ORIGINAL ARTICLE

Indications and endoscopic findings in patients with peptic ulcer disease at a tertiary academic center in Zambia

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ABSTRACT

Background: Global prevalence of peptic ulcer disease (PUD) is 5 - 10 %, while the burden in sub-Saharan Africa is as high as 24%. Clinically, PUD can result in complications such as perforation or progression to malignancy. Our study describes the clinical history and endoscopic features of patients with PUD undergoing an esophagogastroduodenoscopy (EGD) at a tertiary academic center in Zambia.

Methods: A descriptive retrospective analysis was conducted of patients with PUD who had undergone an upper gastrointestinal endoscopy between January 2018 and March 2023. EGD records were retrieved and manually assessed for inclusion criteria. Extracted data included: demographics (age, gender) and clinical history (procedure indication and endoscopic findings).

Results: Three thousand EGD reports were identified, of which 1024 completed charts were included in the final analysis. One thousand, nine hundred seventy-six charts were excluded due to missing data and all patients with non-peptic ulcer disease findings. The age range was 11-90 years (mean, 46.93 ± 17.90 years) while the median was 45.92 years. There were 578 males (56%) and 446 females (44%). Most patients 374 (36%) were in the 20-39 age group followed by 355 (35%) in the 40-59 age group, 214 (21%) in the 60-79 age group. Forty-eight (5%) were over 79 years old (80-96) and 33 (3%) were younger patients (11-19). The most common indication for an EGD was epigastric pain (638, 62%), followed by hematemesis (146, 14%), dysphagia (114, 11%), melena (76, 8%) and microcytic anemia (50, 5%). 492 had gastric ulcers (48%), 368 duodenal ulcers (36%) and 164 had both gastric and duodenal ulcers (16%).

Conclusion: Peptic ulcer disease (PUD) may be suspected clinically, however, an (EGD) is required to confirm the diagnosis. Understanding the

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Keywords: Peptic ulcer disease, duodenal ulcer, gastric ulcer, indications, endoscopic findings, Zambia.

This article is available online at: http://www.mjz.co.zm, http://ajol.info/index.php/mjz, doi: https://doi.org/10.55320/mjz.53.2.553
The Medical Journal of Zambia, ISSN 0047-651X, is published by the Zambia Medical Association

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demographics and clinical features provides information to establish etiology and explore further studies.

The limitation of our study is the nature of the research design as a retrospective study. All the patients' charts were manually retrieved, as such some files had incomplete, inconsistent, and missing data (such as risk factors - cigarette smoking, NSAID use and Helicobacter pylori infection) for analysis, and the findings may not be generalizable. We recommend further studies to study the risk factors and interplay of the risk factors in the pathogenesis of PUD.

INTRODUCTION

Four million people worldwide suffer from peptic ulcer disease (PUD) each year[1], with an estimated lifetime prevalence of 5–10% in the general population[2]. In underdeveloped nations, particularly in Africa, Central America, Central Asia, and Eastern Europe, Helicobacter Pylori (H. pylori) is more common[3]. H. pylori infection and NSAID use are the main causes of gastric and duodenal ulcers[4].

PUD, a frequent illness of the gastrointestinal tract, is described as an injury to the digestive tract that causes a mucosal break more than 3-5 mm and with a visible depth reaching the submucosa[5]. The pathophysiology of PUD involves an imbalance between defensive (mucus-bicarbonate layer, prostaglandins, cellular restoration, and blood flow) and aggressive elements (hydrochloric acid, pepsin, ethanol, bile salts, some drugs)[6]. There are many different symptoms of peptic ulcer illness, such as abdominal or epigastric pain, weight loss, nausea, vomiting and bleeding[7].

To avoid serious complications like bleeding, perforation, penetration into nearby organs, and gastrointestinal obstruction, which could all necessitate urgent endoscopic or surgical treatment, PUD examination and treatment must be done with great clinical caution[8]. There are two different types of peptic ulcers: gastric and duodenal. Approximately 70 percent of peptic ulcers are asymptomatic[9]. Approximately 80 percent of patients with endoscopically diagnosed ulcers have epigastric pain[10]. When there is no food buffer present, acid is secreted two to five hours after a meal. This "classic" pain of duodenal ulcers also happens at night, between around 11 PM and 2 AM, when the circadian pattern of acid production is at its peak which is relieved by eating or drinking milk[11]. Patients with peptic ulcers, and particularly pyloric channel ulcers, may have food-provoked symptoms due to visceral sensitization and gastroduodenal dysmotility[12]. It Affects people's quality of life adversely affecting their health. The significant financial burden of treating the illness falls on employers and healthcare systems as well[13]. Gastric ulcers are known to be a marker of gastric malignancy, due in large part to the fact that both conditions are linked to underlying gastritis[14]. Therefore, accurate estimations of the prevalence of PUD would aid in quantifying and describing the population at risk for gastric cancer and peptic ulcer bleeding.

PUD cannot be effectively diagnosed based on symptoms alone; an endoscopic examination is necessary to make a diagnosis[15]. In many instances, a prompt, focused course of treatment can be achieved with a precise diagnosis of the pathology. Endoscopy plays a significant role in the diagnosis of upper gastrointestinal (UGI) conditions by providing visualization, photography, ultrasonography, and lesion biopsy[16]. Characteristics of patients undergoing an EGD at a tertiary academic center in Zambia is largely unknown. This study aims to describe the clinical history and endoscopic features of patients with PUD undergoing endoscopy at a tertiary academic center in Zambia.

METHODS

A descriptive retrospective analysis was conducted of patients who had undergone an upper endoscopy at a tertiary academic center in Zambia between January 2018 and March 2023. The Levy Mwanawasa University Teaching Hospital (LMUTH) is situated along the Great East Road,

Chainama Hills Area in Lusaka. The hospital has approximately 906 medical and administrative personnel. Among the staff are about 396 nurses and around 146 medical doctors. LMUTH functions as a Provincial hospital with 3rd level services.

A datasheet was constructed with multiple variables. Endoscopic procedures records were retrieved and manually assessed for inclusion criteria. All the reports were included except those that were inconsistent or incomplete. Data extracted from the records included the demographics (age and gender) of the patients, principal indication for the procedure and primary EGD findings. The exclusion criteria were missing data and all patients with non-peptic ulcer disease findings.

Data was entered into Microsoft Excel and double checked for correctness. Collected data was classified into categorical and Continuous variables and analyzed respectively with the Statistical Package for Social sciences (SPSS) version 23. Numerical findings and demographic data collected were computed and presented by frequency and percentages. Additionally, a data mean and mean standard deviation (SD) was calculated, and all numerical findings were systematically arranged to provide a quantitative data summary and descriptive data analysis. The level of significance was considered as $P < 0.05$.

Ethical considerations

Ethical approval was obtained from the Research Ethics Committee, Lusaka Apex Medical University Bio-Medical Ethics Committee (LAMUBREC) (24/02/2024, Ref: 00035-23) and from Levy Mwanawasa University Teaching Hospital (LMUTH) management to gain access to the hospital records and conduct the research. No permission was directly sought from patients since the data was extracted from patients records retrospectively. Data acquired was only used for the study, and patients' information used in the research was kept confidential.

RESULTS

The study population's characteristics are summarized in Table 1. Three thousand patients underwent an EGD over the period; however the complete charts of one thousand, twenty-four patients were included in the final analysis. One thousand, nine hundred seventy-six charts were excluded due to missing data and all patients with non-peptic ulcer disease findings. The age range was 11-90 years (mean, 46.93 ± 17.90 years) while the median was 45.92 years. Males were more affected. 578 (56%) of the patients were males while 446 (44%) were females. Most patients 374 (36%) were in the 20-39 age group followed by 355 (35%) in the 40-59 age group, 214 (21%) in the 60-79 age group. 48 (5%) were over 79 years old (80-90) and 33 (3%) were younger patients (11-19) (Figure 1). By far, the most common primary indication for an EGD was epigastric pain (638, 62 %), (Table 1) followed by hematemesis 146(14%), and dysphagia 114(11%). Other notable indications were melena 76 (8%) and microcytic anemia 50 (5%).

Endoscopic findings have been limited to gastric and duodenal ulcers. Gastric ulcer 492 (48%) was seen more frequently than duodenal ulcer 368 (36%) and 164 (16%) presented with both gastric and duodenal ulcers.

Table 1: Background characteristics (N=1024)

Variable	Number of patients (%)
Age (year)	
<20 (11-19)	33 (3%)
20-39	374 (36%)
40-59	355 (35%)
60-79	214 (21%)
80-90	48 (5%)
Sex	
Male	578 (56%)
Female	446 (44%)

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Indications for an EGD procedure	
Epigastric pain	638 (62%)
Hematemesis	146 (14%)
Dysphagia	114 (11%)
Melena	76 (8%)
Microcytic Anemia	50 (5%)
Upper GI Endoscopy findings	
Gastric ulcer	492 (48%)
Duodenal ulcer	368 (36%)
Both	164 (16%)

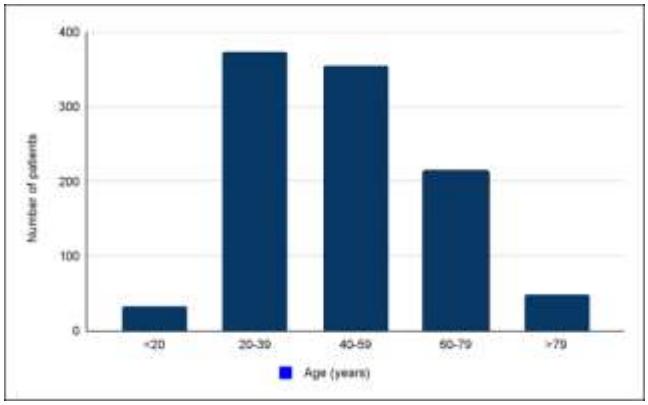

Figure 1: The age distribution of the study population.

Table 2 summarizes the characteristics of patients with an indication of gastric ulcer only, duodenal ulcer only and both gastric and duodenal ulcers. For gastric ulcer, the patient age at diagnosis rose steadily to a peak of 40-59 years and fell gradually in the 11-19 age range. For duodenal ulcer, the patient's peak age at diagnosis was in the 20-39 age range and fell in the elderly (>79 years) (Figure 2). The peak age at diagnosis of both gastric and duodenal ulcers ranged between 20 and 39 years (Table 2). Younger patients (11-19) years had the least presentation of both ulcers.

Table 2: Characteristics of patients with an endoscopic indication of gastric, duodenal and both gastric and duodenal ulcers.

Age (years)	Number of patients	Number of patients with gastric ulcer only	Number of patients with duodenal ulcer only	Number of patients with both gastric and duodenal ulcers
<20 (11-19)	33	12 (2%)	18 (5%)	3 (2%)
20-39	374	140 (28%)	170 (46%)	64 (39%)
40-59	355	200 (41%)	110 (30%)	45 (27%)
60-79	214	116 (24%)	60 (16%)	38 (23%)
80-96	48	24 (5%)	10 (3%)	14 (9%)
Total	**1024**	**492 (100%)**	**368 (100%)**	**164 (100 %)**

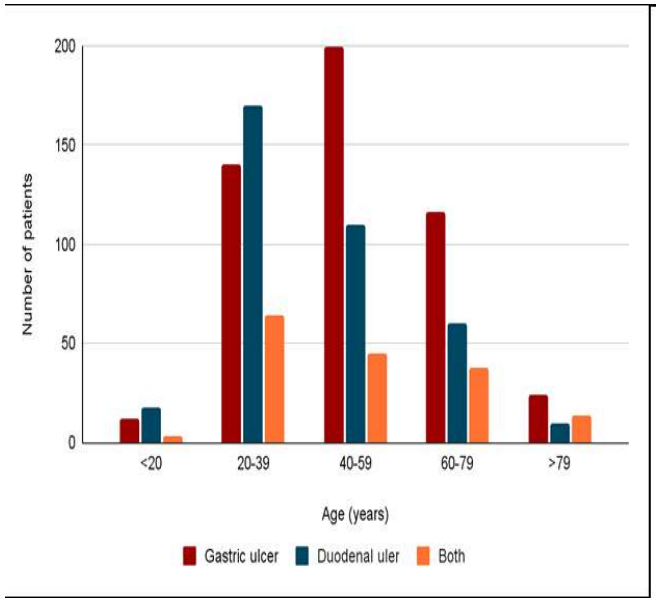

Figure 2: Summary of Endoscopy findings

DISCUSSION

PUD affected more males than females in this study. Epigastric pain was the indication for EGD in the vast majority of patients. Other reasons for EGD included hematemesis, dysphagia, melena and microcytic anemia. *El Mouzan* et al conducted a study on adolescents and children in Saudi Arabia and reported abdominal pain as the commonest presentation (63%), followed by vomiting associated with abdominal pain (17%), hematemesis (13%) and melena (8%)[17].

Gastric ulcers were diagnosed more frequently than duodenal ulcers among the patient population at this tertiary academic center in Zambia. This was also the case of a study from Arar, Northern Saudi Arabia that reported more gastric than duodenal ulcers, and reported coffee drinking, spicy food, physical stress, prolonged use of NSAIDs and H. Pylori infection as risk factors[18]. *Jang* et al. observed a declining trend in the prevalence of primarily duodenal ulcers during the course of a 10-year research conducted in Korea[19]. Due to improved sanitation and cleanliness, as well as the implementation of appropriate H. pylori eradication regimens, the incidence of duodenal ulcers in the western population is gradually declining[20]. The findings of a study from Kumasi, Ghana also showed that gastric ulcers were diagnosed more frequently than duodenal ulcers in the ratio (1.6:1)[21]. In contrast, one study conducted in sub-Saharan Africa showed that most ulcers (86%) were duodenal ulcers while gastric ulcers had (14%)[22].

Our study did not explore risk factors for PUD. However, some of the known risk factors are alcohol consumption and smoking[23]. There is evidence linking smoking and alcohol use to a higher risk of developing a perforated peptic ulcer. Alcohol is a noxious substance that damages the mucosa of the stomach, increases the production of acid, and raises serum levels of gastrin[24]. On the other hand, smoking decreases the secretion of pancreatic bicarbonate, which raises the acidity of the duodenal bulb. Moreover, it prevents duodenal ulcers from healing[25,26]. Similarly, another study done in Nigeria found a variable male preponderance (68.4%)[27]. This is in contrast to the findings of one study from Dhaka, Bangladesh which reported the majority (56%) of the female patients being mostly affected in the age group of 41-50 years[28]. A study from Sierra Leone by Sundufu et al also showed that females (58%) were more affected than males (42%)[29].

Although the general prevalence of PUD and the impact of specific risk factors may differ among communities, several trends are constant when comparing the results of this study with comparable research carried out in other areas. For example, it is commonly known and has been noted in several studies conducted worldwide that lifestyle choices, NSAID use, and H. pylori infection all contribute to the development of PUD. The prevalence and presentation of PUD, however, may be influenced by regional variations in healthcare availability, cultural customs, and environmental factors[30].

The results of this study have significant implications for clinical practice and public health initiatives. By determining the demographics, clinical history, endoscopic findings, and lifestyle factors linked to PUD, medical professionals can create focused interventions to lower the disease's prevalence and severity[31]. Education campaigns to increase

public knowledge of PUD symptoms, risk factors, and prevention strategies can encourage people to lead healthier lives and, when needed, seek prompt medical attention[32]. Additionally, the results of this study can be used by medical professionals to enhance PUD diagnosis and treatment procedures. PUD patients' outcomes can be improved and the total burden of the illness on healthcare systems can be decreased with the use of improved screening techniques, tailored treatment plans, and interdisciplinary care approaches[33].

The limitation of our study is the nature of the research design as a retrospective study. All the patients' charts were manually retrieved, as such some files had incomplete, inconsistent, and missing data (such as risk factors - cigarette smoking, NSAID use and *Helicobacter pylori* infection) for analysis, and the findings may not be generalizable.

CONCLUSION

An endoscopic examination is required to obtain a diagnosis of PUD, as symptoms alone are not sufficient for accurate diagnosis. The age range of patients presenting for endoscopy was wide, with epigastric pain being the most common indication. Duodenal ulcers were less prevalent than gastric ulcers. Knowing the clinical characteristics and demographics provide information to determine the etiology and serve as a baseline for more research as there is paucity of data in Zambia. We recommend further studies to study the risk factors and interplay of those risk factors in the pathogenesis of PUD.

What is known about this topic

- An upper gastrointestinal endoscopy is known as one of the most effective methods for the diagnosis of peptic ulcer disease.
- Literature reports that perforation or progression to malignancy are some of the most serious complications of peptic ulcer disease.
- Understanding risk factors guides both prevention and management of peptic ulcer disease.

What this study adds

- This study has shown a wide range for presentation for endoscopy, with the most common indication being epigastric pain.
- Gastric ulcers were more common than duodenal ulcers at this tertiary academic center in Zambia.
- This study not only provides data to enrich literature on peptic ulcer disease in Zambia as there is paucity of data but also shows the importance of clinical characteristics and demographics in determining the etiology.

Competing interests

All authors declare no competing interests.

Authors contributions

Protocol development: Pharidah Rajan Ibrahim Omar Sundi, John Mathias Zulu, Brght Nsokolo, Akwi Wasi Asombang. Data collection, analysis and interpretation: Pharidah Rajan Ibrahim Omar Sundi, Bright Nsokolo, John Mathias Zulu, Akwi Wasi Asombang. Manuscript writing and approval of final draft: Pharidah Rajan Ibrahim Omar Sundi, Brht Nsokolo John Mathias Zulu and Akwi Wasi Asombang.

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