

Barrett's Esophagitis in Patients with Reflux Symptoms Versus Those Without

Jalal Khaleel Rashid^{1*}, Halgurd Fathu Allah² and Jaafar Tahir Hassan³

¹*MBChB Trainee at Kurdistan Higher Council for Medical Specialities of Gastroenterology and Hepatology, Rizgary Teaching Hospital. Corresponding author

²MBChB, FICMS, ERCP Glasgow. Program director of Internal Medicine at Kurdistan Higher Council for Medical Specialities, Rizgary Teaching Hospital, Erbil, Kurdistan region of Iraq

³MBChB, FKHCMS, (Int. Med.), FKHCMS (GE & H)

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ABSTRACT

Background: In Barrett's oesophagus (BE), the normal squamous epithelium lining the oesophageal mucosa is replaced by columnar intestinal epithelium, which is considered a precursor to oesophageal adenocarcinoma.

Aim : This study aimed to determine the prevalence of BE among patients with and without reflux undergoing endoscopy at the gastroenterology centre at Rizgary Teaching Hospital.

Subject and methods: A prospective study was carried out at the gastroenterology centre of Rizgary Hospital. A convenient sample of all patients attending the endoscopy unit was included during the study period. Endoscopy and biopsy results were documented after review by two experts in the field. Risk factors for developing reflux, such as obesity, smoking, family history, and alcohol consumption, were evaluated.

Statistical analysis: After cleaning the data, it was transferred from the Excel sheet to the Statistical Package for the Social Sciences (SPSS) version 27. The Chi-square test was used to analyse categorical variables.

Results: Out of 300 patients, 112 (37%) were males, and 188 (62.7%) were females. Those who were Kurds constituted 83%, and the non-Kurds were only 16.7%. The majority were from urban areas 97.3%, and only 2.7% were from rural areas. The indications for endoscopy were epigastric pain in 86%, weight loss in 53%, flatulence in 53%, nausea in 52%, stress in 44.7%, disturbed sleep in 42%, belching in 39%, and regurgitation in 34%. In individuals aged 60 years or older, the prevalence was 11.76% among males, and no cases were reported among females in the same age group. The multiple regression analysis predicted age over 50 years, which increases the risk of BE by one-fold (odds ratio 1.42). The male gender increased the risk by twofold (odds ratio 2.21, CI 1.55–6.20).

Conclusions: The prevalence of BE in the Kurdistan region of Iraq was low among both reflux and non-reflux patients. Meanwhile, reflux symptoms are not sensitive enough to detect all cases; male gender, age over 50, and symptom duration were among the factors that predicted the presence of BE.

Keywords: Barrett's oesophagitis, endoscopy, Acid reflux, histopathology, risk factors.

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INTRODUCTION

Gastroesophageal reflux disease (GERD) is a common gastrointestinal disorder worldwide, including in Middle Eastern countries. Recently, a global rise in the prevalence of GERD has been reported. Studies have shown that the prevalence of GERD in North America ranges from 18.1 to 27.8%, 8.8 to 25.9% in Europe, and 33.1% in the Middle East. ¹ The diagnosis of GERD is associated with a 10–15% risk of Barrett's oesophagus (BE) ². In Barrett's oesophagus (BE), the normal squamous epithelium lining the oesophageal mucosa is replaced by columnar intestinal epithelium, which is considered a precursor to oesophageal adenocarcinoma. ² BE is an acquired condition resulting from gastroesophageal reflux disease, influenced by genetic predisposition. ³ Ethnic and gender differences have been reported in the incidence of BE. ⁴ Among the Asian population, the prevalence of

endoscopically diagnosed BE was 7.8%, while histologically confirmed BE was observed in 1.3%⁵. The risk factors linked with the development of BE in patients with gastro-oesophageal reflux disease include alcohol consumption, central obesity, age over 50 years, and male gender. ⁶ Additionally, long-segment BE, dysplasia, smoking, and caffeine intake have been identified as risk factors in review studies. ⁷ Studies indicate that individuals in this region possess risk factors for developing BE. ⁸ It has been concluded that GERD can lead to BE. However, recent research shows that about half of BE patients do not develop GERD. ⁹ BE was classified as long-segment BE (LSBE), short-segment BE (SSBE), and microscopic specialized intestinal metaplasia of the esophagogastric junction (SIM-EGJ). Types of SSBE were circular SSBE (cSSBE) or tongue-like SSBE (tSSBE). Studies revealed that the location differs between round and sharp localized

*Author for Correspondence: joshi.sumit.97@gmail.com

SSBE, possibly due to differences in the BE development process.¹⁰ Rationally: The prevalence of BE in patients admitted to hospitals for endoscopy was unknown in this region. Therefore, the investigator felt it necessary to conduct such a study. Aim of the study: This study aimed to determine the prevalence of BE among patients with and without reflux undergoing endoscopy at the gastroenterology centre at Rizgary Teaching Hospital. Specific objectives: 1-To find the prevalence of BE in patients diagnosed with and without reflux and who underwent an endoscopy.

2- To determine risk factors that contributed to BE.

3-To find gender variation among patients diagnosed with BE in those with and without reflux. 4- To evaluate the concordance of endoscopic and pathologic diagnosis of BE in our centre.

Subjects and methods: A prospective study was carried out at the gastroenterology centre of Rizgary Hospital. A convenient sample of all patients attending the endoscopy unit was included during the study period. The study ran from 1st May 2025 to 1st November 2025. The investigator, with their supervisor's assistance, has prepared a questionnaire to gather sociodemographic data, including age, gender, occupation, residence, weight, height, and BMI. The sample will be divided into two groups: the first comprising patients with reflux and Barrett's oesophagus (BE), and the second consisting of asymptomatic patients with BE only. Endoscopy and biopsy results were documented after review by two experts in the field. Risk factors for developing reflux, such as obesity, smoking, family history, and alcohol consumption, were evaluated. Additionally, comorbidities like hypertension and cholelithiasis were recorded.

Endoscopy procedure: Upper endoscopic examinations will be performed by licensed, experienced endoscopists with more than 20 years of experience. The investigator used the Olympus GIF-1100 (Olympus, Tokyo, Japan), and the study was conducted after participants had fasted for at least 10 hours. The presence of erosive oesophagitis and BE will be documented during the procedure. Biopsies were obtained from all patients from the lower third of the oesophagus (35–40 cm from incisors) to confirm the presence of lesions. Two expert pathologists with more than 20 years of experience in gastroenterology pathology will determine the diagnosis. The criterion for an endoscopic diagnosis of Barrett's epithelium was observing columnar-appearing mucosa between the squamocolumnar and oesophagogastric junction (salmon-coloured mucosa extending into the tubular oesophagus).

BE with a circumferential length exceeding three cm (>3 cm) was classified as LSBE, whereas BE measuring 1-3 cm was classified as SSBE in this study. When SSBE is endoscopically identified, it will be classified as circumferential or localised based on its shape. The localized SSBE was further subdivided into round and sharp types. The locations are indicated in a clock-face orientation.

Inclusion criteria: The study included socially active and productive patients who underwent endoscopy for recent gastrointestinal symptoms and were admitted to the gastroenterology unit at Rizgary Teaching Hospital.

Exclusion criteria included already diagnosed reflux cases, symptoms of gastroesophageal reflux disease more than once a month, and use of medications (such as proton pump inhibitors or H2 receptor antagonists).

Statistical analysis: After cleaning the data, it was transferred from the Excel sheet to the Statistical Package for the Social Sciences (SPSS) version 27. The Chi-square test was used to analyse categorical variables. The data was presented in graphs and figures. A P-value of 0.05% will be considered statistically significant. The odds ratio was calculated with multiple regression analysis.

Ethical Consideration:

Each patient was approached individually, and the purpose of the study was explained. Confidentiality was assured, and verbal informed consent was obtained. Approval from the Kurdistan Board's ethics committee was sought.

Results: (Table 1) presents the distribution of the study sample by gender, ethnic group, and residence. Out of 300 patients, 112 (37%) were males, and 188 (62.7%) were females. Those who were Kurds constituted 83%, and the non-Kurds were only 16.7%. The majority were from urban areas 97.3%, and only 2.7% were from rural areas.

Table (1): Sociodemographic characteristics of the studied sample.

Variables	No (%) Total 300
Gender	
Male	112(37.3)
Females	188(62.7)
Ethnic group	
Kurd	250(83.3)
Non-Kurd	50(16.7)
Residency	
Urban	292(97.3)
Rural	8(2.7)

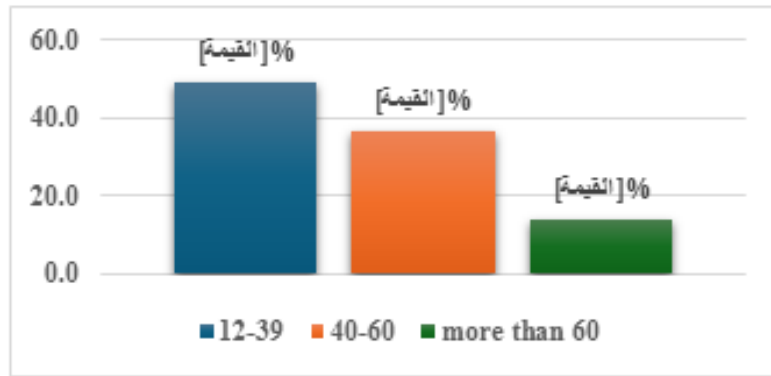


Figure (1): The distribution of the sample by age groups.

Most of the studied sample were in the age group 12-39years (49.3%), more than one third were between 40-60 years, and only 14% were more than 60 years of age.

Table 2 displays the frequency of BE by gender and age group. Of the total 300 cases, 5 cases had a prevalence of 1.67%. One case of BE was diagnosed by endoscopy and histopathology among males aged 12-39 years (1/53,

1.9%). One case was also diagnosed among females in the same age group (1/95, 1.05%). The frequency of BE among females was 1.47% in the age group 40-60 years. In individuals aged 60 years or older, the prevalence was 11.76% among males, and no cases were reported among females in the same age group. The p-value was significant for age group or gender with respect to BE prevalence.

Table (2): The prevalence of BE diagnosed by endoscopy and histopathology stratified by age groups and gender.

Gender	The prevalence rate of BE by age groups			Total	P-value
	12-39	40-60	More than 60		
	No (%)	No (%)	No (%)	No (%)	0.023
Male	1/53(1.88)	0/42(0)	2/17(11.76)	3/112(2.7)	
Female	1/95(1.05)	1/68(1.47)	0/25(0.0)	2/188(1.06)	
Total	2/148(1.35)	1/110(0.9)	2/42(4.76)	5/300(1.67)	

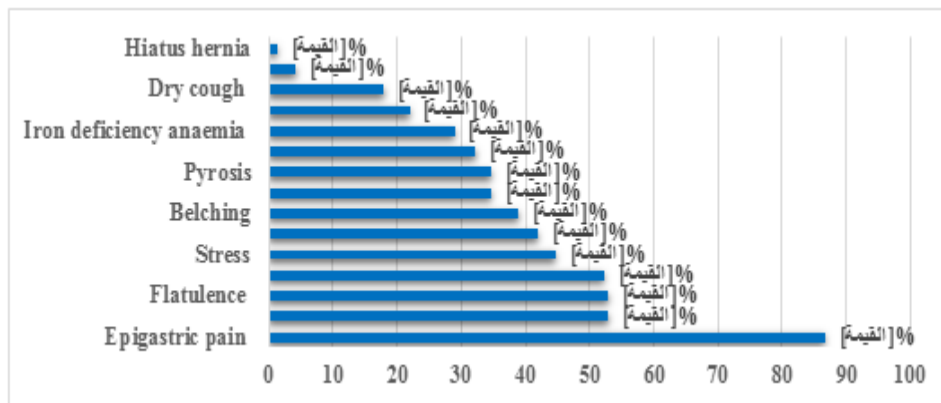


Figure (2): Indication for endoscopy in the studied cohort.

In (Figure 2), the indications for endoscopy were epigastric pain (86.7%), weight loss (53%), flatulence (53%), nausea (52%), stress (44.7%), disturbed sleep (42%), belching (39%), vomiting (32.3%), and regurgitation (34%). Hiatus hernia was present in 1.3%, and anaemia in 29%.

(Table 3) displays the prevalence of BE among patients with and without reflux. Out of 300 patients, half had

reflux, and half did not. The prevalence of reflux cases with normal endoscopy was 98% (147/150), and the rate of normal endoscopy without reflux was 148/150 (98.7%). The prevalence of BE was higher in the reflux group than in the non-reflux group: 2% compared to 1.3%. The overall BE rate in the cohort studied was 1.7%.

*Author for Correspondence: joshi.sumit.97@gmail.com

Table (3): The prevalence of BE after endoscopy among the reflux group and patient without reflux symptoms.

	Normal endoscopy	BE diagnosed by endoscopy.	Total
	No(%)	No(%)	No(%)
Reflux symptoms	147(98)	3(2)	150(50)
No-reflux symptoms	148(98.7)	2(1.3)	150(50)
Total	295(98.3)	5(1.7)	300(100)

In Table 4, out of 300, 110 had no risk factors, and the prevalence of BE among them was 0.9%. The group of patients with risk factors comprised 190 patients, and the prevalence of BE was 2.1% in this group.

Table (4): The prevalence of BE after endoscopy by risk factor presence.

Risk factors	Normal endoscopy for BE	Abnormal endoscopy Findings for BE	Total
Absent	109(99.1)	1(0.9)	110(100)
Present	186(97.9)	4(2.1)	190(100)
Total	295(98.3)	5(1.7)	300(100)

In Table 5, the prevalence of BE among cases with reflux and H. pylori-negative was 3.70%, and among those with H. pylori-positive and reflux, 1.04%. Among the non-reflux group, the rate was 1.9% in the H. pylori-negative group and 1.01% in the H. pylori-positive group. The prevalence rate of H. pylori infection was significantly different (p=0.024), between those with reflux and without reflux.

Table (5): The prevalence of BE by H. pylori infections among the reflux and no-reflux cases.

	H.pylori negative	H.pylori Positive	Total	p-value
Reflux symptoms	2/54(3.70)	1/96(1.04)	150	0.024
No-reflux symptoms	1/51(1.96)	1/99(1.01)	150	
Total	3/105(2.9)	2/195(1.02)	300	

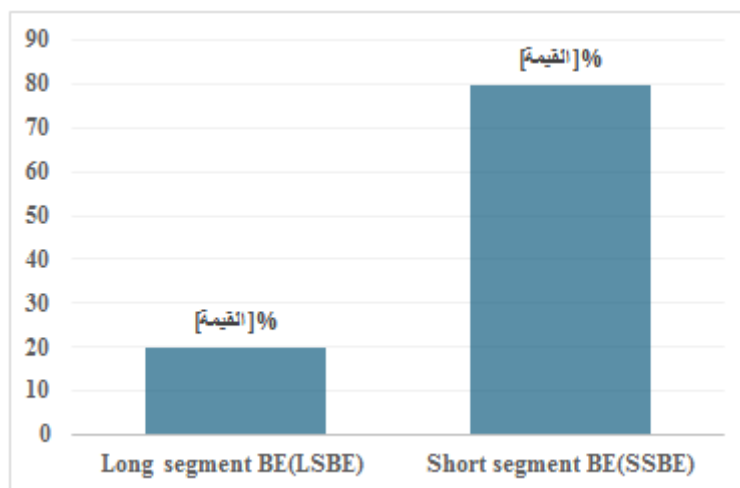


Figure 3: The prevalence of long and short segment BE.

80% were short-segment BE, and 20% were long-segment BE.

Table 6 shows the results of univariate analysis and the odds ratio. Patients aged 50 years or older were at higher risk of BE, with a risk ratio of 1.52 (95% CI: 0.60-4.01), and the result was significant (p=0.032). The odds of being male were twice those of being female (Odds ratio 2.14, 95% CI: 1.55–12.93), and the difference was highly significant. Those with a body mass index of more than 30 kg/m² were also at increased risk of BE, with a 1-fold

increase in odds (odds ratio of 1.31). The incidence of BE was higher in patients with reflux symptoms than in those without. The odds of BE were one-fold higher in reflux patients than in those without reflux. The duration of reflux symptoms was associated with BE incidence. H. pylori-positive individuals have a reduced risk of BE, and this is negatively correlated with BE. The presence of a hiatal hernia and smoking were negatively correlated.

Table (6): Univariate analysis for diagnosed cases of BE by endoscopy.

Variables	Odds ratio	95% confidence interval	P-value
Age over 50 years	1.52	0.60–4.01	0.032
Male gender	2.14	1.55–12.93	<0.001
BMI >30 kg/m ²	1.31	0.13–2.32	<0.001
H.pylori positive	0.47	0.25–0.90	0.024
Hiatal hernia	0.90	0.28–2.40	0.842
Smoking	0.66	0.03–3.28	0.696
Reflux symptoms	1.05	1.45–12.93	<0.001
Duration of reflux	1.71	0.03–3.61	0.041

Table 7 presents the same risk factors that predicted BE incidence among patients with reflux. The multiple regression analysis predicted age over 50 years, which increases the risk of BE by one-fold (odds ratio 1.42), and the result was significant (0.002). The male gender increased the risk by twofold (odds ratio 2.21, 95% CI:

1.55–6.20). A high BMI is associated with a one-fold increase in BE incidence (odds ratio 1.21). The presence of reflux symptoms and the duration of disease were associated with a 1-fold increase in BE incidence (odds ratios of 1.23 and 1.62, respectively).

Table (7): The result of regression analysis for risk factors that predict BE incidence among patients presented with reflux and without reflux.

Variables	Odds ratio	95% confidence interval	P-value
Age over 50 years	1.42	0.40–3.01	0.002
Male gender	2.21	1.55–6.20	<0.001
H.pylori positive	0.37	0.25–0.80	0.220
BMI >30 kg/m ²	1.21	0.14–2.02	<0.001
Hiatal hernia	0.90	0.28–2.30	0.642
Smoking	0.66	0.13–3.27	0.396
Reflux symptoms	1.23	1.45–10.93	<0.001
Duration of reflux	1.62	0.03–4.62	0.024

DISCUSSION:

According to guidelines, patients presenting with reflux symptoms should be screened for BE, especially those with multiple risk factors. There are many variations among the studied cohorts, such as ethnic differences, that limit the pertinency of Western guidelines to the Middle Eastern population. The current study reported a low prevalence of BE (5/300, 1.7%) among the Kurdish population attending the hospital's endoscopic unit for various indications. The BE cases were endoscopically diagnosed and histopathologically confirmed. Among the reflux cases, the prevalence was 2%, compared with 1.3% among the non-reflux cases. The prevalence of BE is highly variable across published studies, reflecting differences in the populations studied and in inclusion and exclusion criteria. A recent study in America screened primary care patients for BE. A prospective case-control survey was conducted, and the results revealed an overall prevalence of 8.6% and a prevalence of 6.7% among patients without reflux. More than half of BE cases were without reflux symptoms but had at least one risk factor.¹¹ This finding was consistent with the current study's results: 50% of our patients were free of reflux symptoms. Another study found that 73,535 patients (13.5%) underwent endoscopy for a primary indication of reflux, and only 4122 (5.6%) had BE.¹² In Asian countries, a systematic review found an increase in the prevalence of BE among patients undergoing endoscopy. The prevalence rate ranged from 1.3% to 15.7%, with a pooled prevalence

of 7.8%. Most of the histologic type was the SSBE (82.1%) (<3 cm). There was a trend toward increasing BE prevalence from 1991 to 2014. In the current study, the prevalence of SSBE was 80%, consistent with previous studies.¹³

Ethnic and geographical factors, along with the presence of risk factors, could explain variation in prevalence in this region of the world. The prevalence of BE varied significantly between Western and non-Western countries. A review study revealed that the prevalence of BE was 8% in the low-risk general population, 3% in the presence of reflux, 12.2% with other risk factors, 23.4% with family history, 6.1% with age > 50, and 6.8% in males.^{14,15} In the current study, the prevalence of BE among males was 3/112 (2.7%); in the reflux group, 3/150 (2%); and in the 50 years or older age group, 3/82 (3.7%). In the presence of risk factors, the prevalence was 2.1%. These figures are significantly lower than the prevalence of BE in Western countries. Studies on the prevalence of BE in Middle Eastern countries are limited. A recent study from Saudi Arabia included 2805 patients. BE was reported endoscopically in 18/2805 (0.64%) and confirmed histologically in 9/2805 patients (0.32%).¹⁶ This figure is lower than the current study findings, 5/300 (1.7%). The short segment BE was 77.8%, which is also lower than the figure in this study (80%).¹⁶ BE can develop due to medical conditions such as reflux disease, peptic stricture, peptic ulcers, helicobacter pylori infection, hiatal hernia, the presence of risk factors, and erosive esophagitis.¹⁷ A

study in Iran reported the prevalence of Barrett's oesophagus of 4.4%, which is higher than the current study finding.¹⁸ The association between *H. pylori* infection and BE remains unclear. Some researchers believe that this infection plays a protective role in the development of Barrett's oesophagus. In contrast, others attribute this relationship to decreased gastric acid secretion caused by *Helicobacter pylori* infection.¹⁸ In the current study, the *H.pylori* positive do provide a protective effect, with an odds ratio of 0.47(95% CI 0.25–0.90). Another study from Iran reported no gender difference in BE prevalence, while older age was associated with a higher risk of developing BE. The presence of a hiatal hernia also increased the risk of BE.¹⁹ Another review study supports a close relationship between hiatal hernia and an increased risk of BE. Additionally, hiatal hernia seems to correlate more strongly with LSBE compared with SSBE.²⁰ The current study did not show such a correlation between hiatal hernia and BE prevalence. The BE may be underdiagnosed in patients with hiatal hernia due to difficulty localizing the gastroesophageal junction. Studies from Lebanon (1.2%) and Turkey (2.9%) reported prevalence rates similar to those of the current study, after endoscopy and histopathological confirmation.^{21,22} The duration of reflux symptoms has been reported as a risk factor for BE. The results of the current study were consistent with those of other studies.^{21,22} The low prevalence in the current study may be due to a lower regional prevalence than in Western countries. In a review study, the prevalence in the North American countries was 10%.²³ In the current study 50% presented with reflux, and the prevalence of BE among them was 2%. Another 50% presented without reflux, and the prevalence of BE was 1.3%. A recent study in Vietnam revealed a 2.4% prevalence of BE, which is higher than the current study findings. The indications for endoscopy were epigastric pain in 47.7%, reflux symptoms in 40.5%, regurgitation in 12%, heartburn in 3.5%, early satiety in 15.5%, belching in 6.5%, and nausea/vomiting in 6.8%. The risk factors that predicted BE were consistent with the current study findings. The male gender increased the odds by 1.29 (95% CI: 0.57–2.95). The elderly age also predicted BE, with an odds ratio of 1.020 (95% CI: 0.99–1.04).²⁴ In the present study, the indications for endoscopy included epigastric pain in 86%, weight loss in 53%, flatulence in 53%, nausea in 52%, belching in 39%, and regurgitation in 34%. The indications were the same, but at a higher rate than those in the Vietnam study.²⁴ A multicentre, prospective study in Taiwan was conducted to examine the prevalence, clinical features, and risk factors of BE among individuals experiencing upper gastrointestinal symptoms. Among 8697 subjects, the prevalence of BE was 2.6%. In the study of Taiwan 61% presented with reflux.²⁵ The analyses revealed that typical reflux symptoms are not a sensitive indicator of BE; therefore, focusing solely on reflux symptoms can miss BE cases. Other indicators should be used to identify instances of BE in accordance with the guidelines.² The independent significant risk factors for BE identified in the Taiwan study were age

over 50 (odds ratio 1.59, 95% CI 1.20–2.11) and male gender (odds ratio 2.27, CI: 1.65–3.11). The presence of reflux symptoms increased the odds of BE to 1.45 (95% CI: 1.10–1.92).²⁵ The findings of the current study's multiple regression analysis aligned with those of the Taiwan and Vietnam studies. Male gender, age over 50 years, and reflux symptoms were identified as independent risk factors for BE. The odds ratios and 95% confidence intervals for males, individuals over 50 years old, and those with reflux were, respectively: 2.21 (1.55–6.20), 1.42 (0.40–3.01), and 1.23 (1.45–10.93). The current study had several limitations; most were symptomatic, and healthy individuals were not included in the screening process. This introduces selection bias, which affects the relationship between BE and reflux. The small sample size was also a limitation. The study included only one health facility; therefore, the results cannot be generalised to other health facilities. But it also has some strengths; the study represents the first prospective investigation into the prevalence, clinical features, and risk factors of BE among individuals with upper gastrointestinal symptoms in Erbil city. Conclusions: The prevalence of BE in the Kurdistan region of Iraq was low among both reflux and non-reflux patients. This is the first study in this region to use regression analysis to assess the prevalence of BE, as reflux symptoms are not sensitive enough to detect all cases. Male gender, age over 50, and symptom duration were among the factors that predicted the presence of BE.

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