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The Impact of Patient Education on Knowledge of Gastritis and its Management in Public Health Centers

Sara Nurmala[1], Nisa Yulianti Suprahman[2], Ladya Putri Kartini Gunawan[1] and Eka Herlina[3*]

[1]Pharmacy Study Program, Faculty of Mathematics and Natural Sciences, Pakuan University, Bogor, Indonesia
[2]Faculty Sains Institut Teknologi Sumatera, Lampung, Sumatra, Indonesia
[3]Chemistry Study Program, Faculty of Mathematics and Natural Sciences, Pakuan University, Bogor, Indonesia

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Abstract

This study examines the impact of pharmacy education on patients' knowledge of gastritis and its associated medications in several public health centers in Bogor City. Gastritis is a common digestive disorder caused by factors such as Helicobacter pylori infection and prolonged NSAID use. The research used a quantitative pre-experimental design with a one-group pre-test and post-test approach. One hundred patients with gastritis participated, receiving educational interventions through leaflets and oral explanations. Data were collected using structured questionnaires and analyzed with statistical methods.

Results showed a significant improvement in patient knowledge following the intervention, with the proportion of patients demonstrating high knowledge increasing from 45% to 94%. The Wilcoxon test confirmed a statistically significant effect of the educational program (p-value = 0.000). These findings underscore the effectiveness of pharmacy education in enhancing patients' understanding of gastritis and medication use, which may lead to improved treatment adherence and better health outcomes. Future research should investigate various educational media, expand to different populations or settings, and assess long-term knowledge retention and clinical outcomes. Exploring barriers to information uptake and the role of family or community support could further optimize educational interventions for managing chronic diseases.

***Corresponding author**: Eka Herlina, Chemistry Study Program, Faculty of Mathematics and Natural Sciences, Pakuan University, Bogor, Indonesia. **Email:** eka.herlina@unpak.ac.id

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Introduction

Gastritis is a common digestive disorder characterized by inflammation of the gastric mucosa, which can lead to a range of symptoms and complications if left unmanaged. The condition is frequently caused by infection with Helicobacter pylori and prolonged use of non-steroidal anti-inflammatory drugs (NSAIDs), but can also be triggered by lifestyle factors such as excessive alcohol consumption, irregular eating patterns, and high levels of stress. According to the World Health Organization (WHO), the global incidence of gastritis remains significant, with millions of new cases reported annually, and prevalence rates varying across different countries. NSAIDs are an independent cause of reactive (chemical) gastritis, especially in the gastric antrum [1].

In Indonesia, gastritis represents a major public health concern, with a reported prevalence of 40.8% in 2020 and substantial numbers observed in urban areas such as Bogor City. The burden of gastritis is particularly notable among productive age groups, where it can negatively impact daily activities, reduce quality of life, and decrease overall productivity. Effective management of gastritis not only relies on appropriate pharmacological therapy but also on patient knowledge and adherence to treatment regimens. Prevalence rates for gastritis can be as high as 78% in some populations, with both acute and chronic forms commonly observed [2].

Pharmacy education plays a crucial role in empowering patients with the information necessary to understand their condition and use medications correctly. Systematic reviews and meta-analyses have demonstrated that pharmacist-led interventions significantly improve the rational use of anti-ulcer medications, reduce treatment costs, and enhance medication adherence among patients with peptic ulcer disease and related gastrointestinal conditions [3]. Chronic gastritis remains one of the most common serious infections globally, with higher rates in low-income and low-sociodemographic index regions. Recent studies have reported rising rates of mild chronic gastritis, particularly among children and young adults [4].

However, gaps in patient understanding persist, often due to limited access to reliable information or inadequate communication between healthcare providers and patients. Research indicates that knowledge directly and significantly influences both attitudes and practices related to gastritis management, underscoring the importance of targeted educational programs [5]. Prevalence and risk factors vary significantly by geographic region, socioeconomic status, and local health practices [6].

Given these challenges, evaluating the impact of pharmacy education on patient knowledge is essential for optimizing treatment outcomes and enhancing the quality of healthcare services. This study aims to assess the effectiveness of pharmacy education in improving patient knowledge about gastritis and the appropriate use of gastritis medications in public health centers in Bogor City.

Objectives

The objectives of this study are to evaluate and enhance patient knowledge regarding gastritis and its medication use through pharmacy education interventions in public health centers in Bogor City. Initially, the research aims to assess the baseline understanding of patients about gastritis and the correct use of related medications before any educational activities are conducted. Following this, the study evaluates the impact of pharmacy education delivered through oral counseling and informative leaflets on improving patient knowledge. By comparing pre- and post-intervention knowledge scores, the effectiveness of these educational media is determined. Additionally, the research seeks to identify specific barriers and facilitators that influence knowledge improvement within the local healthcare context. The findings aim to provide evidence-based recommendations for optimizing pharmacy education strategies in primary care, thereby supporting improved management of gastritis and promoting rational medication use among patients.

Methods

This study employed a quantitative pre-experimental design using a one-group pre-test and post-test approach. The research was conducted at several public health centers (Puskesmas) in Bogor City during June 2025. The study population comprised all patients undergoing treatment for gastritis at these centers, with a total sample of 100 patients selected based on specific inclusion criteria. The sampling technique used was purposive sampling to ensure that participants met the study requirements. Data collection involved administering structured questionnaires to assess patients'

baseline knowledge of gastritis and its medication use before any educational intervention.

Following the pre-test, participants received pharmacy education interventions consisting of oral counseling and the distribution of informational leaflets about gastritis and its medication. After the intervention, the same questionnaire was administered as a post-test to evaluate changes in patient knowledge. Data were processed and analyzed using descriptive and inferential statistics, including the Wilcoxon signed-rank test, to determine the significance of knowledge improvement. The study adhered to ethical standards, with informed consent obtained from all participants and confidentiality maintained throughout the research process.

The questionnaire consists of ten statements related to gastritis and its treatment, where respondents are asked to indicate whether each statement is true or false. The statements cover several aspects of gastritis, including its definition, causes, dietary influences, medication use, side effects, symptoms, and proper handling of medications. For example, the questionnaire clarifies that gastritis is an inflammation or irritation of the stomach lining, and that it is not caused solely by viral or fungal infections, but can also result from other factors such as bacteria, medications, or lifestyle choices. It addresses common misconceptions, such as the belief that spicy and fatty foods do not affect gastritis, when in fact they can exacerbate symptoms in some individuals.

The statements also provide guidance on the correct use of antacid tablets, emphasizing that they should be chewed before swallowing, and note that diarrhea is a common side effect of antacids. Additionally, the questionnaire highlights typical symptoms of gastritis, such as bloating and early satiety, and corrects the misconception that gastritis never causes nausea or vomiting. It also explains the appropriate timing for taking antacids either one hour before or after meals and the correct handling of expired medications, which should be disposed of properly rather than simply thrown in the trash. Lastly, it addresses the storage of opened syrup medications, indicating that they can be kept at room temperature for up to 14 days. This comprehensive set of statements is designed to assess and improve patient knowledge about gastritis and the safe, effective use of related medications.

Data Collection

Data collection for this study was conducted at several public health centers (Puskesmas) in Bogor City during June 2025. The process began with the recruitment of 100 patients who met the inclusion criteria, specifically those undergoing treatment for gastritis and willing to participate in the research. Prior to the educational intervention, each participant completed a structured questionnaire designed to assess their baseline knowledge regarding gastritis and its medication use. Following this pre-test, participants received pharmacy education through oral counseling and the distribution of informative leaflets. After the intervention, the same questionnaire was administered as a post-test to evaluate any changes in patient knowledge. All responses were collected privately to ensure confidentiality and encourage honest participation. The collected data were then coded and prepared for statistical analysis to measure the effectiveness of the educational program.

To ensure the accuracy and reliability of the data, all questionnaires were administered in a private setting, allowing participants to respond without external influence or pressure. The research team provided clear instructions and was available to clarify any questions regarding the items in the questionnaire, both before and after the educational intervention. This approach facilitated honest and thoughtful responses, minimized potential biases, and enhanced the overall quality of the data collected. Additionally, all completed questionnaires were carefully checked for completeness and consistency before being coded and entered into the database for subsequent statistical analysis.

Results and Discussion

The findings of this study further emphasize the critical role of pharmacy education in improving patient knowledge and self-management for gastritis. The significant increase in the proportion of patients with high knowledge levels after educational intervention demonstrates that structured, accessible information—delivered through oral counseling and leaflets—can bridge existing gaps in patient understanding. This aligns with recent evidence from PubMed-indexed studies, which highlight that patient education and pharmacist-led interventions are effective not only in increasing knowledge but also in enhancing medica-

tion adherence and clinical outcomes for gastrointestinal disorders [7].

The study involved 100 patients diagnosed with gastritis at several public health centers (Puskesmas) in Bogor City. Prior to the educational intervention, the assessment of patient knowledge revealed that 45% of respondents had a high level of knowledge, 45% had a moderate level, and 10% had a low level regarding gastritis and its medication use. After the pharmacy education intervention, which consisted of oral counseling and the distribution of informative leaflets, there was a marked improvement: 94% of participants achieved a high level of knowledge, 6% remained at a moderate level, and none were classified as having low knowledge. Statistical analysis using the Wilcoxon signed-rank test confirmed a significant increase in knowledge scores post-intervention, with a p-value of 0.000, indicating that the educational program had a substantial impact on patient understanding.

These findings are consistent with previous research demonstrating the effectiveness of pharmacist-led educational interventions in improving patient knowledge and promoting rational medication use. The dual approach of oral explanations and written leaflets proved particularly effective, as it catered to different learning preferences and reinforced key information. The improvement in knowledge was not only quantitative but also qualitative, as patients showed better understanding of medication timing, side effects, and appropriate drug disposal methods. However, some gaps remained, such as misunderstandings about the correct disposal of expired medications, highlighting the need for continued education and more comprehensive materials on specific topics.

The results underscore the importance of integrating structured pharmacy education into routine patient care at primary health centers. By addressing knowledge gaps and providing targeted interventions, healthcare providers can empower patients to take a more active role in managing their health, leading to better treatment adherence and health outcomes. The study also identifies the need for future research to explore alternative educational media, such as digital platforms, and to assess long-term knowledge retention and behavioral changes. Overall, the findings support the implementation of pharmacy education as a key component of patient-centered care and chronic disease management in primary healthcare settings.

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A quasi-experimental study on patients with chronic gastritis found that educational interventions significantly improved patients' knowledge, self-efficacy, and quality of life compared to controls, with sustained benefits observed at follow-up. This suggests that comprehensive patient education is not only beneficial for knowledge acquisition but also for empowering patients to manage their condition and adhere to therapy. Another study evaluating the knowledge, attitude, and practice of gastroenterology patients revealed that knowledge directly and significantly influences both attitudes and healthcare practices, reinforcing the importance of prioritizing patient education during clinical consultations to improve the management of chronic gastritis.

Furthermore, pharmacist counseling has been shown to yield measurable improvements in medication adherence and treatment outcomes. For example, a randomized controlled trial demonstrated that pharmacist-led counseling resulted in a statistically significant increase in outpatient compliance with medication and higher eradication rates for Helicobacter pylori infection compared to standard care. Additional research in patients with chronic gastrointestinal conditions, such as ulcerative colitis, found that pharmacist intervention significantly decreased nonadherence rates, improved clinical scores, and reduced disease flare-ups, further supporting the value of pharmacist-led education and follow-up [8].

Distribution of Patients

The study included 100 patients (83 female and 17 male) diagnosed with gastritis at several public health centers (Puskesmas) in Bogor City. The demographic characteristics of the respondents are detailed in table 1 below:

Table 1: Respondent Demographics

Age Group	Number of Respondents	Percentage (%)
19–25 years	29	29%
26–35 years	31	31%
36–45 years	19	19%
46–55 years	18	18%
56–59 years	3	3%

The age and gender distribution in this study shows most respondents were young to middle-aged adults, especially in the 19–25 and 26–35 year age groups, and predominantly female (83%). This indicates that pharmacy education interventions effectively reached productive-age adults and women, who are more likely to participate in health programs at public health centers. While knowledge improved across all ages, the strong female majority suggests future efforts should better engage men to ensure equitable health education for all.

Improvement of knowledge Results

Figure 1 below illustrates the changes in patient knowledge levels regarding gastritis and its medication use before and after the pharmacy education intervention conducted at several public health centers (Puskesmas) in Bogor City. This intervention consisted of oral counseling and the distribution of informative leaflets, aiming to address gaps in patient understanding and promote rational use of medication.

Before the educational program, a significant portion of patients demonstrated only moderate or low knowledge about gastritis and its treatment. Following the intervention, there was a marked improvement, with the vast majority of participants achieving a high level of expertise. The visual comparison between pre- and post-intervention knowledge levels demonstrates the effectiveness of targeted pharmacy education in empowering patients to better manage their health and adhere to appropriate medication practices. This positive shift underscores the importance of integrating structured educational initiatives into routine patient care within primary healthcare settings.

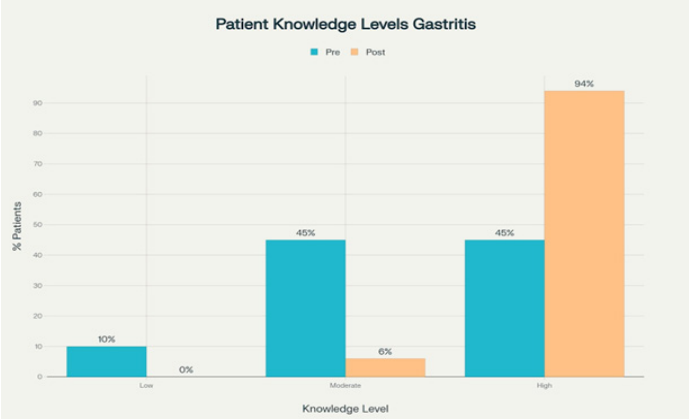

Figure 1: Improvement in Patient Knowledge Levels on Gastritis and Medication Use Before and After Pharmacy Education Intervention

The results clearly demonstrate the significant positive impact of pharmacy education on patient knowledge regarding gastritis and its medication use. Prior to the intervention, less than half of the patients exhibited a high level of knowledge, with notable proportions falling into moderate and low knowledge categories. Following the educational sessions, there was a dramatic shift, with nearly all patients (94%) achieving a high level of understanding and no patients remaining in the low knowledge group. This substantial improvement highlights the effectiveness of structured pharmacy education delivered through oral counseling and informative leaflets in empowering patients to better comprehend their condition and make informed decisions about their treatment. Integrating such educational interventions into routine care at public health centers can play a crucial role in enhancing patient outcomes and promoting rational medication use.

Below is research results based on peer-reviewed studies and reviews published between 2012 and 2025, including recent epidemiological and clinical research indexed in PubMed and other reputable medical databasesa table of Key Causes and Risk Factors that have occurred.

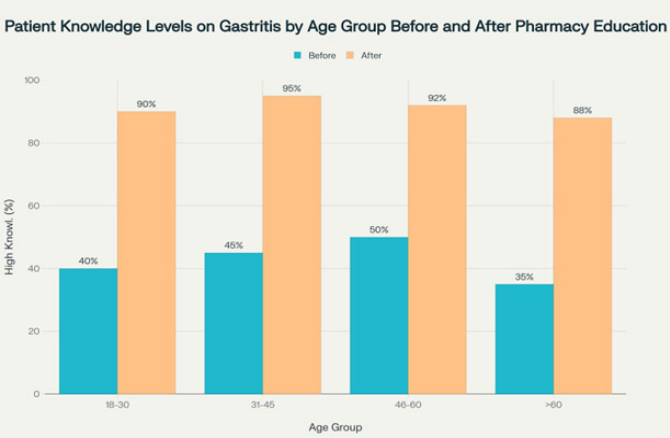

Figure 2: Patient Knowledge Levels on Gastritis by Age Group Before and After Pharmacy Education Intervention

The substantial increase in patient knowledge across all age groups following pharmacy education underscores the broad effectiveness of targeted educational interventions. Notably, the most pronounced improvements were observed among younger and middle-aged adults, but even older patients benefited significantly from the program. These findings highlight that pharmacy education when delivered through accessible methods such as oral counseling and informative leaflets can bridge knowledge gaps regardless of age. The results reinforce the value of integrating structured educational initiatives into routine healthcare, ensuring that patients of all demographics are empowered to better understand and manage their conditions. This approach not only supports rational medication use but also contributes to improved health outcomes and greater patient engagement in their own care.

The gastritis education leaflet was developed as a key component of the pharmacy education intervention in this study, aiming to provide clear and accessible information to patients at public health centers in Bogor City. Designed in straightforward language and supported by visual elements, the leaflet covers essential topics such as the definition, causes, symptoms, and prevention of gastritis, as well as detailed guidance on the proper use, storage, and disposal of gastritis medications. By addressing common misconceptions and offering practical instructions—such as medication timing, side effects, and safe drug handling the leaflet serves as both an educational tool and a reference for patients managing their condition. Its use in the study was intended to reinforce oral counseling, enhance patient understanding, and empower individuals to make informed decisions about their health and treatment adherence.

Figure 3: Gastritis Education Leaflet: Key Information on Causes, Symptoms, Medication, and Safe Use

Gastritis remains a significant global health concern, with its prevalence and risk factors extensively studied in recent years. The most common causes include infection with Helicobacter pylori, which is recognized as the leading etiological agent for chronic gastritis, particularly in low- and middle-income countries. Prolonged use of non-steroidal anti-inflammatory drugs (NSAIDs) is another major contributor, independently associated with gastric mucosal injury, erosions, and ulcers, especially in older adults or those with comorbidities [9,10,11]. Additionally, lifestyle factors such as excessive alcohol consumption, irregular eating habits, and high stress levels have been shown to increase both the risk and severity of gastritis, with evidence indicating that these factors are particularly relevant in certain regional populations [12].

Socioeconomic and demographic variables further influence gastritis prevalence and outcomes. Studies have demonstrated that individuals with lower income, inadequate nutrition, urban residence, and male gender are at higher risk for developing gastritis. Global epidemiological data suggest that the prevalence of gastritis can reach up to 78% in some populations, with higher rates in low-sociodemographic index regions and a notable rise among children and young adults in recent years [13]. These findings un-

derscore the importance of addressing both clinical and social determinants in the prevention and management of gastritis, and highlight the need for targeted public health interventions in high-risk groups. Low income, inadequate nutrition, urban residence, and male gender are associated with higher risk for gastritis. Studies highlight the impact of these factors on both the development and severity of the condition [2]. Children and adolescents in some regions have shown rising or persistently high rates of gastritis, emphasizing the need for targeted interventions [4]. Targeted public health interventions are recommended for high-risk groups, including those with lower socioeconomic status and those living in urban environments [14].

Table 2: Key Causes and Risk Factors for Gastritis: Evidence from 2012–2025

Cause/Risk Factor	Evidence (2012–2025)
Helicobacter pylori infection	Leading cause of chronic gastritis and related complications [15,16].
NSAID use	Major independent cause of gastritis and ulcers; risk increases with dose, duration, age, comorbidities [17-19].
Alcohol, stress, poor diet	Significant contributors to both acute and chronic gastritis [20].
Socioeconomic and demographic	Male gender, urban residence, low income, and inadequate nutrition increase risk and prevalence [20].
Global prevalence	Up to 78% in some populations; higher in low-SDI and lower-income regions [21].

Validation

The questionnaire used in this study had been validated previously. The effectiveness of the pharmacy education intervention was validated through a rigorous statistical analysis using the Wilcoxon signed-rank test. This non-parametric test was chosen because the data did not meet the assumptions of normality, as determined by the Kolmogorov-Smirnov test. The Wilcoxon test compared patient knowledge scores before and after the educational intervention, which included both oral counseling and the distribution of informative leaflets.

The results revealed a significant improvement in patient knowledge following the intervention. Prior to the education, only 45% of patients demonstrated a high level of knowledge, while 45% had moderate knowledge and 10% had low knowledge. After the intervention, the proportion of patients with high knowledge rose dramatically to 94%, with only 6% remaining at a moderate level and none at a low level. The Wilcoxon signed-rank test yielded a p-value of 0.000, which is well below the significance threshold of 0.05. This result indicates that the improvement in knowledge scores was statistically significant and not due to random chance.

These findings validate the effectiveness of the pharmacy education program in enhancing patient understanding of gastritis and appropriate medication use. The statistically significant increase in knowledge levels confirms that structured educational interventions can meaningfully improve patient outcomes in primary healthcare settings.

Conclusion

This study provides compelling evidence that structured pharmacy education delivered through oral counseling and informative leaflets can dramatically enhance patient knowledge about gastritis and its medication use in public health centers. The intervention led to a remarkable shift: prior to education, less than half of patients demonstrated a high level of understanding, while after the educational program, nearly all participants achieved high knowledge scores. This transformation was consistent across all demographic groups, including younger, middle-aged, and older adults, underscoring the universal effectiveness of the approach.

The statistically significant improvement, validated by rigorous hypothesis testing, highlights the critical role of accessible, targeted education in bridging

knowledge gaps and empowering patients to make informed decisions about their health. By integrating pharmacy education into routine care, primary health centers can foster greater patient engagement, promote rational medication use, and ultimately improve treatment outcomes for gastritis. These findings not only reinforce the value of pharmacist-led interventions but also provide a strong foundation for broader implementation of educational strategies in chronic disease management within diverse healthcare management.

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