Scientific Research Publishing

Open Journal of Gastroenterology, 2026, 16(6), 210-218
https://www.scirp.org/journal/ojgas
ISSN Online: 2163-9469
ISSN Print: 2163-9450

Current Trends in Gastroduodenal Ulcers in Dakar (Senegal): A Prospective Multicenter Study

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How to cite this paper: Gueye, M.N., Leuyou, A.M.M., Diouf, G., Cissé, M.C., Evra, M.L., Niang, S.D., Assani, G.I., Diallo, S., Fall, M.P., Bassène, M.L., Dia, D., Thioubou, M.A. and Diallo, S. (2026) Current Trends in Gastroduodenal Ulcers in Dakar (Senegal): A Prospective Multicenter Study. *Open Journal of Gastroenterology*, **16**, 210-218.
https://doi.org/10.4236/ojgas.2026.166022

Received: March 13, 2026
Accepted: June 8, 2026
Published: June 11, 2026

Abstract

Background: Gastroduodenal ulcer disease (GDU) remains a significant global health concern despite considerable therapeutic advances over recent decades. In Senegal, several studies have reported a progressive decline in its prevalence. However, updated data reflecting current epidemiological and therapeutic patterns remain limited. This study aimed to reassess the epidemiological, clinical, endoscopic, and therapeutic characteristics of gastroduodenal ulcers in Dakar. **Methods:** We conducted a prospective multicenter study in the digestive endoscopy units of three tertiary hospitals in Dakar: Idrissa Pouye General Hospital, Dalal Jamm National Hospital Center, and Abass Ndao Hospital Center. The study period extended from August 1, 2023 to March 31, 2024. All patients with gastric and/or duodenal ulcers diagnosed during upper gastrointestinal endoscopy and who consented to participate were included. Sociodemographic, clinical, endoscopic, histological, therapeutic, and outcome data were collected using a standardized questionnaire. Statistical analyses were performed using Excel 2021 and R version 4.3. **Results:** During the study period, 1455 upper gastrointestinal endoscopies were performed. Among these, 83 cases of gastroduodenal ulcers were identified, corresponding to a frequency of 5.7%. The mean age of patients was 46 years (range: 12 - 80 years), with a predominance in the 40 - 60 year age group. A male predominance was observed (63.9%), with a

sex ratio of 1.7. The most common clinical manifestation was epigastric pain (79.7%), while gastrointestinal bleeding occurred in 14.5% of cases. Duodenal ulcers were the most frequent (54.2%), followed by gastric ulcers (37.3%). *Helicobacter pylori* infection was detected in 92.6% of patients who underwent histological examination. Triple therapy combining a proton pump inhibitor, amoxicillin, and clarithromycin was the most frequently prescribed treatment (53.1%). Clinical improvement was observed in 80% of patients. **Conclusion:** This study highlights a continued decline in the prevalence of gastroduodenal ulcers in Dakar. However, *Helicobacter pylori* infection remains a key etiological factor in our context. Public health efforts should focus on improving access to eradication therapies, strengthening endoscopic follow-up, and enhancing patient awareness regarding treatment adherence in order to optimize the management of gastroduodenal ulcer disease.

Keywords

Peptic Ulcer Disease, *Helicobacter pylori*, Upper Gastrointestinal Endoscopy, Senegal

1. Introduction

Gastroduodenal ulcer disease (GDU), also referred to as peptic ulcer disease, is defined as a mucosal defect of the stomach or duodenum extending through the muscularis mucosae into deeper layers of the gastrointestinal wall. This condition results from an imbalance between mucosal defensive mechanisms and aggressive factors such as gastric acid secretion, *Helicobacter pylori* infection, and the use of gastrotoxic medications [1].

Although the global incidence of gastroduodenal ulcer disease has declined over the past decades, it remains an important cause of morbidity due to potentially severe complications, including gastrointestinal bleeding, perforation, and gastric outlet obstruction [2].

In Senegal, the prevalence of gastroduodenal ulcers has markedly decreased, falling from 23.5% in 1993 to 12.4% in 2009. This decline has been attributed to improvements in living conditions, sanitation, and access to safe drinking water, which may reduce the transmission of *Helicobacter pylori*. Additionally, the widespread use of eradication therapies has significantly modified the epidemiology of ulcer disease [3] [4].

Given these epidemiological and therapeutic changes, it is important to reassess the current characteristics of gastroduodenal ulcer disease in our setting. The aim of this study was therefore to evaluate the epidemiological, clinical, endoscopic, and therapeutic aspects of gastroduodenal ulcers in Dakar more than a decade after the last available data.

2. Patients and Methods

This was a prospective multicenter study conducted in the digestive endoscopy

units of Idrissa Pouye General Hospital, Dalal Jamm National Hospital Center, and Abass Ndao Hospital Center in Dakar. The study period extended from August 1, 2023, to March 31, 2024, corresponding to a total duration of eight months.

All patients in whom upper gastrointestinal endoscopy revealed a gastric and/or duodenal ulcer and who consented to an additional medical interview were included in the study. Patients with psychiatric disorders preventing reliable history-taking were excluded.

Data collected included sociodemographic, clinical, endoscopic, histological, therapeutic, and follow-up characteristics of the patients. These data were collected using a standardized questionnaire.

The socioeconomic status of patients was assessed using three parameters:

- access to water and electricity;
- household size (number of people living in the household);
- monthly income of the patient or, for minors and dependent individuals, that of the parents or guardian.

Data entry was performed using KoboToolBox software. Statistical analysis was conducted using Excel 2021 and R software version 4.3.

3. Results

During the study period, 1455 esophagogastroduodenoscopies were performed. Among them, 83 revealed gastric and/or duodenal ulcers, corresponding to an endoscopic frequency of GDUs of 5.7%.

The mean age of patients was 46 years, ranging from 12 to 80 years. The 40 - 60 years age group was the most represented (Figure 1). A male predominance was observed with 53 male patients (63.9%), corresponding to a sex ratio of 1.7.

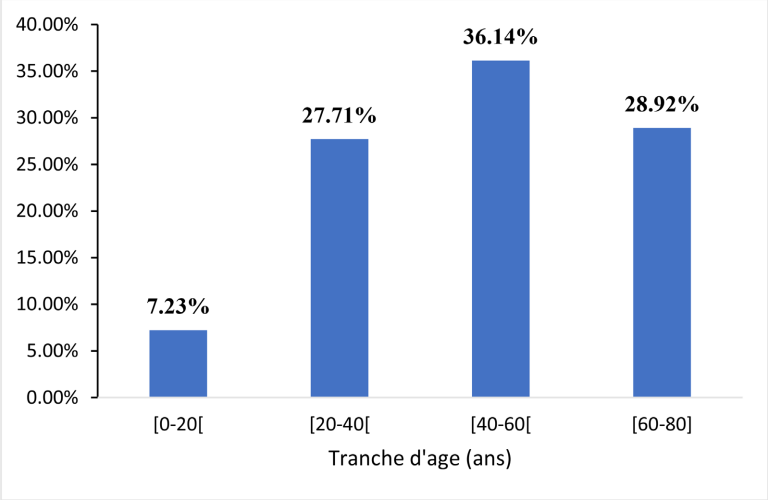

Figure 1. Distribution of patients by age group.

The mean diagnostic delay was 22 months, ranging from three weeks to 120 months. Clinical manifestations were dominated by epigastric pain, reported in 63 patients (79.7%). Gastrointestinal bleeding occurred in 12 patients (Table 1).

Table 1. Distribution of patients according to functional symptoms.

Functional symptoms	Number of patients	(%)
Epigastralgia	63	79.70%
Vomiting	18	22.80%
Weight loss	12	15.20%
Gastroesophageal reflux disease (GERD)	11	13.90%
Hematemesis	9	11.40%
Dyspepsia	7	8.86%
Anorexia	7	8.86%
Dysphagia	7	8.86%
Diarrhea	6	7.59%
Constipation	6	7.59%
Nausea	3	3.80%
Hiccups	3	3.80%
Clinical anemia	2	2.54%
Sialorrhea	2	2.54%
Melena	1	1.27%
Rectorrhagia	1	1.27%
Belching	1	1.27%

Regarding risk factors:

- active smoking was found in 16 patients (23.9%);
- alcohol consumption in 5 patients (7.5%);
- use of gastrotoxic drugs, particularly NSAIDs or aspirin, in 19 patients (28.3%).

Socioeconomic status was considered low in 80% of cases.

On endoscopy:

- duodenal ulcers were found in 45 patients (54.2%);
- gastric ulcers in 31 patients (37.3%);
- combined gastroduodenal ulcers in 7 patients (8.4%).

The gastric antrum was the most frequent location of gastric ulcers (71.9%), while duodenal ulcers were most often located on the anterior wall of the duodenal bulb.

Associated endoscopic lesions were dominated by erythematous gastritis, found in 22 patients (27.8%).

A complicated ulcer was observed in 20 patients (24.1%). Among the 12 patients with gastrointestinal bleeding, 8 had a duodenal ulcer (66.7%). According to the Forrest classification:

- Forrest III: 9 patients;
- Forrest IIa: 1 patient;
- Forrest IIb: 1 patient;
- Forrest IIc: 1 patient;

A bulbar stenosis was found in 3 patients (3.6%), and a pyloric stenosis in 5 patients (6.0%).

Gastric biopsies were performed in 59 patients (71.1%). Among the 31 patients with gastric ulcers, 28 underwent biopsy (90.3%). Histopathological results were obtained in 27 patients (45.8%) of those biopsied.

Helicobacter pylori infection was detected in 25 patients (92.6%), including:

- 12 cases of duodenal ulcer (48%);
- 11 cases of gastric ulcer (44%);
- 2 cases of gastroduodenal ulcer (8%).

Regarding treatment:

- triple therapy combining a proton pump inhibitor (PPI), amoxicillin, and clarithromycin was the most frequently prescribed regimen (53.1%);
- concomitant quadruple therapy was used in only 4.7% of cases.

Treatment duration was 14 days in most cases (57.8%), and longer than one month in 29.7%.

Side effects were reported in 12 patients (18.8%), with nausea being the most frequent (41.7%).

Maintenance therapy with once-daily PPI was prescribed in 34 patients (53.1%), most often for two weeks (35.3%).

Endoscopic dilation using a hydrostatic balloon was performed in three patients with pyloroduodenal stenosis secondary to ulcer disease. Two dilation sessions were required for each patient. This treatment resulted in therapeutic success in two patients, whereas one patient required surgical management with truncal vagotomy and gastroenterostomy.

Clinical evolution under treatment was favorable in 80% of patients.

Among the 31 patients with gastric ulcers, only three underwent follow-up upper endoscopy (9.7%). The main reasons for the absence of follow-up endoscopy were:

- lack of prescription by the treating physician;
- financial constraints;
- intolerance of the procedure during the initial endoscopy.

4. Discussion

Our study showed an overall prevalence of gastroduodenal ulcers of 5.7%. Several epidemiological studies have demonstrated that the incidence and prevalence of GDUs tend to decrease in the general population [5]-[8].

In Senegal, literature data confirm this trend since the 1990s.

Between 1989 and 1992, Diouf *et al.* reported a prevalence of 24.6% at Aristide Le Dantec University Hospital [3]. In 2009, in the same center, they reported 118 GDUs among 951 upper endoscopies, corresponding to a prevalence of 12.4% [4]. Our study therefore confirms the continuation of this decline with a current prevalence of 5.7%.

A similar evolution has been observed in several Sub-Saharan African countries. In Burkina Faso, prevalence decreased from 10.1% in 2010 to 6.6% in 2016,

while in Cameroon it decreased from 31.7% in 1990 to 10.4% between 2011 and 2014 [9]-[12].

This decline may be explained by improvements in hygiene and living conditions as well as by the dissemination of *Helicobacter pylori* eradication therapies.

In Western countries, the prevalence of GDUs is also relatively low, with 5.9% reported in the Netherlands and 4.1% in Sweden [8] [13].

Overall, these findings suggest a global trend toward harmonization of the prevalence of gastroduodenal ulcers [14].

The mean age of patients in our study was 46 years, which is slightly higher than in earlier Senegalese studies [15] [16].

In African series, the mean age generally ranges between 40.6 and 52.3 years [17] [18].

This evolution reflects a gradual convergence with the age of onset observed in Western countries.

Historically, the earlier occurrence of GDUs in Africa was largely related to *Helicobacter pylori* infection acquired during childhood in unfavorable socioeconomic conditions, facilitating transmission.

Improvements in hygiene conditions may explain why GDUs now occur at older ages. In addition, the increase in mean age could also be related to the growing use of gastrotoxic medications, particularly NSAIDs, among older patients.

Our study also showed a male predominance with a sex ratio of 1.7, which is widely reported in both African and international studies [14] [19].

Several factors may explain this difference between sexes. On one hand, estrogens appear to exert a protective effect on the gastroduodenal mucosa. On the other hand, men are generally more exposed to certain risk factors such as smoking and alcohol consumption.

In our series, 23.9% of patients were smokers, 7.5% consumed alcohol, and 28.3% reported the use of gastrotoxic medications. The increased use of NSAIDs and aspirin observed in our study may be explained by population aging and the increasing prevalence of cardiovascular diseases requiring antiplatelet therapy.

Duodenal ulcers represented 54.2% of cases, gastric ulcers 37.3%, and combined gastroduodenal ulcers 8.4%. This predominance of duodenal ulcers is widely reported in both African and international studies and is largely explained by the high prevalence of *Helicobacter pylori* infection in developing countries [13] [19].

In our study, histological examination was the only diagnostic method used to detect *Helicobacter pylori*, with an infection rate of 92.6%.

The infection rate of *H. pylori* appears to be higher than that reported in other African series, where it ranged from 63% to 88.9% [18]-[20].

The low number of histological examinations that we were able to perform may explain this higher rate of *H. pylori* infection compared with other studies. Indeed, the prevalence of *H. pylori* infection is decreasing in our countries. In 2017, in Senegal, Bamba *et al.* conducted a study on gastritis and reported a prevalence of 68% [21], which suggests that, in general, the prevalence of *H. pylori* infection is

declining.

The majority of our patients (53.1%) were treated with a triple therapy regimen combining a PPI, amoxicillin, and clarithromycin. Quadruple therapy, which is the currently recommended treatment, was prescribed for only 4.7% of our patients.

A study conducted by Diallo *et al.* in Senegal demonstrated the efficacy of triple therapy in 92.5% of cases and of sequential therapy in 92.7% of cases [22]. Seck *et al.* demonstrated in a study that *H. pylori* resistance to clarithromycin was very low (1%), unlike in Western countries, and thus recommended clarithromycin-based H. pylori eradication therapy as first-line treatment [16]. The therapeutic strategy for *H. pylori* infection must take into account the local bacterial ecology.

5. Conclusions

This study highlights a continued decline in the prevalence of gastroduodenal ulcers in Dakar. However, *Helicobacter pylori* infection remains a key etiological factor in our context.

Public health efforts should focus on improving access to eradication therapies, strengthening endoscopic follow-up, and enhancing patient awareness regarding treatment adherence in order to optimize the management of gastroduodenal ulcer disease.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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