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# ENHANCING MEDICATION SAFETY AND EFFICACY IN GERIATRICS: STRATEGIES FOR ADDRESSING POLYPHARMACY AND DRUG INTERACTIONS

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***Abstract:*** Patient safety is a growing concern and opportunity for individuals interested in enhancing health care delivery. Because of the widespread use of medications, life expectancy is rising, and the elderly and those with comorbidities require polypharmacy, raising the risk of drug-drug interactions (DDIs). According to studies, the rate of DDIs is high in both outpatients and hospitalised patients. It is more common among the elderly, children under the age of five, and women. DDIs are also common in individuals with chronic kidney disease, cardiovascular disease such as heart failure and hypertension, and cancer. To reduce the risk of DDIs, physicians should collect a detailed medication history, prescribe suitable and low-dose medicines, and eventually consult with a clinical pharmacologist as a critical approach to ensure patient safety. This article examines the available facts on this issue in order to assist in selecting the proper medications and prescribing the most effective with the lowest DDIs for patient safety.

**Keywords:** Adverse drug reaction , Drug -drug interaction, Polypharmacy, Geriatric

## 1. INTRODUCTION

Elderly health care has become a global concern as medical knowledge has advanced and the older population has grown in recent decades. According to the World Health Organisation, a country is considered elderly when its population of people over the age of 60 exceeds 7%.[1]

The biological system evolves as we age. Among the important physiological changes in old age are a decrease in body volume, a decrease in blood plasma, a decrease in total body fluids, a decrease in serum albumin and changes in protein binding, a decrease in the first phase of liver metabolism, renal glomerular filtration, and renal clearance. Furthermore, studies have demonstrated that ageing can directly alter the pharmacokinetic and pharmacodynamic processes of medications.[2]

Absorption, metabolism, release, protein binding, and hepatic and renal clearance are all affected by pharmacokinetic alterations.Pharmacodynamic alterations include changes in medication action on the target tissue, which can lead to undesired pharmacological side effects in the elderly. On the other side, as life expectancy rises, so does the likelihood of chronic disease and the need for health care, including pharmacological therapy.[3]

The term 'polypharmacy' refers to the usage of several medications. Polypharmacy is common in elderly people due to the increasing number of co-morbid illness conditions associated with ageing. Existing practise recommendations advocate for the use of numerous drugs to treat various chronic conditions (e.g., HIV, TB, hypertension, and so on).[4]For some disorders, a polypharmacological strategy has been proven to increase treatment response while decreasing morbidity and death. Polypharmacy, on the other hand, may result in iatrogenic problems that are frequently unnoticed prior to the start of medication regimens.[5]

Adverse drug effects, drug-drug interactions, disease-drug interactions, food-drug interactions, nutraceutical-drug interactions, and medication cascade effect are all consequences of polypharmacy.[6]

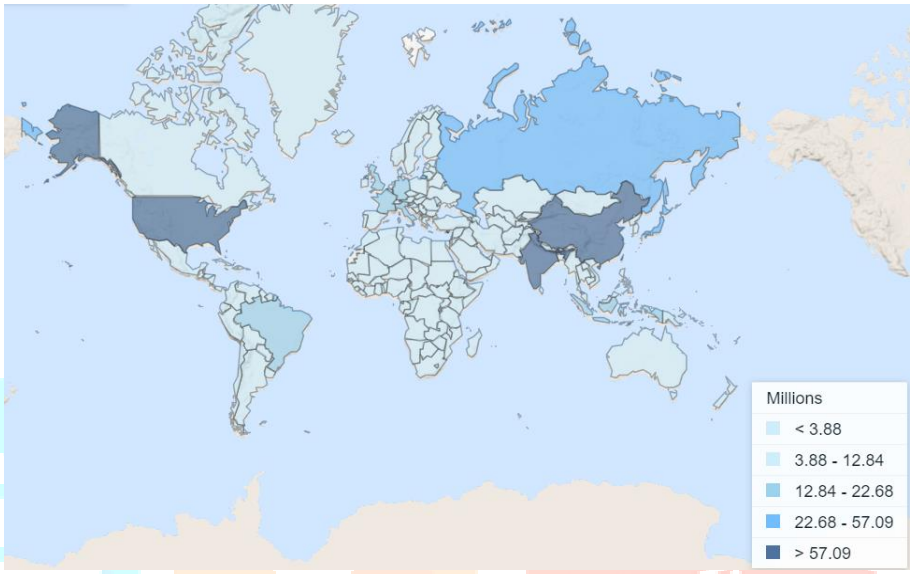


**Figure 1.1. Polpulation above 65 years of age in selected countries [7]**

A drug-drug interaction (DDI) is a potentially preventable cause of medication-related damage that happens when the impact of one medicine is changed by the use of another.[8] DDIs are typically referred to as "potential" in pharmacoepidemiological research estimating DDI prevalence since it is difficult to exactly identify if a DDI has happened in the absence of confirming clinical evidence. Clinically relevant DDIs are those linked with a known or increased risk of poor outcomes and there is universal agreement that these are frequently predicted and usually preventable sources of medication-related harm.[9]

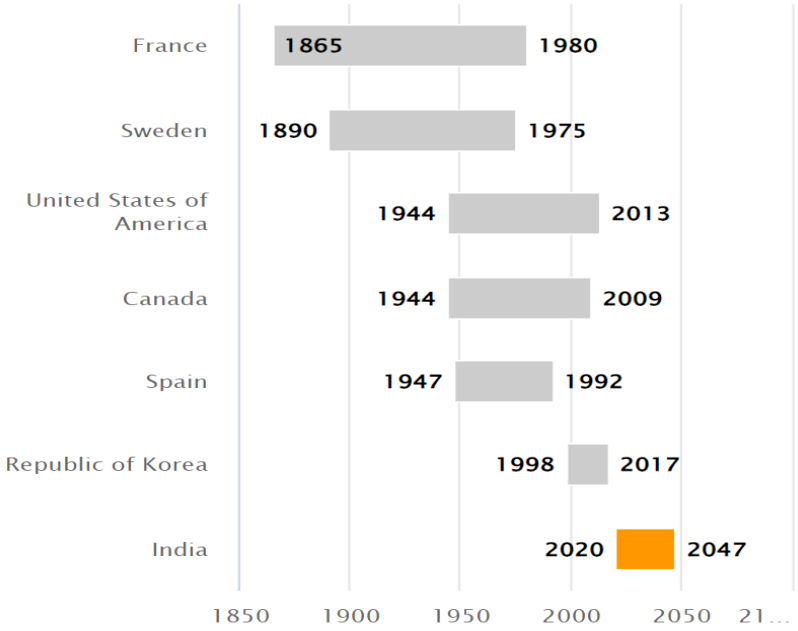


**Figure 1.2. Speed of ageing (Number of years required or expected for percentage of population aged 65 and over to rise from 7 per cent to 14 per cent) [10]**

## 2. ADR IN GERIATRICS

In the last century, medical advances have significantly extended life expectancy, which has lead to an increase in the number of elderly patients. According to estimates, there will be 70 million persons in the US over the age of 65 by 2030, making about 20% of the country's total population. [11]

More than 75% of Americans aged 60 and older took two or more prescription medicines between and 37% used five or more. While older patients take more medications overall than younger patients, it can be more difficult to dose them correctly because older patients may have altered kinetics due to deteriorating organ function and coexisting diseases, and drug-drug interactions are more common and difficult to predict. [12]

15% of elderly people experience adverse medication effects. Approximately half of the occurrences are thought to be avoidable. [13]

### 2.1 Rationale for a Relationship with Adverse Drug Reactions

Geriatricians commonly refer to GCs or "geriatric syndromes" as clinical disorders seen in older populations that do not fall into certain disease categories. GCs include delirium, falls, weakness, dizziness, syncope, and urine incontinence.[14]

GCs may enhance the risk of ADRs irrespective of established risk factors including comorbidity and polypharmacy, and ADRs may promote GCs. [15]

Indeed, changes in the distribution volume of some medications due to loss of free fat mass or difficulties with dosing and utilising pharmaceuticals due to reduced dexterity are evident risk factors for ADRs. [16]

ADRs, on the other hand, may contribute to the development of GCs; for example, various medicines are known to increase the risk of falls, which are frequently ADRs in addition to being one of the most major GCs. Because ADRs have been shown to predict functional deterioration in older hospitalised patients, ADRs and GCs are likely to be regarded components of a harmful vicious loop that should be tackled in the management of older patients. [17]

### 2.2 Mechanisms of the Link Between Geriatric Conditions and Adverse Drug Reactions

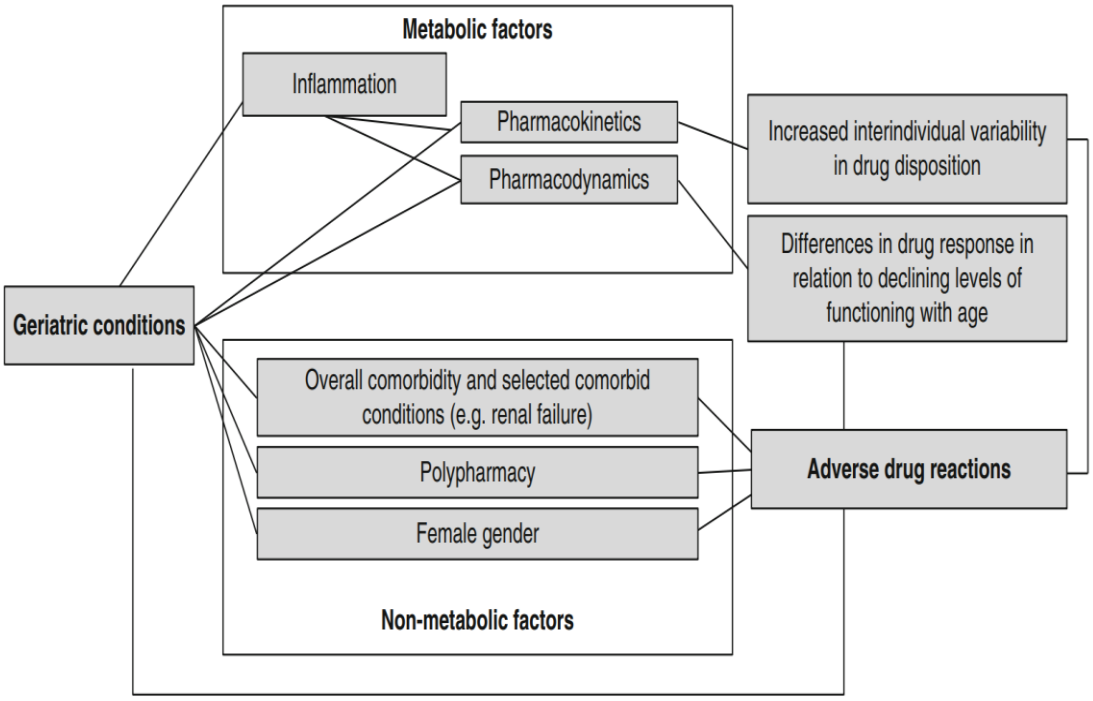


**Figure 2.1. Putative mechanisms linking geriatric conditions and adverse drug reactions. [18]**

Above figure summarises possible processes relating GCs and ADRs. Either metabolic or non-metabolic variables are likely to be implicated, however it is crucial to remember that both factors might interact with each other in determining the risk of ADRs. In terms of metabolic variables, age-related changes in pharmacokinetics and pharmacodynamics are likely involved, and new research shows that either acute or chronic inflammation may play a role in these changes. [19]

## 3. DRUG INTERACTION

Older adults with numerous disease processes requiring treatment with several drugs are more likely to have drug-drug interactions, which can result in increased or reduced drug bioavailability. [20] Drugs that are metabolised via the cytochrome P450 pathway, such as phenytoin and oestrogen, require greater dosages to have the intended effect when administered concurrently since their metabolism is accelerated. In certain circumstances, just one medication is rapidly metabolised while the other is not. Geriatric people frequently have lower stomach acid, lower intestinal blood flow, and a delayed gastric-emptying time.[21]

These changes tend to affect the pace of medication absorption but not the amount of drug absorbed. As a result, the beginning of action and peak impact of drugs may be delayed. Anti-epileptic medicines (phenytoin, carbamazepine), indomethacin, prazosin, and digoxin are among medications that are impacted by changes in the gastrointestinal system.[22]

### 3.1 Risk Factors for Drug-Drug Interactions

It is widely known that the risk of drug-drug interactions increases with age and the number of prescriptions administered. Sloan has even claimed that after a patient is prescribed eight medicines, the possibility of interaction approaches 100%. As more successful treatments for primary and secondary disease prevention are identified, the number of medications given to patients grows (for example, in ischemic heart disease). As a result, this issue will become more important in the future. [23]

### 3.2 Mechanisms Involved in Drug-Drug Interactions

The causes of harmful medication interactions vary, but inhibition of metabolism is becoming more widely accepted as an explanation for clinically relevant interactions. Protein binding interactions, which were originally considered to be significant, are now widely regarded as having minimal relevance, and in many cases, the inhibition of metabolism occurring concurrently is the key mechanism. [24]

Cytochrome P450 (CYP) is currently recognised as made up of numerous subtypes, or isozymes, and enzyme inhibition interactions with at least six of them have been observed. 1A2 CYP subtype (CYP1A2) participates in the metabolism of xanthines, the R enantiomer of warfarin, clozapine, and other drugs. tacrine. For example, CYP2C9 is implicated in theS-warfarin and phenytoin metabolism, as well as in the Amitriptyline demethylation. [25]

CYP2C19 is involved in the metabolism of diazepam and omeprazole. CYP2E1 participates in oxidative metabolism. containing alcohol, isoniazid, and paracetamol (acetaminophen). CYP2D6 plays a crucial role in the metabolism of several medicines, including codeine, haloperidol, imipramine, and nortriptyline, have been hydroxylated as well as the metabolism of paroxetine, venlafaxine, risperidone and thioridazine are two antidepressants. [26]

## 4. INFLUENCE OF DIET IN MEDICATION DISTRIBUTION

The dietary state of the patient frequently influences medication distribution. Geriatric individuals often have lower lean body mass and may have an increase in body weight, which allows some medicines, such as opiates (i.e., hydrocodone, oxycodone) and long-acting benzodiazepines (i.e., diazepam, flurazepam), to distribute more freely. Other variables that can influence medication distribution include decreased drug binding, such as to serum albumin, and decreased cardiac output. [27]

Reduced hepatic blood flow and bulk can impair medication metabolism, contributing to higher circulating drug concentrations and, perhaps, drug-drug interactions in older patients. Thyroid illness, cancer, congestive heart failure, and smoking can all have an impact on a drug's pharmacokinetic profile. The expression levels of phase I and II enzymes normally decline with age, particularly in persons over the age of 60. [28]

Renal function deteriorates with age as well, with a drop in renal blood flow and, as a result, a decrease in filtration rate. A decrease in blood flow to the kidney, like a decrease in hepatic blood flow, can result in the buildup of various medicines, such as cardiac agents like digoxin and antibiotics. Several medication categories should be taken with caution in the elderly due to impaired gastrointestinal, hepatic, and renal metabolism and elimination capability.[29]

## 5. CLINICAL STUDIES IN ELDERLY

Clinical studies frequently omit elderly individuals with impaired organ function, making it harder for physicians to identify acceptable dosages. Inclusion of older patients with comorbidities in trials, on the other hand, is a problematic challenge since this population is, by definition, very diverse and would necessitate the participation of many more participants to assess a drug's safety and efficacy. [30]

Furthermore, previous research has indicated that older patients with comorbid diseases are less likely to finish a study due to poor follow-up, impaired cognition, and greater death rates. As a result, "recruitment bias" causes healthier individuals with greater cognitive function to represent the "elderly population" in the medication development process. [31]

## 6. POLYPHARMACY

Polypharmacy develops as a result of multimorbidity, which is the presence of two or more chronic conditions. It is quite frequent in the elderly. Adverse effects are more common in individuals on multidrug treatment since they take many medicines that may interact and cause ADRs. Such side effects can be reduced by having a physician evaluate all medicines and their dosage on a frequent basis. [32]

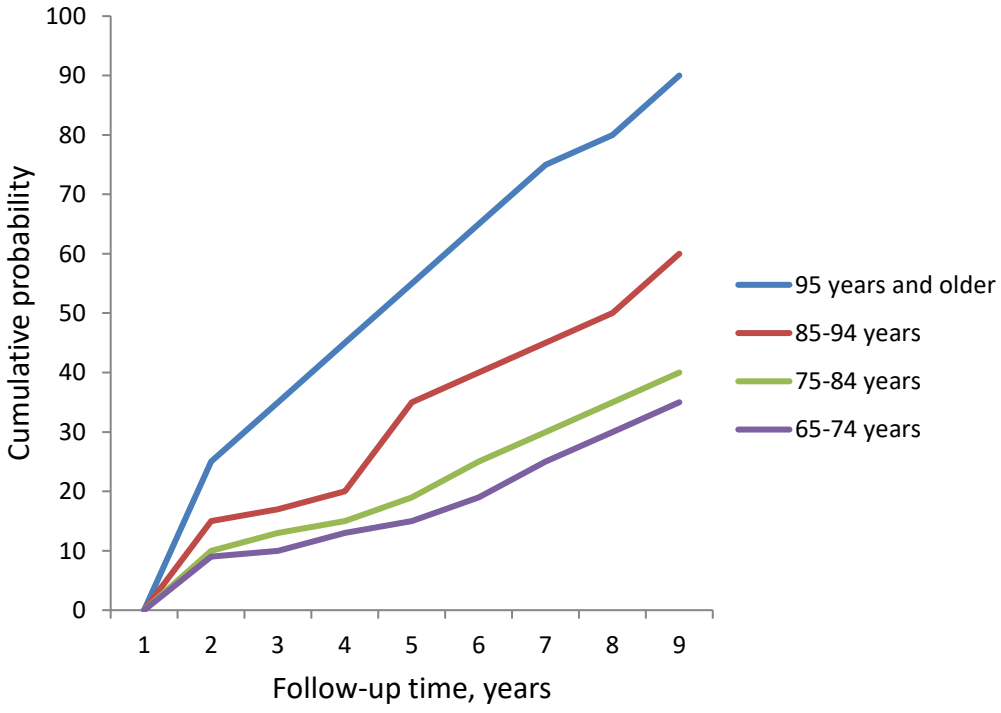


**Fig. 6.1. Polypharmacy risk in elderly**

Other things to consider include: age, self-treatment, and medication errors. As the older population grows, so does illness development, necessitating more medicine.When a multiple medication system is utilised for a single condition or may be used for several diseases, an adverse drug response occurs as a result. [33]

Alzheimer's disease, Parkinson's disease, cardiovascular illness, gastrointestinal disease, hypoglycemia, urine dysfunction, and electrolyte disturbance are the most prevalent ailments. As we all know, as the number of medications grows, so does the chance of drug interactions. [34]

Drug-drug interactions (DDIs) are changes in the effectiveness or toxicity of one medication caused by the presence of another medicine being administered at the same time. [35]

This change is largely quantitative, in that the strength of a drug's reaction is either increased or diminished. DDIs can arise as a consequence of pharmacokinetic processes, in which the transport of a drug to its site of action is changed by a second medication, or as a result of pharmacodynamic processes, in which the two medicines operate on the same or associated target, resulting in synergistic or antagonistic activity. [36]

**Table 6.1 Process to identify drug therapy problems in cases of polypharmacy [37]**

| **Perform stepwise** | Reasons/examples | Problems/risks to be found | Actions/simplify if possible |
|---|---|---|---|
| **Medication reconciliation: an accurate medication list** | -Know what patient actually takes<br>-Discover unexpected or unfilled prescriptions | -Discontinued medications<br>-Missing medications<br>-Taking incorrectly | -Stop, modify or initiate appropriate therapy<br>-Patient education |
| **Adherence assessment: Identify missed doses using tools such as Morisky, review pillbox and bottles, filldates** | -Adherence barriers<br>-complex therapy burden: 3-times-daily, 4-times daily doses, missing inhalers (cost), missing bottles, duplicate bottles | -Too many doses of medications daily unfilled or perpetuated prescriptions -Unaffordability of medications Presence of side effects | -Simplify regimen burden, use cost effective alternatives: eliminate agent(s) with adverse side effects |
| **Identify drug-drug interactions using interaction databases** | -Interactions risk: QT prolongation, -anticoagulant and bleed risk medications: NSAIDs, anticoagulants<br>-Serotonin syndrome | Monitor the risk, eliminate when risk outweighs benefit | Select non interacting agents; choose alternatives with lower risk |
| **Drug disease interaction screen** | NSAIDs in CHF, CKD, hypertension; sulfonylureas in CKD | High-risk therapy that exacerbates heart failure, hypoglycemia | Select alternate therapy; monitor for high-risk events |
| **Over treatment: accumulating therapy** | Identify duplicate or concomitant therapy result in orthostasis, hypoglycemia | Duplicates, medications with additive side effects resulting in toxicity | Adjust doses, taper therapy; monitor results |

| | | | |
|---|---|---|---|
| **Identify high risk drugs in older adults: STOPP/START** | Sedative/hypnotics, opioids, anticholinergics, benzodiazepines, anxiolytics, hypoglycemic | Monitoring of high-risk therapy isnecessary;surveyriskb eforeitbeginsto outweighbenefit | Reduceoreliminateri sk;educatepatientsab outOTCanticholiner gicavoidance |
| **Undertreated indications or missed therapy. START criteria** | Overlooked treatment: CAD without a Statin ,anti platelet agent after coronary stenting. | Incomplex regimen, sometimes an Indicated medication has fallen unnoticed | Initiate medications that decrease risk for the patient within goals of care |
| **Medication monitoring for efficacy and safety** | Insulin without glucose monitoring, TSH, warfarin: INR | Medication is fulfilling its purpose/indication; safety monitoring for each medication | Routine labs (TSH), drug levels; assess kidney, liver function |
| **Evaluate supplements multiple vitamins** | Contribute to medication burden, cost, Side effects, interactions: iron, multivitamin/trace elements | Except for recommended supplements Such as vitamin D ,many supplements are non contributive | Discuss, simplify, educate patients |

### 6.1 THE IMPACT CAUSED BY POLYPHARMACY

In general, elderly people suffer from some chronic diseases, consequently using a drug that is more complex than other groups of age [38].

This group has a condition more severe disease than younger adults, due to changes in pharmacokinetics and pharmacodynamics in the elderly may affect the metabolism of drugs and drug side effects. Often the drugs used in the elderly are often inaccurate, which would be associated with health problems, including the incidence of drug side effects, and ADRs. [39]

Drugs given to the elderly need to be assessed on all aspects of elderly patients, taking account of comorbidity, complex treatment regimens, functional and cognitive status, the goals of therapy, and quality of life. A comprehensive evaluation is needed to improve the compliance of drug use in elderly patients were included, prescribing the wrong drug without indication, an indication without drugs [40].

- Wrong prescription is related to the prescription indication that lead to a significantly increased risk of reaction/event associated with a drug that is not needed, such as incorrect medication dosage, treatment duration and method of use, as well as the clinical effects, including interactions with medicines drug or drug-disease. [41]
- Drugs without indication associated with prescription drugs that are not in accordance with the patient's clinical condition or medications used for clinical treatment, but they are used to prevent or prophylaxis against certain other diseases. [42]
- Indication without prescription relating to drugs clinical need, but not given. The impact of polypharmacy in elderly patients as shown in Figure 6.2.

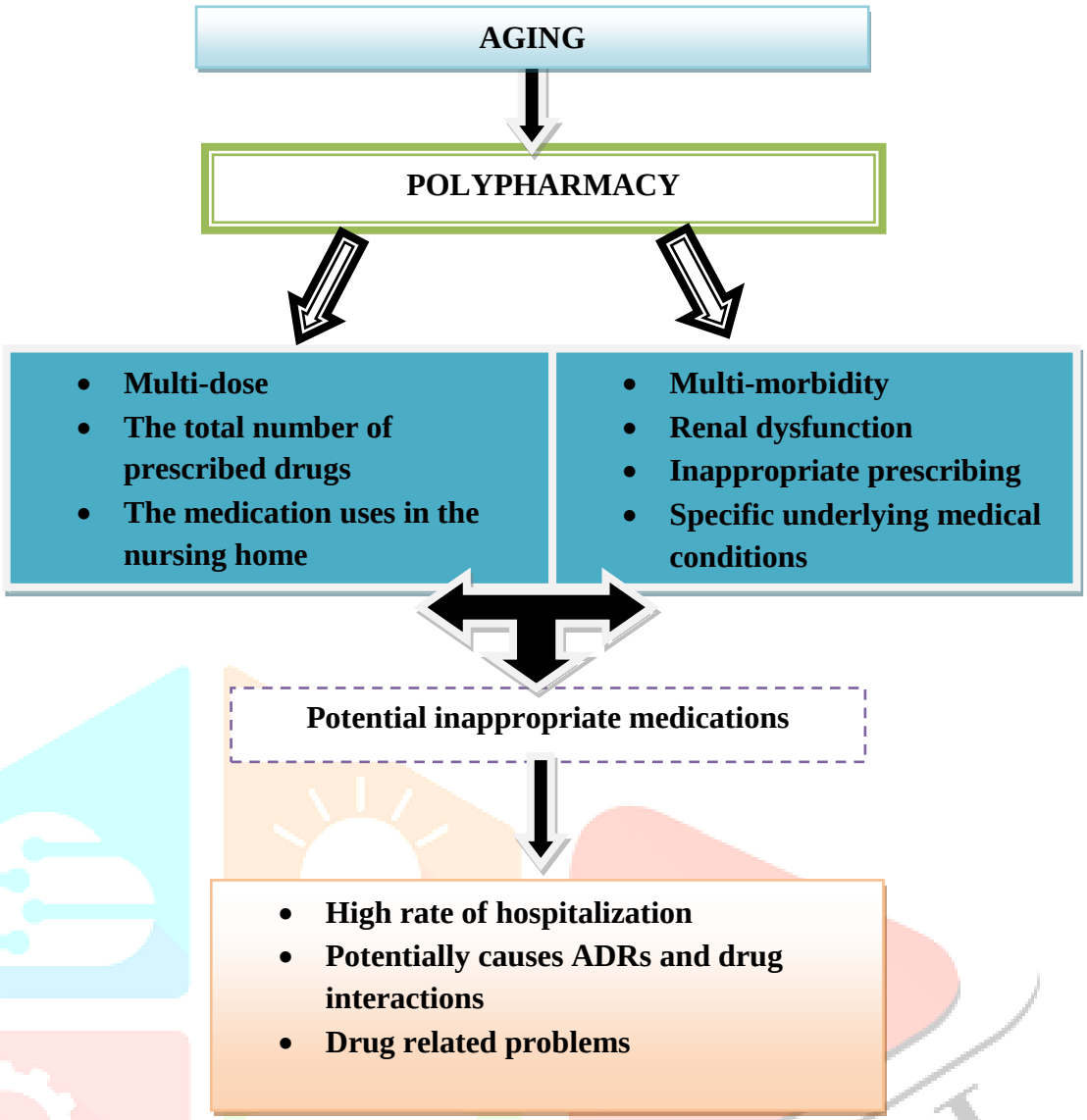


**Figure 6.2. Impact caused by polypharmacy [43]**

## 7. PHYSIOLOGICAL CHANGES IN GERIATRICS

### 7.1.Pharmacokinetic changes:

#### 7.1.1. Absorption

- Carbohydrates ,iron, calcium and thiamine reduced
- Lipid soluble drugs- not impaired by the age.
- Intestinal blood flow- reduced by up to 50% ( reduced absorption) [44]

#### 7.1.2. Distribution

- Loss of lean body mass with ageing.

  - increase ratio of fat to muscle and fat to body water, which enlarge the volume of distribution of fat soluble drugs( diazepam and lidocaine).

  - distribution of Polar drug is reduced( digoxin).

- Change in plasma proteins.

  - fall in albumin.

- rice in Gamma globulin. [45]

### 7.1.3. Hepatic metabolism

- Decrease in the hepatic clearance of some drugs.

  -Reduce metabolism of drugs ( benzodiazepine).

  It slows accumulation which further shows adverse effects ( onset from days or weeks after initiating therapy). [46]

### 7.1.4. Renal excretion

- Decline in Renal function.
- gfr is less than 50 ml per minute.
- required dose adjustment
- example of drugs that requires dose adjustment in elderly:

  - Aminoglycoside, Atenolol, Diazepam, Digoxin, NSAIDs, oral Hypoglycemic agent., Warfarin [47]

### 7.2. Pharmacodynamic changes

- Increase sensitivity to CNS.

  - example. benzodiazepine given to elderly at hypnotic dosecan produce long day time confusion even after single dose.

- increase incidence of postural Hypotension

  - example. Phenothiazine, diuretics.

- reduced clotting factor synthesis

  - reduce the dose of warfarin

- increase toxicity to NSAIDs
- increased incidence to allergic reactions to drugs. [48]

## 8. Common Examples Of Drug Interaction

Multiple drug prescription can cause drug drug interaction that may produce beneficial or adverse outcomes:

- **Synergism**
- **Summation**
- **Antagonism**

Prescribers treating older patients must consider aging physiology, functional status, cognitive issues, nutritional status, and social-support systems as well as mental, somatic, and psychological health. At some point, a regimen of multiple drugs to treat multiple diseases in an older person becomes overtly problematic. [49]

The heightened association between polypharmacy and negative clinical consequences in older patients is reportable. Polypharmacy has strong associations with increasing risk of falls, emergency care, and hospitalizations in older adults, all resulting in high health care costs. [50]

**Table 8.1 Drug Interaction and their beneficial or adverse outcomes [51]**

| |
|---|
| **(A) SYNERGISM** |
| Combination effect is greater than summation of individual drug effects. |
| Example: |
| • beneficial outcome |
| aminoglycoside +penicillin- penicillins and bactericidal through bacterial cell wall destruction which also enhances aminoglycoside transport into cell and its bactericidal effect. |
| • harmful outcome |
| barbiturates + opiates- both are CNS depressant acting on different targets but give rise to similar or an effect that are thus augmented: sedation and respiratory depression. |
| **(B) SUMMATION** |
| Combination effect is equal to summation of individual drug effect. |
| Example: |
| • beneficial outcome |
| Aspirin + acetaminophen- acetaminophen lacks anti inflammatory action but adds to the antipyretic and analgesic effect of aspirin. |
| • harmful outcome |
| macrolide + quinolones- both antibiotic group have the potential of including heart arrhythmia. |
| **(C) ANTAGONISM** |
| Combination effect is less than the submission of individual drug effect. |
| Example |
| • beneficial outcome |
| opiates + Naloxone- Naloxone as the opioid receptor blocker reverse op8 effect in acute poisoning that is respiratory depression. |
| copper + penicillamine- penicillamine mines Copper and reduces its harmful effect during copper poisoning. |
| • harmful outcome |
| warfarin + vitamin K- supplementary vitamin K disturbs the anticoagulation state maintained by the warfarin with the synthesis of vitamin K dependent anticoagulant has been inhibited. This can lead to sub-optimal or failure of anticoagulation therapy with a shortened INR. |

## 9. Management Of Polypharmacy

The first and most important step is to educate them about the dangers of taking several medicines. It is possible to do this through presentation and collaboration.

### 9.1 SIMPATHY (Stimulating innovation management of polypharmacy and adherence in the elderly)

As an example, consider a management system. SIMPATHY (Stimulating innovation management of polypharmacy and adherence in the elderly)has investigated healthcare management systems with the goal of improving polypharmacy safety while also improving patient adherence, and they have observed a positive trend in Healthcare management. [52]

#### 9.1.1 Advantage

- Improved diseased condition
- Reduced symptoms

#### 9.1.2 Disadvantage

- high risk of medication error
- more costly. [53]

#### 9.1.3 Plan to reduce ADR occurring due to polypharmacy:

- Assess drug-drug interaction
- Assess drug disease interaction
- Identification of high risk therapy
- Adjustment of elimination
- Avoiding toxicity
- Identification of other barriers. [54]

#### 9.1.2 Management Of Drug Interaction

- Changing off dose interval.
- Managing symptoms.
- Alternative medication.
- Discontinuation. [55]

## 10. Methods to improve patient medication adherence

It is important for the improvement of health condition in the older patients specially as in older patients the chronic condition is more and the medication is for a prolonged period of time. [56]

Patient compliance refers to a patient's adherence to recommended therapy and whether or not the patient returns for re-examination and follow-up treatment. [57]

### 10.1 Polypharmacy stepwardship

Polypharmacy stewardship is a novel concept that aims to promote the appropriate use of medication and minimise medication-related harm. It is a coordinate intervention designed to assess, monitor, improve, and measure the pharmacotherapeutic treatment of multimorbidity, taking into account potentially inappropriate medications, potential prescribing omissions, drug-drug and drug-disease interactions, and prescribing cascades with the aim of aligning treatment regimens with the overall conditions, prognosis, and preferences of the individual patient.[58]

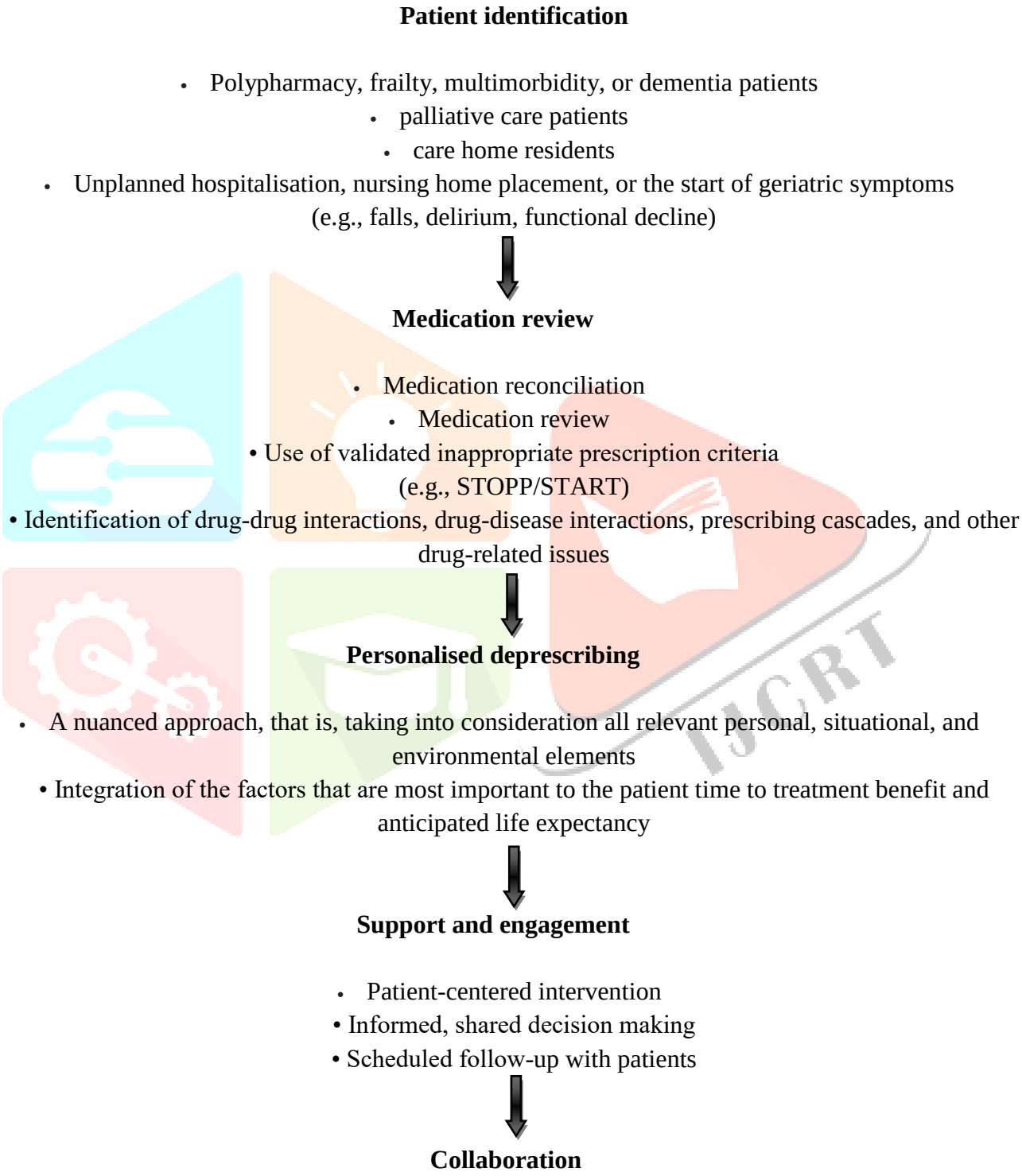


**Figure 10.1. Polypharmacy stepwardship model [59]**

**Table 10.1 Strategies to enhance patient compliance with medications [60]**

| | |
|---|---|
| • Communication | ✓ |
| • Providing proper information about the prescription. | ✓ |
| • Patient counseling | ✓ |
| • Patients feedback. | ✓ |
| • Taking proper note of side effect. | ✓ |
| • Collaboration with patient. | ✓ |
| • Affordability of medicine. | ✓ |

### 10.2 Communication between the doctor and the chemist in order to adjust the drug regimen

Several studies have noted the considerable influence of the interaction between the treating physician and the chemist in reducing the number of medications in people's prescription regimens, particularly the elderly. [61] Similar effects and side effects are addressed in these people's pharmaceutical regimens, and in certain situations, the old person is treated by numerous doctors at the same time, resulting in complex prescription regimens for the individual. [62]

The elderly can benefit greatly from a clinical chemist who specialises in mechanisms and drug interactions, as well as their effects and side effects, and, most importantly, in the pharmacokinetic and pharmacodynamic changes of drugs in the elderly more than other members of the treatment team, and this is despite the fact that it has been observed in many cases that the clinical pharmacist's opinions and interactions with the treating physician and the treatment team have redacted. [63]

### 10.3 Educating the Elderly on the Importance of Not Taking Drugs At Random

- One of the phenomena that is common among the elderly nowadays is self-prescription or self-treatment. It is a behaviour in which a person attempts to treat his or her ailment or health condition without the assistance and advice of specialists. [64]
- This occurrence is connected with a variety of dangers, including a rise in the number of pharmaceuticals ingested, which can lead to polypharmacy by interfering with an aged person's medication routine. [65]
- Aside from avoiding the developed polypharmacy, one of the other key issues that might cause problems for an aged person who regularly self-prescribes is the usage of obsolete pharmaceuticals. [66]
- The most common reasons for self-inflicted drug use in the elderly are previous drug use and recovery, the presence of a similar condition, the doctor's prescription of the same prescription, minor symptoms and no need to visit the doctor, a lack of financial ability to visit the doctor again, and ensuring that the drug is safe. [67]

- Cold discomfort and digestive difficulties are the most prevalent problems that the elderly self-medicate for, while musculoskeletal pain and headache are typical symptoms among the elderly. [68] Various studies show that more than 73% of the elderly use more than three painkillers on a daily basis. Given the prevalence of pain in the elderly, the use of non-pharmacological and alternative pain control methods (such as yoga, water therapy, music therapy, and medicinal scents, etc.) can be substituted. [69]

**10.4 Educating the Elderly on the Risks of Using Herbal Medicines**

- According to studies, older people have utilised medical plants for a variety of reasons, including believing in the better effectiveness of plants, being concerned about the potential adverse effects of chemical treatments, and assuming that medicinal plants are free of hazards and disadvantages. [70]

- It is critical to recognise the major problems created by these plants' interactions with one another and with pharmaceutical medications. Taking herbal medications at the same time might also create complications and interrupt treatment. [71]

- Although the beneficial properties of medicinal plants have been confirmed and their use has become widespread in many countries' health systems, the elderly's ignorance and mistaken beliefs that medicinal plants are healthy and harmless may result in adverse effects, so it is clear that medicinal plants, like herbal medicines, should be taken in consultation with a doctor or chemist. [72]

**10.5Application of Drug Administration Guidelines and Standards**

- The use of possibly inappropriate medications is one of the issues associated with drug use in the elderly. The names of possibly unsuitable medications for the elderly are included in many guidelines, and several drug administration regimens have been developed. There are tools available to prescribe the most appropriate medicine in the older age group, and paying attention to these instructions by medical personnel and drug prescribers can considerably minimise the consumption of these drugs. [73] As a result, these instruments must be used both during medicine prescription by the attending physician and during frequent drug regimen reviews by the nurse and treatment team. [74]

- One of these criteria, for example, is the Beers criteria, which was developed by a committee of pharmacotherapy specialists and comprises a list of pharmaceuticals that should not be used by the elderly. As a result, it is required to define continuous review of the elderly drug list as one of the nursing measures by incorporating drug screening tools for the elderly in medical centre educational programmes and familiarising treatment groups with these tools. [75]

## CONCLUSION

The elderly are obliged to utilise medicine to treat and maintain their health due to their age and physiological circumstances. In certain circumstances, due to a variety of difficulties and ailments, older people experience an increase in drug intake, which might have negative consequences. The repercussions of this medication proliferation harm the elderly first, then society and the treatment system subsequently. Due to an increase in the elderly population and the resulting need for more medication in recent years, this issue has become a high priority for health professionals and experts in order to find the best solutions for optimal drug use and solutions to deal with the plethora of available drugs.

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