Correlation between the symptoms of upper gastrointestinal disease and endoscopy findings: Implications for clinical practice

Maria Aparecida A.O. Serra, PhD\textsuperscript{a,*}, Arlene T. Medeiros, RN\textsuperscript{a}, Mateus D. Torres, RN\textsuperscript{a}, Ismália Cassandra C.M. Dias, PhD\textsuperscript{a}, Carlos Alberto A.S. Santos, MSc\textsuperscript{b} and Márcio Flávio M. Araújo, PhD\textsuperscript{c}

\textsuperscript{a} Federal University of Maranhão, Nursing Department, Imperatriz, Maranhão, Brazil
\textsuperscript{b} Faculdade de Imperatriz (FACIMP-Wyden), Nursing Department, Imperatriz, Maranhão, Brazil
\textsuperscript{c} Universidade para a Integração Internacional da Lusofonia Afro Brasileira, Instituto de Saúde, Eusebio, Ceará, Brazil

Received 9 September 2020; revised 29 December 2020; accepted 30 December 2020; Available online 19 February 2021

Abstract

Objective: Digestive symptoms are the most common complaints among patients who seek primary healthcare services. This study aims to identify digestive symptoms and determine their association with upper gastrointestinal endoscopy findings in patients treated at a public endoscopy centre in Northeast Brazil.

Methods: We conducted a cross-sectional study using data from 751 patients with digestive symptoms who had an indication for upper gastrointestinal endoscopy. We identified the association between these variables through Fisher’s exact test or Chi-square test and calculated the odds ratio.

Results: Epigastric pain occurred in 83%, post-prandial plenitude in 72.6%, and heartburn in 72.3% of the patients. Women were more likely to present with epigastric pain ($p=0.001$; odds ratio [OR] = 1.25; confidence interval [CI] = 1.07–1.47), post-prandial plenitude ($p=0.001$; OR = 1.21; CI = 1.06–1.37), retrosternal pain or burning ($p=0.03$; OR = 1.11; CI = 1.004–1.24), heartburn ($p=0.04$; OR = 1.10; CI = 0.98–1.24), and dysphagia ($p=0.01$; OR = 1.14; CI = 1.03–1.25). There was no statistically significant association...
between digestive symptoms and endoscopic findings of the upper gastrointestinal tract. Additionally, there was no significant association between digestive symptoms and abnormalities detected by endoscopy.

**Conclusion:** Dyspeptic symptoms of epigastric pain, post-prandial fullness, and heartburn were the most common symptoms in patients referred for endoscopy. Dyspepsia, heartburn, and dysphagia were more common in women than in men. Digestive symptoms were not associated with positive endoscopy findings or abnormalities detected by endoscopy.

**Keywords:** Clinical medicine; Dyspepsia; Endoscopy; Public health; Upper gastrointestinal diseases

© 2021 The Authors. Production and hosting by Elsevier Ltd on behalf of Taibah University. This is an open access article under the CC BY-NC-ND license (http://creativecommons.org/licenses/by-nc-nd/4.0/).

### Introduction

Digestive symptoms are among the most common complaints from patients who seek primary healthcare services. Dyspepsia, defined as pain or persistent or recurrent discomfort located in the upper abdomen, is one of the most common symptoms of gastrointestinal disease throughout the world. It includes several symptoms such as epigastric pain, retrosternal pain or burning, post-prandial plenitude, and early satiety and is sometimes associated with heartburn.\(^1\)\(^,\)\(^2\)

Dyspeptic symptoms can be associated with different gastrointestinal diseases such as esophagitis, gastritis, peptic ulcer, and gastric cancer, which are the main causes of gastrointestinal morbidity and mortality worldwide.\(^3\) Western endoscopy societies,\(^4\)\(^,\)\(^5\) Asian recommendations,\(^6\) and current Brazilian guidelines recommend investigation of these symptoms through upper gastrointestinal endoscopy, also known as esophagogastroduodenoscopy (EGD) to detect organic diseases that cause the patient’s symptoms and, more importantly, to exclude upper gastrointestinal malignancies.

EGD is one of the most common endoscopic procedures used for the investigation of digestive symptoms, and it provides information for the diagnosis and treatment of gastrointestinal disorders.\(^5\) The indications for EGD include patients aged above 40 years with warning signs (symptoms of dysphagia, unintentional weight loss, odynophagia, anaemia, digestive tract haemorrhage, nausea, persistent vomiting, or family history of cancer). It is recommended to conduct EGD immediately in the presence of warning signs.\(^9\)

EGD has proven to be a relatively safe procedure that can be performed in large healthcare centres, small rural hospitals, or even private practices. Consequently, the timely performance of EGD to investigate the patient’s symptoms leads to more efficient treatment of upper gastrointestinal diseases and a decrease in their morbidity and mortality rates.\(^10\)

Socioeconomic factors, lifestyle habits, diet, genetic and environmental factors, and infectious diseases are all involved in the appearance of digestive symptoms, and these symptoms can vary in different regions of the world.\(^11\) This highlights the responsibility of healthcare professionals regarding early and timely detection of upper gastrointestinal diseases to avoid complications.

Therefore, the investigation of digestive symptoms and possible disease complications helps medical professionals formulate a differential diagnosis and urgently rule out serious pathology. Consequently, this will lead to better prevention, care, and development of effective treatment protocols. Considering these benefits, our study aims to identify digestive symptoms and determine their association with upper gastrointestinal endoscopy findings in patients treated at a public endoscopy centre in Northeast Brazil.

### Materials and Methods

This was a cross-sectional study that involved patients who showed digestive symptoms and had an indication for upper gastrointestinal endoscopy in a public endoscopy centre located in the city of Imperatriz, Maranhão, in Northeast Brazil. The city has a territory of 1,369.98 kilometers and a population of approximately 252,320 inhabitants.\(^5\) At public endoscopy centres, routine diagnostic and therapeutic endoscopies are performed twice a week. Gastrointestinal endoscopy is performed by general surgeons with training and experience in endoscopy.

We calculated the sample size using a formula for the finite population. A prevalence of 50% was adopted because it provides the maximum sample size; the confidence level was 95% (\(Z_\alpha = 1.96\)), and the sampling error was 5%. For better representation of the study population, we increased the sample size by 10% (\(n = 751\) patients with dyspeptic symptoms).\(^13\)

Participants were selected at random, following the established eligibility criteria. Patients aged \(\geq\) 18 years of both sexes with an indication for upper gastrointestinal endoscopy were included. The exclusion criteria were the use of antibiotics or medication to inhibit gastric secretions within the 2 weeks preceding the EGD, pregnancy or lactation, and conditions associated with gastric physiology disorders such as vagotomy, previous gastric resection surgery, or pyloric stenosis.

Data were collected from October 2015 to February 2018 in the waiting room of the public institution. We recruited the patients after explaining our research objectives and methodology. The patients who agreed to participate in the study provided signed consent.

The instrument used to gather the data was a form for recording data regarding personal identification, socioeconomic and clinical characteristics, and the history of digestive symptoms in the past 3 months. The endoscopy results were obtained from the patient’s medical records. *Heli-co bacter pylori* was detected using a rapid urease test during the EGD. The rapid urease test is an indirect test that
indicates the presence of *H. pylori* by detecting urease produced by the bacteria.\(^{14}\)

Data processing and statistical analysis were performed using the Statistical Package for the Social Sciences (SPSS) version 22.0. The quantitative variables are presented through descriptive statistics and ratio proportions with a 95% confidence interval (CI). To verify the association between the variables, we performed Fisher’s exact test or Chi-square test, and we calculated the odds ratio considering a significance level of \(p < 0.05\). A \(p\)-value < 0.05 was considered statistically significant because it provides sound evidence against the null hypothesis. A value of \(p < 0.05\) means that a discrepancy from the hypothesis prediction (no difference between answer groups) must be larger than that observed.\(^{15,16}\)

**Results**

Analysis of the study population (751 patients with digestive symptoms who underwent endoscopy in a public endoscopy centre) showed a 68.3% prevalence in female sex (513). Their ages varied between 18 and 91 years, with an average age of 43.4 years (standard deviation = 16.4 years).

Regarding digestive symptoms, 623 (83%) reported epigastric pain, 545 (72.6%) post-prandial plenitude, 473 (63%) retrosternal pain or burning, 204 (27.2%) dysphagia, 67 (8.9%) haematemesis, and 319 (42.5%) unintentional weight loss (Table 1).

Most of the patients were aged 45 years or younger (54.9%). Among these patients, 84.9% reported epigastric pain, 73.3% post-prandial plenitude, 63.6% retrosternal pain or burning, 74.5% heartburn, 8.7% haematemesis, 44.1% weight loss, and 27.6% dysphagia. There was no statistically significant association between symptoms of upper gastrointestinal disease and age group (Table 1).

Female patients were more likely to have symptoms of epigastric pain (\(p = 0.001; \text{OR} = 1.25; \text{CI} = 1.07–1.47\)), post-prandial plenitude (\(p = 0.001; \text{OR} = 1.21; \text{CI} = 1.06–1.37\)), retrosternal pain or burning (\(p = 0.03; \text{OR} = 1.11; \text{CI} = 1.004–1.24\)), heartburn (\(p = 0.04; \text{OR} = 1.10; \text{CI} = 0.98–1.24\)), unintentional weight loss (\(p = 0.01; \text{OR} = 1.12; \text{CI} = 1.02–1.24\)), and dysphagia (\(p = 0.01; \text{OR} = 1.14; \text{CI} = 1.03–1.25\) (Table 2).

In 703 patients (93.6%), positive findings were observed using endoscopy, and in 48 patients (15.6%), no abnormalities were detected using EGD. The digestive symptoms of post-prandial plenitude (73.1%), retrosternal pain or burning (63.7%), haematemesis (8.9%), and dysphagia (27.2%) were more frequent among patients who presented positive findings on endoscopy. The digestive symptoms of epigastric pain (89.5%), heartburn (72.9%), and unintentional weight loss (52.1%) were more frequent among patients who presented negative findings on endoscopy. There was no statistically significant association between digestive symptoms and upper endoscopy positive and negative findings (Table 3).

The most frequent abnormality detected by endoscopy in the studied sample was gastritis (\(n = 593, 78.9\%\)), infection with *H. pylori* (\(n = 396, 52.7\%\)), erosive esophagitis (\(n = 195, 25.9\%\)), and peptic ulcer (\(n = 60, 7.9\%\)). There was no significant association between digestive symptoms and abnormalities detected by endoscopy (Table 4).

**Table 1: Frequency and association of digestive symptoms with age in patients who attended a public endoscopy centre in Northeast Brazil.**

| Symptoms                  | Total, n = 751, n (%) | \(\leq 45\) years, n = 413, n (%) | \(>45\) years, n = 338, n (%) | \(p\)-value |
|---------------------------|-----------------------|---------------------------------|--------------------------------|-------------|
| Epigastric pain           |                       |                                 |                                |             |
| Yes                       | 623 (83)              | 351 (84.9)                      | 272 (80.4)                     | 1.02        |
| No                        | 128 (17)              | 62 (15.1)                       | 66 (19.6)                      |             |
| Post-prandial plenitude   |                       |                                 |                                |             |
| Yes                       | 545 (72.6)            | 303 (73.3)                      | 242 (71.5)                     | 0.58        |
| No                        | 206 (27.4)            | 110 (26.7)                      | 96 (28.5)                      |             |
| Retrosternal pain or burning |                   | 263 (63.6)                     | 210 (62.1)                     | 0.66        |
| Yes                       | 473 (63)              | 150 (36.4)                      | 128 (37.9)                     |             |
| No                        | 278 (37)              |                                 |                                |             |
| Heartburn                 |                       |                                 |                                |             |
| Yes                       | 543 (72.3)            | 308 (74.5)                      | 235 (69.5)                     | 0.12        |
| No                        | 208 (27.7)            | 105 (25.5)                      | 103 (30.5)                     |             |
| Haematemesis              |                       |                                 |                                |             |
| Yes                       | 67 (8.9)              | 36 (8.7)                        | 31 (9.1)                       | 0.82        |
| No                        | 684 (91.1)            | 377 (91.3)                      | 307 (90.9)                     |             |
| Weight loss               |                       |                                 |                                |             |
| Yes                       | 319 (42.5)            | 182 (44.1)                      | 137 (40.5)                     | 0.33        |
| No                        | 432 (57.5)            | 231 (55.9)                      | 201 (59.5)                     |             |
| Dysphagia                 |                       |                                 |                                |             |
| Yes                       | 204 (27.2)            | 114 (27.6)                      | 90 (26.6)                      | 0.76        |
| No                        | 547 (72.8)            | 299 (72.4)                      | 248 (73.4)                     |             |
### Table 2: Association between digestive symptoms and sex of patients who attended a public endoscopy centre in Northeast Brazil.

| Symptoms                | Male, n = 238, n (%) | Female, n = 513, n (%) | p-value | OR    | 95% CI    |
|-------------------------|----------------------|------------------------|---------|-------|-----------|
| Epigastric pain         |                      |                        |         |       |           |
| Yes                     | 182 (76.4)           | 441 (85.9)             | 0.001*  | 1.25  | 1.07–1.47 |
| No                      | 56 (23.6)            | 72 (14.1)              |         |       |           |
| Post-prandial plenitude |                      |                        |         |       |           |
| Yes                     | 154 (64.7)           | 391 (76.2)             | 0.001*  | 1.21  | 1.06–1.37 |
| No                      | 84 (35.3)            | 122 (23.8)             |         |       |           |
| Retrosternal pain or burning |                |                        |         |       |           |
| Yes                     | 137 (57.5)           | 336 (65.4)             | 0.03*   | 1.11  | 1.004–1.24 |
| No                      | 101 (42.5)           | 177 (34.6)             |         |       |           |
| Heartburn               |                      |                        |         |       |           |
| Yes                     | 162 (68)             | 381 (74.2)             | 0.04*   | 1.10  | 0.98–1.24 |
| No                      | 76 (32)              | 132 (25.8)             |         |       |           |
| Haematemesis            |                      |                        |         |       |           |
| Yes                     | 25 (10.5)            | 42 (8.1)               | 0.33    | 0.91  | 0.75–1.10 |
| No                      | 213 (89.5)           | 471 (91.9)             |         |       |           |
| Weight loss             |                      |                        |         |       |           |
| Yes                     | 86 (36.1)            | 233 (45.4)             | 0.01*   | 1.12  | 1.02–1.24 |
| No                      | 152 (63.9)           | 280 (54.6)             |         |       |           |
| Dysphagia               |                      |                        |         |       |           |
| Yes                     | 51 (21.4)            | 153 (29.8)             | 0.01*   | 1.14  | 1.03–1.25 |
| No                      | 187 (78.6)           | 360 (70.2)             |         |       |           |

OR = odds ratio; CI = confidence interval.  
* p < 0.05.

### Table 3: Association between digestive symptoms and EGD findings of patients in Northeast Brazil.

| Symptoms                | Results from the EGD exam | p-value | OR    | 95% CI    |
|-------------------------|----------------------------|---------|-------|-----------|
|                         | Positive, n = 703, n (%)  |         |       |           |
|                         | Negative, n = 48, n (%)   |         |       |           |
| Epigastric pain         |                            |         |       |           |
| Yes                     | 580 (82.5)                 | 0.20    | 1.82  | 0.70–4.69 |
| No                      | 123 (17.5)                 | 5 (10.5) |       |           |
| Post-prandial plenitude |                            |         |       |           |
| Yes                     | 514 (73.1)                 | 0.20    | 0.67  | 0.36–1.24 |
| No                      | 189 (26.9)                 | 17 (35.5) |       |           |
| Retrosternal pain or burning |                    |         |       |           |
| Yes                     | 448 (63.7)                 | 0.10    | 0.61  | 0.34–1.11 |
| No                      | 255 (36.3)                 | 23 (47.9) |       |           |
| Heartburn               |                            |         |       |           |
| Yes                     | 508 (72.2)                 | 0.92    | 1.03  | 0.53–1.99 |
| No                      | 195 (27.8)                 | 13 (27.1) |       |           |
| Haematemesis            |                            |         |       |           |
| Yes                     | 63 (8.9)                   | 0.88    | 0.92  | 0.32–2.65 |
| No                      | 640 (91.1)                 | 44 (91.7) |       |           |
| Weight loss             |                            |         |       |           |
| Yes                     | 294 (41.8)                 | 0.16    | 1.51  | 0.84–2.71 |
| No                      | 409 (58.2)                 | 23 (47.9) |       |           |
| Dysphagia               |                            |         |       |           |
| Yes                     | 192 (27.3)                 | 0.72    | 0.88  | 0.45–1.74 |
| No                      | 511 (72.7)                 | 36 (75) |       |           |

EGD = esophagogastroduodenoscopy; OR = odds ratio; CI = confidence interval.
The most prevalent gastric symptoms were epigastric pain, followed by post-prandial plenitude and heartburn. These data suggest that the intensity of the pain and gastric discomfort combined with the fear of serious diseases are the main reasons for seeking a clinical opinion from gastroenterology specialists. A study conducted in the southeast region of Brazil on patients with dyspepsia showed that epigastric pain was reported in 10%, post-prandial plenitude in 6.7%, and heartburn in 52.8% of patients. In the United States, research involving patients with dyspepsia showed a prevalence of 51% for epigastric pain and 47% for post-prandial discomfort. The prevalence of heartburn was approximately 35.3% among the patients who had this symptom at least once a month, which agrees with our study’s data.

In a population study conducted in Asia, the authors found that the prevalence of epigastric pain was 20.2% and that of heartburn was 2.1%. The variation of symptoms observed in different countries suggests a difference in the pattern of development of digestive symptoms between western and oriental cultures, in addition to differences in the diagnostic instruments used.

In a population study conducted in Asia, the authors found that the prevalence of epigastric pain was 20.2% and that of heartburn was 2.1%. The variation of symptoms observed in different countries suggests a difference in the pattern of development of digestive symptoms between western and oriental cultures, in addition to differences in the diagnostic instruments used.

A study in South Korea evaluating differences between the sexes in the production of ghrelin, psychological factors, and quality of life in patients with dyspepsia demonstrated that men produced a lower amount of ghrelin, and women had a higher score of anxiety and depression, whereas the anxiety score was associated with epigastric pain only in female patients. A study conducted in Indonesia reported decreased quality of life scores among women with functional dyspepsia. In this study, symptoms of dysphagia and unintentional weight loss were associated with female sex. Clinicians should be able to appropriately investigate digestive symptoms and urgently rule out serious pathology. If a patient complains of swallowing difficulties, it is important to take a specific history because progressive dysphagia, weight loss, anorexia, and change in taste are warning manifestations that often indicate an obstructive lesion; it is usually a peptic stricture or oesophageal carcinoma.

The current study revealed that there was no significant association between digestive symptoms and abnormalities detected by endoscopy. The most frequent abnormality detected by endoscopy was gastritis, infection with H. pylori, and erosive esophagitis. Dyspepsia and gastroesophageal reflux disease occur frequently in the population at large and have significant overlapping of symptoms; therefore, knowledge of the underlying clinical cause of these symptoms could help perfect the management of upper gastrointestinal diseases.

The current study has shown that women are more likely than men to have gastrointestinal symptoms of epigastric pain, post-prandial plenitude, retrosternal pain or burning, and heartburn. The higher frequency of digestive symptoms in women was also observed in other studies.

The differences between gastrointestinal symptoms in men and women have not been elucidated. These differences may be related to differences in the production of gastric hormones between the sexes that are responsible for the higher motility of the gastrointestinal tract, such as ghrelin, in addition to psychosocial factors and lifestyle choices.

A study conducted in the southeast region of Brazil on patients with dyspepsia showed that epigastric pain was reported in 10%, post-prandial plenitude in 6.7%, and heartburn in 52.8% of patients. In the United States, research involving patients with dyspepsia showed a prevalence of 51% for epigastric pain and 47% for post-prandial discomfort. The prevalence of heartburn was approximately 35.3% among the patients who had this symptom at least once a month, which agrees with our study’s data.

In a population study conducted in Asia, the authors found that the prevalence of epigastric pain was 20.2% and that of heartburn was 2.1%. The variation of symptoms observed in different countries suggests a difference in the pattern of development of digestive symptoms between western and oriental cultures, in addition to differences in the diagnostic instruments used.

A study in South Korea evaluating differences between the sexes in the production of ghrelin, psychological factors, and quality of life in patients with dyspepsia demonstrated that men produced a lower amount of ghrelin, and women had a higher score of anxiety and depression, whereas the anxiety score was associated with epigastric pain only in female patients. A study conducted in Indonesia reported decreased quality of life scores among women with functional dyspepsia. In this study, symptoms of dysphagia and unintentional weight loss were associated with female sex. Clinicians should be able to appropriately investigate digestive symptoms and urgently rule out serious pathology. If a patient complains of swallowing difficulties, it is important to take a specific history because progressive dysphagia, weight loss, anorexia, and change in taste are warning manifestations that often indicate an obstructive lesion; it is usually a peptic stricture or oesophageal carcinoma.

The current study revealed that there was no significant association between digestive symptoms and abnormalities detected by endoscopy. The most frequent abnormality detected by endoscopy was gastritis, infection with H. pylori, and erosive esophagitis. Dyspepsia and gastroesophageal reflux disease occur frequently in the population at large and have significant overlapping of symptoms; therefore, knowledge of the underlying clinical cause of these symptoms could help perfect the management of upper gastrointestinal diseases.

A few studies have demonstrated a significant relationship between epigastric pain in patients with dyspepsia infected with H. pylori compared with non-infected patients.

### Table 4: Association between digestive symptoms and abnormalities detected by endoscopy in patients in Northeast Brazil.

| Symptoms                          | Erosive esophagitis, n = 195 | Gastritis, n = 593 | Peptic ulcer, n = 60 | H. pylori, n = 396 |
|----------------------------------|-------------------------------|-------------------|---------------------|-------------------|
|                                  | E (%) | p-value | E (%) | p-value | E (%) | p-value | E (%) | p-value |
| Epigastric pain                  |       |         |       |         |       |         |       |         |
| Yes                              | 154 (78.9) | 0.05 | 494 (83.3) | 0.62 | 48 (80) | 0.52 | 327 (82.5) | 0.77 |
| No                               | 41 (21.1)  |       | 99 (16.7)  |       | 12 (20)  |       | 69 (17.5)  |       |
| Post-prandial plenitude          |       |         |       |         |       |         |       |         |
| Yes                              | 141 (72.3) | 0.92 | 435 (73.3) | 0.35 | 44 (73.3) | 0.89 | 287 (72.4) | 0.95 |
| No                               | 54 (27.7)  |       | 158 (26.7) |       | 16 (26.7) |       | 109 (27.6) |       |
| Retrosternal pain or burning     |       |         |       |         |       |         |       |         |
| Yes                              | 125 (64.1) | 0.70 | 379 (63.9) | 0.30 | 33 (55)  | 0.18 | 254 (64.1) | 0.48 |
| No                               | 70 (35.9)  |       | 214 (36.1) |       | 27 (45)  |       | 142 (35.9) |       |
| Heartburn                        |       |         |       |         |       |         |       |         |
| Yes                              | 145 (74.3) | 0.45 | 432 (72.8) | 0.51 | 40 (66.6) | 0.30 | 293 (73.9) | 0.27 |
| No                               | 50 (25.7)  |       | 161 (27.2) |       | 20 (33.4) |       | 103 (26.1) |       |
| Haematemesis                     |       |         |       |         |       |         |       |         |
| Yes                              | 19 (9.7)  | 0.64 | 56 (9.4)  | 0.33 | 5 (8.3)  | 0.86 | 30 (7.5)  | 0.17 |
| No                               | 176 (90.3) |       | 537 (90.6) |       | 55 (91.7) |       | 366 (92.5) |       |
| Weight loss                      |       |         |       |         |       |         |       |         |
| Yes                              | 73 (37.4)  | 0.09 | 251 (42.3) | 0.87 | 29 (48.3) | 0.33 | 162 (59.1) | 0.35 |
| No                               | 122 (62.6) |       | 342 (57.7) |       | 31 (51.7) |       | 234 (40.9) |       |
| Dysphagia                        |       |         |       |         |       |         |       |         |
| Yes                              | 54 (27.6)  | 0.84 | 167 (28.1) | 0.23 | 15 (25)  | 0.69 | 110 (27.7) | 0.69 |
| No                               | 141 (72.4) |       | 426 (71.9) |       | 45 (75)  |       | 286 (72.3) |       |

*p < 0.05.
However, a Brazilian study did not observe a relationship between digestive symptoms and the presence of bacteria, which agrees with the current study’s data.\textsuperscript{31} Therefore, we need to investigate the factors that contribute to the appearance of digestive symptoms through a personalised and multi-professional approach that considers issues regarding sex. This will improve the early detection and treatment of upper digestive tract diseases and improve the quality of care provided to patients, especially women, referred to as gastroenterology clinics. The development of similar research in different geographic regions with different methodological approaches will enable full comprehension of the topic.

Our study has some limitations, such as obtaining our study sample from a single centre and lack of follow-up of the study’s participants because it was a cross-sectional study. Our evaluation relied on self-reporting only, which may not be reliable. Finally, recall bias may have occurred because gastrointestinal symptoms were investigated that occurred within the past 3 months.

Conclusion

The present study showed that digestive symptoms such as epigastric pain, post-prandial plenitude, and heartburn are the most common symptoms in patients referred for an endoscopy examination. In addition, women were more likely than men to present dyspeptic symptoms, heartburn, and dysphagia. Digestive symptoms were not associated with positive endoscopy findings or abnormalities detected by endoscopy.

Recommendations

In light of the current study’s findings, more elaboration is needed on the guidelines for treatment and follow-up of patients with upper gastrointestinal diseases. This can be achieved by a multi-professional team focused on the individual’s complete care to prevent and urgently rule out serious digestive diseases that impair the quality of life and overload healthcare services. In addition, healthcare professionals need to be equipped with supplies to build care plans guided towards women.

Source of funding

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

Conflict of interest

All authors have no conflicts of interest to declare.

Ethical approval

This study was performed in accordance with the principles of the Declaration of Helsinki. Approval was granted by the Ethics Committee of Maranhão Federal University (approval number: 1,304,308; date: 30 December 2015). The study was performed considering the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) guidelines.

Authors contributions

MAAOS designed the study. MAAOS, ATM, MDT, ICCMD, CAASS, and MFMA contributed to the extraction of data, analysed the data, wrote the paper, and approved the manuscript. All authors have critically reviewed and approved the final draft and are responsible for the content and similarity index of the manuscript.

Acknowledgements

The authors acknowledge the support of the Fundação de Amparo à Pesquisa e ao Desenvolvimento Científico e Tecnológico do Maranhão (FAPEMA) in the development of the research, and Coordenação de Aperfeiçoamento de Pessoal de Nível Superior- Brasil (CAPES)- Finance Code 001.

References

1. Ford AC, Moayyedi P. Dyspepsia. Curr Opin Gastroenterol 2013; 29: 662–668.
2. Stanghellini V, Chan FK L, Hasler WL, Malagelada JR, Suzuki H, Tack J, et al. Gastrroduodenal disorders. Gastroenterology 2016; 150: 1380–1392.
3. Moayyedi PM, Lacy BE, Andrews CN, Enns RA, Howden CW, Vakil N. ACG and CAG clinical guideline: management of dyspepsia. Am J Gastroenterol 2017; 112: 988–1013.
4. Sáfieiu A, Hassan C, Araia M, Bhutani MS, Bischoops R, Bories E, et al. Role of gastrointestinal endoscopy in the screening of digestive tract cancers in Europe: European society of gastrointestinal endoscopy (ESGE) position statement. Endoscopy 2020; 52(4): 293–304. https://doi:10.1155/a-1104-5245.
5. ASGE Standards of Practice Committee, Shaukat A, Wang A, Acosta RD, Bruining DH, Chandrasekhara V, Chathadi KV, et al. The role of endoscopy in dyspepsia. Gastrointest Endosc 2015; 82(2): 227–232. https://doi:10.1016/j.gie.2015.04.003.
6. Zhang X, Li M, Chen S, Hu J, Guo Q, Liu R, et al. Endoscopic screening in Asian countries is associated with reduced gastric cancer mortality: a meta-analysis and systematic review. Gastroenterology 2018; 155(2): 347-354.e9, https://doi:10.1053/j.gastro.2018.04.026.
7. Coelho LGV, Marinho JR, Genta R, Ribeiro LT, Passos MCF, Zaterka S, et al. IVth Brazilian consensus conference on Helicobacter pylori infection. Arq Gastroenterol 2018; 55(2): 97–121. https://doi:10.1590/S0004-2803.201800000-20.
8. Quach DT, Hiyama T, Gotoda T. Identifying high-risk individuals for gastric cancer surveillance from western and eastern perspectives: lessons to learn and possibility to develop an integrated approach for daily practice. World J Gastroenterol 2019; 25(27): 3546–3562. https://doi:10.3748/wjg.v25.i27.3546.
9. Odgehe EA, Adeniyi OF, Oyeleke GK, Keshinro SO. Use of alarm features in predicting significant endoscopic findings in Nigerian patients with dyspepsia. Pan Afr Med J 2019; 34: 66. Published 2019 Oct 2. https://doi:10.11604/pamj.2019.34.66.18848.
10. Agyei-Nkansah A, Duah A, Alfonso M. Indications and findings of upper gastrointestinal endoscopy in patients presenting to a District Hospital, Ghana. Pan Afr Med J 2019; 34: 82. https://doi:10.11604/pamj.2019.34.82.18002.
11. Ford AC, Marwaha A, Sood R, Moayyedi P. Global prevalence of, and risk factors for, uninvestigated dyspepsia: a meta-analysis. Gut 2015; 64(7): 1049–1057. https://doi.org/10.1136/gutjnl-2014-307843.

12. Instituto Brasileiro de Geografia e Estatística (IBGE). Censo demográfico 2010: resultados gerais da amostra; 2012. https://ibge.gov.br/censos/Censo-Demografico-2010/Resultados_Gerais_da_Amostra/resultados_gerais_amostra.pdf. [Accessed 12 February 2019].

13. Marotti J, Galdino AP, Furuyama RJ, Pigozzo MN, Campos TND, Laganá DC. Amostragem em pesquisa clínica: tamanho da amostra. Rev Odontol Unis São Paulo 2008; 20(2): 186–194. https://www.researchgate.net/profile/Juliana_Marotti/publication/285800533_Amostragem_em_pesquisa_clinica_Tamanho_da_amostra/links/566aca4008aea0892c4b9e11.pdf. [Accessed 12 February 2015].

14. Uotani T, Graham DY. Diagnosis of Helicobacter pylori using the rapid urease test. Ann Transl Med 2015; 3(1): 9. https://doi:10.23976/1389-5370.2014.12.04.

15. Greenland S, Senn SJ, Rothman KJ, Carlin JB, Poole C, Altman DG. Statistical tests, P values, confidence intervals, and power: a guide to misinterpretations. Eur J Epidemiol 2016; 31(4): 337–350. https://doi:10.1007/s10654-016-0493-3.

16. Grabowski B. P < 0.05? might not mean what you think: American statistical association clarifies P values. J Natl Cancer Inst 2016; 108(8): djw194.

17. Aro P, Talley NJ, Agrén L, Bolling-Sternevald E, Keltikangas-Järvinen L, Aromaa A, et al. Prevalence of dyspepsia in a typical African population: a symptom-based multicenter study. BMC Gastroenterol 2020; 20(1): 107. https://doi.org/10.1186/s12866-019-1831-5.

18. Almeida AM, Martins LA, Cunha PL, Brasil VW, Félix LG, Patrício MC, et al. Prevalence of dyspepsia and heartburn of adults in Belo Horizonte, Brazil. Arq Gastroenterol 2017; 54(1): 46–50. https://doi:10.1590/S0004-2803.2017v54n1-09.

19. Choung RS, Locke 3rd GR, Schleck CD, Zinsmeister AR, Talley NJ, Schad MW, et al. How common is overlap of dyspepsia and gastroesophageal reflux disease in an Asian primary care population? J Clin Gastroenterol 2008; 42(6): 680–686. https://doi:10.1097/MCG.0b013e3180653613.

20. Mahadeva S, Ford AC. Clinical and epidemiological differences in functional dyspepsia between the East and the West. Neuro Gastroenterol Motil 2016; 28(2): 167–174. https://doi.org/10.1111/nmo.12657.

21. Ho KY, Gwee KA, Khor JL, Selamat DS, Yeoh KG. Validation of a graded response questionnaire for the diagnosis of gastroesophageal reflux disease in an Asian primary care population. J Clin Gastroenterol 2008; 42(6): 680–686. https://doi:10.1097/MCG.0b013e3180653613.

22. Rodríguez-García JL, Carmona-Sánchez R. Functional dyspepsia and dyspepsia associated with Helicobacter pylori infection: do they have different clinical characteristics?. Dispepsia funcional y dispepsia asociada a infección por Helicobacter pylori: ¿son entidades con características clínicas diferentes? Rev Gastroenterol México 2016; 81(3): 126–133. https://doi.org/10.1016/j.rgmx.2016.02.009.

23. Naphahi K, Koloski N, Walker MM, Talley NJ, Women and functional dyspepsia. Wom Health (Lond) 2016; 12(2): 241–250. https://doi:10.2217/whe.15.88.

24. Yagi T, Asakawa A, Ueda H, Miyawaki S, Inui A. The role of ghrelin in patients with functional dyspepsia and its potential clinical relevance (Review). Int J Mol Med 2013; 32(3): 523–531. https://doi:10.3892/ijmm.2013.1418.

25. Choi YJ, Park YS, Kim N, Kim YS, Lee SN, Lee DH, et al. Gender differences in ghrelin, nociception genes, psychological factors and quality of life in functional dyspepsia. World J Gastroenterol 2017; 23(45): 8053–8061. https://doi.org/10.3748/wjg.v23.i45.8053.

26. Kim YS, Kim N. Functional dyspepsia: a narrative review with a focus on sex-gender differences. J Neurogastroenterol Motil 2020; 26(3): 322–334. https://doi:10.5053/jnm2020.

27. Hantoro IF, Syam AF, Mudjaddid E, Setiati S, Abdullah M. Factors associated with health-related quality of life in patients with functional dyspepsia. Health Qual Life Outcome 2018; 16(1): 83. https://doi:10.1186/s12955-018-0913-z.

28. Hsu CS, Wen SH, Hung JS, Liu TT, Yi CH, Lei WY, et al. Overlap of dyspepsia in patients with gastroesophageal reflux disease: impact of clinical, metabolic, and psychosocial characteristics. Dig Dis Sci 2017; 62(4): 994–1001. https://doi:10.1007/s10620-017-4455-8.

29. Nwokediuko SC, Adekanle O, Akere A, Olokoba A, Anyanachi C, Umar SM, et al. Gastroesophageal reflux disease in a typical African population: a symptom-based multicenter study. BMC Gastroenterol 2020; 20(1): 107. https://doi.org/10.1186/s12866-019-1831-5.

30. Miwa H, Kusano M, Arisawa T, Oshima T, Kato M, Joh T, et al. Evidence-based clinical practice guidelines for functional dyspepsia. J Gastroenterol 2015, 50(2): 125–139. https://doi:10.1007/s00535-014-1022-3.

31. Santos IS, Sassi RA, Minten GC, Tuerlinckx GC, Valle NCJ, Oliveira SS, et al. Validity of an epidemiologic instrument for H. pylori screening among dyspeptic patients. Rev Saude Publica 2009; 43(4): 639–646. https://doi.org/10.1590/s0034-89102009000500034.

How to cite this article: Serra MAO, Medeiros AT, Torres MD, Dias ICCM, Santos CAAS, Araújo MFM. Correlation between the symptoms of upper gastrointestinal and endoscopy findings: Implications for clinical practice. J Taibah Univ Med Sc 2021;16(3):395–401.