



## Polypharmacy Profile in Geriatric Patients

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### Abstract

*Polypharmacy is a common phenomenon in geriatric patients and is strongly associated with aging and the presence of multiple comorbidities. In the elderly population, the simultaneous use of several medications increases the risk of negative outcomes, including higher healthcare costs, adverse drug reactions, drug–drug interactions, poor medication adherence, functional decline, and geriatric syndromes. Older adults are particularly prone to polypharmacy, which considerably heightens the risk of drug interactions, especially among those with multiple chronic conditions. The probability of drug–drug interactions escalates in direct proportion to the number of medications prescribed, as geriatric patients generally receive more prescriptions compared to younger populations. This study employed a Literature Review approach with a Narrative Review design. Polypharmacy is highly prevalent among geriatric patients and is significantly linked to disease burden, adverse effects, drug interactions, and increased treatment costs. Elderly patients with multiple comorbidities taking several medications concurrently are at heightened risk of harmful drug interactions, with the likelihood rising alongside the number of medications consumed. Geriatric patients are particularly vulnerable to polypharmacy, which substantially increases the risk of drug–drug interactions. The greater the number of medications prescribed, the higher the potential for adverse outcomes.*

## Introduction

The term geriatrics was first known around 5000 BC in ancient Indian medical texts, Ayurveda. In the Ayurvedic medical system, there are eight branches of science, one of which is rasayana, a branch that focuses on premature aging and the management of diseases related to old age (Setiati, 2013). Geriatrics encompasses prevention, diagnosis, treatment, and health services for the elderly. This field of study is important because the response of older individuals to disease and therapy can differ from that of younger adults. In Indonesia, geriatric patients are defined as individuals over the age of 60 who generally experience various health disorders (multipathology), whether physical, psychological, or social (Safitri, 2015; Dartigues et al., 2022; Llop-Medina et al., 2022; Alvarez-Galvez & Vegas-Lozano, 2022).

Globally, the elderly population continues to grow, with an estimated 629 million people (about 1 in 10 people over the age of 60). It is estimated that by 2025, this number will jump to 1.2 billion people. In Southeast Asia, World Health Organization (WHO) member countries currently have around 142 million elderly people, and this number is estimated to triple by 2050 (Sari & Susanti, 2017; Wong, 2023). In Indonesia alone, the elderly population has increased significantly. In 2000, there were 14,396,745 people aged  $\geq 60$  years, and this increased to 18,043,712 people in 2010. This surge was largely due to increased life expectancy (Pratama et al., 2018).

The geriatric population is highly vulnerable to medication-related problems, including potential side effects and drug interactions, which can lead to increased hospitalization rates, morbidity, and mortality (Falemban, 2023; Antimisiaris et al., 2021; Pramotesiri et al., 2024). This condition is influenced by various factors such as polypharmacy, level of adherence to therapy, and changes in pharmacokinetics and pharmacodynamics due to the aging process. For example, anticholinergic drugs are known to cause cognitive impairment in geriatric patients (Lupitaningrum & Rahmawati, 2019; Taylor-Rowan et al., 2021; Gildengers et al., 2023; Kristensson et al., 2021). Polypharmacy is defined as the use of more than five types of drugs simultaneously in one day. Chronic diseases that commonly occur in elderly patients lead to an increase in the number of drugs prescribed, thereby posing the risk of side effects and drug interactions, which are common problems in hospitals and are important factors in increasing morbidity and mortality rates (Zulkarnaini & Martini, 2019; Dhole et al., 2023; Mozaffari et al., 2023).

Another definition of polypharmacy states that this condition is the use of drugs that exceeds medical needs. Because the elderly often have several medical conditions at once, the tendency for polypharmacy is higher in this group (Herdaningsih et al., 2016; Remelli et al., 2022; Mascarelo et al., 2023; Pazan & Wehling, 2021). Diseases in the elderly have different characteristics compared to other age groups, namely chronic, interrelated, degenerative, and often causing long-term disability before death occurs. The treatment of these diseases often involves multiple medications simultaneously (polypharmacy), which makes patients susceptible to drug interactions. The risk of these interactions increases with the number of drugs consumed, and geriatric patients generally receive more drugs than other age groups (Zulkarnaini & Martini, 2019; Zazzara et al., 2021; Schmitt et al., 2022). Based on the above description, the author is interested in compiling a Literature Review that discusses the description of polypharmacy in geriatric patients.

## Methods

The research design adopted in this study was a literature-based study, which utilized a narrative review in its design in an attempt to develop a complete and critical knowledge of polypharmacy in geriatric patients. Instead, this design aimed to integrate both empirical data and clinical observations and the conceptual knowledge of several studies to unravel the higher patterns that cause the development of multiple drug use among older adults. It was purposely decided to use the narrative review approach since it gives the researcher the opportunity to go beyond synthesis as it is strict and gives the researcher the opportunity to interpret and relate findings in a manner that gives them their contextual richness. Such flexibility not only turned out to be useful but also required in the case of polypharmacy, which is a complex and multidimensional phenomenon, as the phenomenon simultaneously involves physiology, clinical management, patient behavior, and health policy.

The research was initiated by a thorough search of the literature that was considered relevant using various academic databases, such as ClinicalKey, Google Scholar, and Mendeley. The choice of these databases was due to their accessibility and their scope of coverage in the fields of medicine, pharmacy and public health. This search strategy was based on a specific attempt

to include the global and local visions to ensure that the discussion is grounded not on the general tendencies only but on the particular facts of healthcare systems functioning in the developing environment like in Indonesia. The keywords (polypharmacy, geriatric patients, drug interactions and geriatric diseases) were used in combination and changed progressively to narrow down the search results. At this phase, focus was not on sheer numbers but conceptual applicability, with every source identified as a possible fragment of the bigger picture with regard to weaknesses and impact of using medications in the elderly.

After the first search had been made, a selective procedure was carried out on the materials that were gathered in an effective and systematic manner. The inclusion criteria was limited to the studies of the past five years as a priority to guarantee that the analysis was based on the most recent clinical insights and therapeutic advances. Peer-reviewed journal articles were also selected because they can be highly scrutinized concerning the clarity of the methods used and ethical integrity. Also, the articles that investigated more closely related questions like comorbidity patterns, adverse drug events, medication adherence, and economic impact of polypharmacy were also included because these dimensions are core aspects of how the concept of multiple drug use works in the real-world healthcare practice. On the other hand, articles that were either unavailable in their entire text or did not provide enough empirical or analytical coverage were not included in order to preserve the integrity and integrity of the synthesis.

Out of the original amount of 384 studies, titles and abstracts were culled to select the ones that were most likely to support the goals of this review. The initial phase produced 50 articles, which seemed to be thematically relevant. These were then discussed fully to determine methodological transparency, depth of context, and addition to the polypharmacy knowledge. After this evaluation, 20 articles were considered to be appropriate in terms of further analysis. Out of these, 10 studies were then chosen as the dominant corpus since they featured the most all-inclusive and empirically based discussions of polypharmacy amongst the geriatric patients. The refinement was not mechanical as it did not involve reducing by criteria but reflection on how each study might help to enrich the depiction of the problem under consideration in a more layered manner.

The analysis stage was a close and interpretive reading of every chosen article. The main aspects such as authorship, research design, study setting, sample characteristics, and main findings regarding the drug interactions, comorbidities, and treatment outcomes were identified systematically. However, the review failed to consider each study as its own entity. Rather, the analysis was geared towards creating a dialogue between the sources, delving into how the findings overlapped, supplemented or contravened each other. In the process, the review started to draw common patterns that characterize polypharmacy in the elderly, including the relationship between the number of drugs that are prescribed and the chances of adverse drug reactions, the prevalence of cardiovascular and metabolic diseases among the cases of polypharmacy, and the socio-economic consequences of taking complicated and extensive drug regimens. This synthesis was thus developed naturally, based on empirical rigor and interpretive sensitivity.

In handling the data, the study took a framework of an interpretive synthesis approach, in which evidence was categorized not simply according to the amount of frequency or prevalence, but rather according to conceptual resonance. This interpretive approach enabled the development of themes of medicalization of aging, clinical dilemma of therapeutic need versus pharmacological overload and the structural aspect of healthcare systems that perpetuate trends of excessive prescription. Integration of results was therefore a two-fold task to summarize the existing and to bring into view what is not explored. All the literature work led to a shared concept, which was not static but dynamic, and it focused on the everydayness of the aging process and medication, not necessarily making one of them the sole quantifiable measure.

During the research, scholarly rigor was ensured using transparency, coherence, and critical assessment. Even though original data were not collected, and no statistical meta-analysis was used in this review, it adhered to the principles of a systematic inquiry, as every step of the selection, appraisal, and synthesis was documented. It was not merely what the studies were reporting but what they were building on how they were building what assumptions they were making and what implication it might have on the clinical practice. This introspective approach played a critical role in changing a set of articles into an academic discourse of a substance on geriatric pharmacotherapy. Such a complex nature of the subject on which the review is directed, thus, reflects on the complexity of its narrative structure that is characterized by the overlap between biological aging, medical culture, and patient vulnerability.

The review was conducted with a sense of integrity. All references were noted according to the standards of the APA code of ethics, to realise the intellectual property and the academic integrity. Since the research was purely based on secondary data, no form of physical interaction with human participants was implemented and hence there was no need to seek ethical clearance. The whole exercise was however carried out considering the principles of academic ethics, transparency and accountability which is the core of responsible scholarship.

## Result and Discussion

Based on the search results, there were 384 articles. Journals or articles were filtered based on the title, abstract, and keyword search "Polypharmacy Profile in Geriatric Patients," resulting in 50 articles to be reprocessed. All journals or articles were filtered again by looking at the entire text, resulting in 20 desired journals or articles published within the last 5 years. The final result of the article search and screening yielded 10 articles relevant for use in this study.

Table 1. Literature Review Results

Author	Title	Method	Results
(Irawan & Wilar, 2022)	Evaluation of Potential Drug Interactions in Geriatric Patient Prescriptions at the Outpatient Pharmacy Department at a Hospital in Sukabumi	Identification of potential drug interactions was conducted by reviewing prescriptions of geriatric outpatients during the month of September 2020	The results of this study indicate that the percentage of drug interactions classified based on their severity level was 4.63% for minor drug interactions, 83.33% for moderate drug interactions, and 12.03% for major drug interactions. Furthermore, the percentage between the number of drug interactions and the number of drug types (R/) shows that the number of R/ with more than five drug types has a high percentage.
(Reyaan et al., 2021)	Study of Potential Drug Interactions in Polypharmacy Prescriptions at Two Pharmacies in Bandung City	This study used a non-experimental research design in a descriptive with a retrospective method.	Of the 1,218 prescriptions, 896 prescriptions that met the inclusion criteria were analyzed, with 569 prescriptions (63.50%) experiencing potential drug interactions. Based on severity, the majority of interactions were moderate (85.60%), followed by minor interactions (9.28%), and major interactions (5.12%). Based on mechanism, the majority of drug interactions were pharmacodynamic interactions (90.34%), followed by pharmacokinetic interactions (9.66%).
(Afrilla et al., 2022)	Analysis of the Relationship Between Polypharmacy	This study is an observational study with a cross-sectional design	The results of the study show that 1,985 patients received non-polypharmacy medication (<5 drugs) with an average medication cost of Rp. 45,013.21, while 124 patients received polypharmacy medication ( $\geq$

	and the Cost of Use of Fall Risk Medications in Geriatric Patients at a Neurology Clinic Dr. Soedarso General Hospital, Pontianak	cross-sectional research design of an analytical nature	5 drugs) with a higher average medication cost of Rp 105,210.7.
(Utami & Handayani, 2020)	Potential Drug Interactions in Geriatric Patients Using Antihypertensive Medications at the Karanggeneng Lamongan Community Health Center	The research design used was descriptive with data collection retrospective	The results of the study showed that out of 129 geriatric patients, 72 patients had a potential for drug interactions amounting to 55.81%. These interactions occurred more frequently in prescriptions containing $\geq 4$ types of drugs according to the data in this study. The number of drugs in a single prescription was dominated by $\geq 4$ types of drugs, which means that the potential for drug interactions is quite high.
(Fauziah et al., 2020)	Polypharmacy in geriatric patients	A systematic approach to optimizing polypharmacy, including the <i>Prescribing Optimization Method (POM)</i>	The results show that polypharmacy is commonly found in geriatric patients and is related to disease conditions and aging. Polypharmacy in geriatrics increases negative risks such as increased costs, side effects, drug interactions, non-compliance with treatment, decreased functional status, and geriatric syndromes.
(Zulkarnaini & Martini, 2019)	Overview of Polypharmacy in Geriatric Patients in Several Outpatient Clinics at Dr. M. Djamil Padang Regional General Hospital	This study is an observational study	The results obtained were that this study found polypharmacy in 400 patients (64.72%) undergoing outpatient treatment at the M. Djamil Hospital polyclinic. The diseases most commonly suffered by geriatric patients were cardiovascular diseases such as atrial fibrillation, coronary heart disease, heart failure, hypertension, as well as lung disease, arthritis, and bone fractures. The highest number of medications taken was 12 types of drugs by some patients. The drugs taken were Glikuidon, simvastatin, sodium bicarbonate, allopurinol, aspirin, bisoprolol, telmisartan, and amlodipine. The serious drug interaction in these patients was between amlodipine and simvastatin.
(Parulian et al., 2019)	Analysis of the Relationship Between Polypharmacy and Drug Interactions in Outpatients Receiving	non-experimental descriptive Analytical using a retrospective method	The results of the study show that based on the number of drugs, it can be seen that the more drugs consumed, the greater the drug interactions that occur, where the increase in the number of drugs also increases the incidence of interactions. Based on the data linking the number of medications to the number of interactions, a

	Hypertension Medications at RSP. Dr. Ario Wirawan January-March 2019		positive correlation was found, meaning that the more medications taken, the more interactions occur.
(Hanutami & Dandan, 2019)	Identification of Potential Drug Interactions in General Prescriptions at Kimia Farma Pharmacy 58 in Bandung City in April 2019	Identification drug between drugs was conducted by selecting prescriptions randomly each day, two prescriptions containing two or more types of drugs (R/) then determined the severity level.	The results of the study showed that out of 60 prescriptions taken, 21 prescriptions were found to have drug interactions with a percentage of 35%. Of these 21 prescriptions, the highest interaction was moderate in 12 prescriptions (57.14%), followed by minor interactions in 5 prescriptions (23.8%) and major interactions in 4 prescriptions (19.04%). The drug most frequently found to have the potential for drug interactions was methylprednisolone. Several actions can be taken to minimize the potential for drug interactions.
(Pratama et al., 2018)	Multipathology Profile of Geriatric Patients at the Outpatient Clinic Special Geriatric Outpatient Clinic at Dr. M. Djamil General Hospital, Padang Period January – December 2014	This study is descriptive with a <i>cross-sectional</i> design	The results of the study show that the most common chronic diseases based on organ system are cardiovascular disorders, endocrine, metabolic, and nutritional disorders, as well as musculoskeletal disorders. The most common chronic disease groups based on ICD-10 were circulatory diseases, followed by hormonal, nutritional, and metabolic diseases, as well as musculoskeletal and connective tissue diseases.
(Maindoka et al., 2017)	Study of Drug Interactions in Geriatric Inpatients at Prof. Dr. R.D. Kandou General Hospital, Manado	Sampling was conducted using <i>consecutive sampling</i>	The results of the study showed that the most common diagnoses were hypertension (58 cases, 17.90%), anemia (35 cases, 10.80%), and chronic kidney failure (28 cases, 8.64%). The results also showed that 76 geriatric patients (76%) received prescriptions for $\geq 5$ types of drugs when they were admitted to the hospital.

## Discussion

Based on the 10 literature reviews above, a discussion review was conducted. Research conducted by Husna Fauziah, Roza Mulyana, Rose Dinda Martini in 2020 entitled "Polypharmacy in geriatric patients" using the Prescribing Optimization Method (POM) found that polypharmacy is commonly found in geriatric patients and is related to disease conditions and aging. Polypharmacy in geriatrics increases negative risks such as increased costs, side

effects, drug interactions, non-compliance with treatment, decreased functional status, and geriatric syndrome. This study concluded that a better understanding of polypharmacy and its consequences in geriatric patients is needed, as well as the implementation of instruments and methods to address polypharmacy in daily clinical practice with geriatric patients (Fauziah et al., 2020).

A study conducted by Aryaldy Zulkarnaini and Rose Dinda Martini in 2019 entitled "An Overview of Polypharmacy in Geriatric Patients in Several Polyclinics at Dr. M. Djamil Padang Regional General Hospital" used an observational method. The results obtained were that this study found polypharmacy in 400 patients (64.72%) undergoing outpatient treatment at the M. Djamil Hospital polyclinic. The diseases most commonly suffered by geriatric patients were cardiovascular diseases such as atrial fibrillation (AF), coronary heart disease, heart failure, hypertension, diabetes mellitus, lung disease, arthritis, bone fractures, and malignancies (Zulkarnaini & Martini, 2019).

The highest number of polypharmacy cases was 12 types of drugs obtained by several patients. The drugs obtained were Glikuidon, simvastatin, sodium bicarbonate, allopurinol, furosemide, aspirin, bisoprolol, telmisartan, amlodipine, lansoprazole, sucralfate, and cefixime. The serious drug interaction in these patients was between amlodipine and simvastatin. This study concluded that heart disease has a high rate of polypharmacy and carries the risk of drug dependence from polypharmacy (Zulkarnaini & Martini, 2019).

The study conducted by Lamtiar Parulian, Ening Listyanti, Anita Kumala Hati, and Istianatus Sunnah in 2019, titled "Analysis of the Relationship Between Polypharmacy and Drug Interactions in Outpatients Receiving Hypertension Medication at Rsp. Dr. Ario Wirawan Hospital from January to March 2019" using a retrospective method. The results of the study show that based on the number of drugs, it can be seen that the more drugs consumed, the greater the drug interactions that occur, where the higher the number of drugs, the higher the incidence of interactions (Parulian et al., 2019).

Based on the data linking the number of drugs to the number of interactions, a positive correlation (very strong correlation) was found, meaning that the more drugs taken, the more interactions occur. In this study, it can be concluded that out of a total of 72 samples, there were 37 prescriptions (51.39%) with 63 cases of interactions, and there was a strong correlation or relationship between polypharmacy and interactions (Parulian et al., 2019).

Research conducted by Berlian Hanutami NP and Keri Lestari Dandan in 2019 entitled "Identification of Potential Drug Interactions in General Prescriptions at Kimia Farma 58 Pharmacy in Bandung City in April 2019" used the method of identifying drug interactions by randomly selecting two prescriptions containing two or more types of drugs every day (R/) and then determining the severity level. The results showed that of the 60 prescriptions taken, 21 prescriptions had drug interactions with a percentage of 35%. Of the 21 prescriptions, the highest interaction was moderate interaction in 12 prescriptions (57.14%), followed by minor interaction in 5 prescriptions (23.8%) and major interaction in 4 prescriptions (19.04%). The drug most often found to have the potential for drug interactions was methylprednisolone. Several measures can be taken to minimize the potential for drug interactions. In this study, there were 21 prescriptions out of 60 prescriptions that had drug interactions. The potential for drug interactions was 35%. For minor interactions, it was 23.8%, moderate interactions 57.14%, and major interactions 19.04% (Hanutami & Dandan, 2019).

A study conducted by Elfon Lindo Pratama, Rose Dinda Martini, and Dian Pertiwi in 2017 entitled "Description of Multipathology in Geriatric Patients at the Geriatric Special Clinic of Dr. M Djamil Padang Hospital from January to December 2014" used a descriptive method with a cross-sectional design. The results showed that the most common chronic diseases based

on organ system were cardiovascular disorders, endocrine, metabolic, and nutritional disorders, and musculoskeletal disorders (Pratama et al., 2018).

The most common chronic disease groups based on ICD-10 were circulatory diseases, followed by hormonal, nutritional, and metabolic diseases, as well as musculoskeletal and connective tissue diseases. This study concluded that chronic diseases are most prevalent in the elderly. The most common geriatric patients were those aged 60–69, and female. The average number of chronic diseases in geriatric patients in this study was six (Pratama et al., 2018).

Research conducted by Fangky Sandy Maindoka, Deby Mpila, and Gayatri Citraningtyas in 2017 entitled "Study of drug interactions in geriatric inpatients at Prof. Dr. R. D. Kandou Manado Hospital" used consecutive sampling. The results showed that the most common diagnoses were hypertension (58, or 17.90%), anemia (35, or 10.80%), and chronic kidney failure (28, or 8.64%). The results also showed that 76 geriatric patients (76%) received prescriptions for  $\geq 5$  types of drugs when they were admitted to the hospital. This study concluded that the prevalence of drug interactions in geriatric inpatients was 44% (44 patients) with a total of 146 interactions (Maindoka et al., 2017).

Research conducted by Dian Afrilla, Nurmaina, and Resi Susanti in 2021 entitled "Analysis of the Relationship between Polypharmacy and the Cost of Using Fall Risk Medications in Geriatric Patients at the Dr. Soedarso Pontianak Hospital Neurological Clinic" used an observational method. The results showed that 1,985 patients received non-polypharmacy drugs ( $< 5$  drugs) with an average drug cost of Rp. 45,013.21, while 124 patients received polypharmacy drugs ( $\geq 5$  drugs) with a higher average drug cost of Rp 105,210.7. The conclusion drawn from this study is that there is a significant relationship between polypharmacy and the average cost of medication use for fall risk in geriatric patients at the Neurology Clinic of Dr. Soedarso General Hospital in Pontianak (Afrilla et al., 2022).

The study conducted by Primanitha Ria Utami, Riana Prastiwi Handayani, and Vivin Dwi Aprilia Puspitasari in 2020, entitled "Potential Drug Interactions in Geriatric Patients Using Antihypertensives at the Karanggeneng Lamongan Community Health Center," used a descriptive method with retrospective data collection. The results showed that out of 129 geriatric patients, 72 patients had a potential for drug interactions of 55.81%. These interactions were more common in prescriptions containing  $\geq 4$  types of drugs according to the data in this study. The number of drugs in a single prescription was dominated by  $\geq 4$  types of drugs, indicating a high potential for drug interactions. This study concluded that the potential for drug interactions was 55.81% of the total 129 patients (72 patients included). The type of drug interaction with a moderate severity rate was 66.36%, and the mechanism of drug interaction was pharmacodynamic 98.2% (Utami & Handayani, 2020).

The study conducted by Irianti Bahana Maulida Reyaan, Cempaka Kuning, and I Ketut Adnyana in 2021 was titled "Study of the Potential for Drug Interactions in Polypharmacy Prescriptions at Two Pharmacies in Bandung" using a non-experimental descriptive analytical method with a retrospective approach. Of the 1,218 prescriptions, 896 prescriptions were included in the inclusion criteria and analyzed, with 569 prescriptions (63.50%) experiencing potential drug interactions. Based on severity, the majority of interactions were moderate (85.60%), followed by minor interactions (9.28%), and major interactions (5.12%). Based on mechanism, the majority of drug interactions were pharmacodynamic interactions (90.34%), followed by pharmacokinetic interactions (9.66%). Given the number of potential drug interactions, it is advisable to avoid prescribing polypharmacy and to manage potential drug interactions that may occur in collaboration with the prescribing physician, considering the risks and benefits to minimize or prevent drug interactions (Reyaan et al., 2021).

Research conducted by Aurizal R Irawan and Gofarana Wilar in 2022 entitled "Evaluation of Drug Interaction Potential in Geriatric Outpatient Prescriptions at an Outpatient Pharmacy in a

Hospital in Sukabumi" used the method of reviewing prescriptions for geriatric outpatients during September 2020. The results of this study showed that the percentage of drug interactions classified based on their severity was 4.63% for minor drug interactions, 83.33% for moderate drug interactions, and 12.03% for major drug interactions. Furthermore, the percentage between the number of drug interactions and the number of drug types (R/) showed that the number of R/ with more than five types of drugs had a high percentage of 41.67%, 27.78%, and 18.52% with six, seven, and eight drugs, respectively. This study shows that geriatric patients are prone to receiving polypharmacy prescriptions, which can increase the risk of drug interactions (Irawan & Wilar, 2022).

From the 10 literature studies that have been examined, it can be seen that polypharmacy is commonly found in geriatric patients and is associated with disease conditions, drug interactions, polypharmacy side effects, and increased costs. Polypharmacy is the use of multiple drugs that are not appropriate for the patient's health condition. Identifying and avoiding polypharmacy can provide better outcomes for elderly patients and help improve their quality of life.

Elderly people who have more than one disease and receive various medications at the same time are a group that is vulnerable to drug interactions. The risk of drug interactions increases in line with the number of drugs prescribed, and geriatric patients usually receive more drugs than patients of other ages. The risk of drug interactions increases in line with the number of drugs prescribed.<sup>6</sup> These interactions can occur due to intentional misuse or a lack of knowledge about the active ingredients in the drugs (Reyaan et al., 2021).

Cardiovascular disease and hypertension are chronic diseases that have a high rate of polypharmacy and a risk of drug dependence. The high prevalence of hypertension in geriatric patients makes hypertension a major risk factor for cardiovascular disease. Geriatric patients have specific characteristics, namely the presence of various chronic diseases and decreased organ function, especially decreased kidney and liver function.

In cases of polypharmacy among geriatric patients, healthcare costs inevitably increase due to the consumption of multiple medications. The use of polypharmacy leads to higher healthcare costs, with a significant correlation between the number of medications and the total medication expenses incurred.

## Conclusion

Based on the results of the literature review, polypharmacy is a common condition in patients with heart disease and geriatric patients, with a significant risk of drug dependence, drug interactions, and adverse side effects. Geriatric patients are particularly vulnerable to polypharmacy due to the large number of comorbidities, which increases the likelihood of drug interactions that can worsen clinical conditions, such as constipation, hypertension, and heart failure. In addition, the use of various medications also has an impact on increasing the cost of treatment, especially when compared to non-polypharmacy patients.

## References

- Afrilla, D., Nurmainah, & Susanti, R. (2022). Analisis Hubungan Polifarmasi dan Biaya Penggunaan Obat Risiko Jatuh pada Pasien Geriatri di Klinik Saraf RSUD dr. Soedarso Pontianak. *Jurnal Cerebellum*, 8(2), 7–11.
- Alvarez-Galvez, J., & Vegas-Lozano, E. (2022). Discovery and classification of complex multimorbidity patterns: unravelling chronicity networks and their social profiles. *Scientific Reports*, 12(1), 20004. <https://doi.org/10.1038/s41598-022-23617-8>
- Antimisiaris, D., McHolan, B., Moga, D., & Mospan, C. (2021). Medication related

problems. *The Senior Care Pharmacist*, 36(2), 68-82.

- Dartigues, J. F., Le Bourdonnec, K., Tabue-Teguo, M., Le Goff, M., Helmer, C., Avila-Funes, J. A., ... & Proust-Lima, C. (2022). Co-occurrence of geriatric syndromes and diseases in the general population: assessment of the dimensions of aging. *The Journal of nutrition, health and aging*, 26(1), 37-45. <https://doi.org/10.1007/s12603-021-1722-3>
- Dhole, S., Mahakalkar, C., Kshirsagar, S., & Bhargava, A. (2023). Antibiotic prophylaxis in surgery: current insights and future directions for surgical site infection prevention. *Cureus*, 15(10). <https://doi.org/10.7759/cureus.47858>
- Falemban, A. H. (2023). Medication-related problems and their intervention in the geriatric population: A review of the literature. *Cureus*, 15(9). <https://doi.org/10.7759/cureus.44594>
- Fauziah, H., Mulyana, R., & Martini, R. D. (2020). Polifarmasi pada Pasien Geriatri. *Human Care Journal*, 5(3), 804. <https://doi.org/10.32883/hcj.v5i3.796>
- Gildengers, A., Stoehr, G. P., Ran, X., Jacobsen, E., Teverovsky, E., Chang, C. C. H., & Ganguli, M. (2023). Anticholinergic drug burden and risk of incident MCI and dementia: a population-based study. *Alzheimer Disease & Associated Disorders*, 37(1), 20-27. <https://doi.org/10.1097/wad.0000000000000538>
- Hanutami, B., & Dandan, K. L. (2019). Identifikasi Potensi Interaksi Antar pada Resep Umum di Apotek Kimia Farma 58 Kota Bandung Bulan April 2019. *Farmaka*, 17(2), 57–64.
- Herdaningsih, S., Muhtadi, A., Lestari, K., & Annisa, N. (2016). Potential of Drug-Drug Interaction in Polypharmacy Prescription: Retrospective Study on a Drugstore in Bandung. *Indonesian Journal of Clinical Pharmacy*, 5(4), 288–292. <https://doi.org/10.15416/ijcp.2016.5.4.288>
- Irawan, A. R., & Wilar, G. (2022). Evaluasi Potensi Interaksi Obat pada Resep Pasien geriatri di Instalasi Farmasi Rawat Jalan di Salah Satu Rumah Sakit di Sukabumi. *Farmaka*, 20(1).
- Kristensson, J. H., Zahirovic, I., Londos, E., & Modig, S. (2021). Medications causing potential cognitive impairment are common in nursing home dementia units—a cross-sectional study. *Exploratory research in clinical and social pharmacy*, 3, 100054. <https://doi.org/10.1016/j.rcsop.2021.100054>
- Llop-Medina, L., Fu, Y., Garcés-Ferrer, J., & Doñate-Martínez, A. (2022). Palliative care in older people with multimorbidities: a scoping review on the palliative care needs of patients, carers, and health professionals. *International journal of environmental research and public health*, 19(6), 3195. <https://doi.org/10.3390/ijerph19063195>
- Lupitaningrum, D. M., & Rahmawati, F. (2019). The Effect of Anticholinergic Use on Cognitive Impairment in Geriatric Patients in Central Lombok, Indonesia. *Pharmaceutical Sciences and Research*, 6(1). <https://doi.org/10.7454/psr.v6i1.4077>
- Maindoka, F. S., Mpila, D., & Citraningtyas, G. (2017). Kajian Interaksi Obat pada Pasien Geriatri Rawat Inap di RSUP Prof. Dr. R. D. Kandou Manado. *Pharmacon: Jurnal Ilmiah Farmasi*, 6(3), 240–250.
- Mascarelo, A., Alves, A. L. S. A., Hahn, S. R., Doring, M., & Portella, M. R. (2023). Incidence and risk factors for polypharmacy among elderly people assisted by primary health care in Brazil. *BMC geriatrics*, 23(1), 470. <https://doi.org/10.1186/s12877-023-04195-4>
- Mozaffari, S., Mousavi, T., Nikfar, S., & Abdollahi, M. (2023). Common gastrointestinal drug-drug interactions in geriatrics and the importance of careful planning. *Expert Opinion*

- Parulian, L. P., Listyanti, E., Hati, A. K., & Sunnah, I. (2019). Analisis Hubungan Polifarmasi dan Interaksi Obat Pada Pasien Rawat Jalan Yang Mendapat Obat Hipertensi Di Rsp. Dr. Ario Wirawan Periode Januari-Maret 2019. *Indonesian Journal of Pharmacy and Natural Product*, 2(2). <https://doi.org/10.35473/ijpnp.v2i2.280>
- Pazan, F., & Wehling, M. (2021). Polypharmacy in older adults: a narrative review of definitions, epidemiology and consequences. *European geriatric medicine*, 12(3), 443-452. <https://doi.org/10.1007/s41999-021-00479-3>
- Pramotesiri, P., Putthipokin, K., & Ruangritchankul, S. (2024). Drug related problems among older inpatients at a tertiary care setting. *Journal of Clinical Medicine*, 13(6), 1638. <https://doi.org/10.3390/jcm13061638>
- Pratama, E. L., Martini, R. D., & Pertiwi, D. (2018). Gambaran Multipatologi Pasien Geriatri di Poliklinik Khusus Geriatri RSUP Dr. M. Djamil Padang Periode Januari – Desember 2014. *Jurnal Kesehatan Andalas*, 6(3), 536–545. <https://doi.org/10.25077/jka.v6.i3.p536-545.2017>
- Remelli, F., Ceresini, M. G., Trevisan, C., Noale, M., & Volpato, S. (2022). Prevalence and impact of polypharmacy in older patients with type 2 diabetes. *Aging clinical and experimental research*, 34(9), 1969-1983. <https://doi.org/10.1007/s40520-022-02165-1>
- Reyaan, I. B. M., Kuning, C., & Adnyana, I. K. (2021). Studi Potensi Interaksi Obat pada Resep Polifarmasi di Dua Apotek Kota Bandung. *Jurnal Manajemen Dan Pelayanan Farmasi (Journal of Management and Pharmacy Practice)*, 11(3), 145. <https://doi.org/10.22146/jmpf.56931>
- Safitri, S. (2015). Instabilitas dan Kejadian Jatuh pada Lansia. *Jurnal Kesehatan Dan Agromedicine*, 2(4), 504–509.
- Sari, M. T., & Susanti. (2017). Gambaran Kualitas Hidup Lansia di Pantai Sosial Tresna Werdha Budi Luhur. *Jurnal Ilmiah Universitas Batanghari Jambi*, 17(2), 178–183.
- Schmitt, J. P., Kirfel, A., Schmitz, M. T., Kohlhof, H., Weisbarth, T., & Wittmann, M. (2022). The impact of drug interactions in patients with community-acquired pneumonia on hospital length of stay. *Geriatrics*, 7(1), 11. <https://doi.org/10.3390/geriatrics7010011>
- Setiati, S. (2013). Geriatric Medicine, Sarkopenia, Frailty, dan Kualitas Hidup Pasien Usia Lanjut: Tantangan Masa Depan Pendidikan, Penelitian dan Pelayanan Kedokteran di Indonesia. *EJournal Kedokteran Indonesia*, 1(3). <https://doi.org/10.23886/ejki.1.3008>.
- Taylor-Rowan, M., Edwards, S., Noel-Storr, A. H., McCleery, J., Myint, P. K., Soiza, R., ... & Quinn, T. J. (2021). Anticholinergic burden (prognostic factor) for prediction of dementia or cognitive decline in older adults with no known cognitive syndrome. *Cochrane Database of Systematic Reviews*, (5). <https://doi.org/10.1002/14651858.cd013540.pub2>
- Utami, P. R., & Handayani, R. P. (2020). Potensi Interaksi Obat pada Pasien Geriatri yang menggunakan AntiHipertensi di Puskesmas Karanggeneng Lamongan. *SURYA: Jurnal Media Komunikasi Ilmu Kesehatan*, 12(2). <https://doi.org/10.38040/js.v12i2.141>
- Wong, J. W. (2023). Ageing and Health in Southeast Asia: Challenges for Policy and Practice. In *The United Nations Madrid International Plan of Action on Ageing* (pp. 139-152).

Routledge India.

- Zazzara, M. B., Palmer, K., Vetrano, D. L., Carfi, A., & Onder, G. (2021). Adverse drug reactions in older adults: a narrative review of the literature. *European geriatric medicine*, 12(3), 463-473. <https://doi.org/10.1007/s41999-021-00481-9>
- Zulkarnaini, A., & Martini, R. D. (2019). Gambaran Polifarmasi Pasien Geriatri di beberapa Poliklinik RSUP Dr. M. Djamil Padang. *Jurnal Kesehatan Andalas*, 8(1S), 1–6. <https://doi.org/10.25077/jka.v8i1S.916>