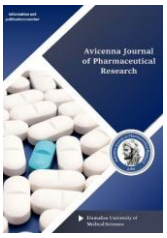
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Original Article

Prescribing Patterns and Direct Medication Costs among Gastritis Outpatients at a Tertiary Hospital in Indonesia

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Abstract

Background: Gastritis is a common gastrointestinal disorder and a frequent cause of outpatient visits. In routine clinical practice, its pharmacological management often involves combination therapy, which may substantially influence medication costs. However, real-world evidence integrating prescribing patterns and direct medication costs among gastritis outpatients in Indonesian tertiary hospitals remains limited.

Methods: This retrospective cross-sectional study was conducted at RSUD Prof. Dr. Margono Soekarjo, a tertiary referral hospital in Central Java, Indonesia. Data were collected from outpatient medical records and pharmacy databases from January to December 2025. All outpatients of any age who were diagnosed with gastritis (International Classification of Diseases, Tenth Revision codes K29.5 and K29.7) and who received pharmacological treatment were included. Prescribing patterns were described according to medication type, therapeutic class, and prescription regimen. Direct medication costs per prescription were analyzed and presented as mean ± standard deviation and median with interquartile range (IQR).

Results: A total of 313 gastritis outpatients were included. Most patients were women (64.5%), with a mean age of 47.5 ± 15.4 years. Combination therapy was frequently prescribed: 62.9% of patients received two medications, and 34.2% received three or more medications per prescription. The most commonly prescribed drug was the antispasmodic–anxiolytic combination, chlordiazepoxide–clidinium (73.5%). Proton pump inhibitors were prescribed more frequently than H2 receptor antagonists, with lansoprazole being the most commonly used acid-suppressive agent. The mean direct medication cost per prescription was IDR 26,453 ± 7,623, with a median cost of IDR 27,130 (IQR: 21,800–36,730). Medication costs increased consistently with the number of prescribed drugs.

Conclusion: Outpatient management of gastritis in a tertiary hospital setting was characterized by frequent use of combination therapy. The number of prescribed drugs emerged as a key driver of direct medication costs. These findings highlight the importance of rational prescribing and cost-conscious pharmacotherapy in the outpatient care of gastritis, with potential support from clinical pharmacy services.

Keywords: Drug utilization, Gastritis, Medication cost, Outpatient, Prescribing patterns, Pharmacoepidemiology

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Introduction

Gastritis is a common gastrointestinal disorder characterized by inflammation of the gastric mucosa and represents a substantial global health burden. Epidemiological studies have shown that gastritis and dyspepsia affect approximately 20%–30% of the global population, with a higher prevalence observed in developing countries due to *Helicobacter pylori* infection, nonsteroidal anti-inflammatory drug use, dietary factors, and psychosocial stressors [1-3]. In Indonesia, gastritis remains one of the leading causes of outpatient visits, reflecting its significant impact on healthcare utilization and hospital services [17].

Clinically, gastritis presents with a wide spectrum of symptoms, including epigastric pain, nausea, vomiting, bloating, and early satiety, which frequently prompt patients to seek outpatient care. The primary goals of pharmacological management are symptom relief, suppression of gastric acid secretion, and protection of the gastric mucosa. Current clinical practice commonly involves the use of proton pump inhibitors (PPIs), H2 receptor antagonists (H2RAs), and gastroprotective agents, such as sucralfate, with additional adjunctive therapies, including antispasmodics, prokinetics, and antiemetics, depending on symptom severity and physician preference [4, 15, 22].

Although international and regional guidelines recommend rational, stepwise therapy for gastritis and dyspepsia, real-world prescribing patterns often differ from guideline-based recommendations [4, 16, 22]. Several studies have reported frequent use of combination therapy and polypharmacy in outpatient management of acid-related disorders, which may not always be supported by strong clinical evidence [7-10]. Overlapping acid-suppressive therapy and adjunctive medications are commonly prescribed, potentially increasing treatment complexity and the risk of unnecessary drug use [9, 10].

From a pharmacoeconomic perspective, gastritis management contributes to direct medication costs, particularly in outpatient settings where prescription volumes are high. Although individual medications used for gastritis are relatively inexpensive, the cumulative economic burden may be substantial due to the high prevalence of the disease and frequent use of multi-drug regimens [11-14]. Previous pharmacoeconomic studies have demonstrated that polypharmacy is a major driver of increased pharmaceutical expenditure, emphasizing the importance of evaluating prescribing patterns in relation to medication costs [11, 12, 20].

In Indonesia, studies evaluating drug utilization in gastrointestinal disorders have primarily focused on descriptive prescribing patterns or assessments of rational drug use, with limited integration of economic outcomes [18-20]. Moreover, evidence specifically addressing the relationship between prescribing patterns and direct medication costs among gastritis outpatients in tertiary hospitals remains scarce. This lack of real-world evidence limits clinicians, pharmacists, and hospital managers' ability to assess the economic implications of current prescribing practices and to design strategies for more cost-effective pharmacotherapy.

Therefore, this study aimed to analyze prescribing patterns and direct medication costs among gastritis outpatients at RSUD Prof. Dr. Margono Soekarjo, a tertiary referral hospital in Indonesia. By describing commonly prescribed drugs, prevalent treatment regimens, and cost distribution according to the number of prescribed medications, this study provides real-world pharmacoepidemiological evidence to support rational drug use and cost-conscious management of gastritis in outpatient clinical practice.

Materials and Methods

Study Design and Setting

This observational analytic study employed a retrospective cross-sectional design and was conducted at a tertiary referral hospital in Central Java, Indonesia. The study was designed according to established principles of drug utilization research (DUR) and pharmacoepidemiology to describe real-world prescribing patterns and direct medication costs in outpatient clinical practice [23, 24]. This study was reported in accordance with the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) guidelines for cross-sectional studies.

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Study Period and Data Sources

Data were collected from January to December 2025. Secondary data were obtained from electronic medical records, which provided demographic and diagnostic information, and from pharmacy dispensing and billing databases, which supplied detailed information on prescribed medications and direct medication costs. The use of secondary hospital databases for pharmacoepidemiological and cost analyses has been widely applied and validated in previous drug utilization and pharmacoeconomic studies [23-26].

Study Population

The study population comprised all outpatients of any age diagnosed with gastritis and treated at RSUD Prof. Dr. Margono Soekarjo during the study period. Gastritis diagnoses were identified using the International Classification of Diseases, Tenth Revision (ICD-10) codes K29.5 and K29.7, which are commonly applied in epidemiological and clinical research on gastritis and dyspepsia [5, 22].

The inclusion criteria were outpatients diagnosed with gastritis (ICD-10 codes K29.5 or K29.7), patients receiving at least one pharmacological therapy for gastritis, and those with complete medical records and pharmacy cost data available. The exclusion criteria included patients with incomplete or missing medical records and prescriptions without documented medication cost information.

Variables and Operational Definitions

Demographic variables included age and sex. Clinical variables consisted of a gastritis diagnosis based on ICD-10 codes. Prescribing pattern variables included the type of medication prescribed, therapeutic drug class, and number of drugs per prescription.

Medications were categorized into PPIs, H2RAs, gastroprotective agents, antispasmodic–anxiolytic combinations, prokinetic agents, and antiemetics, following established classifications used in drug utilization and prescribing pattern studies [7-9, 27].

The primary economic outcome was direct medication cost per outpatient visit, defined as the total cost of all medications prescribed for gastritis treatment during a single encounter. Only direct drug costs were included, in accordance with standard pharmacoeconomic methodology [11, 12, 28].

Data Analysis

Data were analyzed using descriptive and inferential statistical methods. Categorical variables were summarized as frequencies and percentages, while continuous variables were presented as mean ± standard deviation (SD) and median with interquartile range (IQR), as appropriate.

The distribution of direct medication cost data was assessed and found to be non-normal, as is typical for cost data. Accordingly, non-parametric analytical approaches were emphasized [11-29]. Medication costs were analyzed by the number of drugs per prescription to identify potential cost drivers in the outpatient management of gastritis. Statistical methods commonly applied in DUR and pharmacoeconomic studies were used to ensure analytical and methodological consistency [23, 24]. All statistical analyses were performed using standard statistical software.

Ethical Considerations

This study was conducted in accordance with the Declaration of Helsinki. The Institutional Health Research Ethics Committee approved the study and granted institutional research permission (November 4, 2025). As this study involved a retrospective analysis of anonymized secondary data, the Ethics Committee waived the requirement for informed consent[30].

Results

Patient Characteristics

A total of 313 gastritis outpatients were included in this study. Most patients were women (64.5%), while 35.5% were men. The mean age of the patients was 47.5 ± 15.4 years, with a median age of 49 years (range: 17–90 years). Most patients were diagnosed with chronic gastritis (ICD-10 K29.5), accounting for 62.9% of cases, whereas 37.1% were classified as gastritis, unspecified (K29.7). Regarding prescribing patterns, polypharmacy was common: 62.9% of patients received two medications, and 34.2% received three or more medications per prescription (Table 1).

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Table 1. Demographic and Clinical Characteristics of Gastritis Outpatients at RSUD Prof. Dr. Margono Soekarjo (January–December 2025)

Characteristic	No. (%)
Gender	
Male	111 (35.5)
Female	202 (64.5)
Age (y)	
Mean ± SD	47.5 ± 15.4
Median (range)	49 (17–90)
Diagnosis (ICD-10)	
K29.5 – Chronic gastritis, unspecified	197 (62.9)
K29.7 – Gastritis, unspecified	116 (37.1)
Number of prescribed drugs per prescription	
1 drug	9 (2.9)
2 drugs	197 (62.9)
≥3 drugs	107 (34.2)

Abbreviations: SD, standard deviation; ICD-10, International Classification of Diseases, Tenth Revision.

Prescribing Patterns

The analysis of prescribed medications revealed that antispasmodic–anxiolytic combination therapy (chlordiazepoxide–clidinium) was the most frequently prescribed drug, used in 73.5% of patients. Among acid-suppressive therapies, PPIs were prescribed more frequently than H2RAs. Lansoprazole (61.7%) was the most commonly used PPI, followed by omeprazole (14.7%), whereas ranitidine, an H2 receptor antagonist, was prescribed in 20.1% of cases. Sucralfate was prescribed in 50.2% of patients as a gastroprotective agent. Adjunctive therapies, including prokinetic agents and antiemetics, were used less frequently (Table 2).

Prescription Regimens

Combination therapy predominated in the outpatient management of gastritis. The most common prescription regimen was chlordiazepoxide–clidinium combined with lansoprazole and sucralfate (18.2%), followed by chlordiazepoxide–clidinium with lansoprazole (16.9%). Regimens consisting of two or more medications accounted for the majority of prescriptions, reflecting a high prevalence of combination therapy in routine clinical practice (Table 3).

Table 2. Frequency of Prescribed Medications Among Gastritis Outpatients (n = 313)

Therapeutic Class	Medication	No. (%)
Proton pump inhibitors (PPIs)	Lansoprazole	193 (61.7)
	Omeprazole	46 (14.7)
H2 receptor antagonists (H2RAs)	Ranitidine	63 (20.1)
Gastroprotective agents	Sucralfate	157 (50.2)
Antispasmodic–anxiolytic combination	Chlordiazepoxide + clidinium	230 (73.5)
Prokinetic agents	Domperidone	23 (7.3)
Antiemetics	Ondansetron	5 (1.6)
Anticholinergics	Hyoscine butylbromide	7 (2.2)

Percentages exceed 100% because patients may receive more than one medication.

Table 3. Five Most Common Prescription Regimens Among Gastritis Outpatients (n = 313)

Rank	Prescription Regimen	No. (%)
1	Chlordiazepoxide–clidinium + Lansoprazole + Sucralfate	57 (18.2)
2	Chlordiazepoxide–clidinium + Lansoprazole	53 (16.9)
3	Lansoprazole + Sucralfate	44 (14.1)
4	Chlordiazepoxide–clidinium + Ranitidine	42 (13.4)
5	Chlordiazepoxide–clidinium + Omeprazole	31 (9.9)

Medication Cost Analysis

The overall mean direct medication cost per prescription was IDR 26,453 ± 7,623, with a median cost of IDR 27,130 (IQR: 21,800–36,730). Medication costs increased consistently with the number of prescribed drugs. Patients receiving a single medication incurred the lowest costs, whereas those prescribed three or more medications had the highest mean and median costs. This finding indicates that the number of prescribed drugs was a major driver of direct medication costs in the outpatient treatment of gastritis (Table 4).

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Table 4. Distribution of Direct Medication Costs by Number of Prescribed Drugs Among Gastritis Outpatients (n = 313)

Number of Prescribed Drugs	No. (%)	Mean ± SD (IDR)	Median (IQR) (IDR)	Minimum–Maximum (IDR)
1 drug	9 (2.9)	9,600 ± 0	9,600 (9,600–9,600)	9,600–9,600
2 drugs	197 (62.9)	25,730 ± 4,812	25,382 (21,800–29,600)	14,300–34,800
≥3 drugs	107 (34.2)	36,981 ± 3,921	36,730 (34,200–39,800)	28,500–44,132
Overall	313 (100)	26,453 ± 7,623	27,130 (21,800–36,730)	9,600–44,132

Abbreviations: SD, standard deviation; IQR, interquartile range.

Discussion

This study provides real-world evidence on prescribing patterns and direct medication costs among gastritis outpatients at a tertiary referral hospital in Indonesia. The findings reveal a high prevalence of combination therapy, with most patients receiving two or more medications per prescription. This pattern reflects routine outpatient clinical practice, in which heterogeneous symptom presentations, physician preferences, and attempts to achieve rapid symptom relief often influence therapeutic decisions.

The predominance of antispasmodic–anxiolytic combination therapy (chlordiazepoxide–clidinium) observed in this study is consistent with reports from other Asian outpatient settings, where dyspeptic symptoms are frequently associated with functional gastrointestinal complaints and psychosomatic factors [15, 22, 27]. Although international clinical guidelines emphasize acid suppression as the cornerstone of gastritis management, adjunctive therapies are commonly prescribed in real-world practice to address abdominal discomfort, bloating, and anxiety-related symptoms [4, 16, 22]. This divergence between guideline recommendations and actual prescribing behavior has been documented in previous drug utilization studies and underscores the challenges of translating evidence-based guidelines into routine outpatient care [7-10].

Among acid-suppressive therapies, PPIs, particularly lansoprazole, were prescribed more frequently than H2RAs. This finding is in line with current evidence demonstrating superior acid suppression and symptom control with PPIs compared to H2Ras [4, 22]. Similar prescribing trends favoring PPIs have been reported in both international and Indonesian studies, indicating a broader shift toward PPI-based therapy in the management of acid-related disorders [8, 18]. Nevertheless, the concurrent use of PPIs with multiple adjunctive medications may increase treatment complexity and contribute to higher medication costs.

From an economic perspective, this study demonstrates that the number of prescribed drugs per prescription is a key driver of direct medication costs. Patients receiving three or more medications incurred substantially higher costs than those receiving fewer drugs. This observation is consistent with established pharmacoeconomic principles and prior evidence showing that polypharmacy significantly increases pharmaceutical expenditure, even when individual drug prices are relatively low [11, 12, 20, 23]. In high-volume outpatient settings, such incremental cost increases may have meaningful implications for hospital budgeting and efficient resource allocation.

The observed cost distribution highlights the importance of evaluating prescribing patterns not only from a clinical standpoint but also from a cost-conscious perspective. While combination therapy may be clinically justified in selected patients, routine use of multi-drug regimens without clear additional benefit may reduce prescribing efficiency. From a pharmacy practice perspective, these findings point to opportunities for clinical pharmacists to review prescription regimens, identify potentially unnecessary combination therapy, and support rational drug use. Previous studies have demonstrated that pharmacist-led interventions and multidisciplinary collaboration can improve prescribing quality and optimize medication-related costs in outpatient care [23, 24].

This study adds to the limited body of evidence integrating drug utilization patterns with medication cost analysis in Indonesian tertiary hospitals. In contrast to prior studies that primarily described prescribing patterns [18, 19], the present study provides additional insight into the economic implications of routine outpatient prescribing

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practices. These findings may inform hospital-level strategies to improve rational pharmacotherapy, such as periodic prescription audits, the development of local treatment pathways, and strengthened collaboration between physicians and clinical pharmacists.

Several limitations should be acknowledged. First, the single-center retrospective design may limit the generalizability of the findings to other healthcare settings. Second, the analysis was restricted to direct medication costs and did not include indirect costs or non-pharmaceutical medical expenses. Third, detailed clinical information, such as symptom severity, treatment duration, and clinical outcomes, was not available, precluding a formal cost-effectiveness analysis. Despite these limitations, the use of real-world hospital data and a relatively large outpatient sample enhances the relevance of the findings to everyday clinical practice.

In conclusion, outpatient management of gastritis in a tertiary hospital setting in Indonesia is characterized by frequent use of combination therapy, with polypharmacy emerging as a major determinant of direct medication costs. These findings underscore the need for ongoing evaluation of prescribing practices to balance clinical effectiveness with economic efficiency, and highlight the potential role of clinical pharmacists in promoting rational, cost-conscious pharmacotherapy for outpatient care for gastritis.

Conclusion

In a tertiary hospital setting in Indonesia, outpatient management of gastritis is characterized by the frequent use of combination therapy. The number of prescribed drugs per prescription is a major determinant of direct medication costs. These findings emphasize the need for continuous evaluation of prescribing practices to promote rational, effective, and cost-conscious pharmacotherapy for the outpatient care of gastritis, with potential support from clinical pharmacy interventions.

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