

Patterns of Upper Gastrointestinal Endoscopic Findings at Endoscopy Unit of Jimma University Medical Center, Jimma, Ethiopia

Beyan Mohammed Beshir¹, Wasihun Zerfu Zewde², Tsion Haile Woldemariam^{1,*},
Asfaw Hagos Shumye², Dagim Kassahun Minasie², Mohammed Kedir Shukri², Emebet Woldearegay Bereka³

¹Arba Minch University College of Medicine and Health Sciences, Arba Minch, Ethiopia

²Saint Paul's Hospital Millennium Medical College, Addis Ababa, Ethiopia

³Jimma University Medical Center, Jimma, Ethiopia

*Corresponding author: tsinahailey55@yahoo.com

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Abstract Background: Upper gastrointestinal (GI) disorders are common causes of morbidity worldwide, presenting diagnostic and therapeutic challenges. Endoscopy remains the gold standard for diagnosing these conditions. However, data on the regional patterns of upper GI diseases in Ethiopia are limited. This study aimed to describe the endoscopic findings and their associations among patients undergoing upper GI endoscopy at Jimma University Medical Center (JUMC). **Methods:** A retrospective descriptive study reviewed endoscopy reports and medical records of 435 patients who underwent upper GI endoscopy at JUMC between September 2021 and September 2022. Data on sociodemographic characteristics, clinical indications, and endoscopic findings were analyzed using descriptive statistics, and associations between clinical features and diagnoses were examined. **Results:** The mean age of patients was approximately 42.5 (SD $\pm$ 16.8), with males constituting 52%. The most common indications for endoscopy were dyspepsia (30.11%), dysphagia (20.69%), and upper GI bleeding (18.39%). Erosive gastritis was the most frequent endoscopic finding, observed in 47.35% of cases, followed by duodenal ulcer (31.7%), GERD (17.9%), and esophageal cancer (14%). Notably, esophageal cancer accounted for 14% of findings, highlighting its significance in this population. Benign lesions predominated among patients under 45 years, whereas malignant lesions like esophageal cancer were more common in older age groups. There was a significant association between certain indications (e.g., dysphagia, bleeding) and specific diagnoses ($p < 0.05$). **Conclusion:** The study underscores the predominance of benign inflammatory conditions, such as erosive gastritis, and highlights the considerable presence of esophageal cancer among patients undergoing endoscopy at JUMC. These findings suggest the need to improve endoscopic access, implement early detection programs, and develop targeted interventions to address the regional burden of upper GI diseases.

Keywords: Endoscopy, Upper Gastrointestinal Tract, Epidemiology, Diagnosis, Ethiopia

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1. Introduction

Upper gastrointestinal (GI) disorders represent a significant global health challenge, encompassing a broad spectrum of conditions from common ailments like dyspepsia, gastroesophageal reflux disease (GERD), and peptic ulcers to more serious pathologies such as GI hemorrhage and malignancies of the esophagus and stomach [1]. These conditions contribute substantially to healthcare utilization worldwide, with their incidence showing a rising trend in many regions [2,3,4,5].

The pattern of upper GI diseases varies markedly across regions. In Western countries, GERD, peptic ulcers, and

gastrointestinal bleeding are frequently reported [2], often linked to lifestyle factors such as diet, obesity, smoking, and widespread use of non-steroidal anti-inflammatory drugs (NSAIDs) [6]. Conversely, African studies have demonstrated a higher prevalence of gastritis, esophageal cancers, and duodenal ulcers, with dyspepsia being a common indication for endoscopy [7,8]. Factors such as high *Helicobacter pylori* infection rates, dietary habits rich in smoked and salted foods, and environmental influences contribute to these regional variations [9,10].

Literature comparing these patterns explicitly shows that while GERD and peptic ulcer disease are predominant causes of upper GI pathology in Western populations, infectious and inflammatory conditions, particularly gastritis and esophageal carcinoma, tend to be more

prevalent in Africa [11,12]. For example, a review by Mayne et al. highlighted that in European and North American settings, GERD is among the top indications for endoscopy, whereas in African countries, *Helicobacter pylori*-associated gastritis and related complications dominate [13].

In Ethiopia, existing data, including a retrospective study conducted five years ago at Jimma University Medical Center (JUMC), reflect these regional trends, indicating dyspepsia as the leading indication and duodenal ulcers as the most common abnormality identified via endoscopy [14,15]. Despite JUMC's critical role as a major public referral center for endoscopy in southwest Ethiopia, recent and comprehensive data on the patterns of upper GI endoscopic findings remain limited. This scarcity hampers effective healthcare planning, optimal resource allocation, and the development of targeted interventions. Moreover, Ethiopia faces high prevalence rates of *Helicobacter pylori* infection, significantly impacting the epidemiology of peptic ulcer disease and gastric cancers [16,17].

Understanding the current spectrum of upper GI disorders in this regional context is crucial for improving clinical outcomes. Such knowledge can inform strategies to expand endoscopy services, facilitate early diagnosis, and develop region-specific management protocols. Therefore, this study aims to characterize the patterns of upper GI endoscopic findings at JUMC, evaluating sociodemographic factors, indications, and disease associations to enhance healthcare delivery and policy planning.

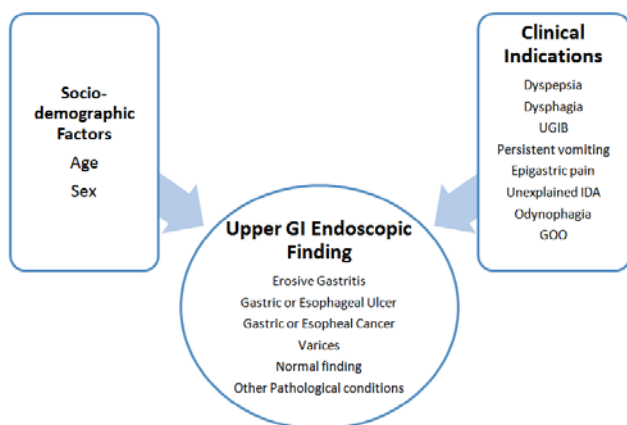


Figure 1. Conceptual framework illustrating the relationship between clinical, socio-demographic, and endoscopic findings in patients with upper gastrointestinal symptoms

‘Image credits: Beyan Mohammed Beshir, Wasihun Zerfu Zewde, Emebet Woldearegay Bereka, Tsion Haile Woldemariam’

2. Methods and Materials

Study Area and Period

This study was conducted at Jimma University Medical Center (JUMC), Jimma, Ethiopia, the only teaching and specialized hospital in the region, serving approximately 15 million people. The hospital was established in 1938 G.C. and provides a wide range of healthcare services,

including a dedicated endoscopy unit operational since May 2016 G.C. The study period spanned from September 9, 2021 to September 8, 2022 G.C.

Study Design

A retrospective, cross-sectional descriptive study was employed to analyze endoscopy reports and medical records of patients who underwent upper gastrointestinal endoscopy during the study period.

Study Population

The source population included all adult patients (aged ≥ 15 years) who visited JUMC and had a diagnostic upper GI endoscopy performed within the specified period. Patients with incomplete or missing medical records, or those who underwent therapeutic or follow-up endoscopy procedures without diagnostic intent, were excluded.

During the study period, a total of 439 endoscopic procedures were performed. All eligible patients meeting the inclusion criteria were included, ensuring comprehensive coverage without sampling.

Data Collection

Data were extracted from patient medical records, endoscopy report forms, and registry books maintained by the endoscopy unit. A structured data collection tool was developed based on a review of relevant literature and existing protocols. This tool captured socio-demographic data (age, sex, residency), clinical indications for endoscopy, endoscopic findings, and histopathological results when available.

Data collectors, two trained health professionals (general practitioners), reviewed the charts independently to ensure accuracy. Prior to data collection, a pre-test was conducted on 20 randomly selected charts outside the main study population to refine the data collection process and ensure clarity of the tool.

Data Quality Assurance

To maintain data integrity, training sessions were provided to data collectors on the use of the data collection tool and study protocols. Daily supervision and review meetings were held to monitor completeness, consistency, and accuracy of data collection. Discrepancies were resolved through discussion with a senior investigator.

Operational Definitions

Adult: A person aged 15 years and above.

Dyspepsia: Chronic or recurrent epigastric pain or discomfort, early satiety, bloating, or fullness.

Gastroesophageal Reflux Disease (GERD): Reflux of stomach contents causing troublesome symptoms or complications.

Hematemesis: Vomiting of red blood or "coffee-ground" material.

Hematochezia: Passage of fresh or maroon blood from the rectum.

Melena: Black, tarry stool.

Urban residency: Residence within designated urbanized areas defined by the Ethiopian Central Statistical Agency as areas with a population of 50,000 or more.

Rural residency: All areas outside the defined urban boundaries.

Data Processing and Analysis

Data were entered into EpiData version 3.1, cleaned, and exported to SPSS version 29.0 for analysis. Descriptive statistics, including frequencies, percentages, means, and standard deviations, summarized socio-demographic and clinical variables.

Associations between categorical variables, such as demographic factors and endoscopic findings, were assessed using the chi-square test of independence. The p-value threshold for statistical significance was set at <0.05.

Multivariate logistic regression analysis identified factors independently associated with specific endoscopic diagnoses. Variables with a p-value <0.2 in bivariate analysis or deemed clinically relevant were included in the multivariable model. Model assumptions, including multicollinearity and goodness-of-fit, were checked to ensure robustness.

Ethical Considerations

Ethical approval was obtained from the Jimma University Institutional Review Board (IRB). Since this was a record review study, a waiver of informed consent was granted by the IRB. Patient confidentiality was strictly maintained by de-identifying data; access was limited to the principal investigators and authorized study personnel. Data handling complied with ethical standards to ensure anonymity and privacy.

3. Results

Demographic Characteristics

A total of 435 patients who underwent upper gastrointestinal endoscopy during the study period were included. The mean age of participants was 42.5 ± 16.8 years, with an age range of 15 to 85 years. The majority of patients were within the age group of over 45 years ($n=183$, 42%), followed by those aged 35-45 years ($n=131$, 30%). Females comprised 48% ($n=209$) of the study population, while males accounted for 52% ($n=226$).

Indications for undergoing Upper GI endoscopic examination among the study participants

Among the 435 patients who underwent upper gastrointestinal endoscopy (UGIE) at JUMC in 2022, the most common indication was dyspepsia, accounting for 131 cases (30.11%). This was followed by dysphagia in 90 patients (20.69%) and upper gastrointestinal bleeding (UGIB) in 80 patients (18.39%). Epigastric pain and persistent vomiting were indications for 62 (14.25%) and 42 (9.65%) patients, respectively. Screening UGIE for chronic liver disease (CLD) and portal hypertension was performed in 8 patients (1.6%) (Table 1).

Upper Endoscopic findings among the study participants undergoing Upper GI endoscopy

Among the 435 patients who underwent upper gastrointestinal endoscopy (UGIE), 10 (2.3%) had normal endoscopic findings. Erosive gastritis was the most common finding, observed in 206 patients (47.35%), followed by duodenal ulcer in 138 patients (31.7%). Gastroesophageal reflux disease (GERD) was diagnosed in 78 patients (17.9%), esophageal cancer in 61 patients

(14%), and esophageal and/or gastric varices in 40 patients (9.2%).

Hemorrhagic gastritis and atrophic gastritis were found in 54 (12.4%) and 27 (6.2%) patients, respectively. Gastric outlet obstruction (GOO) was identified in 40 patients (9.2%), Duodenitis in 34 (7.8%), pyloric ulcer in 25 (5.74%), gastric mass in 17 (3.9%), and bile reflux gastropathy in 14 (3.22%) patients (Table 3). The pyloric ulcer was the most common cause of GOO, accounting for 22 cases (55%). Cicatrization, duodenal ulcer, antral ulcer, and antral cancer each accounted for 4 cases (10%). Other causes included surgical scar and gastric ulcer (Table 2).

Table 1. Clinical Indication of UGI Endoscopy among the study participants, JUMC Endoscopy unit, 2022

Variables	Indication for Upper GI Endoscopy	Frequency	Percent (%)
Upper GI Endoscopy	Dyspepsia	131	30.11
	Dysphagia	90	20.69
	UGIB	80	18.39
	Persistent vomiting	42	9.65
	Epigastric pain	62	14.25
	Portal HTN	4	0.91
	Unexplained IDA	3	0.68
	CLD	4	0.68
	PUD	6	1.38
	Odynophagia	2	0.45
	GOO	2	0.45
	Others ¹	8	2.06

Others¹: Hoarseness of Voice, hiccup, Indigestion, Food impaction, Foreign Body

Table 2. UGI Endoscopic finding among the study participants, JUMC Endoscopy unit, 2022

Endoscopic Finding	Frequency	Percent (%)
Erosive Gastritis	206	47.35
Duodenal Ulcer	138	31.70
Hemorrhagic Gastritis	54	12.40
Atrophic Gastritis	27	6.20
Esophageal Cancer	61	14.00
Esophageal and/or Gastric Varices	40	9.20
Gastroesophageal Reflux Disease (GERD)	78	17.90
Gastric Outlet Obstruction (GOO)	40	9.20
Pyloric Ulcer	25	5.74
Antral Gastritis	10	2.29
Achalasia	5	1.15
Gastric Cancer	17	3.90
Duodenitis	34	7.80
Bile Reflux Gastropathy	14	3.20
Normal Study	10	2.29
Others ²	33	7.35

Others²: Gastric ulcer, follicular gastritis, esophagitis, duodenal adenoma, deformed stomach, patulous lower esophageal sphincter, anterior ulcer, gastrointestinal stromal tumor, foreign body (bone debris), Zenker's diverticulum, esophageal submucosal tumor, and laryngeal polyp.

Pathology reports of endoscopic biopsy samples

Biopsies were generally performed when endoscopic findings suggested either inflammatory pathology or carcinoma. Histological examination of esophageal samples confirmed esophageal cancer in 50 cases. Two samples showed esophageal carcinoma in situ, and three samples revealed full-thickness dysplastic squamous epithelium. Six samples yielded inconclusive results. Among 17 lesions suggestive of gastric cancer on upper GI endoscopy, five cases were confirmed histologically, while four showed low-grade dysplasia and three showed high-grade dysplasia. Five histology reports were inconclusive. For 21 patients with pyloric or other types of gastric ulcers who underwent biopsy for gastritis, none showed evidence of gastric cancer; instead, 16 cases demonstrated chronic gastritis, four showed acute gastritis, one was normal, and two were inconclusive (Table 3).

Association of major indications and upper endoscopic findings with explanatory variables among patients undergone upper GI endoscopy

Dyspepsia was the most common indication for upper GI endoscopy in this study, with females comprising the majority of patients evaluated for dyspepsia (72, 55%). Dyspepsia showed a significant association with sex ($P = 0.014$) (Table 4). Among these patients, erosive gastritis was the predominant finding, present in 99 (75.6%), followed by duodenal ulcer in 58 (44.3%) and GERD in 37 (28.2%). Only 3 patients (2.3%) had normal endoscopic findings. Erosive gastritis, duodenal ulcer, and GERD were significantly associated with dyspeptic symptoms ($P < 0.001$).

Dysphagia was the second most common indication for upper GI endoscopy. More than half (53.3%) of patients

evaluated for dysphagia were older than 45 years, and dysphagia showed a significant association with age ($P < 0.001$) (Table 4). Among these patients, esophageal cancer was diagnosed in 50 (55.6%), erosive gastritis in 18 (20%), duodenal ulcer in 10 (11.1%), duodenitis in 8 (8.9%), and GERD in 7 (7.8%). Only one patient had normal findings.

Eighty patients were evaluated for upper GI bleeding (UGIB). Of these, 35 (43.8%) had gastric and/or esophageal varices, 28 (35%) had erosive gastritis, 22 (27.5%) had duodenal ulcers, and 9 (11.25%) had hemorrhagic gastritis. Two patients (2.5%) had normal findings. The majority (55%) of patients evaluated for UGIB were under 35 years of age, and UGIB was significantly associated with younger age ($P = 0.002$) (Table 4).

This study concludes that there is a significant association between erosive gastritis and patient age ($P = 0.022$). Among patients with erosive gastritis, 92 cases (44.7%) were reported in those under 35 years old, while 58 cases (28.2%) and 56 cases (27.2%) were diagnosed in the 35–45 years and over 45 years age groups, respectively. The prevalence of duodenal ulcer was highest among younger patients (<35 years), with a significant association between younger age and duodenal ulcer ($P < 0.001$). However, neither erosive gastritis nor duodenal ulcer showed a significant association with the sex of the patients.

Esophageal cancer was more prevalent in patients over 45 years old, with 36 cases (59%), compared to 5 cases (8.2%) in patients under 35 years ($P < 0.001$) (Table 5). Dyspeptic symptoms were the most common indication among patients with erosive gastritis and duodenal ulcer, found in 98 (47.6%) and 56 (40.6%) cases, respectively. Dysphagia was the presenting symptom in 50 patients (82%) with esophageal cancer

Table 3. Histologic Diagnosis of Upper GI Endoscopic Biopsies (JUMC, 2022)

Endoscopic Diagnosis	Frequency	Pathologic Finding	Frequency	Percentage
Esophageal Cancer	61	Esophageal Squamous Cell Carcinoma	37	60.7%
		Esophageal Adenocarcinoma	11	18%
		Undifferentiated Esophageal Carcinoma	2	3.3%
		Esophageal Carcinoma In Situ	2	3.3%
		Full-thickness Dysplastic Squamous Ep.	3	4.9%
		Inconclusive	6	9.8%
Gastric Cancer (suspected)	17	Gastric Adenocarcinoma	5	29.4%
		High-grade Dysplasia	3	17.6%
		Low-grade Dysplasia	4	23.5%
		Inconclusive	5	29.4%
Other Suspicious Gastric Lesions	21	Chronic Gastritis	16	76.2%
		Acute Gastritis	4	19%
		Normal	1	4.8%
		Inconclusive	2	9.5%

Note: One patient can have multiple endoscopic findings.

Table 4. Age and sex distribution of major upper GI Endoscopy indication and their association, JUMC Endoscopy unit, 2022

Variable	Category	Dyspepsia		χ^2	P Value	Dysphagia		χ^2	P Value	UGIB		χ^2	P Value
		Yes	No			Yes	No			Yes	No		
Sex	Male	59	167	6.005	0.014*	41	185	3.004	0.083	47	179	1.847	0.397
	Female	72	137			49	160			33	176		
Age (years)	<35	61	61	4.688	0.096	16	106	28.342	<0.001*	44	78	17.4	<0.002*
	35–45	36	95			26	105			24	107		
	>45	34	149			48	95			12	131		

Key: * indicates variables associated with each endoscopic finding during chi-square analysis at p value <0.05.

Table 5. Factors associated with major endoscopic finding among patients who had undergone Upper GI Endoscopy at JUMC Endoscopy unit, 2022

Erosive Gastritis

Category	Yes n (%)	No n (%)	X ²	P Value
Sex			1.577	0.022
Male	104(50.5)	122(49.5)		
Female	102(49.5)	107(51.5)		
Age(years)				
<35	92(44.7)	30(55.3)	5.541	0.022*
35-45	58(28.2)	73(71.8)		
>45	56(27.2)	87(72.8)		

Duodenal Ulcer

Category	Yes n (%)	No n (%)	X ²	Value
Sex				
Male	76(55)	150(45)	0.007	0.508
Female	62(45)	147(55)		
Age(years)				
<35	77(57.4)	45(42.6)	21.936	<0.001*
35-45	30(19.4)	101(80.6)		
>45	31(23.3)	112(76.7)		

Esophageal Cancer

Category	Yes n (%)	No n (%)	X ²	P Value
Sex				
Male	22(36)	204(64)	7.97	0.003*
Female	39(64)	170(36)		
Age(years)				
<35	5(8.2)	117(91.8)	33.08	<0.001*
35-45	20(32.8)	111(67.2)		
>45	36(59.0)	107(41)		

GERD

Category	Yes n (%)	No n (%)	X ²	P Value
Sex				
Male	44(56.4)	182 (43.6)	0.193	0.660
Female	34(43.5)	175 (56.5)		
Age (years)				
<35	36(46.6)	86(53.4)	1.731	0.192
35-45	10(26.0)	121(74)		
>45	22(27.4)	121(72.6)		

4. Discussion

This study provides an overview of the endoscopic findings among patients undergoing upper GI endoscopy at Jimma University Medical Center (JUMC), revealing patterns that align with and diverge from previous regional and global reports. The most prevalent finding in our study was erosive gastritis, accounting for a significant proportion of abnormalities. Similar observations have been documented in studies from Sudan, and India, where gastritis and erosive changes are commonly reported as leading endoscopic diagnoses [18,19].

In Ethiopia, studies from Gondar and Tikur Anbessa Hospital reported gastritis in roughly 24-53% of cases, with duodenal ulcers as the second most common abnormality [20,21]. Our finding of erosive gastritis indicating a rising trend is consistent with recent reports

from Ethiopia and other African countries, such as Uganda and Sudan [18,22], where increased NSAID use, *Helicobacter pylori* prevalence, and changing dietary patterns have been implicated. The increase in erosive gastritis observed in our setting may also be associated with improved endoscopic technology—higher resolution scopes detect subtle erosions more readily—highlighting the need for standardized diagnostic criteria.

The prevalence of duodenal ulcers in our cohort (31.7%) was slightly lower compared to earlier Ethiopian studies, such as the 40.1% reported at Jimma University Medical Center five years prior, yet it remains higher than the figures reported in some West African regions. This persistent high prevalence of peptic ulcer disease (PUD) underscores the continuing impact of *H. pylori* infection, dietary factors, and NSAID consumption, which have not sufficiently declined despite global trends showing reduced ulcer incidence. Interestingly, our data illustrate that PUD predominantly affects young adults (<35 years), aligning with findings from Ethiopia and Sudan but contrasting with high-income countries where ulcer prevalence is higher among older populations.

Esophageal abnormalities, including reflux esophagitis and esophageal cancers, constituted a noteworthy portion of the findings. Our observation of esophageal cancer accounting for 14% of cases is consistent with regional data from East Africa, which reports high rates of esophageal squamous cell carcinoma, often linked to environmental factors such as dietary carcinogens and tobacco use [23,24]. The prevalence of GERD in our study was comparatively lower (details to be added from your data), similar to European patterns [25], emphasizing the differing epidemiological profiles across regions.

Additionally, our findings regarding the distribution of benign versus malignant lesions suggest late presentation and diagnosis, common in resource-limited settings [26]. While the prevalence data highlights the significant burden of erosive gastritis and peptic ulcer disease in this population, its true value lies in guiding targeted interventions to improve patient outcomes. These findings can inform healthcare policies focused on early detection, risk factor modification (such as NSAID use and *H. pylori* screening), and development of standardized management protocols. Incorporating additional risk factors like BMI, smoking, and dietary habits in future screening efforts could enhance patient selection and prevent disease progression. Ultimately, translating these epidemiological insights into policy changes and preventive strategies has the potential to reduce complication rates, optimize resource utilization, and improve overall gastrointestinal health in the Ethiopian context.

Limitations of our study include its retrospective nature and potential selection bias due to being a tertiary referral center. Prospective, multicenter studies are needed for comprehensive national data.

5. Conclusion

The significant occurrence of benign conditions presents an opportunity for early intervention through public health strategies focusing on risk factor modification, *H. pylori* eradication, and increased

awareness. The persistent high prevalence of peptic ulcer disease and esophageal malignancies emphasizes the need for improved diagnostic access, early screening, and targeted health policies to reduce morbidity and mortality associated with upper GI disorders in Ethiopia. Future prospective studies are warranted to further elucidate the etiological factors and develop region-specific management protocols to improve patient outcomes.

Declaration of Interest

We declare that there are no known competing financial interests or conflicts of interest that might have appeared to influence the work reported here.

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