

# Issues and challenges of polypharmacy in the elderly: A review of contemporary Indian literature

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## ABSTRACT

The aging population is of growing concern all across the globe as well as in India. Polypharmacy has been defined as the simultaneous use of multiple medications by an individual and the clinical suitability of such use. Polypharmacy is found more frequently in the geriatric population. Researches in India have also reiterated the fact. Polypharmacy in the geriatric population leads to many negative consequences such as increased adverse drug reactions, falls, frailty, and even increased mortality. Moreover, it leads to increased out-of-pocket expenditure. Polypharmacy also poses risk of poor treatment adherence and missed dose in the geriatric population. Mitigation measures in this regard may include increased awareness among physicians, improved medication management and adherence, efforts to reduce self-medication, and improper crosspathy.

**Keywords:** Elderly, polypharmacy, issues and challenges

## Introduction

Polypharmacy is referred to as taking several medications, usually five or more per day and/or administration of more medicines than that are clinically reasonable, indicating needless or unwanted drug use.<sup>[1]</sup> Although polypharmacy is practiced quite often, there is a lack of consensus in the definition for polypharmacy. It is also not known as to the concurrent use of how many medications are considered as polypharmacy. Different thresholds have been used to assess polypharmacy. The definition is solely based on the count of medications irrespective of clinical indications and conditions suffered by the patient.<sup>[2]</sup>

The aging population is a growing concern. In India, the number of elderly population is growing very fast; from 5.6% in

1961 to 12.4% of the population by the year 2026 as estimated. In the last century, India has observed substantial growth in life expectancy. From an average life expectancy of 32 years in the 1930s, the figure has stepped to nearly 67 years in present times competing with the global average life expectancy of 75 years. India expects to reach this figure of 75 years in 2025. Furthermore, the United Nations projections indicate that the elderly Indian population will rise from 7.2% estimated in 2005 to 21.2% of the total population by the year 2055. Besides, being one of the significant achievements of the Indian healthcare system, it also poses a major public health issue, as with the increase in the aging population, drug-related problems have also increased.<sup>[3]</sup> In India, an estimated 50% of elderly people suffer from at least one chronic disease that requires medications lifelong.<sup>[4]</sup> In 1999, the Government of India implemented the “National Policy on Older Persons” in this policy “elderly” or “senior citizen” is well defined as a person who is of the age of 60 years or above. According to the census of 2011, the elderly population represented 8.6% of the total population.

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As per the Population Census of India of 2011, there are nearly 104 million elderly people in India, which is expected to grow to 173 million by 2026. With such a dynamically growing elderly population, concerns regarding polypharmacy and its effect on this geriatric population step up.<sup>[5]</sup>

Various studies globally have shown that elderly people consume on average two to nine medications per day. Apart from a higher incidence of chronic diseases, the elderly population is at risk of multimorbidities. To treat several parallel diseases, elderly patients often use several medications, making this age group the largest consumer of medications. The prevalence of inappropriate medication used by aging people was found to be from 11.5% to 62.5%.<sup>[6]</sup>

Geriatric polypharmacy has been a cause of significant concern. With the higher number of medicine intake, elderly people are at the same time at a greater risk of encountering adverse drug reactions (ADRs).<sup>[6]</sup> The use of multiple medications potentiates drug-drug interactions. Encountering ADRs also leads to prescribing cascade inviting more side effects, contributing to a greater pill burden.

### Causes of polypharmacy in geriatric population

Among many causes of polypharmacy in the geriatric population. A few are enlisted below:

- Patients self-medicating with over-the-counter medications without awareness and clear understanding of the adverse reactions and interactive effects pertaining to these medications.
- Increased comorbidities in this population invite increased medications
- Availability of newer medications and curiosity toward it
- One patient often consults multiple physicians and continues with each prescription, without proper therapeutic reconciliation.
- Crosspathy: Availability of crosspathy: Ayurveda, herbal medicines. Often concomitant use of such medication causes polypharmacy.

### Burden of polypharmacy in geriatric population: Excerpts from various Indian studies

The data in Table 1 shows the burden of polypharmacy in the geriatric population as found in a few selected studies in India.

Most of the studies have taken the use of more than five medicines as polypharmacy. Thus, this review takes into account the use of five or more medications as the base for defining polypharmacy. There was a considerable amount of difference in the prevalence rates depending on the type of study; institution-based study or community-based study. The study done by Pandey and Saharan shows that the prevalence of polypharmacy is 4.2% among the elderly in India.<sup>[15]</sup> Hospital-based studies have shown greater prevalence, whereas community-based studies have shown as expected lower prevalence compared with the hospital-based studies.

**Table 1: Burden of polypharmacy in the geriatric population as studied by different researchers in India**

Study done by	Burden (%)
Srikanth and Sireesha, 2012 <sup>[7]</sup>	40.77
Shalini and Joshi, 2012 <sup>[8]</sup>	25.20
Kanagasanthosh <i>et al.</i> , 2015 <sup>[9]</sup>	16.5
Khandeparkar and Rataboli, 2017 <sup>[10]</sup>	13.85
Priya <i>et al.</i> , 2018 <sup>[11]</sup>	33.7
Rajeev <i>et al.</i> , 2018 <sup>[12]</sup>	22.9
Agrawal and Nagpure, 2018 <sup>[13]</sup>	26
Tamilselvan <i>et al.</i> , 2018 <sup>[14]</sup>	43

### Consequences of polypharmacy

Till date, many narratives about polypharmacy and its consequences have been published. In general, polypharmacy has been associated with a variety of undesirable outcomes, including frailty, falls, and mortality. Various health outcomes and even their association with polypharmacy have been the topic of choice of various researchers.

Concomitant intake of multiple drugs often causes increased adverse drug events. In the aging population, with multiple medications and chances of altered sensorium, the risk of falls and fractures increases up. Studies have also reported that this association has been often dose-dependent. Polypharmacy in the geriatric population increases the risk of renal injury. Various population-based studies have been conducted to test these hypotheses. Moreover, this leads to increased out-of-pocket expenditure.<sup>[6,7,10]</sup>

### Possible mitigation measures

#### Increased awareness among physician

Healthcare professionals can help in raising awareness among their peers regarding the role of medication review in shrinking the harm associated with inappropriate polypharmacy practices. Measures such as introducing mandatory training on safe medication management practices through prudent changes in medical curricula along with proper knowledge of human factors ruling polypharmacy can be further beneficial in terms of patient communications and also aid in shared decision-making.

One of the main causes of polypharmacy is inappropriate prescribing which includes overprescribing, misprescribing, and underprescribing. Multiple tools have been proposed for identifying inappropriate polypharmacy which includes the screening tool of older person's prescriptions (STOPP) and the screening tool to alert doctors to the right treatment (START).

#### Improved medication management and adherence

In polypharmacy, it is imperative to find strategies to improve medication adherence and develop strategies to ensure that the right medicine is taken at the right time. Various medication compliance devices, also known as pill dispensers, have hit the

market and are proving much beneficial to elderly people. They are much user-friendly. Patient-centered measures such as mobile applications, labels with pictograms, and reminders are now being explored as potential strategies.

#### **Efforts to reduce self-medication**

Self-medication embraces the unsupervised use of medications including nonprescription drugs, traditional products, herbal remedies, and food supplements. Studies have shown that the prevalence of self-medication among the elderly has been high. The causes of self-medication in this population has been multifactorial. High treatment cost and deficient insurance coverage, have left many elderly, who cannot have enough money to pay physician's fees, choose self-medication. Other causes include avoiding work-time loss, long waiting time preconsultation, prior disease experience, underestimating disease, prior experience about the drug, and certainty of its safety. Increased awareness regarding medications through proper educational interventions can thus better empower patients and minimize perils of self-medication. Patients must know about the hazards of self-medications and treating physicians are at the center stage who can provide this support. Sparing a little time to understand patients' psyche toward self-medications, can mitigate the situation to a great extent.

#### **Efforts to reduce crosspathy**

Indian medicine systems comprising Ayurveda, Yoga, Unani, and Siddha were practiced way before today's modern healthcare system evolved.<sup>[16]</sup> India, in having a pluralistic medical culture, invites increased propensity of drug interactions when self-medication goes wrong. Crosspathy is a practice in which homeopathic, ayurvedic, siddha, or unani drugs are prescribed along with allopathic medications. A modern medicine physician should be made aware of the medicines from other systems that is a must a patient is consuming concomitantly. Thus, proper history taking of self-medication in elderly for ensuring safer prescribing. Appropriate polypharmacy measures should be undertaken at all transition of care points, from the point of therapy initiation, during medication review to transition of care.

#### **Geriatric polypharmacy and role of primary care physicians**

Geriatric polypharmacy is a very important consideration for primary care physicians. For the majority of geriatric patients, primary care physicians remain as the first and only point of medical care. Geriatric persons with multiple comorbidities often find difficulty in doing multiple specialist consultations and neither is it recommended. When a prescription is made for an elderly person the polypharmacy issue must be taken care of. Reducing the number of medications, using approved combination drugs, taking care of adherence of the prescribed medications is very important for a primary care physician. If a polypharmacy prescription is inevitable primary care physician

should elaborately discuss with the elderly person and his/her caregiver the possible side effects.

### **Conclusion**

With the increased burden of polypharmacy in the geriatric population, there arises a global concern given the risk of a wide range of adverse health outcomes. Due to multiple ailments in elderly, prescribing more than one drug is often necessitated. However, at the same time a physician should exercise increased caution keeping in mind the possibility of adverse drug interactions resulting in toxicity, treatment failure, or loss of drug effect. Thus, periodic monitoring and evaluation of patients' drug regimen is needed with proper therapeutic reconciliation. A significant proportion of hospitalized geriatric patients are exposed to polypharmacy. Further researches are required to identify the risk of adverse drug effects following multiple drug administration due to drug-drug interactions. Proper understanding of the crosspathy effect on polypharmacy also needs to be studied.

### **Recommendations**

Optimal medication use and good communication among elderly patients and health providers are warranted. Moreover, accessible interventions to decrease polypharmacy by deprescribing or other interventions are needed to decrease the increasing trend of polypharmacy in the geriatric population. Self-medication and unsupervised crosspathy should also be discouraged.

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#### **Conflicts of interest**

There are no conflicts of interest.

### **References**

1. Kumar KN, Holyachi S, Reddy K, Nayak P, Byahatti N. Prevalence of polypharmacy and potentially inappropriate medication use among elderly people in the rural field practice area of a medical college in Karnataka. *Int J Med Sci Public Health* 2015;4:1071-5.
2. Grover S. Polypharmacy among elderly: Need for awareness and caution. *J GeriatrMent Health* 2017;4:1.
3. Mandavi, D'Cruz S, Sachdev A, Tiwari P. Adverse drug reactions and their risk factors among Indian ambulatory elderly patients. *Indian J Med Res* 2012;136:404-10.
4. Dhanapal CK. Prevalence of polypharmacy in geriatric patients in rural teaching hospital. *Am J Phytomed Clin Ther* 2014;2:413-9.
5. Salwe KJ, Kalyansundaram D, Bahurupi Y. A study on polypharmacy and potential drug-drug interactions among elderly patients admitted in department of medicine of a tertiary care hospital in Puducherry. *J Clin Diagn Res* 2016;10:FC06-10.
6. Dagli RJ, Sharma A. Polypharmacy: A global risk factor for elderly people. *J Int Oral Health* 2014;6:i-ii.

7. Srikanth BA, Sireesha G. Assessment on the prevalence of polypharmacy in urban population. *Congestive Heart Fail* 2012;3:2-91.
8. Shalini MD, Joshi MC. Study of polypharmacy and associated problems among elderly patients. *Internet J Med Update* 2012;7:35-9.
9. Kanagasanthosh K, Topno I, Aravindkumar B. Prevalence of potentially inappropriate medication use and drug utilization pattern in elderly patients: A prospective study from a tertiary care hospital. *Int J Res Med Sci* 2017;3:2062-72.
10. Khandeparkar A, Rataboli PV. A study of harmful drug-drug interactions due to polypharmacy in hospitalized patients in Goa Medical College. *Perspect Clin Res* 2017;8:180.
11. Priya S, Gupta NL, Chauhan HS. Polypharmacy - Prevalence and risk factors among elderly patients in government medical college, Tanda, Distt Kangra (HP). Available from: [https://gmch.gov.in/community%20medicine/IPHA\\_Vol%203\\_No9.pdf](https://gmch.gov.in/community%20medicine/IPHA_Vol%203_No9.pdf). [Last accessed on 2019 Jun 13].
12. Rajeev A, Paul G, George S, Vijayakumar P. The study on use of potentially inappropriate medications in elderly patients presenting to a tertiary care hospital in Kerala. *Int J Sci Res* 2018;7:3542-4.
13. Agrawal RK, Nagpure S. A study on polypharmacy and drug interactions among elderly hypertensive patients admitted in a tertiary care hospital. *Int J Health Allied Sci* 2018;7:222.
14. Tamilselvan T, Kumutha T, Priyanka MK, Reeba Bose S, Shabana S, Sindhuja M. Incidence of polypharmacy and drug related problems among geriatric patients in a multispecialty hospital. *Int J Res Dev Pharm L Sci* 2018;7:3055-9.
15. Pandey M, Saharan V. Prevalence and risk factors of polypharmacy among elderly in Mumbai. *World J Pharm Pharm Sci* 2017;6:902-7.
16. Ravishankar B, Shukla VJ. Indian systems of medicine: A brief profile. *Afr J Tradit Complement Altern Med* 2007;4:319-37.