



## Understanding Polypharmacy: Managing Multiple Drug Prescriptions

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### Abstract

Polypharmacy, defined as the simultaneous use of multiple medications by a single patient, is a growing concern in healthcare, particularly among older adults and those with chronic conditions. While it is often necessary for managing complex medical needs, polypharmacy poses significant challenges, including adverse drug reactions (ADRs), drug-drug interactions, medication non-adherence, and increased healthcare costs. Effective management strategies,



such as medication reconciliation, deprescribing, and patient education, can mitigate these risks. This article explores the causes, risks, and strategies for managing polypharmacy, highlighting the importance of a multidisciplinary approach to improve patient outcomes.

**Keywords**-Polypharmacy, Medication management, Drug-drug interactions, Deprescribing, Adverse drug reactions (ADRs), Multidisciplinary care

## Introduction

In modern healthcare, polypharmacy has become increasingly prevalent due to advancements in medical treatments and the growing aging population. Defined as the use of five or more medications simultaneously, polypharmacy is often necessary for managing multiple chronic conditions, such as diabetes, hypertension, and cardiovascular diseases. However, this practice also comes with substantial risks, including adverse drug reactions, drug-drug interactions, and increased complexity in medication regimens.

Older adults are particularly vulnerable to the effects of polypharmacy due to age-related changes in pharmacokinetics and pharmacodynamics, as well as the likelihood of having multiple chronic conditions. Additionally, individuals with mental health disorders and those receiving care in long-term facilities are at heightened risk.

The challenges associated with polypharmacy are not limited to clinical risks but extend to patient adherence, quality of life, and financial burden. To address these issues, healthcare providers must adopt a patient-centered, multidisciplinary approach. This includes regular medication reviews, deprescribing unnecessary medications, and educating patients about their treatment plans.

This article delves into the concept of polypharmacy, its implications for healthcare, and the strategies required for its effective management. By understanding and addressing the challenges of polypharmacy, healthcare providers can optimize therapeutic outcomes while minimizing risks for patients.

## Definition and Scope of Polypharmacy

### Definition of Polypharmacy

Polypharmacy traditionally refers to the concurrent use of multiple medications by a single patient. While there is no universally agreed-upon definition, it is often quantified as the use of **five or more medications simultaneously**. However, the term encompasses more than just a numerical count—it also reflects the **appropriateness and necessity of the medications** in relation to the patient's health needs.



Polypharmacy can be categorized as:

1. **Appropriate Polypharmacy:** When multiple medications are necessary and prescribed in alignment with clinical guidelines to address complex or coexisting medical conditions.
2. **Problematic Polypharmacy:** When medications are unnecessary, redundant, or potentially harmful due to interactions or side effects.

### Scope of Polypharmacy

Polypharmacy is a growing global concern, especially in healthcare systems with aging populations and an increasing prevalence of chronic diseases. It spans several domains:

1. **Epidemiological Scope:**
  - Polypharmacy is most prevalent among older adults, with studies showing up to **80% of elderly patients** on multiple medications.
  - It is also common in individuals with **chronic conditions**, such as diabetes, hypertension, or mental health disorders.
2. **Clinical Scope:**
  - Includes managing complex medical conditions that require multiple drugs to achieve optimal therapeutic outcomes.
  - Addresses risks such as **adverse drug reactions (ADRs)**, **drug-drug interactions**, and **medication non-adherence**.
3. **Pharmacological Scope:**
  - Examines how multiple medications interact within the body, considering factors like **altered pharmacokinetics** and **pharmacodynamics**, especially in older populations.
4. **Economic Scope:**
  - Polypharmacy contributes to increased healthcare costs due to unnecessary prescriptions, management of complications, and hospitalizations arising from medication errors or ADRs.
5. **Ethical Scope:**
  - Raises concerns about overprescribing, patient autonomy, and informed decision-making in medication use.



## Why is Polypharmacy Important?

Polypharmacy is both a **symptom of advancements** in medical science, which allows for the management of multiple conditions simultaneously, and a **challenge** that highlights the complexities of personalized medicine. Understanding its scope enables healthcare providers to strike a balance between optimizing therapeutic benefits and minimizing risks for patients.

## Causes of Polypharmacy

Polypharmacy arises from a combination of patient-specific, provider-specific, and healthcare system-related factors. These causes often overlap, contributing to the complexity of managing polypharmacy effectively. Below are the key contributors to polypharmacy:

### 1. Aging Population and Chronic Diseases

- **Multiple Chronic Conditions:** Older adults are more likely to have multiple chronic conditions, such as diabetes, hypertension, cardiovascular diseases, and arthritis, which require complex medication regimens.
- **Physiological Changes:** Aging-related changes in drug metabolism and clearance necessitate tailored therapies, often resulting in more prescriptions.

### 2. Advances in Medical Science

- **New Drug Availability:** The development of new medications and treatment options has increased the likelihood of prescribing multiple drugs for the same condition or comorbidities.
- **Prolonged Lifespans:** Improved treatments have extended lifespans, leading to longer periods of medication use and an increased chance of accumulating prescriptions.

### 3. Specialist Involvement

- **Fragmented Care:** Patients often see multiple specialists for different health issues, each of whom may prescribe medications without fully coordinating with other providers.
- **Lack of Communication:** Insufficient communication between healthcare providers can result in redundant or conflicting prescriptions.

### 4. Lack of Regular Medication Review

- **Unnecessary Continuation:** Medications prescribed for acute issues may continue to be used long after their relevance or necessity has passed.
- **Overprescribing:** Providers may not regularly reassess the need for each medication, especially in the absence of a structured medication review process.



## 5. Patient Expectations and Behaviors

- **Demand for Immediate Relief:** Patients may request medications for symptoms without considering long-term risks, leading to overprescribing.
- **Self-Medication:** Over-the-counter drugs, supplements, and alternative therapies are often used in conjunction with prescribed medications, increasing the overall medication burden.

## 6. Healthcare System Factors

- **Inadequate Access to Non-Pharmacological Options:** Limited access to lifestyle interventions, physical therapy, or counseling may lead to over-reliance on pharmacological solutions.
- **Incentives for Prescribing:** In some healthcare systems, the reimbursement structure may inadvertently encourage prescribing more medications.

## 7. Diagnostic Uncertainty

- **Trial-and-Error Prescribing:** In cases of unclear diagnoses, multiple medications may be prescribed to determine what works best, sometimes leading to polypharmacy.
- **Preventive Medications:** Overuse of preventive medications for asymptomatic conditions (e.g., statins for cardiovascular risk) can increase the total number of drugs.

## 8. Complex Treatment Guidelines

- **Condition-Specific Guidelines:** Disease-specific treatment protocols often recommend multiple medications, especially for managing chronic conditions like diabetes and heart disease.
- **Polytherapy in Guidelines:** Guidelines frequently suggest combining medications to achieve optimal control, inadvertently promoting polypharmacy.

## 9. Social and Cultural Factors

- **Caregiver Influence:** Family members or caregivers may push for more medications, believing that more treatment equates to better care.
- **Cultural Beliefs:** In some cultures, there is a preference for using medications over lifestyle changes, leading to higher prescription rates.

## 10. Patient Demographics and Health Literacy

- **Elderly Populations:** Older adults are more likely to have limited health literacy, making them reliant on providers for medication decisions.



- **Poor Understanding of Medications:** Patients may fail to question or report side effects and interactions, perpetuating unnecessary medication use.

## Summary

The causes of polypharmacy are multifaceted and require a comprehensive approach to address. Understanding these causes enables healthcare providers to proactively manage polypharmacy, focusing on medication reconciliation, patient education, and the integration of non-pharmacological treatments where appropriate.

## Risks and Challenges of Polypharmacy

Polypharmacy, while often necessary for managing complex health conditions, presents significant risks and challenges for patients and healthcare systems. These risks are particularly pronounced in vulnerable populations, such as older adults and those with multiple chronic conditions. Below are the key risks and challenges associated with polypharmacy:

### 1. Adverse Drug Reactions (ADRs)

- **Increased Likelihood of ADRs:** The risk of experiencing ADRs rises exponentially with the number of medications a patient takes. Older adults are especially vulnerable due to age-related changes in drug metabolism and excretion.
- **Severity of ADRs:** Adverse effects range from mild discomfort to life-threatening conditions, such as liver or kidney damage and gastrointestinal bleeding.

### 2. Drug-Drug Interactions

- **Harmful Interactions:** The simultaneous use of multiple drugs increases the likelihood of one drug altering the efficacy or toxicity of another.
- **Unpredictable Outcomes:** Some interactions may exacerbate symptoms or cause new health issues, complicating treatment plans.

### 3. Medication Non-Adherence

- **Complex Regimens:** Patients with numerous medications often struggle to adhere to prescribed schedules, leading to skipped doses or incorrect administration.
- **Cognitive and Physical Barriers:** Older adults or those with cognitive impairments may find it challenging to manage multiple medications, resulting in poor adherence and suboptimal therapeutic outcomes.

### 4. Functional Decline and Frailty

- **Physical Impairment:** Certain medications, especially sedatives or antipsychotics, can cause dizziness, confusion, or drowsiness, increasing the risk of falls and injuries.



- **Cognitive Decline:** Long-term polypharmacy has been linked to cognitive impairment, particularly in older adults.

## 5. Increased Healthcare Costs

- **Direct Costs:** Polypharmacy increases spending on medications, especially for patients without adequate insurance coverage.
- **Indirect Costs:** Managing complications such as ADRs, hospitalizations due to drug interactions, and emergency visits further strains healthcare resources.

## 6. Reduced Quality of Life

- **Symptom Burden:** Unnecessary medications may contribute to unpleasant side effects, reducing overall well-being.
- **Treatment Fatigue:** Managing multiple medications can overwhelm patients, negatively affecting their mental and emotional health.

## 7. Risk of Overprescribing and Overdiagnosis

- **Redundant Medications:** Without regular review, patients may continue taking drugs that are no longer needed, leading to unnecessary risks.
- **Dependency Risks:** Overprescription of medications, such as opioids or benzodiazepines, can lead to dependency or misuse.

## 8. Challenges for Healthcare Providers

- **Time Constraints:** Conducting thorough medication reviews is time-consuming, particularly in busy clinical settings.
- **Limited Interdisciplinary Communication:** Poor coordination among healthcare providers can result in conflicting prescriptions or oversight of potential interactions.

## 9. Polypharmacy in Vulnerable Populations

- **Older Adults:** Aging-related changes in drug metabolism make older adults more susceptible to the risks of polypharmacy.
- **Patients with Mental Health Conditions:** Polypharmacy is common in managing psychiatric conditions, increasing the risk of side effects and drug interactions.

## 10. Ethical and Professional Challenges

- **Balancing Benefits and Risks:** Healthcare providers face dilemmas in prescribing medications that are essential for one condition but potentially harmful in combination with others.



- **Deprescribing Resistance:** Providers may hesitate to discontinue medications due to uncertainty about potential withdrawal effects or patient reliance.

## Summary

The risks and challenges of polypharmacy highlight the importance of careful medication management, regular reviews, and a patient-centered approach. By addressing these issues through strategies such as deprescribing, patient education, and multidisciplinary care, healthcare providers can minimize the negative consequences of polypharmacy while ensuring optimal patient outcomes.

## Strategies for Managing Polypharmacy

Effectively managing polypharmacy requires a comprehensive, patient-centered approach that focuses on optimizing medication use while minimizing risks. Below are key strategies that healthcare providers, patients, and healthcare systems can adopt to address the challenges of polypharmacy:

### 1. Conduct Regular Medication Reviews

- **Comprehensive Reviews:** Schedule routine medication reviews to evaluate the necessity, safety, and efficacy of each drug in the patient's regimen.
- **Collaborative Approach:** Engage a multidisciplinary team, including physicians, pharmacists, and nurses, to assess and streamline medications.
- **Deprescribing:** Identify and discontinue medications that are unnecessary, ineffective, or potentially harmful through a structured deprescribing process.

### 2. Promote Patient-Centered Care

- **Shared Decision-Making:** Involve patients in discussions about their medications, ensuring they understand the purpose and potential side effects of each drug.
- **Tailored Regimens:** Customize treatment plans based on the patient's age, comorbidities, preferences, and lifestyle.

### 3. Enhance Communication Among Healthcare Providers

- **Interdisciplinary Collaboration:** Improve coordination between specialists, primary care providers, and pharmacists to prevent redundant or conflicting prescriptions.
- **Centralized Medical Records:** Utilize electronic health records (EHRs) to maintain an up-to-date list of all medications prescribed to a patient.



#### 4. Implement Deprescribing Protocols

- **Assess Benefit-Risk Balance:** For each medication, evaluate whether its benefits outweigh its risks in the context of the patient's overall health.
- **Stepwise Approach:** Discontinue one medication at a time to monitor the effects and avoid withdrawal symptoms or rebound conditions.

#### 5. Improve Patient Education and Engagement

- **Medication Counseling:** Provide clear instructions on how and when to take medications, as well as potential side effects and interactions.
- **Empower Patients:** Encourage patients to ask questions, report side effects, and keep a personal record of their medications.

#### 6. Utilize Technology for Medication Management

- **Medication Reconciliation Tools:** Use software to cross-check medications for potential interactions or duplications.
- **Reminders and Apps:** Implement digital tools or mobile apps to help patients track their medication schedules.

#### 7. Focus on Non-Pharmacological Interventions

- **Alternative Therapies:** When appropriate, prioritize lifestyle modifications, physical therapy, or dietary changes over pharmacological treatments.
- **Behavioral Approaches:** Use counseling or cognitive behavioral therapy to address conditions like insomnia or anxiety without medication.

#### 8. Address Specific Patient Needs

- **Geriatric Considerations:** Account for age-related changes in drug metabolism and prioritize medications with lower risks of side effects or interactions.
- **Chronic Disease Management:** Optimize therapy for comorbid conditions to reduce the overall medication burden without compromising outcomes.

#### 9. Develop System-Level Policies

- **Clinical Guidelines:** Create evidence-based protocols for prescribing in specific populations, such as older adults or those with multiple chronic conditions.
- **Pharmacist Involvement:** Integrate pharmacists into care teams to provide expertise in medication management and reconciliation.

#### 10. Monitor Outcomes and Adjust Plans



- **Track Patient Progress:** Regularly evaluate clinical outcomes, side effects, and adherence to ensure the therapeutic regimen remains effective.
- **Feedback Mechanisms:** Use patient feedback to refine treatment plans and address concerns about medications.

## Conclusion

Managing polypharmacy is a dynamic process that requires vigilance, communication, and adaptability. By combining medication reviews, patient education, interdisciplinary collaboration, and technology, healthcare providers can optimize drug therapy while minimizing the risks and challenges associated with polypharmacy. This approach ensures safer, more effective care tailored to individual patient needs.

## Benefits of Proper Polypharmacy Management

Effective management of polypharmacy offers numerous advantages for patients, healthcare providers, and healthcare systems. It helps optimize therapeutic outcomes while minimizing risks associated with the simultaneous use of multiple medications. Below are the key benefits of proper polypharmacy management:

### 1. Improved Patient Safety

- **Reduction in Adverse Drug Reactions (ADRs):** Proper management minimizes the risk of side effects, drug-drug interactions, and toxicities.
- **Prevention of Medication Errors:** Streamlining and reviewing medication regimens reduces the likelihood of dosing errors or incorrect prescriptions.

### 2. Enhanced Therapeutic Outcomes

- **Optimized Treatment:** Ensuring the right medication at the right dose improves disease control and symptom management.
- **Improved Quality of Life:** By addressing medication-related side effects and unnecessary drugs, patients experience fewer complications and better overall health.

### 3. Increased Medication Adherence

- **Simplified Regimens:** Reducing the number of medications or dosing frequency makes it easier for patients to adhere to prescribed treatments.
- **Patient Understanding:** Education about medication use fosters better compliance and trust in the healthcare process.



#### 4. Financial Benefits

- **Reduced Healthcare Costs:** Eliminating unnecessary medications decreases direct expenses for patients and healthcare systems.
- **Lower Risk of Hospitalizations:** Proper management prevents complications like ADRs, which can lead to costly emergency visits or prolonged hospital stays.

#### 5. Better Management of Chronic Conditions

- **Comprehensive Care:** Proper polypharmacy management ensures all chronic conditions are treated effectively without overburdening the patient.
- **Personalized Medicine:** Tailored approaches consider individual patient needs, improving the outcomes of long-term therapies.

#### 6. Improved Communication and Collaboration

- **Stronger Patient-Provider Relationship:** Engaging patients in medication decisions fosters trust and open communication.
- **Interdisciplinary Coordination:** Healthcare teams work together more effectively, ensuring all providers are aligned on the patient's treatment plan.

#### 7. Reduced Risk of Functional and Cognitive Decline

- **Minimized Side Effects:** Avoiding unnecessary sedatives or other high-risk drugs helps maintain cognitive function and physical mobility, particularly in older adults.
- **Focus on Holistic Health:** Proper management addresses both pharmacological and non-pharmacological aspects of care, promoting overall well-being.

#### 8. Support for Deprescribing Initiatives

- **Safe Medication Discontinuation:** Gradually stopping unnecessary drugs reduces dependency and side effects while maintaining therapeutic benefits.
- **Preventive Care:** Proactive management prevents the escalation of medication use, keeping regimens streamlined and effective.

#### 9. Enhanced Patient Autonomy

- **Empowered Decision-Making:** Patients involved in their treatment plans are more likely to make informed choices about their medications.
- **Increased Confidence:** Understanding the purpose of each medication builds patient confidence in their care and fosters proactive health behaviors.



## 10. Long-Term Health Benefits

- **Prevention of Complications:** Effective management reduces risks of long-term complications like kidney damage or cardiovascular events caused by inappropriate drug use.
- **Longevity and Well-Being:** Balanced medication regimens contribute to healthier aging and improved life expectancy.

### Summary

Proper polypharmacy management delivers substantial benefits by improving safety, enhancing therapeutic outcomes, and reducing unnecessary healthcare costs. It promotes a patient-centered approach to care that supports adherence, fosters communication, and ensures long-term health and well-being. By addressing the challenges of polypharmacy proactively, healthcare providers can deliver more effective, efficient, and holistic care.

### The Role of Healthcare Providers in Addressing Polypharmacy

Healthcare providers play a pivotal role in managing polypharmacy to ensure patient safety, improve therapeutic outcomes, and enhance quality of life. Their responsibilities span across prescribing, monitoring, educating, and coordinating care to address the complexities associated with multiple medication regimens.

#### 1. Physicians: Key Decision-Makers in Prescribing

- **Rational Prescribing:** Physicians are responsible for prescribing medications judiciously, ensuring that each drug is necessary and appropriate for the patient's condition.
- **Regular Medication Reviews:** Conducting periodic reviews to assess the continued need for each medication and adjusting treatment plans as needed.
- **Deprescribing:** Identifying and discontinuing unnecessary or potentially harmful medications to streamline therapy and reduce the medication burden.

#### 2. Pharmacists: Medication Experts

- **Medication Reconciliation:** Ensuring accurate and up-to-date medication lists, particularly during transitions of care (e.g., hospital discharge or admission).
- **Identifying Interactions:** Detecting potential drug-drug and drug-food interactions that may compromise safety or efficacy.
- **Patient Education:** Explaining how to take medications correctly, the importance of adherence, and potential side effects to enhance patient understanding and compliance.



### 3. Nurses: Bridging Care and Monitoring

- **Medication Administration:** Safely administering prescribed medications and observing for adverse drug reactions (ADRs) or side effects.
- **Patient Monitoring:** Identifying early signs of complications or drug-related issues and reporting them to physicians or pharmacists.
- **Health Education:** Providing patients with clear instructions and ongoing support to manage their medication regimens effectively.

### 4. Allied Health Professionals

- **Physiotherapists and Dietitians:** Offering non-pharmacological interventions that may reduce the need for certain medications (e.g., exercise for pain management or diet modifications for chronic diseases).
- **Social Workers:** Addressing socioeconomic barriers that may influence medication adherence, such as financial constraints or access to care.

### 5. Multidisciplinary Teams: Collaborative Care

- **Holistic Approach:** Coordinating care among physicians, pharmacists, nurses, and allied health professionals to create a unified treatment plan.
- **Shared Decision-Making:** Involving the patient and caregivers in decisions about medications to ensure the regimen aligns with the patient's goals and preferences.
- **Use of Technology:** Implementing electronic health records (EHRs) and decision-support tools to monitor polypharmacy and flag potential risks.

### 6. Educators and Researchers

- **Training Programs:** Incorporating polypharmacy management strategies into medical and nursing education to prepare future providers.
- **Research Initiatives:** Conducting studies on drug safety, interactions, and the efficacy of deprescribing protocols to enhance evidence-based practices.

### 7. Advocates for Patient-Centered Care

- **Addressing Vulnerable Populations:** Paying special attention to older adults, patients with chronic conditions, and those at higher risk of ADRs or drug interactions.
- **Empowering Patients:** Encouraging patients to ask questions, voice concerns, and participate actively in managing their health.
- **Cultural Competence:** Adapting medication management strategies to meet the unique needs and preferences of diverse populations.



## Conclusion

Polypharmacy, while often necessary to manage complex medical conditions, poses significant challenges related to patient safety, adherence, and healthcare costs. Addressing polypharmacy requires a coordinated and patient-centered approach involving physicians, pharmacists, nurses, and allied health professionals. Effective strategies such as regular medication reviews, deprescribing, patient education, and leveraging technology can optimize medication use while minimizing risks. Collaborative efforts among healthcare providers and patients ensure a balanced approach to treatment, enhancing therapeutic outcomes and quality of life. As healthcare systems evolve, embracing evidence-based practices and fostering interdisciplinary collaboration will be pivotal in addressing the complexities of polypharmacy and improving overall patient care.

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