Innovation in Health for Society

ISSN: 2798-7094

ORIGINAL RESEARCH

Submitted 21/10/2024
Revised 23/12/2024
Accepted 24/12/2024
Published 24/12/2024

Prevalence and characteristics of peptic ulcer in patients presenting with hematemesis and/or melena undergoing esophagogastroduodenoscopy: a descriptive study

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https://doi.org/10.31603/ihs.12514

Abstract

Peptic ulcers are a leading cause of upper gastrointestinal bleeding, with the highest incidence observed among men and the elderly. Esophagogastroduodenoscopy (EGD) is the gold standard diagnostic tool, offering sensitivity and specificity rates of up to 90% for identifying peptic ulcers. This study aimed to describe the characteristics of peptic ulcer cases in patients presenting with hematemesis and/or melena who underwent EGD at RSUD Temanggung in 2023. A quantitative descriptive design was utilized, employing retrospective data collection from medical records of patients who met the inclusion and exclusion criteria. A total of 23 medical records were analyzed. Among the 23 cases of hematemesis and/or melena, peptic ulcers were the most common diagnosis, accounting for 47.8% (11 cases). Erosive gastritis was the second most common diagnosis (39.1%, 9 cases), followed by esophageal varices (13.0%, 3 cases). Of the 11 patients diagnosed with peptic ulcers, 63.6% were aged over 60 years, 27.3% were aged 40–59 years, and 9.1% were aged 19–39 years. Regarding gender, 81.8% of peptic ulcer patients were male, and 18.2% were female. The majority (90.9%) of patients had ulcers classified as Forrest III, while 9.1% were classified as Forrest IIc. The most common nursing problems identified included ineffective tissue perfusion (36.4%), nausea (36.4%), and pain (27.2%). The findings highlight that the majority of peptic ulcer cases involved Forrest III ulcers, and key nursing concerns included managing ineffective peripheral tissue perfusion and nausea. This study underscores the need for targeted interventions to address these common nursing problems and improve patient outcomes in peptic ulcer management.

Keywords: Endoscopy, esophagogastroduodenoscopy, hematemesis, melena, peptic ulcer

Introduction

Hematemesis (vomiting blood) and melena (bloody stools) are conditions caused by upper gastrointestinal bleeding (UGIB) (DiGregorio, & Alvey, 2023). Hematemesis-melena is one of the most frequently encountered diseases in the emergency department of hospitals (Kamboj et al., 2019). Most patients arrive in a stable condition, while others come in critical condition requiring immediate and appropriate action (Fadila, 2015). UGIB refers to bleeding originating from the esophagus to the ligament of Treitz (Wilkins et al., 2020). The incidence of UGIB varies between 80 to 150 cases per 100.000 populations, with the highest incidence in males and the elderly (Antunes et al., 2024). More than 60% of UGIB cases are caused by peptic ulcer (PU) bleeding, while bleeding from esophageal varices accounts for only around 6%. Other etiologies include arteriovenous malformations, Mallory-Weiss tears, gastritis, and duodenitis (Hreinsson et al., 2013). Several irritants such as food, beverages, nonsteroidal anti-inflammatory drugs (NSAIDs), alcohol, and bile fluids can cause defects in the mucosal layer (Minakari et al., 2017). PU refer to damage to the mucosal, submucosal, and muscular layers of the gastrointestinal tract caused by the activity of pepsin and stomach acid (Malik, Gnanapandithan, & Singh, 2023). PU can affect the esophagus to the small intestine, but they most commonly occur in the duodenal bulb (90%) and lesser curvature. If they occur between the cardia and pylorus, it is called a gastric ulcer, and if they occur beyond the pylorus, it is called a duodenal ulcer (Azis, 2002).

The pathogenesis of PU generally occurs due to excessive acid secretion and a disruption in mucosal integrity, leading to the back-diffusion of H+ ions from the lumen into the mucosa (Vakil, 2024). The balance between aggressive factors (damaging) and defensive factors (mucosal resistance) is crucial in maintaining the function and integrity of the

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ISSN: 2798-7094

gastrointestinal tract. Defensive factors include the mucous barrier (mucus and bicarbonate), mucosal resistance barrier, microcirculation (mucosal blood flow), and prostaglandins (Azis, 2002). Perforated peptic ulcers (PPU) increase the risk of morbidity and mortality (Boyd-Carson et al., 2020). A study highlighted that the mortality rate for PPU exceeds 27% (Søreide, Thorsen, & Søreide, 2014). To prevent the mortality, there is a need to assess and evaluate the group of patients. Esophagogastroduodenoscopy (EGD) is the standard and most accurate diagnostic test, with a sensitivity and specificity of up to 90% for diagnosing gastric and duodenal ulcers **(Figure 1)**. The American Society of Gastrointestinal Endoscopy has published guidelines on the role of endoscopy in patients with upper abdominal pain or dyspeptic symptoms that may indicate PU (Theunissen et al., 2021). The global prevalence of PU from 21 studies involving 788.525 participants aged 17–82 years was found to be 8.4% (Salari et al., 2022). In Indonesia, the prevalence of PU in several studies ranged from 6–15%, particularly in the 20-50 age group (Raehana, 2021). Research findings in Indonesia show that about 70% of UGIB cases are caused by ruptured esophageal varices (Angela & Surawan, 2022).

Figure 1. Esophagogastroduodenoscopy (EGD) (Documented by lead author).

In a preliminary study conducted in early 2023, the lead author found that 52.94% of the 34 eligible samples had PU. With the increasing number of PU, the researcher aims to assess the overall number of PU cases among patients undergoing EGD. The impact of undiagnosed upper gastrointestinal bleeding is the incorrect treatment, which could lead to worsening conditions and recurrence. Therefore, conducting this study is crucial due to the significant morbidity and potential mortality associated with UGIB, which often manifests as hematemesis and melena. No studies have been conducted at RSUD Temanggung to investigate the prevalence and characteristics of this group of patients. PU remains a

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leading cause of UGIB worldwide, and its timely diagnosis and management are essential to prevent complications such as recurrent bleeding, perforation, and increased mortality. Understanding the prevalence and specific characteristics of PU in this patient population can help clinicians identify high-risk individuals, tailor diagnostic strategies like EGD, and optimize therapeutic interventions. The finding of study highlighted the importance of nurses as frontline healthcare providers in identifying early signs of upper gastrointestinal bleeding, facilitating timely referrals for diagnostic procedures, and providing essential patient education. Moreover, this study can provide valuable insights into regional trends and risk factors, which are critical for guiding public health policies to mitigate the burden of PU. The rationale for conducting a descriptive study on PU in patients presenting with hematemesis and/or melena undergoing EGD lies in the need to better understand the prevalence, characteristics, and clinical outcomes of PU in this specific patient population. Hematemesis and melena are significant indicators of upper gastrointestinal bleeding, which can lead to serious complications if not promptly diagnosed and managed. Systematically examining the findings from EGD in these patients can identify patterns and risk factors associated with PU. Additionally, this research can contribute to the existing body of knowledge regarding gastrointestinal disorders and develop preventive intervention of mortality.

Method

The study employs a quantitative descriptive approach, which aims to provide an objective description of PU in patients with hematemesis and melena in the Endoscopy Room at RSUD Temanggung **(Figure 2)**. The primary goal of the study is to identify the severity of PU and the main nursing diagnoses frequently associated with these cases. A quantitative descriptive approach is a method that focuses on describing observed phenomena based on measurable data without delving into the causal relationships behind them (Aggarwal & Ranganathan, 2019). Researchers in this study adhered to this method by categorizing data according to relevant characteristics and presenting results in a structured and factual manner.

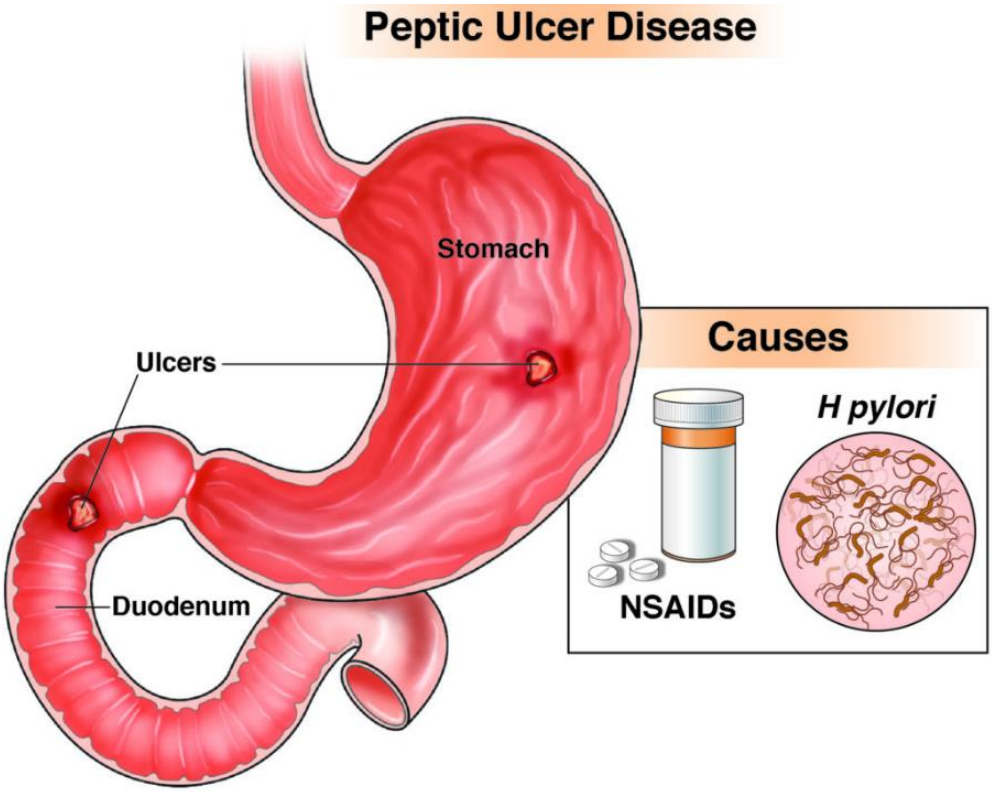

Figure 2. Illustration of PU (Courtesy of www.patient.gastro.org).

The decision to use this approach was guided by its compatibility with the study's objective. A cross-sectional design was selected for the study, meaning data collection occurred at a single point in time (Wang & Cheng, 2020). This design was chosen to provide a snapshot of the prevalence and characteristics of PU among patients experiencing

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hematemesis-melena during the study period. The population consisted of all patients who underwent EGD between September and December 2023. Notably, data from January to March 2023 showed that 20 patients with hematemesis-melena underwent EGD, highlighting the significance of focusing on this patient group. From the total population, the study identified 23 patients who met the inclusion criteria, forming the final sample. The sampling process combined purposive sampling—targeting individuals meeting specific criteria—with total sampling.

The inclusion criteria for this study were straightforward: all patients undergoing their first EGD for hematemesis and/or melena, regardless of age or gender. Exclusion criteria eliminated patients undergoing EGD for reasons unrelated to hematemesis or melena, as well as those undergoing repeat EGDs for follow-up or evaluation of prior treatments. These criteria ensured that the sample accurately reflected the patient population experiencing acute hematemesis-melena and requiring initial diagnostic evaluation. Narrowing the focus to these patients aims to capture a detailed and relevant understanding of their condition and its management. Data collection involved the use of a questionnaire designed to gather comprehensive patient information, including name, age, gender, endoscopy results, degree of PU severity, main nursing diagnoses, and additional clinical details. The primary data source was patient medical records, which were analyzed as secondary data for the study. This method allowed the researcher to systematically extract and compile relevant information, ensuring the accuracy and reliability of the findings. Through this structured approach, the study aimed to provide a clear and concise overview of the characteristics and outcomes of patients presenting with hematemesis-melena who underwent endoscopy. Descriptive statistical methods were used to analyze the data. These methods focus on summarizing and describing the characteristics of a dataset without making broader generalizations about the population. The analysis included determining the mode (most frequently occurring value) for key variables such as the degree of PU severity and the most common nursing diagnoses among the patients studied. This approach allowed the researcher to identify trends and patterns, such as recurring severities of PU or predominant nursing issues, providing valuable insights for clinical practice. The results of this study can serve as a foundation for improving nursing interventions, guiding patient education, and enhancing overall management strategies for PU cases.

Results

The table documented that the most common diagnosis is PU, with 11 cases out of a total of 23 patients presenting with hematemesis-melena, accounting for 47.8%. The second diagnosis is erosive gastritis, with 9 cases or 39.1%, and the third diagnosis is esophageal varices, with 3 cases or 13.0% **(Table 1)**. According to the table, the age group most vulnerable to PU disease is those over 60 years old, with 7 patients out of the 11 diagnosed with PU, representing 63.6%. The second most affected age group is between 40-59 years, with 3 patients or 27.3%, followed by the age group of 19-39 years, which has 1 patient or 9.1% **(Table 2)**. The table also shows that the majority of PU patients are male, with 9 out of 11 individuals, accounting for approximately 81.8%. In contrast, there are 2 female patients out of 11, representing 18.2% **(Table 3)**.

Table 1. Results of diagnosis.

Diagnose	*n*	Percentage (%)
Erosive gastritis	9	39.1 %
PU	11	47.8 %
Esophageal varices	3	13.0 %

Table 2. Vulnerable groups.

Age (Years)	*n*	Percentage (%)
19-39	1	9.1 %
40-59	3	27.3 %
> 60	7	63.6 %

Table 3. Sex.

Sex	*n*	Percentage (%)
Male	9	81.8 %
Female	2	18.2 %

Among the 11 patients with PU, 10 individuals have ulcers classified as Forrest III, which constitutes 90.9%. The characteristics of Forrest III include ulcers with a clean base, free from bleeding. The remaining patient, representing 9.1%,

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has a PU classified as Forrest IIc, characterized by ulcers with red spots indicating past bleeding **(Table 4)**. The primary nursing problems frequently identified include three main issues. The first is nausea, affecting 4 out of 11 patients, or 36.4%. The second common nursing problem is ineffective peripheral tissue perfusion, also affecting 4 out of 11 patients, or 36.4%. The next frequently observed nursing issue is acute pain, affecting 3 out of 11 patients, or 27.3% **(Table 5)**.

Table 4. Categories.

Grading level	*n*	Percentage (%)
Forrest IIc	1	9.1 %
Forrest III	10	90.9 %

Table 5. Nursing problems.

Nursing problems	n	Percentage (%)
Nausea	4	36.4 %
Pain	3	27.3 %
Ineffective peripheral tissue perfusion	4	36.4 %

Discussion

This study revealed that PU is the leading cause of hematemesis-melena. This finding aligns with previous research indicating that over 60% of UGIB cases are caused by PU bleeding (Laine et al., 2021). The high prevalence of PU as the primary cause of UGIB may be attributed to unhealthy dietary habits, which contribute to gastric mucosal inflammation (gastritis). If untreated, gastritis can progress to PU. Supporting this, A study identified unhealthy eating patterns as a major factor in gastritis, with a prevalence rate of 66% (Yegen, 2018). Another significant cause of PU is the unmonitored use of NSAIDs, which can lead to gastric mucosal damage (Drini, 2017). Therefore, patient education on healthy and consistent dietary habits is crucial in hospitals to prevent recurrence in PU cases. The characteristics of bleeding differ among erosive gastritis, PU, and esophageal varices, primarily due to their distinct causes (Kim et al., 2014). Erosive gastritis bleeding occurs when the gastric mucosa erodes, leading to micro or macro bleeding. If the erosion extends to the submucosal layer, a gastric ulcer may develop (Tamura et al., 2013). Gastric ulcer bleeding tends to be more severe, penetrating deeper layers and often significantly reducing hemoglobin levels, depending on the ulcer's size and severity. In contrast, bleeding from esophageal varices is caused by the rupture of esophageal veins due to portal hypertension, which is commonly associated with liver cirrhosis (Singh et al., 2024). Understanding these differences is critical for effective treatment and prevention strategies. In this study, the most common PU classification was Forrest grade III (ulcers without active bleeding). This may be because most patients undergoing endoscopy had already received anti-bleeding therapy, which effectively controlled bleeding. Similar findings were reported in other study, where Forrest grade III was the most prevalent classification (Frandy & Mondrowinduro, 2020).

Peripheral tissue perfusion inefficiency and nausea are common nursing problems found in PU cases. The loss of blood components through UGIB impacts hemoglobin levels then making peripheral tissue perfusion inefficiency (Chai et al., 2021). Peripheral tissue perfusion inefficiency refers to reduced blood circulation at the capillary level, disrupting the body's metabolism (Silva et al., 2021). Nursing interventions for this condition include circulation care, monitoring vital signs, fluid monitoring, and administering blood products (O'Sullivan et al., 2023). Nausea is another frequently encountered nursing issue in these cases. Irritation and inflammation of the gastric mucosa cause nausea, often leading to vomiting. Nursing management for nausea includes providing small, appealing meal portions and collaborating with physicians to administer antiemetics as needed (Kobayashi et al., 2023). The third most common nursing issue is acute pain, which arises due to tissue discontinuity and interaction with stomach acid. Nursing interventions for acute pain include pain management techniques and collaboration with physicians to administer acid-neutralizing medications (Hämäläinen et al., 2022). In this context, nurses play a crucial role in providing care to patients by utilizing their professional expertise in nursing. Nursing education becomes a primary intervention for patients with PU to prevent recurrence. This education includes handwashing before meals, adopting regular eating patterns, awareness of the risks associated with NSAID use, understanding the impact of alcohol and smoking on gastric ulcers, and stress management. Additionally, education about complementary therapies offers an alternative approach that can significantly aid in PU healing (Koretz & Rotblatt, 2004). Herbal therapies have become more accessible and easier for individuals to receive explore complementary treatments for PU. In addition to the role of ward nurses, endoscopic nurses are essential in the management of PU (Blythe et al., 2024). Their involvement in aiding the diagnostic process through endoscopic procedures

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ISSN: 2798-7094

greatly helps determine the appropriate therapeutic approach for patients based on accurate diagnoses. Endoscopy nurses can also provide simple education about risk factors and care management (Dauz, 2024). Ensuring the implementation of procedures that prioritize patient safety is another key responsibility of endoscopy nurses **(Figure 3)**.

Figure 3. Illustration of endoscopy nurses (Courtesy of www.carerev.com).

Endoscopy nurses are instrumental in assisting with diagnostic procedures, ensuring patient safety during endoscopy, and educating patients about risk factors (Bauer & Sauer, 2019). Their role complements the efforts of physicians in providing comprehensive care. The management of PU benefits greatly from a multidisciplinary team approach, which typically includes gastroenterologists, surgeons, nurses, dietitians, and mental health professionals (Choi et al., 2020). Gastroenterologists perform EGD and interpret findings, while surgeons manage cases requiring surgical intervention. Nurses provide pre- and post-procedural care, monitoring for complications and ensuring patient comfort. Dietitians contribute by offering nutritional counseling to promote healing and prevent recurrence, while mental health professionals address patient anxiety or stress related to their condition. Working collaboratively develops individualized care plans that improve patient outcomes, facilitate timely interventions, and enhance the quality of care for individuals with PU (Wijeratne et al., 2022). This comprehensive approach underscores the importance of an integrated healthcare system in managing complex conditions like PU.

This study has several limitations, one of which is the diagnostic requirement for endoscopic examination to confirm PU. Endoscopy is a medical procedure that is essential for accurately diagnosing the condition, but it comes with significant costs (Bennett et al., 2018). The high expense of this procedure limits its accessibility, particularly in regions with financial constraints or where healthcare resources are not readily available. As a result, not all patients presenting with symptoms such as hematemesis (vomiting blood) and melena (black, tarry stools) underwent endoscopic evaluation, which restricts the population of patients who could be included in the study. This limitation presented a significant challenge for the researcher when it came to sample collection. Since not all eligible patients were able to undergo endoscopy due to the associated costs, there was a delay in the process of sample acquisition. The sample size was

therefore smaller than anticipated, which led to the need for a longer period of time to obtain the required data. This resulted in a slower recruitment rate, as endoscopy is not performed on every patient with hematemesis and melena, particularly in situations where clinical judgment suggests that other factors might be contributing to the symptoms. Given these constraints, the researcher was compelled to rely on secondary data for the sample population. This secondary data primarily consisted of patient medical records, which, while still valuable, introduces potential limitations. For example, the use of secondary data means the researcher could not personally verify or control the accuracy and completeness of the data entries. Additionally, there may be discrepancies or missing information that could have affected the overall findings of the study. Furthermore, the reliance on secondary data limited the researcher's ability to prospectively observe and track patient outcomes or intervene in the care process. Despite these limitations, the use of secondary data allowed for the inclusion of a sample population that otherwise might not have been available for analysis. This could help address the limitations of sample size and allow for a broader, more comprehensive understanding of the prevalence and characteristics of PU in patients with upper gastrointestinal bleeding.

Conclusion

The study provides valuable insights into the prevalence and characteristics of PU in patients presenting with hematemesis and/or melena who underwent esophagogastroduodenoscopy. The findings reaffirm that PU are a leading cause of upper gastrointestinal bleeding, with significant associations observed between clinical presentations, demographic factors, and underlying risk factors such as NSAID use, anticoagulant therapy, and comorbid conditions. Early diagnostic evaluation was instrumental in identifying the source of bleeding and guiding timely intervention, thereby highlighting the importance of this procedure in managing UGIB effectively. Future studies should focus on exploring the long-term outcomes of patients with PU-related UGIB, including recurrence and mortality rates, in diverse clinical settings. Additionally, research on innovative therapeutic approaches, such as advanced endoscopic techniques and novel pharmacological interventions, is warranted to improve patient outcomes. Large-scale, multicenter studies investigating regional variations, environmental influences, and genetic predispositions related to PU could provide a broader understanding of this condition. Finally, emphasis on preventive strategies will be crucial in reducing the burden of PU disease globally.

Author declaration

The first author was responsible for obtaining ethical clearance, conducting a comprehensive literature review, executing the research, and overseeing the manuscript writing process. The second and third authors evaluated the research process.

AI statements

The authors affirm that they did not utilize artificial intelligence in the process of writing the manuscript.

Funding

None.

Availability of data and materials

All data are available from the authors.

Competing interests

The authors declare no competing interest.

Acknowledgments

The lead authors would like to express their heartfelt gratitude to Ns. Sodiq Kamal, M.Sc who supported the study.

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Authors' perspective

Innovation points

- The study investigates how PU occur in patients who present with hematemesis and/or melena.
- The research examines the specific features and clinical profiles of patients with PU.
- The study emphasizes the role of EGD as a critical diagnostic tool for identifying and characterizing PU.

Potential areas of interest

- What is the prevalence of PU among patients presenting with hematemesis and/or melena undergoing EGD?
- What are the key demographic and clinical characteristics of patients diagnosed with PU in this population?
- How does EGD contribute to the diagnosis and management of PU-related upper gastrointestinal bleeding?

How to cite this article (APA style)
Hidayanto, A., Subrata, S. A., & Widiyanto, P. (2024). Prevalence and characteristics of peptic ulcer in patients presenting with hematemesis and/or melena undergoing esophagogastroduodenoscopy: a descriptive study. Innovation in Health for Society, 5(1), 21-30. https://doi.org/10.31603/ihs.12514