

# Gastroesophageal Reflux Disease Questionnaire Score and Endoscopic Findings in Patients with Gastroesophageal Reflux Disease

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## Abstract

**Background:** Gastroesophageal reflux disease (GERD) is one of the most common conditions encountered in the in- and outpatient clinic, may present with heartburn and acid regurgitation, and it can be asymptomatic too. Furthermore, chronic recurrent cases lead to potentially preventable complications such as esophageal erosion, stricture, and even ulcers. **Objective:** The aim of the study is to evaluate the accuracy of history taking from patients with GERD and compare it with endoscopic findings. **Patients and Methods:** This study was conducted in GIT center, Department of Medicine at Al-Yarmouk Teaching Hospital from November 2017 to March 2018. One hundred patients (65 males and 35 females) referred for oesophagogastroduodenoscopy (OGD) for symptoms suggesting of GERD; the assumed indication of their referral, severity of their condition evaluated using GERD Questionnaire (GERDQ score), and their endoscopic finding were assessed depending on Los Angeles classification of erosive esophagitis. **Results:** A total of 100 patients were enrolled in this study, including 42 patients had erosive esophagitis and 58 had not. There was statistical significance in the GERDQ score of erosive esophagitis group ( $9.5 \pm 1.2$ ) and nonerosive esophagitis group ( $8.6 \pm 1.98$ );  $P < 0.05$  showing that significant correlation between the score and the occurrence of erosive esophagitis. GERDQ score and the severity of reflux esophagitis were positively correlated. **Conclusion:** There was correlation between GERDQ score and the severity of esophageal erosion by endoscope in patients with GERD, GERDQ a valid scoring system that scientifically correlates between clinical symptoms and history findings with the endoscopic result.

**Keywords:** Gastroesophageal reflux disease, Gastroesophageal Reflux Disease Questionnaire score, oesophagogastroduodenoscopy

## INTRODUCTION

Gastroesophageal reflux disease (GERD) is a common condition encountered in the general practice. The condition resulted from reflux of gastric contents into the esophagus due to poor closure of the lower esophageal sphincter (the junction between the stomach and the esophagus causing symptoms in some patients who might have mucosal damage), while others remain asymptomatic. In the Western world, between 10% and 20% of the population are affected by GERD. Untreated one can lead to esophageal erosions ulceration and stricture formation may develop Barrett's esophagus that associated with increased risk of esophageal carcinoma.<sup>[1]</sup>

Although the pathogenesis of GERD is still not completely understood, it has become clear that multiple factors are contributed to GERD development and these include:

1. Hiatal hernia, which increases the likelihood of GERD due to mechanical and motility factors<sup>[2]</sup>
2. Obesity and obstructive sleep apnea: increasing body mass index (BMI) is associated with more severe GERD. In a large series of 2000 patients with symptomatic reflux disease, it has been shown that 13% of changes in esophageal acid exposure is attributable to changes in BMI<sup>[3]</sup>
3. Zollinger–Ellison syndrome, which can be present with increased gastric acidity due to gastrin production.

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- A high blood calcium level, which can increase gastrin production, leading to increased acidity
4. Scleroderma and systemic sclerosis, which can feature esophageal dysmotility<sup>[4]</sup>
  5. Medicines, such as prednisolone, nonsteroidal anti-inflammatory drugs, antihistamines, calcium channel blockers, and antidepressants<sup>[5]</sup>
  6. Gallstones, which can impede the flow of bile into the duodenum, which can affect the ability to neutralize gastric acid<sup>[6]</sup>
  7. Pylori infection: In 1999, a review of existing studies found that, on average, 40% of GERD patients also had *Helicobacter pylori* infection. The eradication of *H. pylori* can lead to an increase in acid secretion, leading to the question of whether *H. pylori*-infected GERD patients differ from that noninfected GERD patients. A double-blind study, reported in 2004, found no clinically significant difference between these two types of patients with regard to the subjective or objective measures of disease severity.<sup>[7]</sup>

### Gastroesophageal reflux disease symptoms

GERD in adults may present as acidic taste in the mouth, regurgitation, heartburn, Bad breath, chest pain, vomiting or wearing away of the teeth. Less common symptoms include pain with swallowing/sore throat, increased salivation (also known as water brash), and coughing.

GERD sometimes causes injury of the esophagus. These injuries may include one or more of the following:

Reflux esophagitis (RE) – Inflammation of esophageal epithelium which can cause ulcers near the junction of the stomach and the esophagus.

Esophageal strictures – The persistent narrowing of the esophagus caused by reflux-induced inflammation.

Barrett's esophagus – Intestinal metaplasia (changes of the epithelial cells from squamous to intestinal columnar epithelium) of the distal esophagus, it is a precursor condition for esophageal cancer. The risk of progression from Barrett's to dysplasia is uncertain but is estimated at about 20% of cases.<sup>[8]</sup>

Esophageal adenocarcinoma – A form of cancer, some researchers have proposed that recurrent ear infections and idiopathic pulmonary fibrosis might be tied, in some cases, to GERD; however, a causative role has not been established.<sup>[9]</sup>

### Diagnosis

Usually made when typical symptoms are present. Although reflux can be present in people without symptoms. Diagnostic Investigation among those who do not improve with simpler measures may involve gastroscopy, upper gastrointestinal (GI) series, esophageal pH monitoring, or esophageal manometry, esophagogastroduodenoscopy.<sup>[10]</sup>

The current gold standard for diagnosis of GERD is esophageal pH monitoring. It is the most objective test to diagnose the

reflux disease and allows monitoring GERD patients in their response to medical or surgical treatment. One practice for diagnosis of GERD is a short-term treatment with proton-pump inhibitors (PPIs), with improvement in symptoms suggesting a positive diagnosis. Short-term treatment with PPIs may help predict abnormal 24-h pH monitoring results among patients with symptoms suggestive of GERD.<sup>[11]</sup>

### Endoscopy

Looking down into the stomach with a fiberoptic scope is not routinely needed if the case is typical and responds to treatment. It is recommended when people either do not respond well to treatment or have alarm symptoms, including dysphagia, anemia, blood in the stool (detected chemically), wheezing, weight loss, or voice changes. Some physicians advocate either once-in-a-lifetime or 5- to 10-yearly endoscopy for people with long-standing GERD, to evaluate the possible presence of dysplasia, or Barrett's esophagus. Reflux changes may not be erosive in nature, leading to "nonerosive reflux disease."<sup>[12]</sup>

### Severity

Severity assessed by using the Los Angeles (LA) Classification System which was published in its final form back in 1999. It was developed by the International Working Group for the Classification of Esophagitis, supported by the World Organization of Gastroenterology and was first proposed in 1994. It was first presented at the LA World Congress of Gastroenterology, and hence, the name of the classification.

The Los Angeles Classification of Esophagitis include

- Grade A: One (or more) mucosal break no longer than 5 mm that does not extend between the tops of two mucosal folds
- Grade B: One (or more) mucosal break  $\geq 5$  mm long that does not extend between the tops of two mucosal folds
- Grade C: One (or more) mucosal break that is continuous between the tops of two or more mucosal folds but which involve  $<75\%$  of the circumference
- Grade D: One (or more) mucosal break which involves at least 75% of the esophageal circumference.

It is the most validated classification system. Furthermore, it has been consistent at predicting the outcome of acid reflux therapy, correlates well with other tests of acid reflux such as 24-h pH monitoring studies, and when compared with other grading systems, it was the most reproducible and practical.<sup>[11]</sup> One limitation of the LA Classification System is that it excludes minimal mucosal changes that are associated with reflux disease. Recent advances in endoscopic imaging techniques have allowed the visualization of these changes. However, the clinical significance and accuracy of these findings need to be validated rigorously before incorporating them into the classification system.<sup>[13]</sup>

### Treatment

The treatments for GERD include lifestyle modifications, medications, and possibly surgery. Initial treatment is frequently with a PPI such as omeprazole.

### Lifestyle

Certain foods and lifestyle are considered to promote gastroesophageal reflux, but most dietary interventions have little supporting evidence. Avoidance of specific foods and of eating before lying down should be recommended only to those, in which they are associated with the symptoms. Foods that have been implicated include coffee, alcohol, chocolate, fatty foods, acidic foods, and spicy foods. Weight loss and elevating the head of the bed are generally useful. A wedge pillow that elevates the head may inhibit gastroesophageal reflux during sleep. Although moderate exercise may improve symptoms in people with GERD, vigorous exercise may worsen them.<sup>[14]</sup>

### Medications

The primary medications used for GERD are PPIs, H2 receptor blockers, and antacids with or without alginic acid.

PPIs, such as omeprazole, are the most effective, followed by H2 receptor blockers, such as ranitidine. If a once-daily PPI is only partially effective, they may be used twice a day. They should be taken 1½ to 1 h before a meal. There is no significant difference between agents in this class. When these medications are used long term, the lowest effective dose should be taken. They may also be taken only when symptoms occur in those with frequent problems. H2 receptor blockers lead to roughly a 40% improvement. The evidence for antacids is weaker with a benefit of about 10% (number needed to treat [NNT]=13), while a combination of an antacid and alginic acid (such as Gaviscon) may improve symptoms 60% (NNT = 4).<sup>[15]</sup>

### Sucralfate

It has a similar effectiveness to H2 receptor blockers; however, sucralfate needs to be taken multiple times a day, thus limiting its use. Baclofen, an agonist of the GABAB receptor, while effective, has similar issues of needing frequent dosing in addition to greater adverse effects compared to other medications.<sup>[16]</sup>

### Surgery

The standard surgical treatment for severe GERD is the Nissen fundoplication. In this procedure, the upper part of the stomach is wrapped around the lower esophageal sphincter to strengthen the sphincter and prevent acid reflux and to repair a hiatal hernia. It is recommended only for those who do not improve with PPIs.<sup>[17]</sup> Quality of life is improved in the short term compared to medical therapy, but there is uncertainty in the benefits over surgery versus long-term medical management with PPIs. When comparing different fundoplication techniques, partial posterior fundoplication surgery is more effective than partial anterior fundoplication surgery, and partial fundoplication has better outcomes than total fundoplication.<sup>[18]</sup>

In 2012, the Food and Drugs Act approved a device called the LINX, which consists of a series of metal beads with magnetic cores that are placed surgically around the lower esophageal sphincter, for those with severe symptoms that do not respond to other treatments. Improvement of GERD symptoms is

similar to those of the Nissen fundoplication, although there is no data regarding long-term effects. Compared to Nissen fundoplication procedures, the procedure has shown a reduction in complications such as gas bloat syndrome that commonly occur. Adverse responses include difficulty swallowing, chest pain, vomiting, and nausea. Contraindications that would advise against use of the device are patients who are or may be allergic to titanium, stainless steel, nickel, or ferrous iron materials. A warning advises that the device should not be used by patients who could be exposed to, or undergo, magnetic resonance imaging because of serious injury to the patient and damage to the device.<sup>[19]</sup>

Although the relationship between reflux symptoms and GERD were evaluated by some clinical studies, the results varied considerably because the symptoms were quantified by different criteria and methods. This has stimulated us to perform a prospective clinical study to evaluate appearance of esophageal mucosa by upper endoscopic findings in Iraqi patients submitted for various symptoms. Data about the relationship between the combination of main reflux symptoms and proven GERD are lacking. The above encourages many GIT centers to come up with a valid scoring system that might help to collect a valuable clinical information reflect the severity of patient condition. One of them is GERD Questionnaire (GERDQ) score.

### Gastroesophageal Reflux Disease Questionnaire score

More than 20 questionnaires were previously published such as: Carlsson *et al.*,<sup>[20]</sup> ReQuest,<sup>[21]</sup> and Likert's scale, Composite score of reflux symptoms<sup>[22]</sup> GERDQ.etc.

GERDQ is designed by Dent *et al.* in 2007, it is a self-administered diagnostic questionnaire consisted of six items. It is mainly used as a tool to improve and standardize symptom-based diagnosis and evaluation the treatment effects in patients with GERD [Table 1].<sup>[23]</sup>

GERDQ score provides advantages over other GERD scores and scales in that it has valid and preestablished cutoff point, which allow determining likelihood of GERD. It is also simple, convenient, noninvasive examination, low price, good patient compliance, and can be completed in the clinic. The diagnostic validity and reliability of GERDQ have been confirmed in many researches in different countries. It facilitate understanding the occurrence rates of reflux-related symptoms, to explore the correlation between the endoscopic manifestations and GERDQ score, and to provide reference for clinical diagnosis of RE, we conducted the study.<sup>[24]</sup>

### Aim of the study

The aim of the study is to evaluate the accuracy of history taking from patients with GERD and compare it with endoscopic findings.

## PATIENTS AND METHODS

This is a prospective study carried out at the GI Endoscopy Unit in Al-Yarmouk Teaching Hospital in the period from November 2017 to March 2018.

**Table 1: Gastroesophageal Reflux Disease Questionnaire**

Questions	Symptoms scoring			
	0 day	1 day	2-3 days	4-7 days
How often did you have heart burn?	0	1	2	3
How often did you have stomach contents (liquid or food) ascending to your throat or mouth (regurgitation)?	0	1	2	3
How often did you have pain in the center of the upper stomach?	3	2	1	0
How often did you have nausea?	3	2	1	0
How often did you have disturbance in sleeping at nights because of your symptoms?	0	1	2	3
How often did you take other drug for your symptoms that is not prescribed by a physician?	0	1	2	3

Among the patients attending the GI endoscopy unit 100 patients, 65 males and 35 females; mean age  $51.9 \pm 21.7$  years. Age ranges from 18 to 80 years [Tables 2-4].

The interview was done according to a standard questionnaire (GERDQ) based on the previous studies to identify symptoms suggestive of GERD was used to classify both the rate of occurrence and severity of characteristic clinical features of GERD (stomach ache, indigestion, food regurgitation, and acid regurgitation) before execution Oesophagogastroduodenoscopy.

The questionnaires were filled by inpatient and outpatients participants. All patients were scored according to the severity gastroesophageal reflux symptoms. Then again, they classified depending on to “LA classification of reflux esophagitis.”

**Inclusion criteria**

1. All patients with symptoms suggestive of GERD
2. Only the symptoms that occur in the past year before the interview were considered.

**Exclusion criteria**

Patients with previous foregut surgery and other systemic disorders affecting the GI motility were excluded

The disease severity was evaluated like this:

- 0 means none
- 1 for mild (that can be overlooked)
- 2 for moderate (could not be ignored but did not affect life)
- 3 for severe (impair life quality).

The GERDQ is a symptom scale, which include nausea, regurgitation, epigastric pain, heartburn, sleep disturbance, and use of any medications. Patients were asked to review the frequencies of various symptoms during last week, and which were designated by a scale from:

1. Positive symptom problems the score is from 0 to 3
2. Negative symptom from 3 to 0
3. Total GERDQ score is 0–18.

The score of symptom frequency was estimated as follows: 0, no or lower than one occasion per month on average; 1, numerous occasions (once to three times) a month; 2, several occasions (1–6 times) a week; and 3, one or more daily occasions. Grounded on the results of severity and occurrence of

**Table 2: Body mass index category number and percentage of patients**

BMI category	n (%)
Normal	38
Overweight	52
Obese	8
Morbid obesity	2

BMI: Body mass index

**Table 3: Age distribution**

Age	n
<20	7
20-39	55
40-59	23
>60	15

**Table 4: Distribution of smoking habit and endoscopic findings**

Smoking	OGD		P
	Nonerosive	Erosive	
Nonsmoker	53	19	0.000001, $\chi^2$
Smoker	5	23	
Total	58	42	

OGD: Oesophagogastroduodenoscopy

the main GERD symptoms, GERDQ sum marks were counted. GERDQ was completed blinded to the endoscopic doctor.

**Endoscopy**

General upper digestive endoscopy was performed using a Pentax video endoscope, and GI physicians made the judgment depending on the recorded result.

Endoscopic examination reveals esophageal mucosal erosions in patient who have reflux esophagitis and then classified according to the LA Classification System:

Endoscopy regarded as the best tool for the diagnosis of RE. The patients were separated into two groups: those with RE and those who have no RE in relation to whether they had or had not mucosal break or erosions in esophagus revealed by endoscopy.<sup>[25]</sup>

### Statistical analysis

Statistical analyses were performed using SPSS software (IBM Corp. in Armonk, NY). Data are demonstrated in mean, standard deviation (SD), percentages, and ranges. The measurement data and numerical data were assessed by *t*-test and Chi-square test, respectively. Moreover, the linear regression correlation analysis was used. The critical two-tailed value of alpha was set at 0.05

### RESULTS

One-hundred and ten patients were submitted to upper endoscopy in the period from November 2017 to January 2018. They interviewed before the procedure for symptoms; all of these 110 patients have symptoms of GERD, 100 patients were included in this study.

- Grade A: One (or more) mucosal break no longer than 5 mm that does not extend between the tops of two mucosal folds
- Grade B: One (or more) mucosal break  $\geq 5$  mm long that does not extend between the tops of two mucosal folds
- Grade C: One (or more) mucosal break that is continuous between the tops of two or more mucosal folds but which involve  $< 75\%$  of the circumference
- Grade D: One (or more) mucosal break which involves at least 75% of the esophageal circumference.

Total patients were assembled according with gender into 65 males and 35 females; the mean age was  $51.8 \pm 21.7$  age ranges from 18 to 80 years.

Hiatus Hernia was present in eight patients of the 100 patients included three patients had erosive esophagitis and the remaining five had normal endoscopic esophagus.

Among the 100 patients with symptoms typical of GERD, 42 patients suffered many grades of endoscopic esophagitis. Of the remaining, 58 patients with normal endoscopic finding.

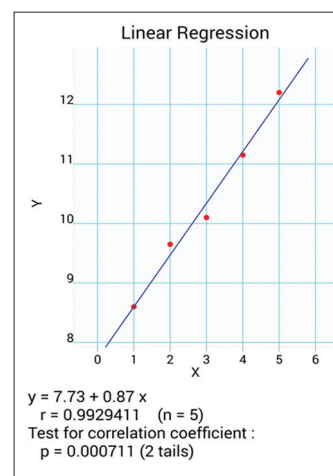
### Reflux esophagitis classification and gastroesophageal reflux disease questionnaire scores

Of the 100 patients with GERD, nearly 27 cases (27%) were demonstrated as Grade A lesion, 8 cases (8%) were categorized as Grade B, 5 cases (5%) were Grade C, and only 2 cases (2%) were Grade D lesion [Table 5]. In patient with nonerosive esophagitis, mean GERDQ score was  $8.6 \pm 1.98$ , and in erosive esophagitis, the mean GERDQ score was  $9.5 \pm 1.2$  and had significant difference between the two groups ( $P = 0.01$ ). All of the RE patients were graded according to LA classification, showed that the mean GERDQ scores of patients with LA-A, LA-B, LA-C, and LA-D was  $9.65 \pm 0.97$ ,  $10.1 \pm 0.86$ ,  $11.15 \pm 1.18$ , and  $12.2 \pm 1.9$ , respectively. Thus, it can be seen that the total GERDQ score increased with increasing severity of esophageal mucosal defect. Examining the correlation coefficient analysis displayed that the GERDQ score was positively correlated with the severity of reflux esophagitis where ( $P = 0.0007$ ) [Figure 1].

**Table 5: Relation of symptom severity by Gastroesophageal Reflux Disease Questionnaire and endoscopic findings**

OGD	n	Mean GERDQ score $\pm$ SD	P
Nonerosive	58	8.6 $\pm$ 1.98	Unpaired <i>t</i> -test, 0.01
Erosive	42	9.5 $\pm$ 1.2	
LA-A	27	9.65 $\pm$ 0.97	
LA-B	8	10.1 $\pm$ 0.86	
LA-C	5	11.15 $\pm$ 1.18	
LA-D	2	12.2 $\pm$ 1.9	

GERDQ: Gastroesophageal Reflux Disease Questionnaire, SD: Standard deviation, OGD: Oesophagogastroduodenoscopy, LA: Los angeles



**Figure 1:** Correlation coefficient between Gastroesophageal Reflux Disease Questionnaire score and esophageal reflux showed that it was clearly correlated with the severity of reflux esophagitis

### DISCUSSION

In the current research, GERDQ score tested in 100 patients; 58 patients with symptoms of GERD had nonerosive esophagitis were endoscopic findings reveal redness without mucosal damage those had mean score of 8.6. Comparing them to the rest 48 patients who had OGD findings of erosive esophageal disease of different degrees (according to LA classification), the latter shows GERDQ of 9.5. This suggested that increasing the severity of esophagitis documented by OGD finding reflected clinically on GERDQ score.

The same findings applied when we assess the mean GERDQ scores for different degrees of erosion (depending on LA criteria), the scores for LA-A, LA-B, LA-C, and LA-D were 9.65, 10.1, 11.15, and 12.2, respectively, and also shows increment in the mean of GERDQ score with increased severity of erosion. Meaning that erosive esophagitis suffering patients probably have much more severe symptoms. Jones *et al.* performed another research revealed that the risk of RE will be relatively small when the GERDQ total score is  $< 8$ , and none of the patients with a GERDQ Score of 0–2 had reflux esophagitis. This finding is in agreement with the present study. It shows that the lower the GERDQ score, the smaller

of the risk of suffering from reflux esophagitis. A higher score signifies a greater possibility of reflux esophagitis.<sup>[26]</sup>

Erosive GERD was found more in older individuals (mean age 57.9 vs. 55.0 years in nonerosive GERD,  $P < 0.005$ ) which is comparable to study that performed by Wang *et al.* Were mean and SD found to be  $53.46 \pm 12.28$ .

In the same Chinese study, it was found that there was no significant relation between erosive reflux disease and nonerosive reflux disease and BMI ( $P = 0.235$ ), while in our research we found that higher BMI found to be related to higher risk of erosive reflux disease ( $27.6$  vs.  $24.3$  kg/m<sup>2</sup>,  $P = 0.02$ ).<sup>[27]</sup>

The present study also shows that smoking demonstrate an obvious correlation with degree of esophageal injury where erosive esophagitis found to be five times more common in smokers than nonsmokers which is comparable to study conducted by Almadi *et al.* were a higher prevalence of GERD found in smokers (51.63%) versus nonsmokers (44.41%); however, it had not reached significant value ( $P = 0.09$ ).<sup>[28]</sup>

We also noticed that the risk of esophagitis associated with erosion occur after mean score above 8.5 that is also comparable to study performed by Zavala-Gonzales, who found that the cut of point indicating esophageal erosion is 8 with high sensitivity and specificity.<sup>[29]</sup>

We suggest that patients with Score 8 and above may be treated pharmaceutically combined with lifestyle counseling. If the patient had symptoms have not improved after 6–12 weeks or had unusual manifestation, for example, cough, asthma, hoarseness, chest pain, and throat symptoms were mentioned in some studies with the prevalence reached up to 80% of GERD patients.

In summary, developing a criterion based on the GERDQ score of typical reflux symptoms is useful to the diagnosis of GERD. Symptom questionnaire and scoring techniques are an important step in this analysis. For patients with a moderate or severe score, GERD diagnosis can be done without further tests in most situations. However, it is better to further testing for patients with doubted clinical symptoms.

## CONCLUSION

There was correlation between GERDQ score and the severity of esophageal erosion by endoscope in patients with GERD. GERDQ a valid scoring system that correlates between clinical history and symptoms with the endoscopic result of GERD. For patients with high GERDQ score, the diagnosis of erosive GERD can be made without the need for further testing.

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## Conflicts of interest

There are no conflicts of interest.

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