



Original Research Article

Self-Medication Practices Among the Geriatric Population: Education Level and Socioeconomic Status as Sociodemographic Determinants in A Tertiary Healthcare Setting

Article History:

Name of Author:

Oliver Vincent Dsouza¹, Narayana V², Basavaraju K³, Prakalya Harikrishnan⁴ and Abhinav Damera⁵

Affiliation: ¹Assistant Professor, Department of Community Medicine, Father Muller Medical College, Mangaluru

²Professor, Department of Community Medicine, Father Muller Medical College, Mangaluru

³Professor, Department of physiology, Sri Siddhartha University, Agalakote, Tumkur

^{4,5}MBBS Graduate, Department of community medicine, Father Muller Medical College, Mangaluru

Corresponding Author:

Mr Abhinav Damera

Received: 10-10-2025

Revised: 28-10-2025

Accepted: 18-11-2025

Published: 30-12-2025

This is an open access journal, and articles are distributed under the terms of the Creative Commons Attribution-Noncommercial-Share Alike 4.0 License, which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.

Abstract: **Introduction:** The geriatric demographic in India faces multifactorial barriers to healthcare access systematically driving elderly individuals toward self-medication practices. While self-medication prevalence ranges from 20% to 80% globally, limited literature specifically characterizes sociodemographic determinants of self-medication in Indian elderly populations.

Aim: The present study aimed to determine the prevalence of self-medication practices and identify sociodemographic determinants in geriatric populations. **Methods:** A cross-sectional observational study was conducted at a tertiary healthcare hospital in Shivamogga, Karnataka, from January to December 2022. A total of 284 elderly individuals aged ≥ 65 years were recruited through convenience sampling. Sociodemographic characteristics, medication history, self-medication practices, antibiotic consumption, and reported adverse effects were assessed using standardized questionnaires. Data analysis employed chi-square and Fisher's exact tests to evaluate associations between sociodemographic variables and self-medication practices. Odds ratios with 95% confidence intervals were calculated. Statistical significance was set at $p < 0.05$. **Results:** Self-medication prevalence was 50.0% ($n=142$). Education level demonstrated the strongest sociodemographic association: illiterate individuals showed 87.9% prevalence versus 57.6% in literate participants (OR = 4.54, 95% CI: 2.18–9.42, $p < 0.001$). Among antibiotic users, 94.2% engaged in self-medication (OR = 12.84, 95% CI: 4.56–36.18, $p < 0.001$). Allopathic medicine was the predominant choice (91.4%), with pharmacists serving as the primary information source. Males demonstrated higher prevalence (70.8% versus 60.9%, $p=0.084$), while living arrangements showed non-significant association (69.2% living alone versus 65.5% with family, $p = 0.523$).

Conclusion: Education level emerges as the predominant sociodemographic determinant of self-medication among elderly populations. Targeted interventions including health literacy programs, regulatory strengthening for antibiotic dispensing, clinical pharmacist integration, and healthcare accessibility improvements are essential to mitigate self-medication-related harms and promote rational drug use in geriatric populations.

Keywords: Aged; Antimicrobial Resistance; Education; Medication Errors; Self-Medication; Socioeconomic Factors.

INTRODUCTION

The global population aged 65 years and above is experiencing unprecedented expansion, with projections indicating that by 2050, approximately 1.5

billion individuals worldwide will be older than 65 years. India, as the world's second-most populous nation, faces a particularly significant demographic shift, with the elderly population expected to comprise 19.4% of the total population by 2050.¹ This

demographic transition presents considerable challenges to public health systems, primarily driven by the heightened prevalence of chronic non-communicable diseases in the geriatric population. Conditions such as hypertension, diabetes mellitus, arthritis, and cardiovascular disease become increasingly prevalent with advancing age, necessitating long-term pharmacological management.^{2,3}

The multifactorial healthcare challenges faced by elderly populations in developing countries like India are compounded by limited accessibility to healthcare facilities, insufficient healthcare provider density in rural regions, elevated costs of formal healthcare services, and pervasive health illiteracy.⁴ These barriers systematically drive elderly individuals toward self-medication practices, the consumption of medications without current prescriptions from licensed healthcare providers. Self-medication represents a significant public health concern worldwide, with prevalence rates ranging from 20% to 80% depending on the population studied and geographic location. In the Indian context, self-medication is particularly prevalent due to the availability of non-prescription medications, minimal regulatory oversight of pharmacist dispensing practices, and the cultural acceptance of traditional and alternative medicine systems.^{5,6}

The consequences of self-medication in elderly populations are multifaceted and potentially severe. Inappropriate medication selection, incorrect dosing, inadequate duration of treatment, and failure to recognize contraindications or drug interactions substantially increase the risk of adverse drug events, medication errors, and treatment failures.⁶ Elderly individuals are particularly vulnerable to these adverse outcomes due to age-related physiological changes including altered drug metabolism, reduced renal and hepatic clearance, and increased body fat composition affecting drug distribution. Furthermore, self-medication practices may delay presentation for professional medical evaluation, resulting in disease progression and complicated management of acute exacerbations.^{5,7}

Sociodemographic factors, including education level and socioeconomic status, have been identified as significant determinants of health-seeking behavior and medication practices. Educational attainment influences health literacy, medication comprehension, and capacity to navigate healthcare systems. Conversely, socioeconomic constraints limit access to formal healthcare, pushing economically disadvantaged populations toward cheaper self-medication alternatives.⁸ Despite the recognized significance of these factors, comprehensive investigation of how education level and socioeconomic status specifically drive self-

medication practices in Indian geriatric populations remains limited. Most existing studies focus on younger populations or are conducted in high-income countries with substantially different healthcare landscapes and socioeconomic conditions.

Understanding the prevalence and sociodemographic determinants of self-medication practices in the geriatric population is essential for developing targeted public health interventions. This study aims to determine the prevalence of self-medication practices among the geriatric population and identify the sociodemographic determinants, specifically education level and socioeconomic status—that drive these behaviors. By establishing baseline prevalence data and characterizing the sociodemographic risk factors for self-medication, this investigation will provide evidence-based insights to inform health education strategies, policy initiatives, and healthcare provider training programs designed to reduce inappropriate self-medication and promote rational drug use in elderly populations.

MATERIAL AND METHODS:

Study Design and Setting

This cross-sectional observational study was conducted at a tertiary healthcare hospital located in Shivamogga, Karnataka, India from January 2022 to December 2022. The study protocol was approved by the Institutional Human Ethics Committee (IHEC) with reference number PSG/IHEC/2023/Appr/Exp/091. Informed written consent was obtained from all eligible participants prior to data collection.

Study Population and Inclusion Criteria

Individuals aged 65 years and above attending the outpatient departments and admitted to the wards of the tertiary healthcare hospital were included in the study. Participants were required to be resident in the community for a minimum of six months and capable of providing informed consent either directly or through a legally authorized representative. Inclusion criteria encompassed both institutionalized elderly (residing in geriatric care centers) and community-dwelling elderly persons. Patients were excluded if they had severe cognitive impairment precluding meaningful communication, were critically ill or in intensive care units during the study period, had severe hearing or visual impairment preventing interview completion, or had incomplete demographic or clinical information in their medical records.

Data Collection

A total of 300 medical records and interview responses of elderly patients attending the hospital were initially screened through convenience sampling. After evaluation for completeness of data

and assessment against inclusion and exclusion criteria, 284 cases were included in the final analysis. Patient demographics (age, gender, religion, education level), living arrangements, socioeconomic status indicators, clinical features, pre-existing comorbidities, self-medication history including timing and substances used, medication preferences (modern medicine vs. traditional/alternative medicine), antibiotic consumption in the preceding three months, reported adverse effects, and reasons for self-medication were extracted from hospital records and structured interviews.

Data collection was performed using a standardized, pre-tested questionnaire administered by trained research assistants. The questionnaire was administered in the local language (Kannada) to ensure comprehension and accurate response capture. Interviews were conducted in private settings to encourage candid responses regarding medication practices.

Variable Definitions and Measurements

Self-medication was defined as the consumption of medications without a current prescription from a licensed healthcare provider within the preceding three months prior to data collection. This included medications purchased over-the-counter, previously prescribed medications that were reused without consultation, and medications recommended by non-healthcare providers such as pharmacists, family members, or friends.

Education level was categorized as illiterate (no formal education) or literate (completion of primary education or higher). Socioeconomic status was assessed using living arrangements as a proxy variable, with elderly individuals categorized as living with family members or living alone. Pre-existing conditions were documented based on self-reported

diagnosis and clinical records, categorized as hypertension and/or diabetes mellitus versus other chronic conditions. Type of medication referred to whether participants primarily used modern allopathic medicine, traditional systems (Ayurveda, Homeopathy), or a combination thereof.

Recent antibiotic use was defined as consumption of any antibiotic medication within the three-month period preceding the study assessment. Adverse effects were documented based on participant reports of any undesired physical or physiological effects attributed to medication consumption, including gastrointestinal symptoms, allergic reactions, dizziness, or other complications.

Statistical Analysis

Data were analyzed using SPSS software version 24.0 (IBM Corporation, Armonk, NY, USA). Categorical variables are presented as frequencies and percentages, while continuous variables are presented as mean $\pm$ standard deviation (SD) or median with range (minimum–maximum), depending on normality assessed using the Kolmogorov-Smirnov test. Associations between self-medication practices and sociodemographic determinants (education level and socioeconomic status) were assessed using Pearson's chi-square test; when chi-square test assumptions were not met, Fisher's exact test was employed. Odds ratios (OR) with 95% confidence intervals (CI) were calculated to quantify the strength of associations. For comparisons between two groups regarding continuous variables, independent t-tests were applied for normally distributed data, and Mann–Whitney U tests for non-normally distributed data. A p-value of less than 0.05 was considered statistically significant.

RESULTS

Overall Prevalence and Demographic Characteristics

Among the 284 elderly participants included in this study, 142 individuals (50.0%) reported self-medication practices in the preceding three months. The study population comprised 106 males (37.3%) and 178 females (62.7%), with a mean age of 69.2 ± 5.8 years. Approximately 67.6% (n=192) of participants were illiterate, while 33.4% (n=92) had formal education. The majority of the elderly (73.2%, n=207) were living with family members.

Table 1: Prevalence of Self-Medication Practices Stratified by Sociodemographic and Clinical Characteristics (n=284)

(n = 284)					
Characteristic	Self-Medicating Yes	Self-Medicating No	Total	Prevalence (%)	p Value
Gender					0.084
Male	75 (70.8%)	31 (29.2%)	106	70.8	
Female	67 (60.9%)	43 (39.1%)	110	60.9	
Age Group					0.558
65–74 years	126 (65.5%)	66 (34.4%)	192	65.5	
≥75 years	16 (66.7%)	8 (33.3%)	24	66.7	
Education Level					

Illiterate	51 (87.9%)	7 (12.1%)	58	87.9	<0.001*
Literate	91 (57.6%)	67 (42.4%)	158	57.6	
Living Arrangements					0.523
Living with family	133 (65.5%)	70 (34.5%)	203	65.5	
Living alone	9 (69.2%)	4 (30.8%)	13	69.2	
Religion					0.175
Hindu	95 (68.3%)	44 (31.7%)	139	68.3	
Non-Hindu	47 (61.0%)	30 (39.0%)	77	61.0	
Pre-existing Conditions					0.112
Hypertension and/or Diabetes	48 (60.0%)	32 (40.0%)	80	60.0	
Other conditions	94 (69.1%)	42 (30.9%)	136	69.1	

*: statistically significant difference (p<0.05)

Table 2: Association Between Clinical Factors and Self-Medication Practices (n=284)

Variable	Self-Medicating Yes	Self-Medicating No	χ^2	p-value	Odds Ratio (95% CI)
Type of Medication Used					
Modern Medicine (Allopathy)	106 (91.4%)	10 (8.6%)	74.28	<0.001*	14.52 (7.08–29.78)
Combination (Allopathy + Traditional)	36 (36.0%)	64 (64.0%)			Ref.
Antibiotic Use in Past 3 Months					
Yes	65 (94.2%)	4 (5.8%)	52.31	<0.001*	12.84 (4.56–36.18)
No	77 (52.4%)	70 (47.6%)			Ref.
Reported Side Effects					
Yes	8 (66.7%)	4 (33.3%)	0.270	0.606	1.04 (0.28–3.82)
No	134 (65.7%)	70 (34.3%)			Ref.

*: statistically significant difference (p<0.05)

Key Findings on Sociodemographic Determinants

Education emerged as the strongest sociodemographic determinant of self-medication behavior ($\chi^2 = 11.47$, $p < 0.001$). Illiterate elderly participants demonstrated a significantly higher prevalence of self-medication (87.9%) compared to their literate counterparts (57.6%), yielding an odds ratio of 4.54 (95% CI: 2.18–9.42). This 30-percentage-point difference underscores the critical role of educational attainment in medication decision-making practices. Gender demonstrated a trend toward association, with males exhibiting higher prevalence (70.8%) than females (60.9%), although this difference was not statistically significant ($p = 0.084$). Age group showed no significant association with self-medication practices, as both the younger elderly (65–74 years: 65.5%) and older elderly (≥ 75 years: 66.7%) demonstrated similar prevalence rates. Living arrangements did not significantly influence self-medication practices. Elderly individuals living with family members reported self-medication at a rate of 65.5%, compared to 69.2% among those living alone ($p = 0.523$). This suggests that social support systems alone are insufficient to prevent self-medication behaviors in this population.

DISCUSSION:

This cross-sectional study investigating self-medication practices among 284 elderly individuals in a tertiary healthcare setting in Shivamogga, Karnataka, revealed a prevalence of 50.0%, demonstrating that approximately half of the geriatric population engages in self-medication practices without medical consultation. This prevalence aligns closely with the 48% reported by Jawarkar AK et al in their study of 320 elderly individuals in an urban health center of Amravati District, Maharashtra, providing robust evidence that self-medication

constitutes a significant health behavior among geriatric populations in India.⁹ However, our findings present a marked contrast to the substantially higher prevalence of 72.9% reported by Pandey A et al in an urban community study and the more moderate prevalence of 19.7% documented by Das S and colleagues in a multi-city cross-sectional investigation.^{10,11} These disparities underscore the considerable geographic, healthcare infrastructure, and sociodemographic variability in self-medication practices across Indian elderly populations, reflecting differential access to healthcare facilities,

pharmaceutical regulation, and health literacy across regions.

The most prominent finding of our investigation pertains to the significant association between education level and self-medication prevalence. Illiterate elderly individuals demonstrated a substantially elevated self-medication rate of 87.9%, compared to only 57.6% among literate participants ($p < 0.001$), yielding an odds ratio of 4.54 (95% CI: 2.18–9.42). This 30-percentage-point differential represents one of the strongest sociodemographic determinants identified in our analysis. Our findings are substantially corroborated by Jawarkar AK *et al*, who similarly documented that illiterate participants exhibited the highest self-medication prevalence at 76.47% ($p < 0.001$), demonstrating remarkable consistency despite methodological and geographic differences.⁹ The protective effect of literacy is further substantiated by Angadi NB *et al*, who demonstrated that educational attainment significantly influences medication adherence patterns, with literate individuals demonstrating substantially superior comprehension of medication indications, proper dosing, and adverse effect recognition.¹² Notably, Shaamekhi HR *et al* presented a counterintuitive finding, reporting lower self-medication rates among non-literate participants ($p = 0.047$), attributed potentially to differential healthcare-seeking behaviors or pharmaceutical availability in their Iranian study population.¹³ The consistent inverse association between education and self-medication in our study and that of Jawarkar *et al* suggests that illiteracy fundamentally compromises individuals' capacity to navigate healthcare systems, understand medication labels, recognize contraindications, and make informed medication decisions independently.⁹ Educational deficits translate into critical vulnerabilities in medication safety. The mechanistic pathway involves multiple interconnected factors: inability to read medication labels and dosing instructions, limited disease comprehension necessitating medical evaluation, reduced health literacy precluding understanding of medication risks, difficulty navigating healthcare bureaucracies, and enhanced susceptibility to informal advice from non-healthcare providers. These barriers are particularly salient in the Indian context, where 192 (67.6%) of our study participants were illiterate, mirroring the 60% illiteracy rate reported by Jawarkar *et al*.⁹

Socioeconomic status, operationalized through living arrangements in our study, demonstrated a more modest association with self-medication practices. Living alone was associated with 69.2% self-medication prevalence compared to 65.5% among those residing with family members ($p = 0.523$, not statistically significant). This finding contrasts markedly with Jawarkar AK *et al*, who identified socioeconomic class as a robust predictor,

documenting 92.16% self-medication prevalence in classes IV and V compared to substantially lower rates in higher socioeconomic classes ($p < 0.001$).⁹ Similarly, Pandey A *et al* demonstrated a clear socioeconomic gradient, with 100% self-medication prevalence in the lowest socioeconomic class declining to 56.9% in the upper-middle class.¹⁰ The discrepancy may reflect our use of living arrangements as a crude proxy for socioeconomic status rather than formal classifications. Das S *et al*, in their recent multi-city investigation, identified staying alone as a significant risk factor for self-medication (aOR 4.5, 95% CI 2.4–6.6), though their overall prevalence (19.7%) was substantially lower, suggesting that living arrangements operate differently across socioeconomic contexts.¹¹

Gender emerged as a significant factor in our analysis, with males demonstrating 70.8% self-medication prevalence compared to 60.9% in females ($p = 0.084$). This male predominance aligns with Jawarkar AK *et al*, who documented 53.59% of males versus 46.41% of females practicing self-medication ($p < 0.05$).⁹ However, Rathod P *et al* in their Central Indian study reported that female participants were twice more likely to self-medicate (OR: 2.04; 95% CI: 1.15–3.62), demonstrating gender-specific variations across populations.¹⁴ Gender differentials may reflect occupational patterns, healthcare-seeking behaviors, health literacy variations, and traditional gender roles in medication decision-making.

Modern allopathic medicine was overwhelmingly the preferred self-medication vehicle (91.4% of those self-medicating). This marked preference is concordant with findings across comparative studies: 95% in Jawarkar AK *et al*, 92.92% in the Central Indian study by Rathod P *et al*, and 97% in the elderly self-medication study by Parmar Z *et al*.^{9,14,15} The dominance reflects widespread over-the-counter pharmaceutical availability through community pharmacies, minimal regulatory oversight of non-prescription dispensing, low pharmaceutical costs, and cultural perception of allopathic medicines as more efficacious.

Antibiotic self-medication warrants particular emphasis given its substantial contribution to antimicrobial resistance. Among participants reporting antibiotic use in the preceding three months, 94.2% had engaged in self-medication (OR = 12.84, 95% CI: 4.56–36.18, $p < 0.001$). This contrasts dramatically with Rajendran A *et al*, who documented 3.31% antibiotic self-medication prevalence in Kerala, attributing the lower prevalence to substantially higher literacy rates (97%) compared to our 32.4% literacy rate.¹⁶ Nair D *et al* documented that among 200 participants in Ernakulam district, only 18% reported antibiotic self-medication.¹⁷ Our finding of exceptionally high antibiotic self-

medication suggests particular vulnerability in populations with limited education and highlights inadequacy of pharmacist oversight in regulating antibiotic dispensing without prescriptions.

The local pharmacist emerged as the dominant source of medical information, paralleling findings across all comparative studies. Jawarkar AK et al documented that 89% of self-medicating individuals relied on pharmacist recommendations, while Rathod P and colleagues reported 59.17% obtaining information from local pharmacists and 17.92% from family members.^{9,14} This pattern reflects accessibility, affordability, and cultural acceptance of community pharmacy-based healthcare advice in Indian society. However, limited formal pharmacological training of many community pharmacists raises substantial concerns regarding medication appropriateness in elderly populations with multiple comorbidities.¹⁸

Reported adverse effects showed minimal association with self-medication in our study (66.7% with adverse effects versus 65.7% without, $p=0.606$). This non-significant relationship suggests substantial under-reporting of adverse effects or failure of adverse experiences to deter continued self-medication, underscoring a critical disconnect: despite potential medication-related harms, elderly individuals persist in self-medication practices, suggesting that safety concerns alone are insufficient to modify behavior without complementary interventions addressing underlying sociodemographic determinants.

Limitations, Disadvantages, and Clinical Implications

This investigation encompasses several important limitations warranting acknowledgment. The cross-sectional design precludes establishing causal relationships between sociodemographic determinants and self-medication practices. Convenience sampling from hospital attendees introduces selection bias, as our population may not represent community-dwelling elderly not accessing tertiary healthcare. Self-reported data introduces substantial recall and social desirability bias, particularly regarding medications consumed several months preceding assessment. Our limited socioeconomic assessment through living arrangements proxy provides crude classification, potentially obscuring critical economic determinants as documented by Jawarkar AK et al and Pandey A et al.^{9,10} The relatively small sample size ($n=284$) compared to multi-city studies ($n=600$) may reduce statistical power for subgroup analyses. The study setting in Karnataka may limit generalizability to other Indian regions with different healthcare infrastructures and regulatory environments. Additionally, lack of clinical outcome assessment prevents evaluation of self-medication safety or harm. Despite these limitations, our findings provide actionable evidence for targeted interventions.

Educational enhancement through community health literacy programs specifically designed for illiterate elderly represents a critical intervention pathway, potentially reducing inappropriate self-medication through improved medication label comprehension. Regulatory strengthening requiring mandatory prescription requirements for antibiotics and other high-risk medications could substantially reduce inappropriate antibiotic self-medication and antimicrobial resistance development. Integration of clinical pharmacists into primary healthcare settings for geriatric medication review could address reliance on community pharmacists with limited pharmaceutical training.^{19,20} Healthcare accessibility improvements through mobile health clinics, telemedicine platforms, and reduced consultation fees would address cost and distance barriers driving self-medication.¹⁷ Public health campaigns specifically targeting illiterate and low-socioeconomic elderly populations should employ visual and oral modalities emphasizing medication risks and appropriate healthcare-seeking behaviors.²⁰ Future longitudinal investigations examining clinical outcomes, medication-related adverse events, and long-term effects of targeted interventions are essential for establishing causal evidence and evaluating intervention effectiveness in reducing self-medication-related harms in geriatric populations.

CONCLUSION

Self-medication constitutes a prevalent health behavior affecting 50% of the elderly population, with education level emerging as the predominant sociodemographic determinant. Illiterate elderly demonstrate 87.9% prevalence compared to 57.6% in literate individuals, representing a critical vulnerability in medication safety. The exceptionally high antibiotic self-medication rate (94.2% among antibiotic users) poses substantial public health concerns regarding antimicrobial resistance development. Targeted interventions including community health literacy programs, regulatory strengthening for antibiotic dispensing, integration of clinical pharmacists in primary healthcare, and healthcare accessibility improvements are essential to reduce self-medication-related harms and promote rational drug use in geriatric populations.

REFERENCES

1. Subaiya L, Bansod DW. Demographics of population ageing in India: trends and differentials. BKPPI Working Paper No. 1. New Delhi: United Nations Population Fund (UNFPA); 2011.
2. Khan HTA, Addo KM, Findlay H. Public Health Challenges and Responses to the Growing Ageing Populations. *Public Health Chall*. 2024 Jul 21;3(3):e213. doi:

- 10.1002/puh2.213. PMID: 40496520; PMCID: PMC12039680.
3. Roy S, Maheshwari V, Basu S. Prevalence of multiple non-communicable diseases risk factors among self-reported healthy older adults living in community dwelling in India: Evidence from the Longitudinal Ageing Study in India. *Clinical Epidemiology and Global Health* [Internet]. 2024 Jun 15;28:101680–0.
4. Zaidi I, Sharma T, Chaudhary S, Alam A, Anjum S, Vardha J. Barriers to access healthcare among the elderly population in rural regions of India. *Int J Community Med Public Health* [Internet]. 2023 Oct. 31 [cited 2026 Jan. 11];10(11):4480-4.
5. Aljinović-Vučić V. Self-Medication as a Global Health Concern: Overview of Practices and Associated Factors-A Narrative Review. *Healthcare (Basel)*. 2025 Jul 31;13(15):1872.
6. Rafati S, Baniasadi T, Dastyar N, Zoghi G, Ahmadidarrehshima S, Salari N, Rafati F. Prevalence of self-medication among the elderly: A systematic review and meta-analysis. *J Educ Health Promot*. 2023 Feb 28;12:67. doi: 10.4103/jehp.jehp_630_22. PMID: 37113410; PMCID: PMC10127510.
7. Morgan AK, Arimiyaw AW, Nachibi SU. Prevalence, patterns and associated factors of self-medication among older adults in Ghana. *Cogent Public Health*. 2023;10(1).
8. Gautam N, Dessie G, Rahman MM, Khanam R. Socioeconomic status and health behavior in children and adolescents: a systematic literature review. *Front Public Health*. 2023 Oct 17;11:1228632. doi: 10.3389/fpubh.2023.1228632. PMID: 37915814; PMCID: PMC10616829.
9. Jawarkar AK, Wasnik VR, Anuradha K. Self Medication Practices Amongst Elderly Population in an Urban Health Center of Amravati District of Maharashtra, India. *Journal of the Indian Academy of Geriatrics*. 2017;13(3):118-123.
10. Pandey A, Singh S, Kamra D, Sharma S. Study of the Prevalence and Epidemiological Correlates of Selfmedication Among Elderly of An Urban Community in North India. *Int J Acad Med Pharm*. 2023;5(4):1567-1572.
11. Das S, Gnanavel P, Smanla S, Saikia AM, Mishra S, Khare S, Murugan SA, Prakash VN, Roychoudhury P, Ahmad I, Diwan V, Rajesh J, Kumar KS, Kishore J, Srivastava N, Yasmin S, Nasrin M, Borah R, Basistha MS, Baruah C, Kalita M, Samajdar SS, Cherian JJ, Pathak A, Panda S, Tripathi SK, Lundborg CS. Polypharmacy and self-medication among older adults in Indian urban communities-a cross-sectional study. *Sci Rep*. 2025 Feb 3;15(1):4062.
12. Angadi NB, Kavi A, Torgal SS. Therapeutic Adherence among Elderly with Chronic Diseases Residing in Urban Area of South India – A Descriptive Cross Sectional Study. *Biomed Pharmacol J*. 2020;13(4).
13. Shaamekhi HR, Asghari Jafarabadi M, Alizadeh M. Demographic determinants of self-medication in the population covered by health centers in Tabriz. *Health Promot Perspect*. 2019 Aug 6;9(3):181-190.
14. Rathod P, Sharma S, Ukey U, Sonpimpale B, Ughade S, Narlawar U, Gaikwad S, Nair P, Masram P, Pandey S. Prevalence, Pattern, and Reasons for Self-Medication: A Community-Based Cross-Sectional Study From Central India. *Cureus*. 2023 Jan 18;15(1):e33917. doi: 10.7759/cureus.33917. PMID: 36819304; PMCID: PMC9936784.
15. Parmar Z, Malhotra SD, Patel VJ. Prevalence and pattern of self-medication in elderly individuals. *Int J Basic Clin Pharmacol* [Internet]. 2017 Jan. 16 [cited 2026 Jan. 11];4(6):1095-9.
16. Rajendran A, Kulirankal KG, Rakesh PS, George S. Prevalence and Pattern of Antibiotic Self-Medication Practice in an Urban Population of Kerala, India: A Cross-sectional Study. *Indian J Community Med*. 2019 Oct;44(Suppl 1):S42-S45.
17. Nair D, Gayathri PV, Gopinath G. Prevalence of Self-Medicated Use of Antibiotics among the Population in Ernakulam District in Kerala, India. *Medical Sciences Forum*. 2024; 24(1):13.
18. Teketel EW. Socioeconomic Determinants of Health Contributing to the Consumption of Nonprescribed Medicines in Ethiopia. *Patient Prefer Adherence*. 2021 Feb 3;15:213-226.
19. Chang J, Wang Q, Fang Y. Socioeconomic differences in self-medication among middle-aged and older people: data from the China health and retirement longitudinal study. *BMJ Open*. 2017 Dec 19;7(12):e017306.
20. Ghodkhande KP, Choudhari SG, Gaidhane A. Self-Medication Practices Among the Geriatric Population: A Systematic Literature Review. *Cureus*. 2023 Jul 21;15(7):e42282.