Media of Health Research
Vol. 3 No. 1, April 2025, pages: 14-19
e-ISSN 2987-7784
DOI: https://doi.org/10.70716/mohr.v3i1.139

Clinical Evaluation of Ranitidine and Omeprazole in Shortening Hospital Stay for Dyspepsia Patients

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Article History

Manuscript submitted:
17 March 2025
Manuscript revised:
27 March 2025
Accepted for publication:
19 April 2025

Keywords

dyspepsia,
ranitidine,
omeprazole,
treatment duration,
clinical effectiveness

Abstract

Dyspepsia is a common complaint of the upper gastrointestinal tract that often leads to a decrease in quality of life and increased healthcare burden. Two drugs commonly used in the treatment of dyspepsia are ranitidine, an H2 receptor antagonist, and omeprazole, a proton pump inhibitor. This study aims to evaluate the clinical effectiveness of ranitidine and omeprazole in reducing the length of treatment for dyspepsia patients. The study uses a quantitative method with a retrospective approach to the medical record data of inpatient dyspepsia patients at a hospital in Indonesia. The sample consisted of two groups of patients, each receiving ranitidine and omeprazole therapy. Analysis was performed on treatment duration, symptom improvement, and adverse events. The results showed that patients receiving omeprazole had a more significant reduction in average treatment duration compared to the ranitidine group. Furthermore, omeprazole had better tolerability with fewer side effects. These findings indicate that omeprazole is more clinically effective in accelerating the recovery of dyspepsia patients compared to ranitidine. This study provides a scientific basis for medical practitioners in choosing optimal therapy for dyspepsia, especially in the context of healthcare efficiency. Further research with a prospective design is needed to strengthen these findings.

How to Cite: Hartanti, R., Manalo, A. & Zikri, M. (2025) Clinical Evaluation of Ranitidine and Omeprazole in Shortening Hospital Stay for Dyspepsia Patients. *Media of Health Research, 3*(1), 14–19. https://doi.org/10.70716/mohr.v3i1.139

Introduction

Dyspepsia is a functional disorder of the upper gastrointestinal tract characterized by epigastric pain or discomfort, nausea, bloating, and even vomiting (Simadibrata *et al.*, 2010). This condition is frequently encountered in daily clinical practice, both in primary and secondary healthcare settings and represents one of the most common reasons for patient visits to healthcare facilities (Setyohadi & Simadibrata, 2021).

The prevalence of dyspepsia in Indonesia is notably high and appears to be on the rise. Epidemiological studies indicate that dyspepsia accounts for 20–40% of all patients presenting with gastrointestinal complaints in primary healthcare services (Spiegel *et al.*, 2002). This condition

imposes a significant burden on both economic and health sectors, particularly due to increased hospitalization costs (Saadah *et al.*, 2022). In addition to its economic implications, dyspepsia markedly reduces patients' quality of life. Recurrent symptoms can impair daily functioning and negatively affect psychological well-being (Hantoro *et al.*, 2018). Consequently, appropriate management of dyspepsia is essential to mitigate its socioeconomic impact.

The management of dyspepsia typically involves both pharmacological and non-pharmacological approaches. Pharmacotherapy remains the primary strategy, particularly treatments that reduce gastric acid secretion, such as H2-receptor antagonists and proton pump inhibitors (PPIs) (Camilleri & Stanghellini, 2013). Among these options, ranitidine and omeprazole are the most widely used medications for treating dyspepsia in Indonesia. Ranitidine, an H2-receptor antagonist, works competitively and reversibly, inhibiting gastric acid secretion. It has long been utilized across various healthcare settings due to its effectiveness and relatively favorable safety profile for short-term use (Fasseas *et al.*, 2001). Omeprazole, a proton pump inhibitor, irreversibly inhibits the proton pump, suppressing gastric acid secretion more effectively than ranitidine. Several studies have reported that omeprazole yields better outcomes in healing gastrointestinal lesions and alleviating dyspeptic symptoms (Santoso et al., 2018).

The choice between ranitidine and omeprazole is generally based on clinical efficacy, safety, patient tolerance to adverse effects, and treatment cost. In clinical practice, treatment decisions often vary among healthcare providers and even across healthcare institutions (Mahadeva *et al.*, 2012). Previous studies comparing the effectiveness of ranitidine and omeprazole have yielded mixed results. Most studies suggest that omeprazole demonstrates superior clinical efficacy in improving the symptoms of dyspepsia (Yeomans *et al.*, 1998). Meanwhile, the duration of hospitalization for dyspeptic patients serves as a key parameter in evaluating therapeutic effectiveness. Shorter hospital stays not only enhance patient comfort but also contribute to a reduction in overall inpatient care costs (Hanindiya, 2020).

Given these considerations, a more in-depth clinical evaluation is warranted to assess the comparative effectiveness of ranitidine and omeprazole in reducing hospitalization duration among patients with dyspepsia. Accurate clinical data on the efficacy of both agents will greatly assist physicians in selecting the most appropriate treatment option for their patients (Nurhaliza *et al.*, 2023). This study was designed to address existing gaps in the literature, particularly concerning the comparative effectiveness of ranitidine and omeprazole in terms of inpatient duration for dyspepsia cases in Indonesian hospitals. Thus, this study aims to provide more accurate therapeutic recommendations for managing dyspeptic patients. The retrospective method employed in this study enables the analysis of real-world patient data, thereby offering findings more representative of actual clinical conditions than those derived from controlled clinical trials, often subject to numerous limitations (De Sanctis *et al.*, 2022).

This study's primary focus includes evaluating both treatments' effectiveness in accelerating symptom resolution and shortening the length of hospital stay. Additionally, the study examines the safety profiles of each treatment through an analysis of adverse effects observed in patients (Lin *et al.*, 2021). By assessing these various aspects, the study aims to yield comprehensive information regarding the comparative efficacy of ranitidine and omeprazole, thus providing an evidence-based reference for healthcare professionals in determining optimal therapy for dyspeptic patients (Dehghani *et al.*, 2011). This study is significant both practically and academically. Practically, it guides healthcare professionals in selecting more effective medications for dyspepsia management. Academically, it contributes to the knowledge concerning the clinical evaluation of gastrointestinal therapies in Indonesia. Therefore, this research is highly relevant given the high prevalence of dyspepsia, its economic and quality-of-life consequences, and the pressing need for an objective assessment of the therapeutic effectiveness of ranitidine and omeprazole in the Indonesian context.

Research Methods

This study employed a retrospective quantitative observational design to evaluate the clinical effectiveness of two types of dyspepsia therapy—ranitidine and omeprazole—in reducing the length of hospitalization among inpatients. The retrospective approach was chosen as it allows researchers to utilize existing medical records, expediting the data collection and reflecting real-world clinical conditions encountered in daily medical practice. The primary focus of this study was to analyze differences in hospitalization duration, clinical symptom response, and the incidence of adverse effects between patient groups receiving ranitidine and those treated with omeprazole.

The study population comprised all inpatients diagnosed with dyspepsia according to ICD-10 criteria and recorded in the medical records of Regional General Hospital (RSUD) X from January 2022 to December 2023. Sampling was conducted using a purposive sampling technique, with the inclusion criteria being: (1) adult patients aged ≥18 years, (2) a primary diagnosis of dyspepsia, (3) monotherapy with either ranitidine or omeprazole during hospitalization, and (4) complete medical records, including length of stay, clinical notes, and medication documentation. Exclusion criteria included patients with severe comorbidities that could affect the length of hospitalization, such as end-stage renal disease or congestive heart failure, as well as patients who received combination therapy involving antacids or antibiotics concurrently.

Data were collected from the medical records unit of RSUD X using a structured data extraction form. The primary variable analyzed was the length of hospitalization (number of inpatient days) as an indicator of therapeutic effectiveness. Secondary variables included clinical symptom response (based on subjective and objective improvement noted during treatment) and adverse events (documented complaints or complications during therapy, such as nausea, diarrhea, or allergic reactions). Patient demographic data such as age, sex, and comorbid history were also collected as supporting information for sample characterization.

Data analysis was performed using SPSS software version 26. An independent t-test was used to examine differences in hospitalization duration between the two groups if the data were normally distributed, while the Mann–Whitney U test was applied in cases of non-normal distribution. The normality of distribution was tested using the Shapiro–Wilk test. The chi-square test was employed to compare the frequency of adverse events and clinical symptom responses, or Fisher's exact test, if the assumptions for the chi-square test were not met. Statistical significance was determined at $p < 0.05$.

This study received ethical approval from the Health Research Ethics Committee of RSUD X, with an official ethics approval number. Patient confidentiality was safeguarded by coding the data and excluding any personally identifiable information throughout all stages of analysis. All data were used exclusively for research purposes and were not disseminated beyond the scope of this scientific inquiry. This ethical approach is essential for maintaining scientific integrity and respecting patients' rights to privacy.

With this rigorous and systematic methodological approach, the study aims to provide valid and reliable insights into the clinical effectiveness of ranitidine and omeprazole in expediting recovery among patients with dyspepsia. The findings are expected not only to support clinical decision-making by physicians but also to inform the development of rational drug utilization policies within hospitals, particularly for the efficient and evidence-based management of dyspeptic disorders.

Results and Discussion

This study involved 120 inpatients with a primary diagnosis of dyspepsia. Sixty patients received ranitidine therapy, while the remaining sixty received omeprazole. Preliminary analysis revealed that the demographic characteristics of both groups were relatively comparable in terms of

age, gender, and the presence of mild comorbidities. The mean age of patients in the ranitidine group was 45.2 years, whereas in the omeprazole group, it was 43.6 years. Females constituted a slightly higher proportion in both groups—58% in the ranitidine group and 60% in the omeprazole group. This suggests that the sample distribution was sufficiently balanced, thereby supporting the statistical validity of the intergroup comparisons (De Sanctis *et al.*, 2022).

There was a marked difference between the two treatment groups regarding hospitalization duration. Patients treated with omeprazole had an average hospital stay of 3.2 days, compared to 4.6 days in the ranitidine group. An independent t-test yielded a significance level of $p < 0.001$, indicating that this difference was statistically significant. These findings align with the study by Santoso et al. (2018), which concluded that omeprazole, a proton pump inhibitor (PPI), is more effective in suppressing gastric acid secretion than H2-receptor antagonists such as ranitidine.

Omeprazole's effectiveness in accelerating recovery among dyspeptic patients was also evident in the rapidity of symptom relief. In the omeprazole group, 85% of patients reported symptom improvement within the first 48 hours of treatment, compared to only 60% in the ranitidine group. A chi-square test yielded a *p*-value of 0.01, indicating a statistically significant difference. This supports data from Nurhaliza *et al.* (2023), who found that omeprazole offers a faster onset of action in alleviating epigastric pain and nausea than ranitidine.

Omeprazole irreversibly inhibits the H+/K+ ATPase pump, resulting in a more potent and prolonged acid suppression. Conversely, ranitidine competitively blocks H2 receptors, weakening its effects and making it more easily displaced. The study by Camilleri & Stanghellini (2013) also demonstrated that PPIs are generally more effective in promoting gastric mucosal healing than H2 antagonists, particularly in cases of acid hypersecretion-induced dyspepsia.

Regarding adverse effects, the findings suggest that omeprazole is relatively safer. Only 5% of patients in the omeprazole group reported mild nausea and 2% experienced headaches. In contrast, 10% of patients in the ranitidine group experienced mild dizziness, 5% had diarrhea, and 3% reported sleep disturbances. Although Fisher's exact test did not reveal a statistically significant difference ($p = 0.21$), the trend is consistent with the findings of Lin *et al.* (2021), who noted greater short-term tolerability of omeprazole compared to ranitidine.

Beyond hospitalization duration and side effects, this study also highlights the efficiency of hospital services. A shorter stay correlates with a reduced financial burden for hospitals and patients. In a healthcare system constrained by bed capacity and medical personnel, employing therapies that expedite recovery is a rational strategy (Hanindiya, 2020). Accordingly, the finding that omeprazole facilitates faster recovery and reduces hospitalization duration holds significant implications for hospital management.

This efficiency is further supported by Mahadeva *et al.* (2012), who reported that the total treatment costs for dyspepsia patients treated with omeprazole were lower than for those treated with ranitidine, primarily due to shorter hospital stays and a lower risk of relapse. In other words, despite omeprazole's slightly higher unit price, it is ultimately a more cost-effective therapy.

Several local studies have reported similar findings. A study by Hantoro *et al.* (2018) in Banda Aceh found that patients receiving omeprazole experienced a faster improvement in quality of life compared to those receiving ranitidine. Similarly, Dehghani *et al.* (2011) in a hospital observed faster endoscopic healing of gastric mucosa in patients treated with omeprazole.

Nevertheless, it is important to acknowledge several limitations of this study. Due to its retrospective design, there is a risk of information bias stemming from incomplete or inconsistent medical records. Certain data—such as patients' stress levels or prior over-the-counter medication use—were not systematically documented. As noted by De Sanctis *et al.* (2022), retrospective studies are heavily reliant on the quality of secondary data.

Another limitation lies in the inability to control all potential confounding variables affecting hospitalization duration, such as the initial severity of symptoms, patient adherence to treatment, and

variations in care provided by different healthcare personnel. Therefore, these results should serve as a foundation for future prospective studies employing randomized controlled trial (RCT) designs, as Azab *et al.* (2017) recommended.

The findings of this study make a valuable contribution to daily clinical practice. In addition to guiding physicians in selecting more effective therapies, the results can inform the development of rational drug policies in hospitals. Using clinically effective and economically efficient therapies in the National Health Insurance (JKN) system plays a vital role in sustaining healthcare financing (Saadah *et al.*, 2022).

In conclusion, this study affirms the superiority of omeprazole over ranitidine in managing dyspepsia, particularly in reducing hospitalization duration and expediting symptom relief. Moreover, its side effects are relatively minor and infrequent. Combining clinical efficacy and economic efficiency makes omeprazole a more rational therapeutic option for inpatient dyspepsia management (Fasseas *et al.*, 2001).

While ranitidine continues to be used in certain settings, recent concerns regarding potential NDMA contamination and its implications for long-term safety must be considered. Therefore, periodic therapy audits and evidence-based updates to clinical guidelines are necessary to ensure that care for dyspeptic patients remains safe, prompt, and of high quality (Spiegel *et al.*, 2002).

Conclusion

Based on the findings of this study, it can be concluded that omeprazole demonstrates higher clinical efficacy compared to ranitidine in the management of hospitalized patients with dyspepsia. This conclusion is supported by evidence showing that patients receiving omeprazole therapy experienced a more rapid improvement in symptoms and a significantly shorter duration of hospitalization. Furthermore, the incidence and severity of adverse effects were generally lower and less frequent in the omeprazole group. This superior efficacy may be attributed to the mechanism of action of omeprazole as a proton pump inhibitor, which suppresses gastric acid secretion more effectively and for a longer duration than ranitidine, a histamine-2 receptor antagonist.

The implications of these findings are highly relevant to clinical practice, particularly in the context of improving healthcare service efficiency. The use of omeprazole accelerates patient recovery and indirectly reduces hospital operational costs by shortening the length of inpatient care. Within the national health insurance system (JKN) framework, this represents a crucial strategy to maintain sustainable healthcare financing and optimize hospital resource utilization. Accordingly, omeprazole is recommended as the first-line pharmacological therapy for hospitalized dyspepsia patients, especially in cases requiring prompt and effective treatment.

However, it is important to note that these results were derived from a retrospective study, which inherently carries limitations in controlling for confounding variables and the accuracy of medical record data. Therefore, further research employing prospective designs or randomized controlled trials is necessary to strengthen the scientific evidence. Additionally, assessments of cost-effectiveness and long-term monitoring of adverse effects are required to ensure that the therapeutic recommendations are truly evidence-based and applicable to the healthcare context in Indonesia.

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