



# International Journal of Advanced Community Medicine

E-ISSN: 2616-3594

P-ISSN: 2616-3586

<https://www.comedjournal.com>

IJACM 2024; 7(2): 34-42

Received: 05-02-2024

Accepted: 09-03-2024

**Altat Ali Manhal**

Al-Sader Teaching Hospital and  
Basra Specialized  
Gastrointestinal Teaching  
Hospital Basra, Iraq

**Nadeem Raheem Shiaa**

Arab Board Center of Family  
Medicine in Basra, Basra, Iraq

**Ali Dawood Al-Hilfi**

Basrah Specialized  
Gastrointestinal Teaching  
Hospital, Basra, Iraq

## Endoscopic findings in patients with dyspepsia without alarming symptoms

**Altat Ali Manhal, Nadeem Raheem Shiaa and Ali Dawood Al-Hilfi**

**DOI:** <https://doi.org/10.33545/comed.2024.v7.i2a.309>

### Abstract

**Background:** Dyspepsia is a prevalent gastrointestinal condition with multiple differential diagnoses and mixed pathophysiology. It is divided into organic and functional types, with functional type being more common.

**Objectives:** This study aims to investigate the diagnostic value of endoscopy in dyspeptic patients without alarming symptoms, the frequency of endoscopic findings, and their association with various patient variables.

**Methods:** A cross-sectional descriptive study during a four months period was conducted on 100 dyspeptic patients without alarm features at Al-Sader Teaching Hospital and Basra Specialized Gastrointestinal Teaching Hospital. Patients with alarming symptoms, had a known cause of dyspepsia, had a history of abdominal surgery and those who are unfit for endoscopy were excluded from the study. The patients' demographic data, gastrointestinal symptoms, history of chronic illness, drug use, smoking, and alcohol were recorded. Endoscopic findings were observed, and statistical analysis was performed using SPSS 23.0 software.

**Results:** A total of 100 patients (54 male and 46 female) spanning a wide age range were included in this study. The majority of the patients were residing in urban areas (56%). The educational background was diverse, with a significant proportion having completed only primary school (36%). A predominant portion were non-employed (61%). Among the reported symptoms, epigastric pain was the most frequently reported symptom (60%), followed by post-prandial fullness (43%). Co-morbidities were present in 21% of cases, with diabetes mellitus being the most frequently observed (8 patients). 20 patients were smokers, 1 alcoholic and 15 were taking NSAIDs. Among the patients, 40% had normal endoscopic findings, while the remaining exhibited various abnormalities. The most common abnormalities were gastritis (15%), duodenal ulcer (14%), esophagitis (12%), and hiatal hernia (11%). Age, educational level, occupational status, smoking, and NSAIDs use were significantly associated with abnormal endoscopic findings. Sex, residency, and the presence of co-morbidity did not show significant associations.

**Conclusion:** Endoscopy remains a valuable diagnostic tool for dyspeptic patients without alarm features, aiding in early detection and tailored treatment approaches for organic disorders. This study highlights the importance of considering patient variables when evaluating and managing dyspeptic patients. Further research is needed to explore additional factors contributing to organic dyspepsia.

**Keywords:** Endoscopic, dyspepsia, symptoms, Basrah, Iraq

### 1. Introduction

The word dyspepsia is originally derived from the Greek words 'dys' and 'pepse' and the literal meaning is "bad or difficult digestion". It is considered the most common symptom of the gastrointestinal system [1]. It can affect individuals of different ages and social status [2]. Furthermore it has a multiple differential diagnosis and a mixed pathophysiology [3, 4]. Dyspepsia does not represent a standalone diagnosis, but a cluster of recurrent or chronic symptoms related to the upper gastrointestinal tract [5]. The National Institute for Health and Care Excellence (NICE) and The British Society of Gastroenterology (BSG) defines dyspepsia as a group of symptoms, which usually are present for 4 weeks or more, which include upper abdominal pain, heartburn, gastric reflux, nausea or vomiting [6]. Dyspepsia is divided into two types: organic and functional. Organic dyspepsia is a symptom caused by other diseases [7], like peptic ulcer, tumours of the gastrointestinal tract, gastroesophageal reflux disease, biliary diseases, pancreatic disorders, intolerance to some drugs or food, and some systemic diseases [8].

**Corresponding Author:**

**Altat Ali Manhal**

Al-Sader Teaching Hospital and  
Basra Specialized  
Gastrointestinal Teaching  
Hospital Basra, Iraq

Functional dyspepsia is defined according to Rome IV criteria as<sup>[9]</sup>, the presence of at least one of the following: 1- Post-prandial fullness (3 days per week), 2-Early satiety (3 days per week), 3-Epigastric pain (1 day per week), 4-Epigastric burning (1 day per week). No evidence of structural disease (including at upper endoscopy) that is likely to explain the symptoms. Criteria must be present for at least the past three months, with symptoms starting at least six months before diagnosis.

The Rome IV classification also subdivides functional dyspepsia into 3 types<sup>[10]</sup> postprandial distress syndrome (PDS), which is characterized by meal-induced symptoms, like discomfort, pain, bloating, and nausea. Epigastric pain syndrome (EPS), which is characterized by epigastric pain or burning that does not necessarily occur post-prandially, can occur during fasting, and may even be improved by food. Overlapping PDS and EPS, which is characterized by meal-induced symptoms and epigastric pain or burning. Globally, the prevalence of dyspepsia is about 20-40%. Dyspepsia accounts for 20-40% of gastroenterological consultation and 4-5% of general practitioner consultation<sup>[11]</sup>. Functional dyspepsia is more common in Western than Eastern countries<sup>[12]</sup>. Functional dyspepsia is relatively more common in women than in men. This is believed to be due to genetic sex-specific variations in gastrointestinal function, hormone mechanisms and pain signaling<sup>[13]</sup>. The frequency of uninvestigated dyspepsia varies in different populations and this can be attributed to real differences in the frequency or the criteria used to diagnose the condition<sup>[14, 15]</sup>. The exact cause of functional dyspepsia is not clearly explained and the etiology is likely to be multifactorial. There are some risk factors that have been found to be associated with this condition<sup>[14]</sup>: 1-Enteric infections: *H. pylori*, *Campylobacter jejuni*, *E. coli*, and *Salmonella*, 2-Recent use of antibiotics, 3-Non-steroidal anti-inflammatory drugs (NSAIDs) use, 4-Being obese or overweight, 5-Cigarette smoking, 6-Psychosocial dysfunction

While the exact cause of dyspepsia is not entirely understood, the pathophysiology of it is complex. Multiple mechanisms are believed to contribute to each subtype<sup>[16]</sup>. The mechanisms essential for the onset of dyspepsia include motility disturbance, changes in immune and mucosal function<sup>[17]</sup>, altered gastrointestinal microbiota, hypersensitivity to gastric distention, duodenal sensitivity to lipids or acids<sup>[18]</sup>, and autonomic central nervous systems dysregulation<sup>[19, 20]</sup>. Other mechanisms include environmental insults like food inducing visceral physiologic changes, infections causing inflammation, and exposure to allergen. Psychological factors like depression and anxiety can cause a negative feedback to the brain-gut axis<sup>[21, 22]</sup>. *H. pylori* infection and hyperacidity may play a role in the pathophysiology of functional dyspepsia because *H. pylori* eradication and acid suppression improve dyspeptic symptoms<sup>[23]</sup>. Several studies have found increased T cells, eosinophils, and mast cells in the bowel wall of patients with functional dyspepsia, and this implicates immune activation mechanism<sup>[24, 25]</sup>. There is overlap in functional dyspepsia with irritable bowel syndrome and gastroesophageal reflux disease. One study states that 35% of patients with functional dyspepsia have irritable bowel syndrome and 50% have gastroesophageal reflux disease<sup>[26]</sup>. The severity of the patient's dyspepsia is estimated by the patient's report of the effect of symptoms on his quality of life. This usually relates to the extent to which it affects sleep, diet, and work<sup>[27]</sup>. Patients suffering from functional dyspepsia usually have normal physical exam, and this can help in excluding other diagnoses<sup>[20]</sup>.

There are various factors that can impact the diagnostic workup and management of dyspepsia in different populations, like variations in the prevalence of *H. pylori*, the availability of diagnostic tests like *H. pylori* assays or endoscopy, and the risk of gastric cancer<sup>[28, 29]</sup>.

Options for evaluating patients with dyspepsia include therapeutic trials, testing and treatment for *H. pylori*, imaging and endoscopy<sup>[30]</sup>. Prompt investigation to rule out serious disease is advisable in patients who exhibit alarm features, young patients unresponsive to initial empirical therapy and those aged 55 years and above with recent onset dyspepsia<sup>[31]</sup>. Upper gastrointestinal endoscopy can help in differentiating organic from functional dyspepsia, as well as early detection of malignancy and thus reducing the morbidity and leading to a better outcome<sup>[12]</sup>. Negative endoscopy may have an advantage of reducing anxiety in dyspeptic patients<sup>[32]</sup>.

The new 2017 American College of Gastroenterology (ACG) and the Canadian Association of Gastroenterology (CAG) guidelines recommend that patients  $\geq 60$  years of age complaining from dyspepsia be investigated with endoscopy to rule out organic pathology, whereas patients at a higher risk of malignancy, such as those who are living in a high-risk gastric cancer population or those with a positive family history, could be offered an endoscopy at a younger age.<sup>(23)</sup> Other guidelines suggest that endoscopy must be offered for patients with alarm features (Advanced age, family history of gastrointestinal malignancy, weight loss, gastrointestinal hemorrhage, odynophagia, dysphagia, recurrent vomiting and abnormal imaging suggesting organic disease)<sup>[32]</sup>. This study aims to study the diagnostic value of endoscopy in patient with dyspepsia who have no alarm features, also to determine the frequency of various endoscopic findings in patients diagnosed with dyspepsia, and to determine the association of different patients' variables with abnormal endoscopic findings.

## 2. Patients and Methods

### 2.1 Study Design

This cross-sectional study was conducted in Al-Sader Teaching Hospital and Basra Specialized Gastrointestinal Teaching Hospital, during four months period (from 1/2/2023 to 1/6/2023).

The Estimation of the sample size of this study was performed using an equation developed by Steven K. Thompson in 2012<sup>[33]</sup>:

### 2.2 Inclusion Criteria

A total of 100 patients (54 male and 46 female) who visited the endoscopy unit and were complaining from dyspepsia for more than one month duration without alarming symptoms (Like gastrointestinal bleeding, weight loss, anemia, and dysphagia) were included in this study.

### 2.3 Exclusion Criteria

Patients with alarming symptoms, had a known cause of dyspepsia, previously operated for gastro-enteric conditions and those who are unfit for endoscopy were excluded from the study.

### 2.4 Statistical Analysis

Patients' data and endoscopic findings were entered and analyzed using the SPSS statistical software, version 26. Descriptive statistics were used to illustrate patient characteristics and endoscopic findings. Chi-Square or Fisher's exact test were used to assess the association between abnormal endoscopic findings and various patient's

variables. A p-value less than 0.05 will indicate statistical significance.

**2.5 Ethical Considerations**

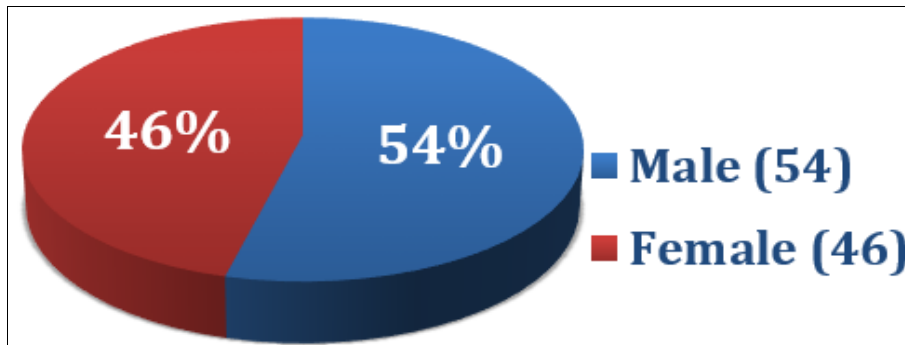
Necessary agreements of the Iraqi ministry of health and Basra health directorate on carrying out this study were obtained before data collection. All patients were briefed on the procedure and the

objectives of the study and consent was taken. Anonymity and confidentiality of patients' data were maintained throughout the study.

**3. Results**

**3.1 Demographic Characteristics**

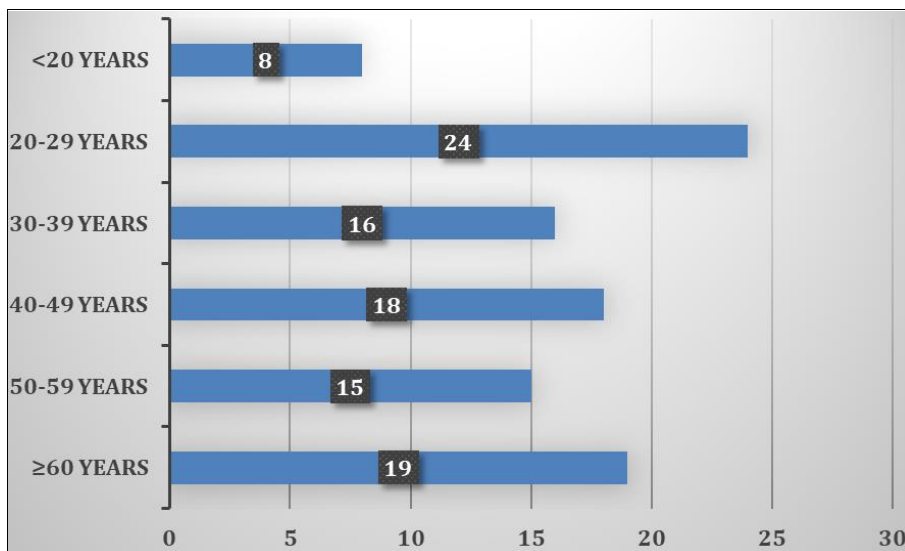
A total of 100 patients (54 male and 46 female) with dyspepsia were included in this study (Figure 1).



**Fig 1:** Distribution of the study population according to sex.

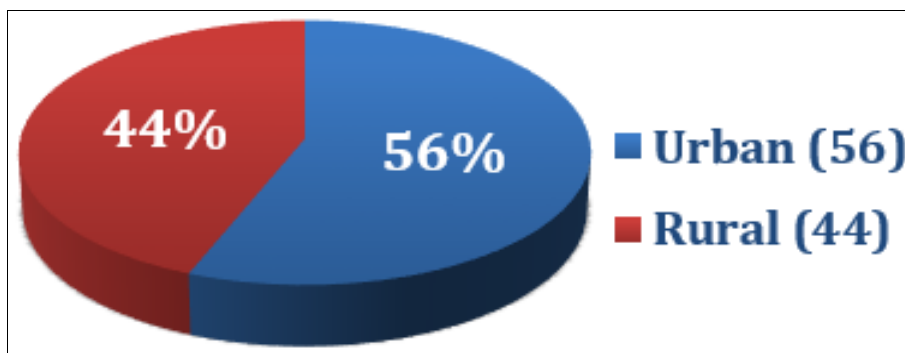
The age distribution of the patients was as follows: 8 patients were less than 20 years old, 24 patients were between 20 and 29 years old, 16 patients were between 30

and 39 years old, 18 patients were between 40 and 49 years old, 15 patients were between 50 and 59 years old, and 19 patients were over 60 years old (Figure 3.2).



**Fig 2:** Distribution of the study population according to age.

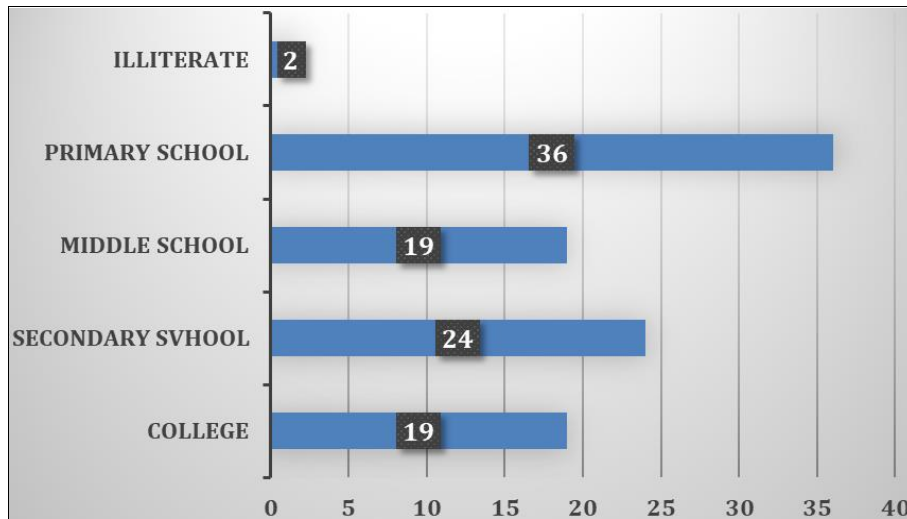
In terms of residency, 56 patients were from urban areas, while 44 patients were from rural areas (Figure 3).



**Fig 3:** Distribution of the study population according to residency.

Regarding educational level, 19 patients had completed college, 24 patients had completed secondary school, 19 patients had completed middle school, 36 patients had

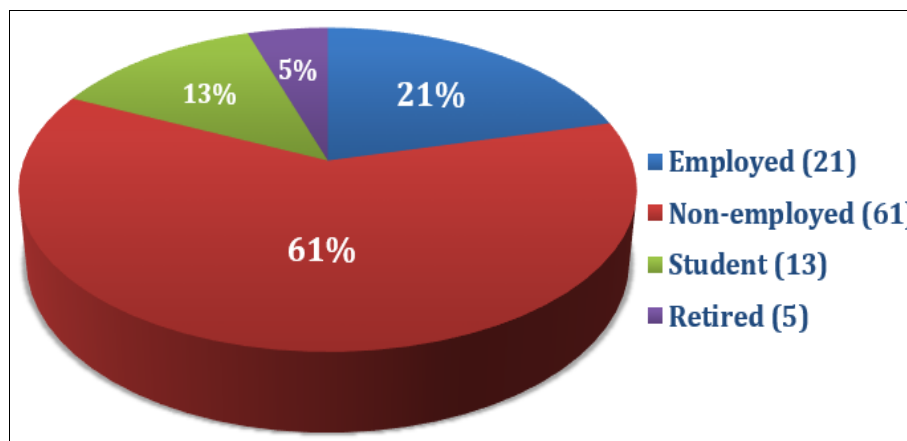
completed primary school, and 2 patients were illiterate (Figure. 4).



**Fig 4:** Distribution of the study population according to level of education.

The occupation of the patients varied, with 61 being non-employed, 21 employed, 13 students, and 5 retired

individuals (Figu5).



**Fig 5:** Distribution of the study population according to occupational status.

**3.2 Gastrointestinal Symptoms:** Regarding the symptoms, 64% of the patients had one symptom while 36% had more than one symptom. The most frequently reported symptom was epigastric pain, observed in 35 patients as a sole symptom and in 60 patients in total. The next most common symptom was post-prandial fullness, observed in 12 patients

as a sole symptom and in 43 patients in total. Further symptoms included early satiety in 4 patients as a sole symptom and in 13 patients in total, epigastric burning in 9 patients, nausea & vomiting in 2 patients as a sole symptom and in 6 patients in total, and heartburn in 2 patients as a sole symptom and in 5 patients in total (Table 1).

**Table 1:** Distribution of the most frequently reported symptoms of the study population.

One Symptom	No.	%
Epigastric Pain	35	35%
Post-prandial Fullness	12	12%
Epigastric Burning	9	9%
Early Satiety	4	4%
Nausea & Vomiting	2	2%
Heartburn	2	2%
Combination of Symptoms	No.	%
Epigastric Pain + Post-prandial Fullness	20	20%
Post-prandial Fullness + Early Satiety	9	9%
Epigastric Pain + Heartburn	3	3%
Epigastric Pain + Nausea	2	2%
Post-prandial Fullness + Nausea	2	2

**3.3 History of Chronic Illness**

Out of the total patients, 21 had a systemic disease (comorbidity), while 79 did not. The most frequent systemic diseases among the patients were diabetes mellitus (8

patients), hypertension (4 patients), ischemic heart disease (3 patients), asthma (1 patients), stroke (1 patient), and 4 patients had more than one disease (Table 2).

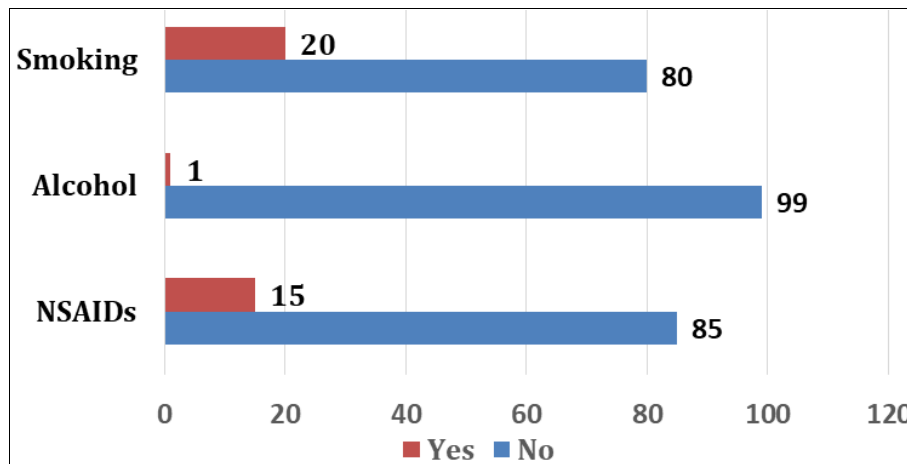
**Table 2:** Number and type of co-morbidity of the study population.

Presence of Co-morbidity	No.	%
Yes	21	21%
No	79	79%
Disease Type		No.
Diabetes Mellitus		8
Hypertension		4
Ischemic Heart Disease		3
Asthma		1
Stroke		1
More than one disease		4

**3.4 Smoking, Alcohol Intake, and NSAIDs Use**

Additionally, 20 patients reported being smokers, while only 1 patient reported alcoholism. Furthermore, 15 patients

reported taking non-steroidal anti-inflammatory drugs (NSAIDs) (Figure 6).



**Fig 6:** Distribution of the study population according to habits.

**3.5 Endoscopic Findings**

During the upper gastrointestinal endoscopy procedure, various findings were observed among the patients with dyspepsia. Among the 100 patients, 40 had normal endoscopic findings.

The most common abnormal findings were as follows: gastritis was observed in 13 patients as a sole finding and in

15 patients in total, duodenal ulcer in 12 patients as a sole finding and in 14 patients in total, esophagitis in 11 patients as a sole finding and in 12 patients in total, hiatal hernia in 11 patients, gastric ulcer in 4 patients as a sole finding and in 5 patients in total, Barrett's esophagus in 3 patients, gastric mass in 2 patients, and gastric polyp in 1 patient (Table 3).

**Table 3:** The most commonly observed endoscopic findings of patients with dyspepsia.

Finding	No.	%
Normal	40	40%
Gastritis	13	13%
Duodenal Ulcer	12	12%
Esophagitis	11	11%
Hiatal Hernia	11	11%
Gastric Ulcer	4	4%
Barrett's Esophagus	3	3%
Gastric Mass	2	2%
Gastric Polyp	1	1%
Gastritis + Esophagitis	1	1%
Gastritis + Duodenal Ulcer	1	1%
Gastric Ulcer + Duodenal Ulcer	1	1%

**3.6 Association of Endoscopic Findings with Patients' Variables**

The association between endoscopic findings and different patients' variables was examined.

Table (4) shows that there was no significant statistical

association between sex of the respondents and the endoscopic findings.

There was significant statistical association between age group and endoscopic findings, when abnormal findings were significantly associated to increase in age (Table 5)

**Table 4:** Association of endoscopic findings with to sex.

		Endoscopic Finding		Total	P-value
		Normal	Abnormal		
Sex	Male	23 (57.5%)	31 (51.7%)	54 (54.0%)	0.566
	Female	17 (42.5%)	29 (48.3%)	46 (46.0%)	
Total		40 (100.0%)	60 (100.0%)	100 (100.0%)	

**Table 5:** Association of endoscopic findings with age.

		Endoscopic Finding		Total	P-value
		Normal	Abnormal		
Age	< 20 years	5 (12.5%)	3 (5.0%)	8 (8.0%)	0.0001
	20 - 29 years	16 (40.0%)	8 (13.3%)	24 (24.0%)	
	30 - 39 years	10 (25.0%)	6 (10.0%)	16 (16.0%)	
	40 - 49 years	5 (12.5%)	13 (21.7%)	18 (18.0%)	
	50 - 59	3 (7.5%)	12 (20.0%)	15 (15.0%)	
	≥ 60 years	1 (2.5%)	18 (30.0%)	19 (19.0%)	
Total		40 (100.0%)	60 (100.0%)	100 (100.0%)	

Also, the endoscopic findings were found to be statistically associated with the level of education.

Abnormal findings were significantly associated to lower educational levels (Table 6).

**Table 6:** Association of endoscopic findings with level of education.

		Endoscopic Finding		Total	P-value
		Normal	Abnormal		
Level of Education	Illiterate	1 (2.5%)	1 (1.7%)	2 (2.0%)	0.039
	Primary School	10 (25.0%)	26 (43.3%)	36 (36.0%)	
	Middle School	6 (15.0%)	13 (21.7%)	19 (19.0%)	
	Secondary School	16 (40.0%)	8 (13.3%)	24 (24.0%)	
	College	7 (17.5%)	12 (20.0%)	19 (19.0%)	
Total		40 (100.0%)	60 (100.0%)	100 (100.0%)	

Moreover, abnormal endoscopic findings were significantly associated to occupational status; the abnormal findings

were significantly higher among non-employed respondents than the normal findings (Table 7).

**Table 7:** Association of endoscopic findings with occupational status.

		Endoscopic Finding		Total	P-value
		Normal	Abnormal		
Occupation	Student	10 (25.0%)	3 (5.0%)	13 (13.0%)	0.022
	Employed	9 (22.5%)	12 (20.0%)	21 (21.0%)	
	Non-employed	20 (50.0%)	41 (68.3%)	61 (61.0%)	
	Retired	1 (2.5%)	4 (6.7%)	5 (5.0%)	
Total		40 (100.0%)	60 (100.0%)	100 (100.0%)	

In Table (8), no significant statistical association between type of residence and endoscopic findings could be noticed.

**Table 8:** Association of endoscopic findings with residency.

		Endoscopic Finding		Total	P-value
		Normal	Abnormal		
Residence	Rural	20 (50.0%)	24 (40.0%)	44 (44.0%)	0.324
	Urban	20 (50.0%)	36 (60.0%)	56 (56.0%)	
Total		40 (100.0%)	60 (100.0%)	100 (100.0%)	

#### 4. Discussion

The study included 100 patients with dyspepsia, comprising 54 males and 46 females. The prevalence of dyspepsia among both sexes reflects its non-discrimination, similar to larger studies in 2015 and 2019 that have shown a nearly balanced sex distribution [20, 34, 35].

Regarding age of the patients involved in this study, the age range was between 17 and 72 years. This is consistent with the fact that dyspepsia is a common gastrointestinal complaint affecting individuals of all ages [13]. The most frequent age groups were between 20 and 29 and above 60 years, which is similar to a study conducted in India [36].

Regarding the symptoms, the most frequently reported symptoms were epigastric pain and post-prandial fullness. Similar findings were found in a study in India [37]. Epigastric pain was also the most frequently observed symptom in other studies in Qatar [38] and the United States [39].

The second most common symptoms in our study were early satiety and epigastric burning. This is also reported by a study in Ninevah Province of Iraq [40].

The least common symptoms were nausea and heartburn. This is also the case in a study conducted in India [41].

This study showed that 40% of dyspeptic patients with no alarming features had normal endoscopic study, a result in line with other studies from Diyala [42] and Anbar [43] Provinces of Iraq in 2019 and 2022, respectively. Similarly, a study in India found normal endoscopic findings in 43% of dyspeptic patients [11].

The study further indicates that among patients with dyspepsia who showed positive endoscopic results, the most commonly observed findings were gastritis, duodenal ulcer, esophagitis, and hiatal hernia. Similar results were observed in other studies conducted in Iraq [42], India [11] and Pakistan [44], where the most frequent findings were esophagitis, gastritis and peptic ulcer.

Hiatal hernia was found in 11% of our patients, which aligns with a study carried out in Iran where the prevalence was 10.2% [45]. In contrast, the above-mentioned studies from India [11] and Pakistan [44] studies reported a lower percentage of hiatal hernia.

Barrett's esophagus was found in 3% of the patients, which is similar to the above-mentioned Iran study wherein Barrett's esophagus was diagnosed in 3.7% patients [45].

In our study, two patients (2%) had a gastric mass, as revealed by endoscopy, which turned out to be malignant by histopathological exam. This finding is similar to the study of Diyala Province of Iraq [42] and a study in Nepal [46], where malignancy was diagnosed in 1.67% and 2% of dyspeptic patients, respectively.

Our study did not find a statistically significant sex difference in the presence of abnormal endoscopic findings, and this aligns with the study of Diyala Province of Iraq [42].

In contrast, studies in Pakistan [44] and China [47] reported that male sex has a stronger association with abnormal endoscopic findings compared to females.

Our research found a significant association between age and abnormal endoscopic findings, a result also observed by multiple studies in Cambodia [35], Pakistan [44], and the United States [39].

Considering the association of endoscopic findings with educational level, our study showed a significant link between lower educational levels and abnormal endoscopic findings. This is in contrast with a research conducted in South Asia [48], which found no association between endoscopic findings and the level of education.

Furthermore, our study suggests a statistically significant correlation between endoscopic findings and patients' employment status; abnormal findings were significantly higher among non-employed patients. However, researches in South India [49] and Italy [50] contradicted this observation. In terms of residency (Urban vs. rural), no statistically significant correlation with abnormal endoscopic findings was found. This observation implies that the prevalence of organic dyspepsia is relatively consistent across urban and rural populations, likely due to similar dietary and lifestyle habits. In our search of the literature, we found no prior studies examining the association between residency and endoscopic findings in dyspeptic patients, as such, we are unable to compare our findings directly with those of other studies.

Our study found that the presence of co-morbidity does not have a significant statistical association with the endoscopic findings. This is similar to findings from studies carried out in the United States [40] and Georgia [51]. However, the small number of patients with co-morbidity in this study may have limited the statistical power to detect such association.

Smoking was found to be significantly associated with abnormal endoscopic findings in this study. This result is also seen in other studies from Bangladesh [52], India [11], and the United States [39]. This aligns with existing knowledge, as tobacco is known to have deleterious effects on gastric mucosa and impairing gastric motility leading to inflammation and ulceration, which can contribute to dyspepsia symptoms [53].

Furthermore, this study showed that there is significant association between taking non-steroidal anti-inflammatory drugs (NSAIDs) and abnormal endoscopic findings. Similar results were found in studies in South India [50] and Ethiopia [54]. Contrary to this finding, studies in India [11] and Nigeri [55] have found no significant association between the use of these drugs and endoscopic findings in patients with dyspepsia. This may be due to differences in usage patterns or related to population differences, as the reaction to NSAIDs can vary among different populations due to genetics and concurrent use of other medications [56].

Of the total 100 patients in our sample, only one self-reported as consuming alcohol, and this patient was found to have abnormal endoscopic finding. Thus, given the rarity of reported alcohol consumption in our sample, we were unable to calculate a p-value for this particular variable. Two studies conducted in India found a significant association between alcohol consumption and abnormal endoscopic findings in dyspeptic patients [57, 58]. Meanwhile, a study in Thailand found no such association [59].

#### 5. Conclusion and Recommendation

##### 5.1 Conclusion

1. This study highlights the diagnostic value of endoscopy in patients with dyspepsia without alarming symptoms.

2. The most frequently reported symptoms among dyspeptic patients were epigastric pain and post-prandial fullness.
3. The prevalence of abnormal endoscopic findings was high in dyspeptic patients across different age groups. The most commonly observed endoscopic findings were gastritis, duodenal ulcer and esophagitis.
4. Age, educational level, occupational status, smoking, and the use of NSAIDs were identified as significant factors associated with abnormal endoscopic findings in dyspeptic patients.

## 5.2 Recommendation

1. The study shows the importance of considering endoscopy as a diagnostic tool in patients with dyspepsia, even in the absence of alarming symptoms.
2. Raising awareness among the public about the prevalence and variety of dyspeptic symptoms and initiating health education programs to inform patients about the potential impact of increased age, smoking, and NSAIDs use on the gastrointestinal system, especially in individuals with dyspeptic symptoms.
3. Given the association of various factors with abnormal endoscopic findings, further larger multicenter studies with long-term follow-up are warranted to validate these associations across diverse populations and regions.

**5.3 Conflict of Interest:** Not available

**5.4 Financial Support:** Not available

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**How to Cite This Article**

Manhal AA, Shiaa NR, Al-Hilfi AD. Endoscopic findings in patients with dyspepsia without alarming symptoms. International Journal of Advanced Community Medicine. 2024;7(2):34-42.

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