

Endoscopic Recognition of Gastric Mucosal Changes and Their Significance in Evaluating Dyspeptic Patients

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ABSTRACT

Introduction: Dyspepsia is a problem related to eating (as pain, nausea, fullness), it remains a common disorder without effective therapy, but these nonspecific symptoms can be indicative of underlying disease as PUD, GERD, and malignancy. **Aim:** Aim of the study to determine the gastric mucosal changes (histopathology) and endoscopic finding in evaluated dyspeptic patient for further management. **Method:** a prospective study was conducted in elbida city in endoscopic unite, 62 patients complain of dyspepsia for more than 1 year, with mean age (50.7%) and Range of 77 years, they evaluated then endoscopy done and biopsies taken (antral, corporal) and examined histopathologically and graded the gastric mucosa by revised Sydney system. **Result:** with other investigations, endoscopic finding: gastritis n=49(80.3%), reflux esophagitis n=23(37.7%), pan gastritis n=5(8.2%), gastric ulcer n=8(13.1%), gastropathy n=2(3.3%), erosive gastritis n=11(18%), hiatus hernia n=13(21.3%), esophageal varices n=5(8.2%), bile reflux n=4(6.6%), cancer n=2(3.3%), functional dyspepsia n=2(3.3%), duodenal ulcer n=8(13.1%), and duodenitis n=16(26.2%). Biopsies show H. pylori n=42(68.9%), atrophic changes n=5(8.2%), dysplasia n=15(24.6%), lymphoid follicle n=9(14.8%), intestinal metaplasia n=8(13.1%), MALT lymphoma n=2(3.3%), chronicity of the inflammation by lymphocyte infiltrations as mild 26(42.6%), moderate 27(44.3%), sever 8(13.1%), and activity of inflammation as mild 37(60.7%), moderate 18(29.5%) and sever 6(9.8%). **Conclusion:** we conclude that most of the patient with dyspeptic symptoms during endoscopic studies they have a serious underlying organic lesions as gastritis (most common), functional dyspepsia (less common) and others as mentions befor, with histopathological assessment of biopsies it gives us a clue about activity, chronicity of the inflammatory process in gastric mucosa which is found to be more in antral area with Positive H. pylori infections, and precancerous lesions as dysplasia, atrophy, intestinal Metaplasia and malignant cells also were present. so dyspepsia is not only a convenient descriptor for upper gastrointestinal symptoms, but also a marker for the risk of structural disease, so endoscopy and histopathological study of the biopsies offers the potential for early diagnosis of structural diseases and then for better managment.

Keywords: *Dyspepsia; Upper gastrointestinal endoscopy; Gastritis; Helicobacter pylori; Gastric mucosal changes; Histopathology; Gastric dysplasia; Intestinal metaplasia; Gastric atrophy; Gastric malignancy.*

INTRODUCTION

Dyspepsia is a common gastrointestinal complaint characterized by chronic or recurrent upper abdominal symptoms, including epigastric pain or discomfort, postprandial fullness, early satiety, bloating, belching, nausea, and, in some patients, heartburn. Although dyspepsia is frequently associated with functional gastrointestinal disorders, it may also occur in association with identifiable structural or organic diseases of the upper gastrointestinal tract. Common organic causes include peptic ulcer disease, gastroesophageal reflux disease, gastritis, and, less frequently, hepatobiliary, pancreatic, infiltrative, or malignant disorders [1–3].

Functional dyspepsia accounts for a substantial proportion of patients presenting with dyspeptic symptoms and is generally characterized by the absence of an explanatory structural abnormality on routine investigation. However, normal endoscopic findings do not necessarily exclude microscopic gastric abnormalities. Gastric biopsy may demonstrate chronic gastritis, *Helicobacter pylori* infection, lymphoid aggregates, atrophic changes, intestinal metaplasia, or other histopathological abnormalities that may not be apparent during endoscopic examination [24–28].

Upper gastrointestinal endoscopy is an important diagnostic investigation in patients with persistent or recurrent dyspepsia, particularly when alarm features or other clinical factors raise concern for organic

disease. Endoscopy permits direct visualization of the esophagus, stomach, and duodenum and can identify lesions such as reflux esophagitis, gastritis, gastric or duodenal ulcers, hiatus hernia, Barrett's esophagus, varices, and malignant lesions. It also allows targeted biopsy of abnormal or apparently normal gastric mucosa for histopathological assessment [1,8].

Histopathological examination provides information beyond the macroscopic appearance of the gastric mucosa. Assessment of chronic inflammation, neutrophilic activity, glandular atrophy, intestinal metaplasia, dysplasia, and *H. pylori* infection is particularly relevant because some of these abnormalities are associated with progression along the gastric carcinogenesis pathway. Population-based studies have demonstrated associations between *H. pylori* infection, gastric mucosal atrophy, premalignant lesions, and subsequent gastric cancer risk [18–21].

The prevalence and clinical significance of *H. pylori* infection vary among populations. In addition to its relationship with chronic gastritis, *H. pylori* infection has been associated with gastric atrophy and an increased risk of gastric malignancy. Cigarette smoking may further influence gastric mucosal injury and atrophic changes, particularly among *H. pylori*-positive individuals [18–20,34].

The clinical assessment of dyspepsia should therefore consider both symptoms and potential risk factors. Medication exposure, particularly aspirin and non-steroidal anti-inflammatory drugs, may contribute to mucosal injury and peptic ulceration. Other reported associations include alcohol consumption, smoking, metabolic disorders, and systemic diseases. However, the presence or absence of individual symptoms alone does not always reliably distinguish functional from organic disease.

The present study was undertaken to evaluate the endoscopic findings and gastric histopathological changes among patients presenting with persistent dyspeptic symptoms. Particular attention was given to the detection of *H. pylori* infection, chronic inflammatory activity, atrophic changes, intestinal metaplasia, dysplasia, and malignant lesions.

Objectives

To identify the etiological and structural abnormalities associated with dyspeptic symptoms using upper gastrointestinal endoscopy and histopathological examination.

- To determine the clinically significant endoscopic findings among patients with persistent dyspepsia.
- To characterize gastric mucosal changes identified by biopsy and histopathological examination.
- To assess the role of upper gastrointestinal endoscopy and gastric biopsy in the detection of clinically important and potentially premalignant or malignant gastric lesions.

Definition Of Dyspepsia, Sign and Symptoms, Types And Causes

Dyspepsia popularly known as indigestion, meaning hard or difficult digestion, it is a medical condition characterized by chronic or recurrent pain in the upper abdomen (1) upper abdominal fullness and feeling of full earlier than expected when eating, it can be accompanied by bloating, belching, nausea or heartburn all symptoms related to food. It is a common problem accounting 80% of the population (7) and tends to occur in bouts from time to time, but some people have frequent bouts which affect their quality of life.

Dyspeptic patients have a different complaint, epigastric pain and tenderness may or may not be found, in some patients we find right hypochondrium tenderness, jaundice, Murphy's sign (Bladder disease) or palpable abdominal mass, weight loss, single lymph node (Virchow's node and acanthosis nigricans in Nigerians (gastric or pancreatic malignancy) or abdominal guarding indicating peritonitis secondary to gastric perforation, per rectum examination will be done to see about melena, haemodynamic status must be confirmed because hypotension or tachycardia indicate significant blood loss from GIT bleeding, there is association between GERD excessive loss of enamel and exposed dentine in tooth.

Dyspepsia could be functional or organic:

FUNCTIONAL DYSPEPSIA: it accounts about 60% (15), it means no known cause can be found for the symptoms, with normal endoscopy, but biopsy shows *H. pylori* infection (28).

This is some theories about causes of functional dyspepsia (12)

1. Accelerated stomach emptying.
2. Abnormal response to food by the duodenum.
3. Poor coordination between the upper and lower part of stomach.
4. Abnormal stomach contraction.
5. Acute or chronic infection.
6. Abnormal processing of internal organ activity by the brain and nerves.

ORGANIC DYSPEPSIA: it is less common in younger age and conversely serious organic | Usually seen in elderly people (3):

A-common causes:

1. Peptic ulcer diseases 15-25%.
2. Gastroesophageal refluxes 5-15%.

B-less common causes:

- a) Biliary tract disease.
- b) Gastroparesis.
- c) Pancreatitis.
- d) Ischemic bowel disease.
- e) Stomach infiltrative disease (Crohn's disease, sarcoidosis).

- f) Abdominal malignancy or masses: figure (1)page(31).
- Gastric cancer.
 - Esophageal cancer.
 - Pancreatic cancer.
 - Hematomas.

GIT cancer account for 20% of all cancers(1).

- Metabolic abnormality:hypercalcemia,hypokalemia.
- Systemic disease: a-DM b- Thyroid Disease. C- Parathyroid Disease. D-connective Tissue Disease. E- Sever Kidney Disease.

C-MEDICATION CAUSES:

- Gastric Irritant (risk of PUD): a-Aspirin. B-NSAID. C-alcohol. D-coffee e. Tobacco Abuse. F-Corticosteroid (Prednisolone).
- Herbal Preparation: they have side effect confused with dyspepsia(13): a. Garlic. B-Ginkgo. C-Saw Palmetto. D.White Willow. e. Chaste Tree Berry.
- Medication: cispride. - codeine. - erythromycin. - iron. - metformine. -theophalline. - potassium chloride.

Dyspepsia is not only a convenient descriptor for upper GIT symptoms, but also a marker for the risk of structural diseases, malignancy is present in 1-3% of patient with dyspepsia and PUD in another 10%, esophagitis in 15%(2) and gastritis so will explain

The most common causes of organic dyspepsia:

- Peptic Ulcer Disease.
- Gastritis.
- Gastritis Esophageal Reflux and Disease.

PATIENT AND METHODE

This is a prospective study held in ELTHOWRA TEATCHING HOSPITAL in elbida city in gastroenterology unite, in endoscopy unit.

The study done through six months from 1-12-2009 to 1-5-2010,during this time 160 patients attend the endoscope unite, 110 were complaining from chronic symptoms related to dyspepsia for more than 1 year, only 61 patients agree about the research others either refuse or escape.

Proper history and clinical examination have been done to those patients by filling a questioner paper (appendix no 1).

Some blood testes have been done for them as CBP, ESR, LFT) RFT, PT. INR, stool for occult blood, Ultrasonography to abdomen and pelvis.

Endoscopy

Those patient were fasted for 12 hours and UGIT endoscope have been done for them and biopsies taken from corporal and antral area and sent for H.pylori and histopathology study to gastric mucosa(inflammation activity, gastric atrophy, intestinal metaplasia dysplasia, cancerous cells)and graded by revised Sydney system, and find the cause of dyspepsia by endoscopic finding and by histopathology study to the biopsies.

Statistical Analysis

Descriptive statistic was used as tables, central tendency and figure to summarize the result, figure was done by Microsoft Excel 2007.

Analytic statistic was used to find the differences between the distributions of variables, analyzed using the X2 test by SPSS version 18.0. A P-value more than 0.05 was considered to be statistically significant and about the P-value done only to crosse tabulation, which had two variables so the tables in the first not to be done on them, the lastfew tables some of them I apply, when I did not apply this mean not applicable there are the numbers is smaller than 5.

RESULTS

The aim of the study was to review gastric biopsies obtained from dyspeptic patients evaluated in the endoscopy unit, with particular emphasis on *H. pylori* positivity and other mucosal changes. A total of 110 patients were assessed for eligibility, of whom 49 declined to participate, leaving 61 patients in the final study group. Of these, 29 (47.5%) were female and 32 (52.5%) were male, as shown in **Table 2 and Figure 2 (Page 33)**. The mean age of the patients was 50.7 years, as shown in **Table 1 and Figure 1**.

Most of the patients were unemployed (83.6%), as shown in **Tables 3a and 3b and Figure 3**. The majority of the patients (83.6%) were from El Bayda city, while the remaining patients were from areas outside El Bayda, as shown in **Tables 4a and 4b and Figure 4**.

Among the lifestyle factors, smoking was the most significant, with 24 patients (39.3%) being smokers. All smokers were male and reported smoking one or more packets per day. Alcohol consumption was reported by 4 patients (6.6%), while 35 patients (57.4%) reported coffee consumption, as shown in **Table 5 and Figure 5**.

Regarding medical history, diabetes mellitus was reported in 14.8% of patients, hypertension in 9.8%, kidney disease in 9.8%, and stress in 31.1%, as shown in **Table 8 and Figure 8**. Regarding medication history, NSAID use was reported in 32.8% of patients and was the most common medication exposure, as shown in **Table 7 and Figure 7**. The use of NSAIDs and aspirin increased with age. Among patients aged 41–50 years, approximately 30% were using NSAIDs and 25% were using aspirin. Among those aged 51–60

years, approximately 20% were using NSAIDs and 21.4% were using aspirin. Among patients aged >60 years, approximately 30% were using NSAIDs and 39.3% were using aspirin, as shown in **Tables 37 and 38**.

The most common presenting symptom was recurrent epigastric pain, reported by 44 patients (72.1%). Other presenting symptoms are shown in **Table 9 and Table 6 and Figure 6**. Bleeding was reported in 23 patients (37.7%), fullness in 21 patients (34.4%), vomiting in 20 patients (32.8%), melena in 14 patients (23.0%), and haematemesis in 10 patients (16.4%). Loss of appetite and weight loss were each reported in 8 patients (13.1%).

The patients were also investigated by ultrasonography. The findings are presented in **Table 10**. Fatty liver was observed in 10 patients (16.4%), splenomegaly in 9 patients (14.8%), gallbladder stones in 7 patients (11.5%), and liver cirrhosis in 4 patients (6.6%).

Laboratory investigations included stool examination for occult blood, which was positive in 34.4% of patients and negative in 62.3%, as shown in **Table 11**. Haemoglobin levels in male and female patients are presented in **Table 12 and Figure 12 and Table 13 and Figure 13**, respectively. The mean haemoglobin level in males was 13 g/dL, with a median of 14.3 g/dL and a minimum value of 4.5 g/dL. In females, the mean haemoglobin level was 10.7 g/dL, with a median of 11.1 g/dL and a minimum value of 4.1 g/dL.

Other laboratory investigations included mean corpuscular volume (MCV), as shown in **Table 14**; mean corpuscular haemoglobin concentration (MCHC), as shown in **Table 17**; and mean corpuscular haemoglobin (MCH), as shown in **Table 22**. These findings indicated anaemia in a considerable proportion of the patients. Serum bilirubin levels are presented in **Table 24**, while alkaline phosphatase levels are presented in **Table 15**, with elevated levels observed in 78.7% of patients. Other laboratory parameters, including white blood cell count, serum sodium, serum potassium, platelet count, erythrocyte sedimentation rate (ESR), blood urea, and prothrombin time, are presented in **Tables 16, 18, 19, 20, 21, 23, and 25**, respectively.

Upper Gastrointestinal Endoscopy Findings

The findings of upper gastrointestinal (UGI) endoscopy are presented in **Table 26**. Gastritis was the most common endoscopic finding, observed in 49 patients (80.3%). Reflux oesophagitis was observed in 23 patients (37.7%), pangastritis in 5 patients (8.2%), gastric ulcer in 8 patients (13.1%), gastropathy in 2 patients (3.3%), and erosive gastritis in 11 patients (18.0%). Hiatus hernia was observed in 13 patients (21.3%), oesophageal varices in 5 patients (8.2%), bile reflux in 4 patients (6.6%), and cancer in 2 patients (3.3%). A normal endoscopic examination was reported in 2 patients (3.3%). Duodenal ulcer was observed in 8 patients (13.1%), while duodenitis was observed in 16 patients (26.2%).

Histopathological Findings

Gastric biopsies were obtained for histopathological examination using the revised Sydney classification system. The chronicity of inflammation was assessed based on lymphocytic infiltration in the antral and corporal mucosa. Chronic inflammation was graded as mild in 26 patients (42.6%), moderate in 27 patients (44.3%), and severe in 8 patients (13.1%), as shown in **Tables 29 and 31**.

The activity of inflammation was assessed based on neutrophilic infiltration of the lamina propria in the antral and corporal mucosa. The inflammatory activity was graded as mild in 37 patients (60.7%), moderate in 18 patients (29.5%), and severe in 6 patients (9.8%), as shown in **Tables 30 and 32**.

H. pylori was detected in 68.9% of the patients and was most commonly identified in the antral mucosa. Other histopathological mucosal changes included atrophic changes in 5 patients (8.2%), dysplasia in 15 patients (24.6%), intestinal metaplasia in 8 patients (13.1%), MALT lymphoma in 2 patients (3.3%), and lymphoid follicles in 9 patients (14.8%), as shown in **Table 27**.

Regarding the grade of dysplasia, 46 patients (75.4%) had Grade 0 (normal) histology, 14 patients (23.0%) had Grade 1 (mild) dysplasia, and 1 patient (1.6%) had severe dysplasia. No patient had moderate dysplasia.

The relationship between dysplasia and the presence of *H. pylori* in the study group was statistically significant ($p = 0.015$, $\chi^2 = 5.876$, $df = 1$), as shown in **Table 33**.

percentage of GIT cancers in relation to other cancers

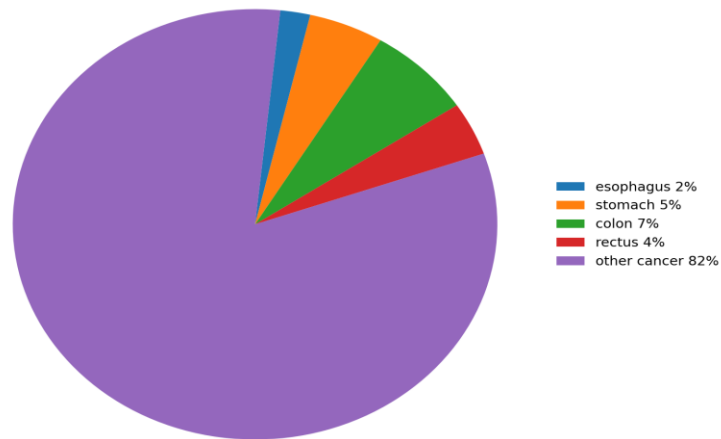


Fig no-1.

Table 2: Distribution of patients according to sex.

Sex	No.	%
Male	32	52.5
Female	29	47.5
Total	61	100

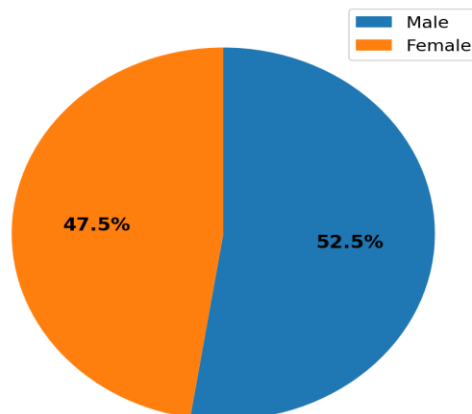


Fig. 2: Distribution of patients according to sex.

Table 3a: Distribution of patients according to type of work.

Type of work	No.	%
Un-employed	51	83.6
Employee	7	11.5
Student	1	1.6
Self employment	2	3.3
Total	61	100

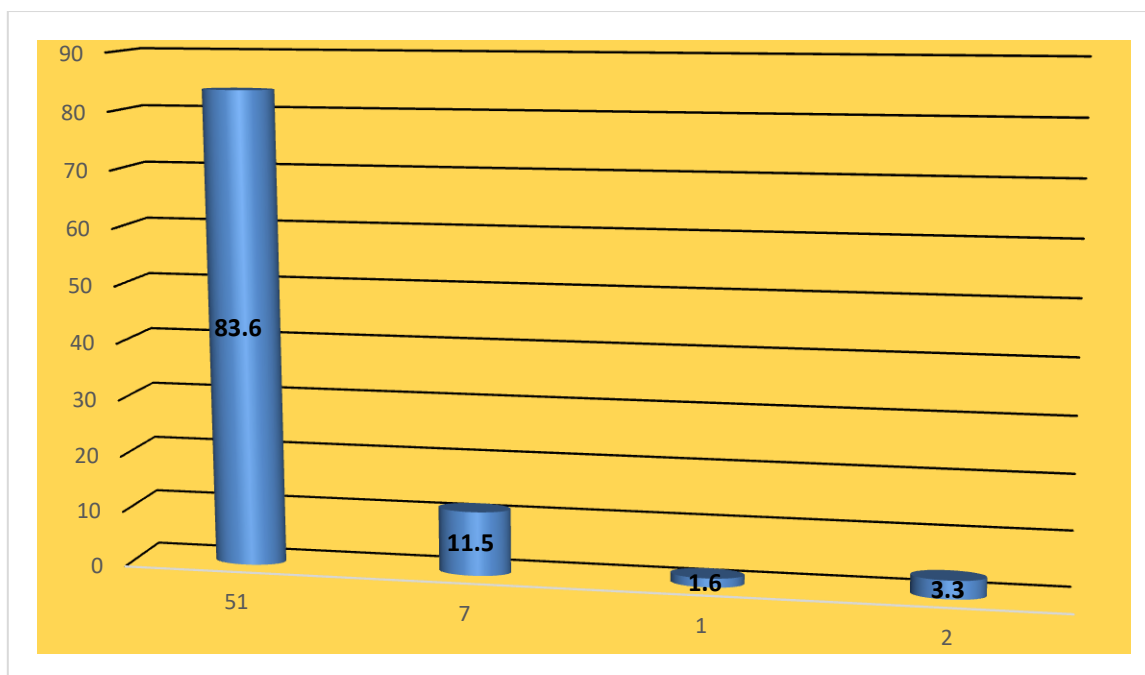


Fig. 3: Distribution of patients according to type of work.

Table 4: Distribution of patients according to residence.

Residence	No.	%
Elbida	51	83.6
Out-side Elbida	10	16.4
Total	61	100

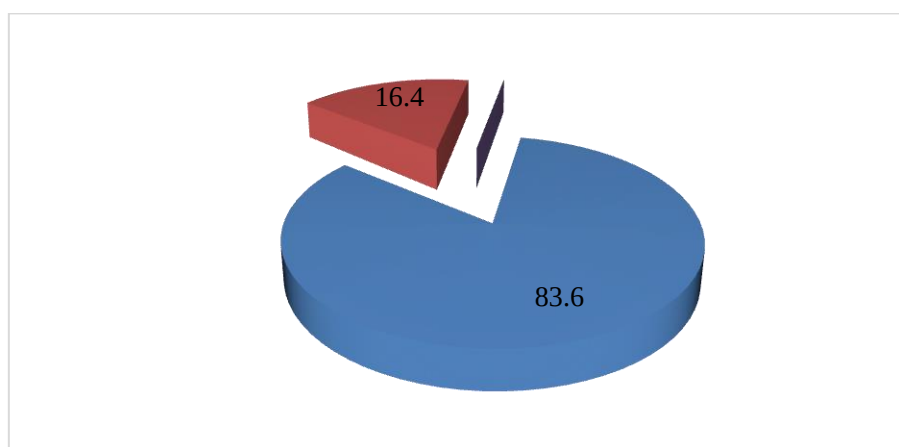


Fig.4

Table 5: Distribution of patients according to life style

Life style	Yes		No	
	No.	%	No.	%
Smoking	24	39.3	37	60.7
Alcoholic	4	6.6	57	93.4
Cafe	35	57.4	26	42.6

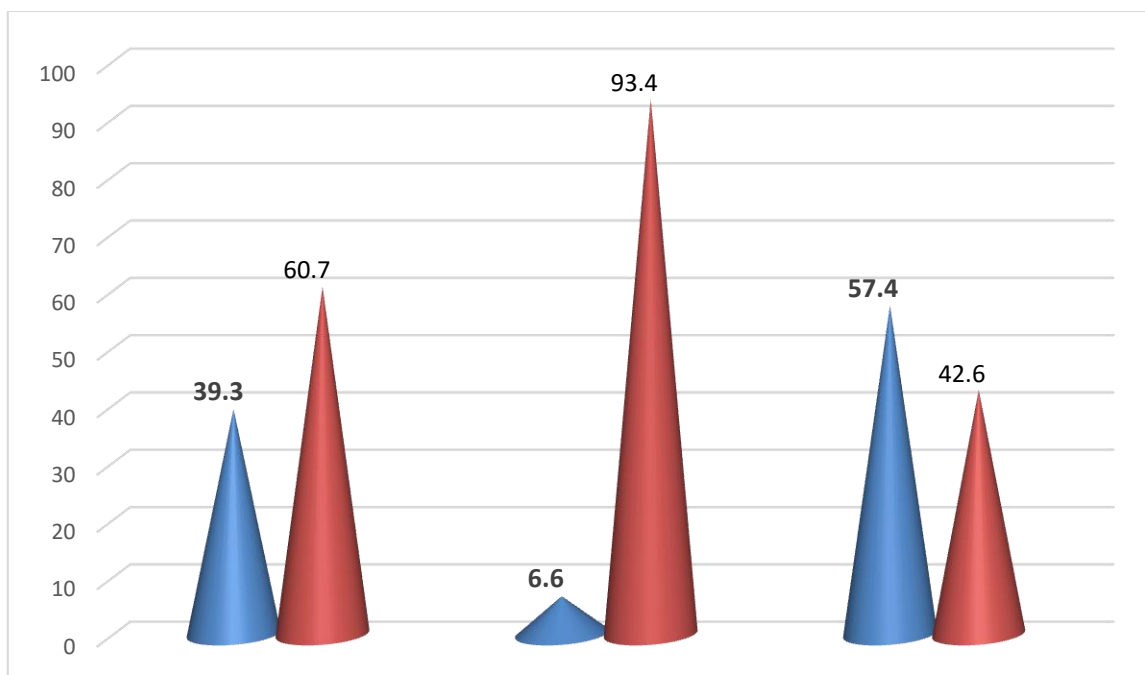


Fig. 5: Distribution of patients according to life style.

Table 6: Distribution of patients according to presentation:

Clinical features	No.	%
Jaundice	5	8.2
Vomiting	20	32.8
Heamatemesiis	10	16.4
Melaena	14	23
Fullness	21	34.4
Bleaching	23	37.7
Weight and appetite lose	8	13.1

*Percentage from 61patients.

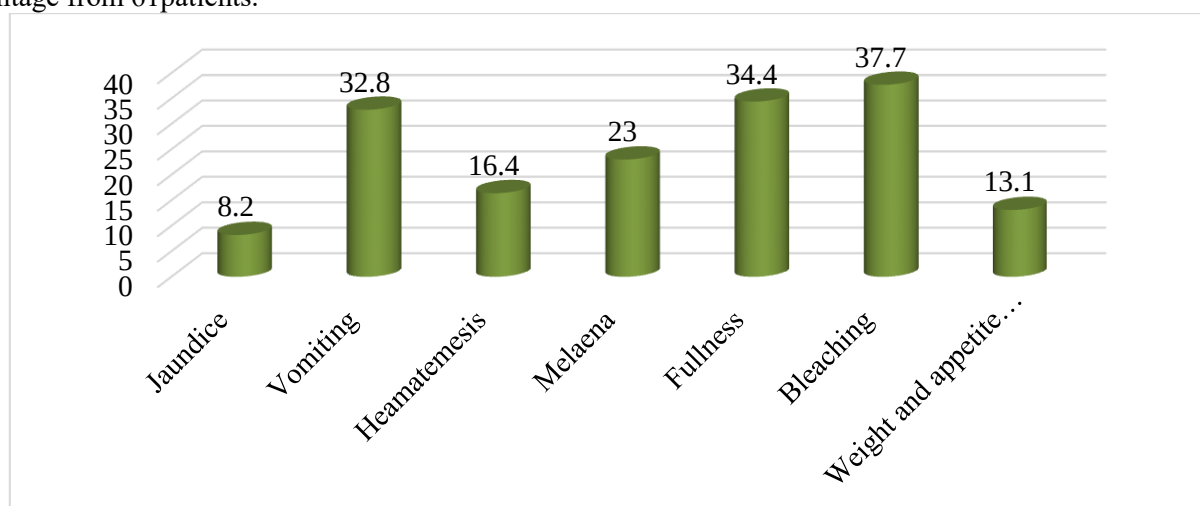


Fig. 6: Distribution of patients according to presentation.

Table 9: Distribution of patients according to symptoms.

Drug history	No.	%
Recurrent epigastric pain	44	72.1
Recurrent epigastric pain and diarrhea	2	3.3
Recurrent epigastric pain and nausea	8	13.1
Nausea	1	1.6

Recurrent epigastric pain, nausea and choking	4	6.7
Recurrent epigastric pain, diarrhea and nausea	1	1.6
Recurrent epigastric pain and dysphagia	1	1.6
Total	61	100

Table 10: Distribution of patients according to USS finding.

USS finding	No.	%
Enlarged Liver	4	6.6
Enlarged Spleen	9	14.8
Fatty liver	10	16.4
Gall bladder stone	7	11.5
Liver cirrhosis	4	6.6

*Percentage from 61

Table 11: Distribution of patients according to result of stool for occult blood.

Occult blood	No.	%
Positive	21	34.4
Negative	38	62.3
Not done	2	3.3
Total	61	100

Table 26: Distribution of patients according to endoscopic finding.

Endoscopic finding	No.	%
Hiatus hernia	13	21.3
Esophageal varices	5	8.2
chronic gastritis	49	80.3
Barrettsesoph.	2	3.3
Reflux esoph	23	37.7
Gast.ulcer	8	13.1
Pangastritis	5	8.2
Duod. ulcer	8	13.1
Bile reflux	4	6.6
Gastropathy	2	3.3
Erosive gastritis	11	18
Duodenitis	16	26.2
Cancer	2	3.3
Normal	2	3.3

One patient may have more than one finding in UGIT endoscopy.

Table 27: Distribution of patients according to result of biopsies (Histopathology).

Result of biopsies	No.	%
H.pylori	42	68.9
Atrophic changes	5	8.2
Dysplasia	15	24.6
Lymphoid follicle	9	14.8
Int.metaplasia	8	13.1
Malignancy	2	3.3

Table 28: Distribution of patients according to presence of dysplasia according to revised sydeny system.

Dysplasia	No.	%
Mild	14	23
Sever	1	1.6
Normal	46	75.4
Total	61	100

Table 29: Distribution of patients according to antral lymphocyte percentage according to revised sydeny system.

Antral lymphocyte percentage	No.	%
Mild	26	42.6
Moderate	27	44.3
Sever	8	13.1
Total	61	100

Table 30: Distribution of patients according to antral neutrophile percentage according to revised sydeny system.

Neutrophile percentage	No.	%
Mild	37	60.7
Moderate	18	29.5
Sever	6	9.8
Total	61	100

Table 31: Distribution of patients according to corporal lymphocyte percentage according to revised sydeny system.

Antral lymphocyte percentage	No.	%
Mild	26	42.6
Moderate	28	45.9
Sever	7	11.5
Total	61	100

Table32: Distribution of patients according to neutrophile percentage according to revised sydeny system.

Neutrophile percentage	No.	%
Mild	39	63.9
Moderate	22	36.1
Total	61	100

Table33 : Distribution of patients according to dysplasia and H.pylori

Dysplasia	H.pylori				Total	
	Yes		No			
	No.	%	No.	%	No.	%
Yes	14	32.6	0	0	14	23
No	29	67.4	18	100	47	77
Total	43	100	18	100	32	100

$X^2 = 5.876$ $df = 1$ $p = 0.015$ (Significant).

Table34: Distribution of patients according to male smoking status and Gastritis.

Gastritis	Mae smoking status				Total	
	Yes		No			
	No.	%	No.	%	No.	%
Yes	19	76	7	100	26	81.2
No	6	24	0	0	6	18.8
Total	25	100	7	100	32	100

DISCUSSION

Dyspepsia is a common gastrointestinal complaint that may result from a variety of functional and organic disorders. Its clinical presentation may include epigastric pain or discomfort, postprandial fullness, early satiety, nausea, vomiting, belching, and symptoms related to gastroesophageal reflux. Because symptoms alone cannot reliably distinguish functional dyspepsia from structural disease, appropriate clinical assessment and, in selected patients, upper

gastrointestinal endoscopy remain important components of evaluation [1,40]. Previous studies have demonstrated that endoscopy can identify clinically relevant pathology in patients presenting with persistent or concerning dyspeptic symptoms, particularly when associated with older age or alarm features.

In the present study, 61 patients with chronic dyspeptic symptoms underwent upper gastrointestinal endoscopy and gastric biopsy. The mean age of the study

population was 50.7 years, with males comprising 52.5% and females 47.5%. The relatively similar distribution between males and females suggests that chronic dyspeptic symptoms affected both sexes in this study population. The age distribution is also clinically relevant because increasing age has traditionally been considered an important factor when deciding whether patients with dyspepsia should undergo endoscopic evaluation. Delaney et al. evaluated the role of initial endoscopy in patients older than 50 years and demonstrated that an endoscopy-based strategy could improve symptom outcomes in this age group [40].

The most frequently reported symptom in the present study was recurrent epigastric pain, occurring in 72.1% of patients. Other symptoms included abdominal fullness, vomiting, melena, hematemesis, loss of appetite, and weight loss. The occurrence of gastrointestinal bleeding and weight loss in a proportion of patients is particularly important because these features may indicate underlying organic pathology and warrant careful investigation. Previous studies have shown that age, bleeding, anemia, and other alarm features may be associated with significant upper gastrointestinal findings, although their predictive accuracy is not sufficient to completely exclude disease in patients without such features [41]. Upper gastrointestinal endoscopy demonstrated a wide spectrum of abnormalities in the present study. Chronic gastritis was the most common finding, identified in 49 patients (80.3%), followed by reflux esophagitis in 23 patients (37.7%) and duodenitis in 16 patients (26.2%). Hiatus hernia was present in 13 patients (21.3%), while erosive gastritis was identified in 11 patients (18.0%). Gastric ulcer and duodenal ulcer were each observed in 8 patients (13.1%). Other findings included pangastritis, bile reflux, gastropathy, esophageal varices, Barrett's esophagus, and gastric malignancy. These findings demonstrate that patients presenting with chronic dyspeptic symptoms may have more than one endoscopically identifiable abnormality.

The high frequency of gastritis in the present study is consistent with the important role of gastric mucosal inflammation in patients with persistent dyspeptic symptoms. Earlier clinical investigations also demonstrated that endoscopy and radiology can identify a range of structural abnormalities among patients presenting with dyspepsia [38]. The coexistence of gastritis, reflux disease, peptic ulcer disease, and duodenal inflammation in the present cohort further emphasizes that dyspeptic symptoms are not attributable to a single pathological mechanism.

Histopathological examination provided additional information beyond the macroscopic endoscopic findings. *Helicobacter pylori* infection was identified in 42 patients (68.9%). Atrophic changes were observed in 5 patients (8.2%), intestinal metaplasia in 8 patients (13.1%), lymphoid follicles in 9 patients (14.8%), dysplasia in 15 patients (24.6%), and malignant lesions in 2 patients (3.3%). These findings

demonstrate the value of gastric biopsy in patients undergoing endoscopic evaluation because mucosal abnormalities may not always be adequately characterized by visual inspection alone.

The relatively high prevalence of *H. pylori* infection in this study is clinically relevant. *H. pylori* is an established cause of chronic gastritis and has been associated with gastric atrophy, intestinal metaplasia, and an increased risk of gastric malignancy [18–20]. Population-based studies have demonstrated an association between *H. pylori* infection and subsequent gastric cancer development, while longitudinal investigations have also documented the progression of premalignant gastric lesions over time [18–21]. Therefore, identification of *H. pylori* and associated mucosal changes during evaluation of dyspeptic patients may provide clinically important information beyond the immediate explanation of symptoms.

The presence of atrophic changes and intestinal metaplasia in the present study is also noteworthy. Gastric atrophy and intestinal metaplasia are recognized as important steps within the multistage pathway of gastric carcinogenesis [18–21]. Although the present study was not designed to determine long-term cancer risk, the identification of these histopathological abnormalities supports the importance of systematic biopsy examination in patients with chronic gastric symptoms, particularly when endoscopic mucosal abnormalities are present.

Dysplasia was identified in 15 patients (24.6%), with most cases categorized as mild dysplasia and one case as severe dysplasia. Gastric mucosal dysplasia is clinically important because it represents a premalignant histological abnormality. Kokkola et al. reported an increased risk of gastric carcinoma among patients with mucosal dysplasia associated with atrophic gastritis, emphasizing the importance of appropriate recognition and follow-up of such lesions [35]. The relatively high proportion of dysplastic changes in the present study should therefore be interpreted as an important histopathological finding rather than simply as an incidental abnormality.

The study also demonstrated mild, moderate, and severe degrees of chronic inflammatory activity in gastric mucosal specimens. Lymphocytic inflammation was predominantly mild to moderate, while neutrophilic activity was also identified at varying degrees of severity. These findings are compatible with the spectrum of chronic active gastritis commonly associated with *H. pylori* infection. The coexistence of *H. pylori* infection with chronic inflammatory changes further supports the importance of histological assessment when investigating persistent dyspepsia.

Smoking was reported by 24 patients (39.3%), and all reported smokers were male. Previous research has demonstrated that cigarette smoking may promote gastric mucosal atrophy, particularly among *H. pylori*-positive individuals [34]. Therefore, the relatively high proportion of smokers in the present population may

represent an additional factor associated with gastric mucosal injury. However, because the present study was observational and had a relatively small sample size, a causal relationship between smoking and the specific endoscopic or histopathological findings cannot be established.

The study population also reported exposure to other potentially relevant factors, including nonsteroidal anti-inflammatory drug (NSAID) use, alcohol consumption, and coffee intake. NSAID exposure was reported in 32.8% of patients. NSAIDs and aspirin are recognized causes of dyspeptic symptoms and may contribute to gastric mucosal injury and peptic ulcer disease [1]. Consequently, medication history should be considered when evaluating patients with persistent dyspepsia and endoscopic abnormalities.

A proportion of patients had associated systemic or metabolic conditions, including diabetes mellitus, hypertension, and kidney disease. Although these conditions were not specifically evaluated as independent determinants of endoscopic abnormalities in the present study, systemic diseases and medications used to treat them may influence gastrointestinal symptoms and mucosal health. The presence of comorbid conditions therefore supports the need for a comprehensive clinical assessment rather than attributing all dyspeptic symptoms solely to primary gastric disease.

The study also identified two patients with gastric malignancy. Although the number was small, this finding is clinically important because it demonstrates that apparently nonspecific dyspeptic symptoms may occasionally coexist with serious organic disease. Endoscopy with biopsy remains particularly important when there are alarm features or clinical suspicion of malignancy. Previous evidence supports prompt endoscopic assessment in appropriate higher-risk patients, while also indicating that age and alarm features alone are imperfect predictors of significant pathology [40,41].

Only two patients had normal endoscopic findings. This observation indicates that most participants in this selected cohort had an identifiable abnormality on endoscopy or histopathological examination. However, the finding should not be interpreted as demonstrating that all dyspeptic patients require endoscopy. Functional dyspepsia remains a common diagnosis in patients whose investigations do not demonstrate an adequate structural explanation for symptoms [39]. Therefore, the results of the present study are most applicable to patients with persistent dyspeptic symptoms who were selected for endoscopic investigation rather than to the general population with dyspepsia.

The high proportion of *H. pylori* infection and the presence of atrophy, intestinal metaplasia, dysplasia, and malignant lesions emphasize the additional diagnostic value of gastric biopsy. Endoscopy permits direct visualization of mucosal abnormalities, while

histopathology provides information regarding inflammatory activity, chronicity, atrophy, metaplasia, dysplasia, and malignancy. The combination of these approaches may therefore provide a more comprehensive assessment of patients with persistent dyspeptic symptoms than either clinical symptoms or endoscopic appearance alone.

The findings of the present study should nevertheless be interpreted in light of several limitations. First, the sample size was relatively small, with only 61 participants completing the study. Second, the study was conducted at a single teaching hospital, which may limit the generalizability of the findings to other populations. Third, patients were selected from individuals attending an endoscopy unit and therefore may have had a higher probability of clinically significant disease than patients with dyspepsia in the community. Fourth, the study was conducted over a historical period, and changes in *H. pylori* prevalence, diagnostic practices, medication use, and patterns of dyspepsia may limit direct comparison with contemporary populations. Fifth, the observational design does not allow causal relationships to be established between risk factors such as smoking, NSAID exposure, or *H. pylori* infection and specific mucosal abnormalities. Finally, some subgroup analyses contained small numbers of observations, and the numerical inconsistencies identified in the corresponding tables require verification against the original patient-level dataset before definitive statistical associations are reported.

Despite these limitations, the study has important strengths. It prospectively evaluated patients with chronic dyspeptic symptoms using both upper gastrointestinal endoscopy and histopathological examination. The assessment included *H. pylori* infection, inflammatory activity, atrophy, intestinal metaplasia, dysplasia, and malignant changes, thereby providing information across multiple stages of gastric mucosal disease. The study also documented a broad range of clinical symptoms, risk factors, laboratory findings, and endoscopic abnormalities, allowing the findings to be considered within a wider clinical context.

Overall, the present study demonstrates that chronic dyspeptic symptoms may be associated with a broad spectrum of endoscopic and histopathological abnormalities. Gastritis was the most frequent endoscopic finding, while *H. pylori* infection was common histologically. The detection of gastric atrophy, intestinal metaplasia, dysplasia, and malignant lesions highlights the potential importance of biopsy-based evaluation in selected patients. These findings support an integrated approach in which clinical assessment, appropriate endoscopy, and histopathological examination are used together to identify clinically relevant gastric disease in patients with persistent dyspepsia.

Strengths and limitations

A strength of the study is the prospective assessment of symptomatic patients with both upper gastrointestinal endoscopy and gastric biopsy, allowing comparison of macroscopic and microscopic findings. The use of histopathological assessment based on the revised Sydney system also provides a structured approach to grading gastric inflammation and identifying *H. pylori*-associated mucosal abnormalities.

Several limitations should be considered. The study was conducted at a single teaching hospital and included only 61 participants, which limits statistical power and generalizability. The study population was also hospital-based and therefore may not represent patients with dyspepsia in the general community. The six-month study period further limits assessment of longer-term outcomes. In addition, some patients initially eligible for participation declined or did not complete evaluation, introducing the possibility of selection bias. The study was not designed to establish causal relationships between lifestyle factors, *H. pylori* infection, and histopathological abnormalities. Finally, some tables in the original dataset contain numerical inconsistencies that should be reconciled with the source data before final publication.

CONCLUSION

In this prospective hospital-based study, persistent dyspeptic symptoms were frequently associated with identifiable endoscopic and histopathological abnormalities. Chronic gastritis was the most common endoscopic finding, while *H. pylori* infection was frequent on biopsy. Atrophic changes, intestinal metaplasia, dysplasia, and malignant/MALT lymphoma-related lesions were also identified. These findings support the complementary role of upper gastrointestinal endoscopy and gastric biopsy in selected patients with persistent dyspepsia, particularly when clinical features raise concern for significant organic disease. However, the small sample size and single-center design limit generalization, and larger prospective studies are required to confirm these observations.

RECOMMENDATIONS

1. Patients with dyspepsia who are older than 50 years, particularly those with persistent symptoms or inadequate response to appropriate proton pump inhibitor therapy, should be considered for upper gastrointestinal endoscopic evaluation based on individual clinical assessment and applicable guidelines.
2. Patients presenting with alarm features such as gastrointestinal bleeding, anemia, unexplained weight loss, persistent vomiting, progressive dysphagia, or other concerning clinical findings should undergo appropriate diagnostic evaluation, including endoscopy when indicated.

3. Testing for *H. pylori* should be considered in appropriate patients with dyspeptic symptoms, and confirmed infection should be treated according to current evidence-based eradication protocols.
4. Patients with *H. pylori*-associated gastritis, peptic ulcer disease, atrophic gastritis, intestinal metaplasia, or dysplasia should receive appropriate follow-up according to established clinical and histopathological risk assessment.
5. Unnecessary use of aspirin and NSAIDs should be avoided, particularly in patients at increased risk of gastric mucosal injury. When these medications are clinically necessary, appropriate gastroprotective measures should be considered.
6. Further prospective studies with larger sample sizes and longer follow-up are recommended to clarify the relationships among dyspepsia, *H. pylori* infection, lifestyle factors, medication use, endoscopic abnormalities, and premalignant gastric lesions.

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