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Comparative Pharmacoeconomic Study of Proton Pump Inhibitors in Gastritis Treatment Using Cost Minimization Approach

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Abstract−Gastritis is an inflammatory condition of the gastric mucosa with varying degrees of severity, ranging from mild asymptomatic cases to more severe forms associated with significant morbidity. The condition may be influenced by multiple factors, including dietary habits that stimulate gastric acid secretion, irregular eating patterns, infections, psychological stress, alcohol consumption, and the use of certain medications such as nonsteroidal anti-inflammatory drugs and corticosteroids. Cost Minimization Analysis (CMA) is a pharmacoeconomic approach applied to compare therapeutic alternatives that have equivalent clinical effectiveness by identifying the option with the lowest direct medical cost. Meanwhile, studies examining real-world cost efficiency at the level of primary care services or private community pharmacies remain relatively limited and underreported. Therefore, this study aims to analyze the cost of PPI use in gastritis patients at Fella Farma Pharmacy in 2023 using the Cost Minimization Analysis (CMA) approach. The results of this study are expected to determine PPI alternatives with the lowest therapy costs as a basis for decision-making in more efficient and rational pharmaceutical services. This study conceptualizes that the use of proton pump inhibitors, specifically omeprazole and lansoprazole, influences the total therapy costs incurred by patients. The choice of PPI is assumed to affect overall treatment expenses as reflected in retrospective medical record data from Fella Farma Pharmacy in 2023. This study used a quantitative research design with retrospective data collection using medical records obtained from Fella Farma Pharmacy for the year 2023.A sample of 52 patients who met the inclusion and exclusion criteria at the Fella Farma Clinical Pharmacy in 2023. The data obtained were then analyzed for minimum costs to determine the lowest cost of treatment between Omeprazole (patent brand x) and Lansoprazole (patent brand y). The results of the study showed that the use of Proton Pump Inhibitor (PPI) drugs that had the lowest cost was omeprazole with an average total cost of IDR 351,000/patient compared to lansoprazole with an average total cost of IDR 514,000/patient.

Keywords: Pharmacoeconomics; Cost Minimization Analysis; Proton Pump Inhibitor; Gastritis

1. INTRODUCTION

Gastritis is a medical disorder marked by inflammation of the gastric mucosa. The condition may present with a wide range of severity, from mild and asymptomatic cases to more serious forms associated with considerable morbidity. The current classification of gastritis is determined by the disease duration (acute or chronic), histopathological characteristics, anatomical location, and the underlying pathophysiological mechanisms (Azer SA, Awosika AO, 2024). The most frequently occurring primary cause is the consumption of foods that stimulate gastric acid production, which in turn can trigger an inflammatory response in the gastric mucosa (Artini et al., 2022).

Gastritis commonly occurs in individuals with irregular eating patterns and habitual consumption of foods that stimulate increased gastric acid secretion. In addition, infections caused by certain microorganisms are also known to contribute to the development of gastritis. Dietary pattern is defined as an effort to regulate the quantity and types of food intake with the aim of maintaining health, preserving nutritional status, and preventing or supporting the recovery from disease. Nevertheless, the etiology of gastritis is not limited to dietary factors alone. Psychological factors, such as stress, may also trigger the onset of gastritis. Stress is a condition that arises from the interaction between an individual and their environment, in which the individual perceives a mismatch—either actual or perceived—between situational demands and the biological, psychological, and social resources available to them (Artini et al., 2022).

Factors contributing to the development of acute gastritis include excessive alcohol consumption, infections resulting from contaminated food, and the use of illicit substances such as cocaine. In addition, the use of certain medications, including corticosteroids and nonsteroidal anti-inflammatory drugs (NSAIDs) such as aspirin and ibuprofen, is also known to trigger gastritis. The clinical manifestations of acute gastritis commonly include anorexia, nausea, vomiting, and a sensation of gastric fullness. Clinically, gastritis may be characterized by the presence of ulceration, which has the potential to cause hemorrhage. Patients may also experience abdominal discomfort accompanied by headache, lethargy, nausea, and anorexia, as well as vomiting and hiccups. In some cases, colic and diarrhea may occur if irritating food is not expelled through vomiting. In chronic gastritis, commonly observed symptoms include decreased appetite (anorexia), epigastric pain after meals, abdominal bloating, a sour taste in the mouth, as well as nausea and vomiting (Ferry & Wijonarko, 2022).

The WHO health research body reported global findings on the prevalence of gastritis across various countries, with incidence rates documented at 22% in the United Kingdom, 31% in China, 14.5% in Japan, 35% in Canada, and 29.5% in France. In the Southeast Asian region, the incidence of gastritis is estimated to reach approximately 583,635 cases annually. Furthermore, WHO data indicate that the prevalence of gastritis in Indonesia is 40.8%, with a notably high number of cases 274,396 out of a total population of 238,452,95 (Artini et al., 2022). According to data from the

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Ministry of Health of the Republic of Indonesia, the prevalence of gastritis reaches approximately 40–50% in the adult population and is one of the leading causes of patient visits to healthcare facilities, including hospitals and pharmacies.

The management of gastric disorders can be achieved pharmacologically through the administration of synthetic medications, including proton pump inhibitors (PPIs), H2-receptor blockers, antacids, and sucralfate. Proton pump inhibitors are potent gastric acid–suppressing agents. Due to their high therapeutic efficacy in acid-related diseases and the increasing availability of both over-the-counter and generic formulations, the utilization of PPIs has continued to rise (Syari & Sari, 2021). Several therapeutic approaches have been explored, including proton pump inhibitors (PPIs), dietary elimination, and corticosteroids; however, the effectiveness of these interventions has not yet been conclusively established. Current management primarily focuses on symptom relief and iron supplementation in cases of anemia. Although most patients demonstrate clinical improvement over time, histopathological abnormalities typically persist. Moreover, there is concern regarding the potential risk of long-term malignant transformation, necessitating prolonged follow-up, including periodic repeat endoscopic evaluations (Ho & Chiou, 2023).

Proton pump inhibitors (PPIs) are a class of drugs that selectively inhibit the H^+/K^+-ATPase enzyme located in gastric parietal cells. They are widely used in the treatment of acid-related disorders, including erosive esophagitis, gastroesophageal reflux disease (GERD), and peptic ulcer disease (PUD) (Faustina et al., 2022). Proton pump inhibitors (PPIs) ultimately act to suppress gastric acid production. These agents are absorbed in the proximal segment of the small intestine and, after entering systemic circulation, exert their effects on gastric parietal cells. Within these cells is the H^+/K^+-ATPase enzyme, also known as the proton pump, which is specifically inhibited by PPIs and represents the terminal step in gastric acid secretion. Notably, PPIs are administered as prodrugs and require activation through acid-mediated cleavage within the acidic secretory canaliculi of parietal cells (Abdelwahab Ahmed & John O. Clarke., 2023).

Pharmacoeconomics is a discipline within health economics that evaluates and compares the costs and outcomes of a specific healthcare intervention relative to alternative options. This form of analysis is essential for achieving optimal value for patients, healthcare payers, and society, particularly in the context of increasingly limited resources. Generally, newly introduced healthcare interventions including pharmaceuticals, medical devices, and health services tend to be more expensive than existing alternatives. However, these innovations often offer additional clinical benefits, thereby providing greater value compared to the current standard of care (Tonin et al., 2021).

The administration of therapeutic treatment received by patients has a significant impact on the overall cost of medical care. Treatment costs continue to increase because patients also incur expenses for direct medical costs, including hospitalization or care costs, medication costs, and laboratory examination costs (Hutahaean et al., 2019).

The selection of Patented Omeprazole and Patented Lansoprazole as comparison objects is based on the results of a preliminary study at Fella Farma Pharmacy that analyzed drug prescription and sales data in 2023. The preliminary study showed that these two patented PPIs are the two drugs most frequently prescribed and used by gastritis patients, with the highest proportion of use compared to other PPIs available in pharmacies. In addition, although used for relatively similar indications, doses, and duration of therapy, Patented Omeprazole and Patented Lansoprazole have significant differences in unit price and total therapy costs, potentially causing differences in the burden of treatment costs for patients. Therefore, the comparison between Patented Omeprazole and Patented Lansoprazole through CMA is considered the most relevant, representative, and has direct practical implications in efforts to improve the efficiency of pharmaceutical services at Fella Farma Pharmacy. Previous research has shown that omeprazole and lansoprazole have equivalent clinical efficacy in healing gastritis and improving symptoms, so there is no significant difference in clinical outcomes between the two drugs (N & B, 2003).

Cost-effectiveness analysis (CEA) is an economic evaluation approach used to assess and compare the relative costs and health outcomes of two or more healthcare interventions. In this method, outcomes are expressed in non-monetary measures, such as the number of deaths averted or decreases in diastolic blood pressure (mmHg). In performing cost analysis, hospitals apply standardized cost classifications, including direct costs. Direct costs refer to all patient-incurred expenditures associated with medical care, encompassing hospitalization, pharmacological treatment, and laboratory services (Pratiwi & Azzahra, 2022). Whereas, Cost Minimization Analysis (CMA) is a pharmacoeconomic evaluation method used to compare two or more therapeutic alternatives based on the lowest cost, under the assumption that each alternative has been demonstrated to produce equivalent clinical outcomes. In its application, CMA requires data on the average total direct medical costs as the primary component of the analysis (Islami & Rahmaniar, 2025).

Various clinical and pharmacoeconomic studies have evaluated the use of proton pump inhibitors (PPIs), particularly omeprazole and lansoprazole. However, most comparative studies between these two agents continue to emphasize primary clinical outcomes, such as mucosal healing rates and symptom improvement, which are generally conducted in secondary or tertiary referral healthcare facilities. Meanwhile, studies examining real-world cost efficiency at the level of primary care services or private community pharmacies remain relatively limited and underreported.

Fella Farma Pharmacy, as a community pharmacy, plays an important role in providing high-quality, effective, and affordable medications for patients. However, the variation in prices among available PPI brands presents a challenge for pharmacists in offering efficient therapeutic recommendations. Thus, a cost-minimization analysis of various PPIs used by gastritis patients in this pharmacy is required to support the implementation of a pharmacoeconomic approach in pharmaceutical care practice.

This study was conducted to determine which proton pump inhibitor, patented omeprazole or patented lansoprazole, offers the lowest cost for gastritis patients at Fella Farma Pharmacy in 2023. Additionally, the study aims to identify the fixed costs and variable costs incurred by patients receiving these patented PPI therapies in the pharmacy.

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2. RESEARCH METHODOLOGY

2.1 Research Procedures and Conceptual model

This study employed a quantitative research design with retrospective data collection using medical records obtained from Fella Farma Pharmacy for the year 2023. This study conceptualizes that the use of proton pump inhibitors, specifically omeprazole and lansoprazole, influences the total therapy costs incurred by patients. The choice of PPI is assumed to affect overall treatment expenses as reflected in retrospective medical record data from Fella Farma Pharmacy in 2023. This study used a quantitative research design with retrospective data collection using medical records obtained from Fella Farma Pharmacy for the year 2023. The independent variable in this study was the use of proton pump inhibitor drugs (omeprazole and lansoprazole), while the dependent variable was the total therapy costs incurred by patients during their treatment.

a. Research Location and Period
   The study was conducted at Fella Farma Pharmacy between May and June 2024, utilizing retrospective data collected from January to December 2023.
b. Population and Sample
   The study population consisted of all patients diagnosed with gastritis at Fella Farma Pharmacy from January to December 2023, totaling 1,672 patients. The sample included gastritis patients from the same period who met the inclusion and exclusion criteria. The sampling technique employed was purposive sampling, in which samples were selected based on predefined considerations established by the researcher according to the characteristics of the known population.
b. Inclusion and Exclusion Criteria
   Inclusion Criteria
   1. Patients aged >17 years
   2. Patients receiving patented proton pump inhibitors: omeprazole or lansoprazole

   Exclusion Criteria
   1. Patients with comorbid conditions
   2. Patients with incomplete data
   3. Patients covered by BPJS (National Health Insurance)
c. Research Instruments
   The research instruments included:
   1. Medical records of gastritis patients
   2. Administrative data from treatment payment records
   3. Data collection sheets
d. Data Collection and Presentation
   Data collection was conducted using medical records and administrative documents of gastritis patients who received patented proton pump inhibitors (omeprazole and lansoprazole) at Fella Farma Pharmacy. The collected data included patient medical record numbers, sex, the type of PPI prescribed (patented omeprazole or lansoprazole), and payment records (doctor consultation fees, administrative fees, supporting examination costs including laboratory tests, ultrasound, and ECG and the cost of the PPI medication itself). The data were then presented in tabular form.

2.2 Data Analysis

The data analysis method used to determine the lowest-cost therapy was pharmacoeconomic evaluation through Cost Minimization Analysis (CMA). The steps involved in the data analysis were as follows:

a. Determination of Study Objectives
   This stage aimed to identify the purpose of the study. The study aimed to determine the cost of using patented proton pump inhibitors (omeprazole and lansoprazole) for gastritis patients at Fella Farma Pharmacy in 2023.
b. Cost Identification
   This stage involved identifying the treatment costs incurred by patients. The costs measured were total costs, including fixed costs and variable costs.
c. Cost-Minimization Analysis
   A cost-minimization analysis was conducted to determine the lowest-cost therapy between patented omeprazole and patented lansoprazole for gastritis patients at Fella Farma Pharmacy in 2023, using the following formula:

$$\text{Total Cost} = \text{Fixed Cost} + \text{Variable Cost} \quad (1)$$

   Fixed cost components included administrative fees, while variable cost components included doctor consultation fees, nursing service fees, supporting examination fees (laboratory tests, ultrasound, ECG), and medication costs for patented omeprazole and lansoprazole. The total cost for each patient was calculated first. To determine the most cost-efficient therapy, the total costs of all patients within each treatment group were summed and divided by the number of patients to obtain the average total cost per patient. Based on these calculations, conclusions were drawn regarding which patented proton pump inhibitor (omeprazole or lansoprazole) presented the lowest overall cost.

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3. RESULTS AND DISCUSSION

3.1 Results

A total of 1,672 gastritis patients were recorded at Fella Farma Pharmacy during the period of January–December 2023, with 52 patients meeting the inclusion and exclusion criteria.

Table 1. Characteristics of Gastritis Patients

No	Description	N	Percentage (%)
1.	Sex		
	Male	16	30.77%
	Female	36	69.23%
	Total	52	100%
2.	Age Group (years)		
	17–19	5	9.60%
	20–45	32	61.54%
	>45	15	28.84%
	Total	52	100%

Source: Primary data

Note:
n = Number of samples

Based on Table 1, among the 52 gastritis patients at Fella Farma Pharmacy, 16 were male (30.77%) and 36 were female (69.23%). Furthermore, Table 1 shows that the distribution of gastritis patients by age group was as follows: 5 patients (9.60%) were aged 17–19 years, 32 patients (61.54%) were aged 20–45 years, and 15 patients (28.84%) were aged above 45 years.

Table 2. Distribution of Patients Using Patented Omeprazole and Lansoprazole

No	Medication	Number of Patients	Percentage (%) (n = 52)
1.	Omeprazole (patented)	13	25%
2.	Lansoprazole (patented)	39	75%
Total		52	100%

Source: Primary data

Note:
n = Number of samples

Based on Table 2, among the 52 gastritis patients using proton pump inhibitor (PPI) therapy at Fella Farma Pharmacy, 13 patients used omeprazole (brand-name) accounting for 25%, while 39 patients used lansoprazole (brand-name) accounting for 75%. Among female patients, 7 used omeprazole and 29 used lansoprazole, whereas among male patients, 6 used omeprazole and 10 used lansoprazole.

Table 3. Price List of Patented Omeprazole and Lansoprazole

No	Medication	Dosage Form	Price (Rp)
1.	Omeprazole (patented)	Capsule	1,300
2.	Lansoprazole (patented)	Capsule	22,000

Source: Primary data

Note:
n = Number of samples

Based on Table 3, the price of patented omeprazole was IDR 1,300 per capsule, whereas patented lansoprazole cost IDR 22,000 per capsule. Using the cost minimization formula described by Akbar, Ardana, and Kuncoro (2018), the average minimal cost per patient was calculated as follows:

$$\text{Average CMA per patient} = \frac{\text{Total Cost}}{\text{Number of Patients}} \quad (2)$$

Average CMA per patient (patented omeprazole)

$$\text{Average CMA per patient} = \frac{\text{Rp. } 4{,}563{,}000}{13} = 351{,}000/\text{Patients}$$

Average CMA per patient (patented lansoprazole)

$$\text{Average CMA per patient} = \frac{\text{Rp. } 20{,}060{,}000}{39} = 514{,}000/\text{Patients}$$

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Table 4. Cost-Minimization Analysis

No	Total Cost	Cost Components	Omeprazole (patented) (n = 13)	Lansoprazole (patented) (n = 39)
1.	Fixed Cost (Rp)	Administration	130,000	390,000
		Average	10,000	10,000
2.	Variable Cost (Rp)	Physician consultation	1,950,000	5,850,000
		Average	150,000	150,000
		Nursing services	65,000	195,000
		Average	5,000	5,000
		Supporting examinations:		
		– Laboratory	220,000	745,000
		– Ultrasound (USG)	1,300,000	3,500,000
		– Electrocardiography (ECG)	560,000	800,000
		Average	160,000	129,000
		Medication	338,000	8,580,000
		Average	26,000	220,000
3.	Average total cost		351,000	514,000

Source: Primary data

Note:
n = Number of samples

Based on Table 4, a total of 13 patients used brand-name omeprazole. The costs incurred for these 13 patients included administrative fees amounting to Rp. 130,000 (an average of Rp. 10,000 per patient), physician consultation fees totaling Rp. 1,950,000 (an average of Rp. 50,000 per patient), nursing service fees totaling Rp. 65,000 (an average of Rp. 5,000 per patient), and ancillary costs amounting to Rp. 2,080,000, consisting of laboratory tests (Rp. 220,000), ultrasound examinations (Rp. 1,300,000), and ECG examinations (Rp. 560,000), with an average of Rp. 160,000 per patient. Medication costs totaled Rp. 338,000 (an average of Rp. 26,000 per patient). The total expenditure for all 13 patients was Rp. 4,563,000, resulting in an average total cost of Rp. 351,000 per patient receiving brand-name omeprazole. These findings indicate that the largest cost components in the omeprazole group were ancillary and physician consultation fees rather than medication costs.

Based on Table 4, a total of 39 patients used brand-name lansoprazole. The costs incurred included administrative fees of Rp. 390,000 (an average of Rp. 10,000 per patient), physician consultation fees totaling Rp. 5,850,000 (an average of Rp. 150,000 per patient), nursing service fees totaling Rp. 195,000 (an average of Rp. 5,000 per patient), and ancillary costs amounting to Rp. 5,045,000, consisting of laboratory tests (Rp. 745,000), ultrasound examinations (Rp. 3,500,000), and ECG examinations (Rp. 800,000), with an average of Rp. 129,000 per patient. Medication costs totaled Rp. 8,580,000 (an average of Rp. 220,000 per patient). The total expenditure for all 39 patients was Rp. 20,060,000, resulting in an average total cost of Rp. 514,000 per patient receiving brand-name lansoprazole. In the lansoprazole group, medication costs contributed a greater proportion to the total expenditure compared to the omeprazole group.

Overall, the average total cost per patient in the lansoprazole group (Rp. 514,000) was higher than that in the omeprazole group (Rp. 351,000), with a difference of Rp. 163,000 per patient. Assuming equivalent clinical effectiveness between the two therapies, based on the Cost Minimization Analysis (CMA) approach, brand-name omeprazole represents a more cost-efficient therapeutic alternative in the treatment of gastritis.

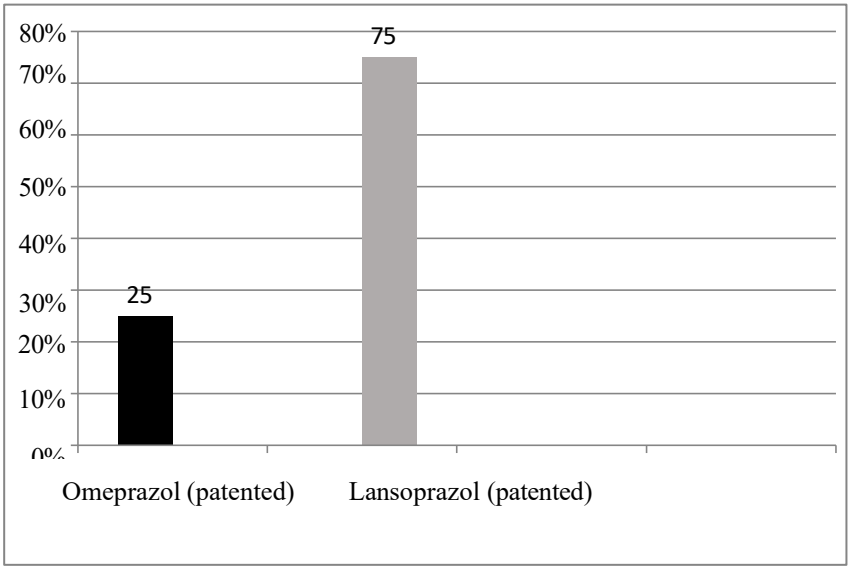

Figure 1. Distribution of Patients Using Patented Omeprazole and Lansoprazole

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Figure 1 illustrates that 25% of patients used patented omeprazole, while 75% used patented lansoprazole, indicating that lansoprazole was more frequently prescribed during the study period.

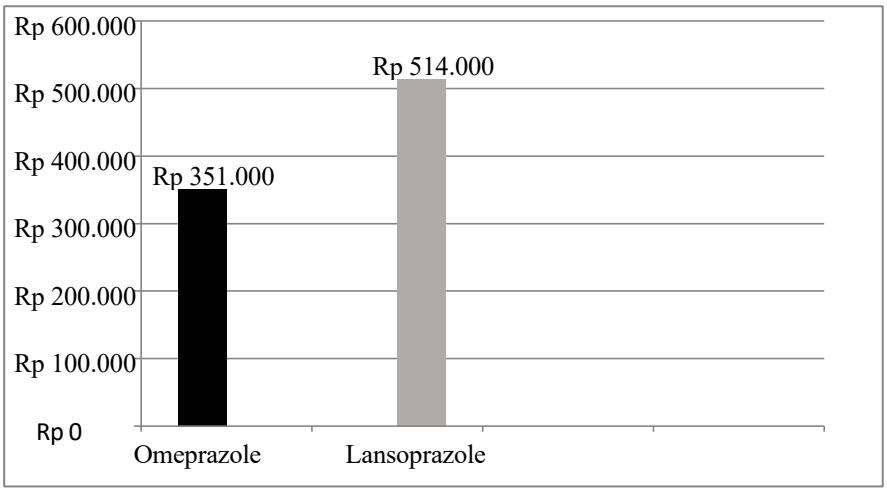

Figure 2. Comparison of Average Total Costs of PPI Therapy

Figure 2 shows that the average total cost for patients receiving patented omeprazole was Rp. 351,000 per patient, whereas the average total cost for those receiving patented lansoprazole was Rp. 514,000 per patient. This indicates that patented omeprazole was the more cost-efficient option for gastritis patients at Fella Farma Pharmacy in 2023.

3.2 Discussion

Gastritis refers to inflammation of the gastric mucosa and represents a significant global health issue because of its high prevalence. The condition may present as either acute or chronic, depending on the underlying causes and the individual's overall health status. With appropriate management, acute gastritis typically resolves within a short period. In contrast, chronic gastritis may develop gradually and can result in atrophy and metaplastic changes, which may ultimately lead to permanent injury to the gastric mucosa (Akram et al., 2025).

Erosive gastritis is characterized by mucosal injury confined to the superficial mucosal layer and is commonly associated with the use of medications such as non-steroidal anti-inflammatory drugs (NSAIDs), psychological or physical stress, alcohol consumption, and *Helicobacter pylori* infection. When gastritis is accompanied by symptoms, erosive gastritis may become a primary target of therapeutic intervention. Symptom management is addressed in the functional dyspepsia guidelines published in 2020. Nevertheless, in addition to symptomatic treatment, pharmacological therapy is sometimes administered to promote healing of erosive lesions. Therefore, the effects of proton pump inhibitors (PPIs) and mucoprotective agents on erosive gastritis were included as key clinical questions (Kang et al., 2023).

Proton pump inhibitors (PPIs) are acid-labile weak bases that are administered in an inactive form and require an acidic environment to initiate inhibition of the H^+/K^+-ATPase enzyme. To prevent premature activation within the stomach, these agents must be protected from gastric acid exposure, which can be achieved through formulations such as enteric coating. PPIs are benzimidazole derivatives, and their optimal pharmacological activity is attained when administered in a fasting state. Therefore, patients are recommended to take PPIs on an empty stomach to ensure maximal absorption and therapeutic effectiveness (Wołowiec et al., 2025).

Through pharmacoeconomic analysis, the most cost-effective treatment strategies can be identified, enabling optimal use of healthcare budgets while minimizing overall expenditures. This approach allows a greater number of patients to access high-quality medical care. Furthermore, pharmacoeconomic indicators support both physicians and patients in making informed decisions when selecting therapies that achieve the best clinical outcomes at the lowest possible cost, thereby improving patients' quality of life and financial well-being (Serikbayeva et al., 2025).

Pharmacoeconomic studies are categorized into four main types: Cost-Effectiveness Analysis (CEA), Cost-Minimization Analysis (CMA), Cost-Utility Analysis (CUA), and Cost-Benefit Analysis (CBA). These approaches support drug selection policies for patient diseases, highlighting the importance of prioritizing pharmacoeconomic considerations in healthcare decision-making. Among these methods, Cost-Minimization Analysis is the simplest and is applied to compare alternative treatments and therapeutic outcomes when the effects of health interventions are considered equivalent (Amalia & Suardiana, 2025).

Cost Minimization Analysis (CMA) is utilized to examine and assess the relative costs associated with interventions that yield equivalent outcomes. CMA is applied when two interventions have been demonstrated to produce identical or comparable therapeutic results. When two treatments are considered equivalent, the analysis focuses solely on the costs involved. The calculation of Cost Minimization Analysis is conducted by determining the average total cost incurred per patient and then comparing these average total treatment costs using the CMA method (Kuna et al., 2024).

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The pharmacoeconomic analysis method applied in this study was Cost Minimization Analysis (CMA) to evaluate the use of proton pump inhibitor (PPI) medications, specifically brand-name omeprazole and brand-name lansoprazole, among gastritis patients at Fella Farma Pharmacy during the period of January–December 2023.

A total of 52 patient records obtained from the medical archives of Fella Farma Pharmacy met the inclusion and exclusion criteria. Patient data were collected using a structured data extraction form. The collected data included clinical information as well as total costs incurred by each patient, encompassing both fixed and variable costs.

Based on Table 2 and Figure 1, lansoprazole (brand-name) was the most frequently prescribed PPI among gastritis patients, accounting for 75%, compared with omeprazole (brand-name), which accounted for only 25%. Lansoprazole was more frequently used because its pharmacodynamic effect lasts for a full 24 hours, allowing once-daily dosing at any time of day to consistently inhibit gastric acid secretion both during daytime and nighttime. In contrast, omeprazole requires repeated administration because its acid-suppressing effect diminishes during nighttime when given once daily in the morning. Due to the convenience of once-daily dosing, physicians at Fella Farma Pharmacy more commonly prescribed lansoprazole than omeprazole, as this regimen is closely associated with patient adherence. Although both medications have comparable effectiveness, their duration of action differs significantly.

Based on Table 1, the number of female gastritis patients was higher than that of males. Females were found to be 6.667 times more likely to develop gastritis than males, indicating that female patients are at higher risk. This increased susceptibility is associated with the higher prevalence of stress among females compared with males (Tambunan, 2022). Women tend to experience stress more easily due to hormonal mechanisms, as fluctuations in hormonal balance can induce stress responses (Waworuntu, Pangemanan, and Natalia, 2024). During periods of intense stress, gastric acid production increases, causing hyperacidity, nausea, and mucosal injury. Excess acid may irritate the gastric mucosa and, if persistent, may lead to inflammation or gastritis. Women are also more prone to gastritis because they tend to be more concerned about weight and appearance, which may lead to dietary patterns that are inconsistent in frequency, portion size, or food type, in an effort to avoid weight gain (Tambunan, 2022). Differences in eating patterns between men and women driven by variations in activity levels, body composition, and dietary choices further contribute to women's higher risk. Moreover, the prevalence of *Helicobacter pylori* infection has been reported to be higher among females, further increasing their risk of gastritis (Waworuntu, Pangemanan, and Natalia, 2024).

Based on Table 1, the age distribution of gastritis patients showed that 5 patients were aged 17–19 years, 32 patients were aged 20–45 years, and 15 patients were above 45 years. The highest prevalence occurred in the 20–45-year age group. This age range represents the productive working-age population, which is more susceptible to gastritis due to busy schedules and lifestyle patterns that often lead to irregular or unhealthy eating habits (Waworuntu, Pangemanan, and Natalia, 2024). Younger and working-age adults frequently have demanding workloads that disrupt regular mealtimes. Long working hours and rest periods that fall outside typical eating schedules may contribute to the development of gastritis (Tambunan, 2022). Based on Table 4, the average total cost per patient using brand-name omeprazole was Rp. 351,000, whereas the average total cost per patient using brand-name lansoprazole was Rp. 514,000.

From these findings, the PPI that demonstrated the lowest total average cost was brand-name omeprazole, with an average expenditure of Rp 351,000 per patient. The findings of this study are consistent with the research conducted by Sari et al., 2024 among gastritis patients in the inpatient unit of Pertamina Balikpapan Hospital, which demonstrated that omeprazole is a more cost-efficient and effective therapy compared to lansoprazole in the management of gastritis patients (Sari et al., 2024). Omeprazole is generally well tolerated and is associated with a low incidence of adverse effects, with approximately 11% of patients experiencing mild symptoms, most frequently headache or diarrhea. It is the most extensively researched and widely utilized proton pump inhibitor, supported by over 1,200 clinical trials and more than 400 million patient treatment courses globally. Omeprazole has a well-established long-term safety profile spanning more than three decades, is approved for the management of most acid-related disorders, and has demonstrated efficacy in treating dyspepsia as well as in the healing and prevention of NSAID-associated gastric and duodenal ulcers (Vg et al., 2024).

4. CONCLUSION

This study demonstrates that among the proton pump inhibitor (PPI) therapies evaluated, patented omeprazole represents the most cost-efficient option for gastritis management at Fella Farma Pharmacy in 2023, with an average total treatment cost of Rp. 351,000 per patient, which is substantially lower than the average cost of patented lansoprazole (Rp. 514,000 per patient). The cost component analysis further indicates that omeprazole therapy is associated with a fixed cost of Rp. 130,000 and a variable cost of Rp. 4,433,000, whereas lansoprazole therapy incurs a higher fixed cost of Rp. 390,000 and variable cost of Rp 19,670,000. These findings confirm that patented omeprazole offers superior cost-minimization compared to patented lansoprazole, while maintaining equivalent therapeutic effectiveness. Overall, this study underscores the importance of pharmacoeconomic evaluation in guiding rational drug selection in community pharmacy settings, particularly in optimizing treatment affordability for patients.

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