effects:** Patients may consciously stop medication due to side effects or lack of perceived efficacy.
- **Limited health literacy:** Difficulty understanding instructions, particularly when switching between different doctors and no having a MD to correlate the prescriptions.

Several studies state that the increasing number of drugs prescribed at hospital discharge is correlated to non-adherence and a high percentage of patients did not understand the purpose of their medications. Simplification of drug regimens and reduction of pill burdens as well as better explanations of the reason for the medications should be targets for intervention [2]. The "Prescribing Cascade" (treating side effects of one drug with another) is another important aspect of futile polymedication that can have a major impact on patient management (Figure 2).



Note:

1. Step 1: Patient takes Drug A (e.g., Amlodipine for BP).
2. Step 2: Patient develops Side Effect (e.g., Ankle Edema).
3. Step 3: Doctor interprets side effect as a new condition (e.g., Heart Failure).
4. Step 4: Doctor prescribes Drug B (e.g., Furosemide).
5. Step 5: Patient develops side effect from Drug B (e.g., Urinary incontinence/Falls) leading to more medication burden.

Figure 2: The Vicious Cycle of the Prescribing Cascade.

Tools for Assessing Inappropriate Polymedication

The STOPP/START criteria are are explicit recomandations that facilitate medication-review in multimorbid older people indifferent of the clinical setting. Can be administered by the General practitioner doctor, nurses or by community pharmacist. They are user friendly and the time needed for evaluation varies between 5 and 20minutes [3]. Published in its entirety in the Journal of the American Geriatrics Society the AGS Beers Criteria® [4] is also available as a mobile app and as a pocket reference card. Both are designed to meet the needs of busy clinicians practicing in a variety of settings and are available from GeriatricsCareOnline.org. The AGS is committed to bringing the expertise of geriatrics health professionals to the public and lay versions of the Beers Criteria® as well as tools to aid older adults and caregivers in understanding what medications are potentially inappropriate are available for free from https://www.healthinaging.org/HealthinAging.org) (Table 6).

Table 6: Common Medication Review Tools.

Tool	Purpose
Beers Criteria	Identifies potentially inappropriate medications
STOPP/START	Detects over- and under-prescribing
Medication Appropriateness Index (MAI)	Assesses individual drug suitability

Medication Appropriateness Index measures of the appropriateness of prescribing for elderly patients, using 10 criteria for each medication prescribed. The time needed is highly operator dependent and increases progressively for each additional medication but is a tool user friendly: and can be also administered by: GP, physicians or community pharmacist [5]. These tools are validated and widely recommended in geriatric care. They allow identification of useless polymedication, corrections in treatment schemes and a proper management of the patient's diseases.

Management Strategies

Deprescribing

Deprescribing is a structured, patient-centered process of withdrawing inappropriate medications. Evidence shows deprescribing reduces ADRs without increasing mortality. (https://deprescribing.org/). For example, we present in the next page the deprescribing flowchart for unappropriate PPI use, as recommended from Canadian GP guidelines [6]. The purpose of the manuals available on deprescribing.com is to provide step-by-step instructions for developing a medication class specific evidence-based deprescribing guideline. And they can be valuable tools for clinical practice in this area (Figures 3 & 4).

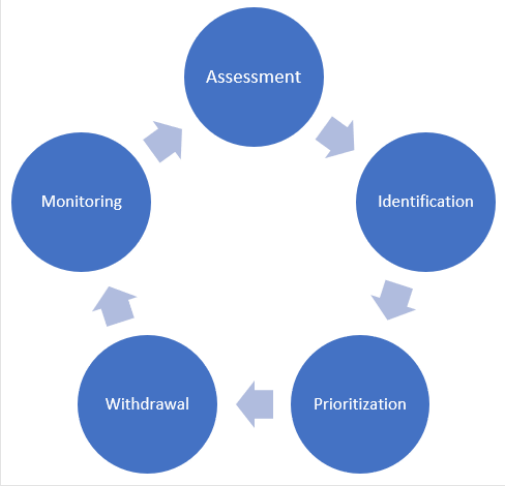


Figure 3: Flowchart of Deprescribing Process.

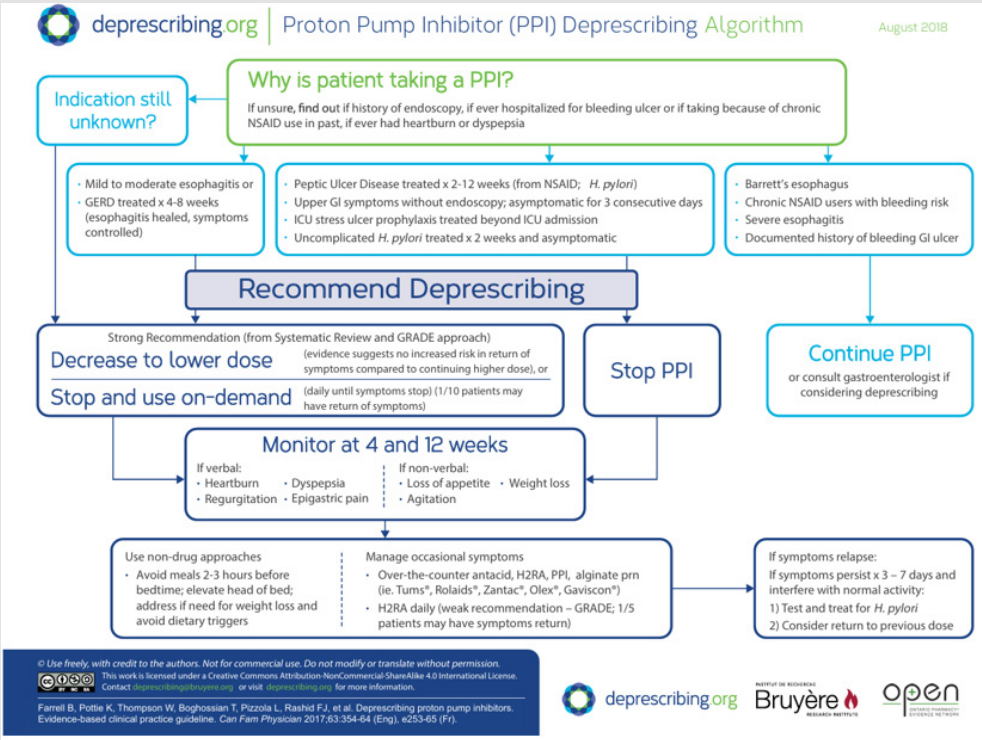


Figure 4

Multidisciplinary Approaches

Pharmacist-led medication reviews, geriatric assessments and shared decision-making may improve outcomes. Decisions should consider patient goals, life expectancy, quality of life, and preferences. Effective communication is essential to overcome resistance and ensure adherence [7,8].

Conclusion

Polymedication is a significant and timely topic. Defined as the concurrent use of 5 or more medications, this practice is a major public health challenge in geriatrics and internal medicine, leading to adverse drug events (ADEs), falls, cognitive decline and increased healthcare costs. Polymedication in elderly patients is a complex but manageable challenge. While multiple medications are often necessary, inappropriate polypharmacy poses significant risks. Evidence-based tools, deprescribing strategies, and interdisciplinary care can optimize medication use and improve outcomes in older adults. Polypharmacy is a modifiable risk factor and should be assessed on every medical visit while implementation of routine "Medication reviews" in primary could make a big difference in every patients disease management.

References

1. Wastesson JW, Morin L, Tan ECK, Johnell K (2018) An update on the clinical consequences of polypharmacy in older adults: a narrative review. Expert Opin Drug Saf 17(12): 1185-1196.
2. Pasina L, Brucato AL, Falcone C, E Cucchi, A Bresciani, et al. (2014) Medication non-adherence among elderly patients newly discharged and receiving polypharmacy. Drugs & Aging 31(4): 283-289.
3. https://www.cgakit.com/_files/ugd/2a1cfa_bcf4d63c427e4e-18963c64e74663728e.pdf.
4. (2023) American Geriatrics Society 2023 updated AGS Beers Criteria® for potentially inappropriate medication use in older adults. J Am Geriatr Soc 71(7): 2052-2081.
5. https://www.cgakit.com/_files/ugd/2a1cfa_be45ab017dfd41bea978f-b9a426817af.pdf.
6. https://deprescribing.org/wp-content/uploads/2018/08/ppi-deprescribing-algorithm_2018_En.pdf.
7. Ersulo T A, Yizengaw M A, Tesfaye B T (2022) Incidence of adverse drug events in patients hospitalized in the medical wards of a teaching referral hospital in Ethiopia: a prospective observational study. BMC Pharmacol Toxicol 23(1): 30.
8. Jonas W Wastesson, Angel Cedazo Minguez, Johan Fastbom, Silvia Maioli, Kristina Johnell (2018) The composition of polypharmacy: A register-based study of Swedes aged 75 years and older. PLoS One 13(3): e0194892.

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