# A study on prevalence of Polypharmacy and Pharmacoeconomics among geriatric patients in a tertiary hospital - Bangalore-A cross sectional study.

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## Abstract

**Background:** The concurrent use of several drugs is known as polypharmacy. The regular use of five or more medications is sometimes used to characterize polypharmacy, while there is no accepted definition. Multiple pharmaceutical prescriptions are frequently required to address different symptoms and diseases as people age and develop chronic conditions. Polypharmacy may have a detrimental impact on a patient's health care expenses as well as increase their risk of medication-related problems such non-adherence, therapeutic duplication, adverse drug events, needless drug exposure, and drug interactions.

**Aim:** To study the prevalence of polypharmacy and its associated factors among geriatric patients and to recognise the pharmacoeconomic implications of medicines utilized among geriatric patients.

**Methodology:** A cross-sectional study conducted at Vydehi hospital, Whitefield, Bengaluru from August 2024 to November 2024. Data was collected using a semi structured pretested questionnaire.

**Results:** Around 80 subjects were involved in the study, out of which 53.8% belonged to urban population and 46.2% belonged to rural population. Nearly half (47.5%) of patients present with co-morbidities, resulting in a higher medication burden.

**Conclusion:** The prevalence of polypharmacy is high among the elderly people and is associated with demographic factors such as male gender, being in the age group of 60-70 years, having comorbidity, being retired, having a history of surgeries or hospitalization.

**Key words:** Polypharmacy, Elderly, Medication, Diseases, Risk.

## Introduction

Polypharmacy refers to the concurrent use of multiple medications, commonly defined as the regular use of five or more drugs. This includes prescription, over the counter, traditional, and complementary medicines. The term highlights both the quantitative burden of prescribing and the inherent complexity of managing multiple therapies. As individuals age and develop chronic conditions, multiple prescriptions often become necessary; however, polypharmacy can increase healthcare costs and heighten risks such as non-adherence, therapeutic duplication, adverse drug events, unnecessary drug exposure, and harmful interactions[1].

This study aims to examine the prevalence of polypharmacy and its association with comorbidities among patients over 60 years of age at a tertiary healthcare centre in Bangalore. By situating our research within Bangalore's healthcare system, we seek to contribute to the growing body of evidence on polypharmacy and its impact on patient outcomes.

Pharmacoeconomics, a key branch of health economics, evaluates the financial implications of pharmaceutical interventions, including cost-effectiveness, prescribing patterns, and resource utilization. Our study will assess the economic impact of polypharmacy by analyzing prescription costs, healthcare utilization, and potential savings from more efficient medication use.

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In India, where 70% of healthcare expenses are paid out of pocket and medications account for the majority of these costs, the issue is particularly pressing. Families with elderly members spend nearly four times more on healthcare than those without, with elderly households contributing the highest share of healthcare expenditure (13%). Understanding how polypharmacy influences these costs—through prescription trends and healthcare consumption[2].

Ultimately, this study seeks to highlight the prevalence and adverse consequences of polypharmacy, while identifying opportunities for cost reduction through interventions that minimize inappropriate prescribing in Bangalore's urban healthcare context.

## Objectives

1. To Study the prevalence of polypharmacy and its associated factors among geriatric patients.
2. To identify the pharmacoeconomic implications of medicines utilized among geriatric patients.

## Materials and methods

This is a cross-sectional study conducted at Vydehi hospital, Whitefield, Bengaluru for a duration of 4 months from August 2024 to November 2024. The study population included patients of age above 60 years visiting Vydehi Hospital. The patients were selected based on inclusion and exclusion criteria, the inclusion criteria for the study was all patients above 60 years of age & patients who gives consent, and the exclusion criteria was patients who are not giving consent and critical patients.

The sample size is 80, Calculated using formula

$n = z^2\ 1\text{-}\alpha/2\ p(1-p) / d^2$

$n = 1.96\text{^}2*0.7393(1\text{-}0.7393)/(0.1)^2 = 74$

where, $Z_{1-\alpha/2}$ = 1.96, standard normal score at 95% level of confidence, P = Proportion (The prevalence of polypharmacy was 73.93%) (from related article), d = 10% margin of error d (Absolute Precision), the minimum sample size is 74. The approximate sample size is 80.

A Pretested Semi-structured questionnaire was used to collect the data to fulfil study objectives.After obtaining ethical clearance from Vydehi Institutional Ethics Committee to conduct a study, A written consent was obtained from the patients for their voluntary participation. Geriatric patients were included in the study. This study will included 80 patients of geriatric age group.

The data was entered in MS-Excel and analysed using SPSS version 23. The results was expressed in tables and graphs and percentages.

## Results

A total 80 patients who participated in the study, the below graph gives the data in which the comparison of SES which represents that majority belongs to Class II, III and V. 53.8% of patients belongs to urban area whereas 46.2% of patients are from rural area.

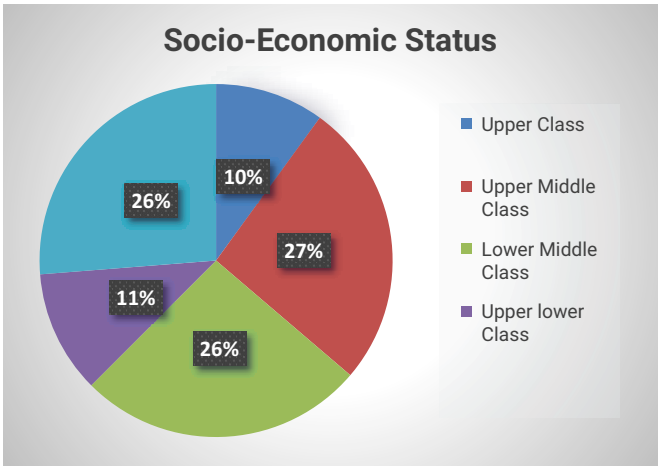


**Figure 1: Distribution of Study Subjects based on their socioeconomic Status.**

In our study, about 60% of patients had polypharmacy whereas 40% of people did not have polypharmacy. Most of the subjects were consuming more than 5 medications. Among them,About 68.9% in the study were consuming multiple medications for 1-5 years of their life whereas few people about 16.3% were consuming multiple medications for more than 15 years of their life

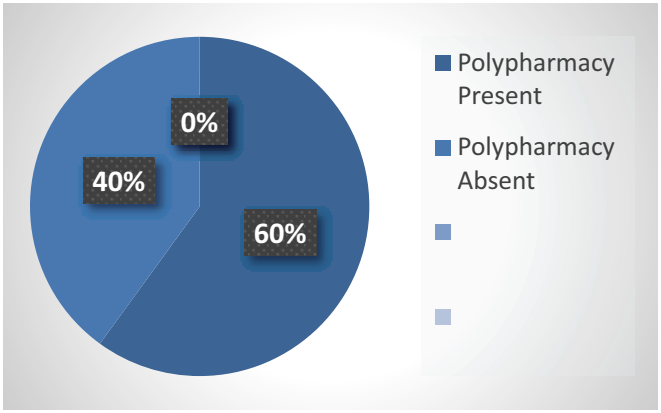


**Figure 2: Prevalence of polypharmacy among study subjects**

Most common side effects seen among the study subjects were tiredness, sleepiness, fatigue, constipation, diarrhea, incontinence, confusion, dizziness, anxiety, hallucinations and skin rashes.

In the study population, 82.5% patients were adherent to their prescribed medications whereas 17.5% patients did not adhere to their medications. Not adhering to

prescribed medications had severe consequences, including disease progression, worsening symptoms, reduced treatment efficacy, and increased risk of complications, hospitalization, and emergency room visits.

**Table 1: Distribution of Study Subjects based on the associated Medications.**

| Medications | Total no of patients consuming medications |
|---|---|
| Antihypertensives | 60 |
| Antidiabetics | 36 |
| Antibiotics | 14 |
| Anti hyperlipidaemia | 10 |
| Hypothyroidism | 8 |
| Vitamin B12 deficiency | 16 |
| Analgesics | 20 |
| Pantoprazole | 27 |
| Asthma | 8 |
| Diuretics | 8 |
| Calcium + Vit D3 deficiency | 12 |
| Hyperthyroidism | 4 |
| Antiplatelets | 10 |
| Ascorbic Acid | 3 |
| Antidepressants | 1 |
| Steroids | 5 |
| Antihistamines | 1 |
| Folic Acid | 1 |
| BPH | 2 |
| Laxatives | 1 |
| Zinc supplements | 1 |

Nearly half (47.5%) of patients who presented with co-morbidities, had a higher medication burden. Conversely, 42.5% of patients did not have any co-morbidities, indicating a relatively simpler treatment regimen. A minority of patients (30%) had taken initiative to adopt healthy lifestyle practices like yoga, medication, dietary changes, exercise, appropriate sleep, reduced stress and many more, alleviating medication-related adverse effects. However, the majority (70%) had not implemented any lifestyle changes.

Only 41.3% of patients had their treatment covered by insurance, leaving a significant 58.7% without insurance coverage. Among those with insurance, nearly a quarter (23.8%) rely on government-funded programs, while 17.5% have private insurance. This highlights a substantial gap in healthcare financing, with more than half of patients shouldering the financial burden of treatment without insurance support.

Maximum patients were spending an approx. of 2000 monthly for their medication need. 37.5% of patients had difficulty in affording their medications whereas 57.5% patients did not have difficulty in affording medication.

About 41.3% had enough knowledge about the indications and proper use of the medications prescribed. About 27.5% believed that more medicines mean more effective treatment whereas 72.5% patients did not. About 50% of patients found medications to be effective therapeutically, while 6.3% did not and 43.8% of patients were not sure of the effectiveness.

**Discussion**

In our study, the prevalence of polypharmacy among the geriatric population was found to be 60%, which, although high, is lower than the rates reported in similar studies across the country. Jhaveri et al. reported an exceptionally high prevalence of polypharmacy at 95%, while Kumar et al. observed a slightly higher prevalence of 73.93%[1,2]. The number of drugs prescribed are found to be lower in our study. 67% of the people are prescribed five drugs or more than five drugs[1,2].

The socio-economic status, age distribution of patients are comparable with that of the previous studies[3,4]. 53.8% of the patients were from urban backgrounds which is lower compared to the other studies[4].

Our study noted that multiple drug prescriptions were more common in the age group of 76-80 years (86.3%) followed by prevalence in the age group of 71-75 years (78.8%).The study by Singh et al also suggests the high prevalence of polypharmacy in the age group of 76-80 years particularly[5].The use of parenteral medicines is low (23.7%) as seen in other studies. We found that combination drugs were prescribed in 60% of the patients which are in line with the findings of the previous study[6].

Our study reports a much lower presence of comorbidities among the patients as compared to the other studies. This reflects an increase in polypharmacy not aligning to the trend in comorbidity prevalence and indicates a relatively simpler regimen.

The most commonly prescribed drugs are antihypertensives followed by antidiabetics, pantoprazole, vitamin supplements, analgesics, antibiotics and drugs for hyperlipidemia and antiplatelets. The observed drug pattern is a bit different from that suggested in the previous literature[7]. This suggests higher prevalence of hypertension

as compared to diabetes, hypothyroidism and other comorbidities. Micronutrient deficiencies are another major contributing cause. The lowered prescription of antibiotics suggests a more rational approach in prescribing antibiotics[8].

Our study found that most patients spent approximately ₹2000 per month on medications, a figure higher than reported in previous studies. This increase could be attributed to the rising cost of drugs, limited access to government schemes, and the prescription of newer, more effective medications[9].. Additionally, a majority of patients' expenses were not covered under government schemes or insurance policies. Only 41.3% of patients utilized existing insurance schemes, leaving the remaining patients to bear the financial burden directly. Approximately 57.5% of patients required hospitalization in inpatient wards, significantly contributing to the overall treatment costs. Expenses were found to rise with an increase in comorbidities and the frequency of hospital stays. These findings align with observations reported in previous literature[10].

This study observed a relatively low prevalence of unemployment among patients, which corresponds with 57.5% of them reporting no challenges in affording their medications. However, 53.8% acknowledged struggling to balance their monthly expenses due to medication costs[3,4].

Our study emphasizes the extent of medication adherence among patients, with an adherence rate of approximately 82.5%. Interestingly, despite a majority of participants being either illiterate or having only primary education, most adhered to their prescribed medications without making any changes. Notably, 38.8% of patients believed that taking more medications equates to greater therapeutic effectiveness[11]. However, 41.3% were unaware of the specific reasons for their prescriptions, reflecting a lack of health awareness. This may also explain why many patients have not adopted lifestyle modifications to manage their condition effectively.

**Strengths and Limitations:**

The study evaluated the impact of polypharmacy on both inpatients and outpatients, focusing on various conditions in the geriatric population across multiple departments. It also highlights the psychological dimensions of polypharmacy by examining reasons for non-adherence and patients' understanding of their prescribed medications.

However, the study has certain limitations. It is restricted to a tertiary healthcare setting, which may introduce referral bias. Variations in treatment approaches among individuals are not accounted for, and the study does not include data on drug-drug interactions. Additionally, the sample size is relatively small.

## Conclusion

The study reveals that polypharmacy is highly prevalent among the elderly and is strongly associated with demographic and health-related factors, including male gender, age 60-70 years, comorbidities, retirement status, prior surgeries or hospitalizations, financial constraints, and unemployment. These findings highlight the urgent need for targeted interventions to ensure rational and appropriate medication use in older adults with these characteristics.

Given the projected rise in the elderly population and the accompanying increase in chronic diseases, medication non-adherence, and polypharmacy, systematic assessment and management by physicians, pharmacists, and healthcare authorities are essential. Furthermore, raising awareness among healthcare professionals, policymakers, and families about the determinants of polypharmacy can promote safer medication practices. Enhanced family awareness fosters adherence to prescribed regimens and helps mitigate the adverse consequences of polypharmacy.

## References


1. *Van Wilder L, Devleesschauwer B, Clays E, Pype P, Vandepitte S, De Smedt D. Polypharmacy and Health-Related Quality of Life/Psychological Distress Among Patients With Chronic Disease. Prev Chronic Dis 2022;19:220062.*
2. *World Health Organisation. "Medication safety in polypharmacy." http:/ www.wipo.int/amc/en/medication/rules, WHO document production services, Geneva, Switzerland, 23 03 2019.*
3. *Anthoorathodi JB, Joju A, Reji AM, Asokan AP, Naseem A, Cherian A, et al. A cross sectional study on the prevalence of polypharmacy and potentially inappropriate medications among elderly patients in a tertiary care centre in central Kerala. Int J Comm Med Public Health 2021;8:1415-9.*
4. *Bhagavathula AS, Vidyasagar K, Chhabra M, Rashid M, et al. Prevalence of polypharmacy, hyperpolypharmacy and potentially inappropriate medication use in older adults in India: a systematic review and meta-analysis. Front Pharmacol. 2021;12:685518.*
5. *Sharma P, Gupta NL, Chauhan HS. Prevalence of polypharmacy: comparing the status of Indian states. Indian J Community Fam Med. 2019;5:4-9.*
6. *Rajeev DA, Paul DG, George DS, Vijayakumar DP. The study on prevalence of polypharmacy in elderly patients presented for the first time to the geriatric clinic of a tertiary care hospital in Kerala. Int J Med Sci Clin Invent. 2018;5(2):3542-4. doi:10.18535/ijmsci/v5i2.10.*
7. *Singh VJ, Roy V, Singhal S, Daga MK. Pharmacoeconomics of medicines used for geriatric individuals in a tertiary care hospital in Delhi. Indian J Med Res. 2024;159(2):143-52.*
8. *Shah BM, Hajjar ER. Polypharmacy, adverse drug reactions, and geriatric syndromes. Clin Geriatr Med. 2012;28(2):173-86.*
9. *Sharma M, Loh KP, Nightingale G, Mohile SG, Holmes HM. Polypharmacy and potentially inappropriate medication use in geriatric oncology. J Geriatr Oncol. 2016;7(5):346-53.*

10. *Kumar KLN, 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.*

11. *Jhaveri BN, Patel TK, Barvaliya MJ, Tripathi CB. Drug utilization pattern and pharmacoeconomic analysis in geriatric medical in-patients of a tertiary care hospital of India. J Pharmacol Pharmacother. 2014;5(1):15-20.*

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