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Original Article

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

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

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

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الملخص

أهداف البحث: الأعراض الهضمية هي الشكاوى الأكثر شيوعا من قبل المرضى الذين يسعون للحصول على خدمات الرعاية الصحية الأولية. تهدف هذه الدراسة إلى تحديد أعراض الجهاز الهضمي وتحديد ارتباطها بنتائج التنظير المعوي العلوي لدى المرضى الذين عولجوا في مركز التنظير العام في شمال شرق البرازيل.

طرق البحث: أجرينا دراسة مقطعية باستخدام بيانات ٧٥١ مريضا يعانون من أعراض الجهاز الهضمي ولديهم حاجة للتنظير المعوي العلوي. حددنا الارتباط بين هذه المتغيرات من خلال اختبار فيشر الدقيق وحسبنا نسبة الاحتمالات.

النتائج: أظهرت النتائج أن ٨٣٪ من المرضى يعانون من آلام شرسوفية، ٧٢.٦٪ من الامتلاء بعد الأكل، و٧٢.٣٪ من حرقة الفؤاد. وكانت النساء أكثر عرضة للمعاناة من الألم الشرسوفي، الامتلاء بعد الأكل، وألم خلف القص أو حرق رجعي، وحرقة الفؤاد، وفقدان الوزن غير المقصود، وعسر البلع. ولم يكن هناك ارتباط إحصائي مهم بين الأعراض الهضمية والنتائج بالمنظار في الجهاز الهضمي العلوي. بالإضافة إلى ذلك، لم يكن هناك ارتباط كبير بين أعراض الجهاز الهضمي والتشوهات التي تم الكشف عنها عن طريق التنظير.

الاستنتاجات: أظهرت الدراسة أن أعراض عسر الهضم من الألم الشرسوفي، والامتلاء ما بعد الأكل، وحرقة الفؤاد كانت الأعراض الأكثر شيوعا في المرضى الذين أحيلوا للتنظير. وكان عسر الهضم، وحرقة الفؤاد، وعسر البلع أكثر شيوعا لدى النساء من الرجال. ولم تكن الأعراض الهضمية مرتبطة بنتائج التنظير الإيجابية أو التشوهات التي تم اكتشافها عن طريق التنظير.

الكلمات المفتاحية: عسر الهضم؛ أمراض الجهاز الهضمي العلوية؛ التنظير؛ الطب السريري؛ الصحة العامة

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), unintentional weight loss ($p = 0.01$; OR = 1.12; CI = 1.02–1.24), and dysphagia ($p = 0.01$; OR = 1.14; CI = 1.03–1.25). There was no statistically significant association

* Corresponding address. Av. da Universidade, S/N, Dom Afonso Felipe Gregory, CEP: 65915-240, Imperatriz, Maranhão, Brazil.
E-mail: cidinhaenfaufc@yahoo.com.br (M.A.A.O. Serra)

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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

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[7] 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.[5,8] 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.[12] 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. *Helicobacter 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® 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, 543 (72.3%) heartburn, 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 ($p = 0.001$; OR = 1.25; 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), unintentional weight loss ($p = 0.01$; OR = 1.12; CI = 1.02−1.24), and dysphagia ($p = 0.01$; OR = 1.14; 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 (%)	Age		*p*-value
		≤45 years, n = 413, n (%)	>45 years, n = 338, n (%)	
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				
Yes	473 (63)	263 (63.6)	210 (62.1)	0.66
No	278 (37)	150 (36.4)	128 (37.9)	
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)	43 (89.5)	0.20	1.82	0.70−4.69
No	123 (17.5)	5 (10.5)			
Post-prandial plenitude					
Yes	514 (73.1)	31 (64.5)	0.20	0.67	0.36−1.24
No	189 (26.9)	17 (35.5)			
Retrosternal pain or burning					
Yes	448 (63.7)	25 (52.1)	0.10	0.61	0.34−1.11
No	255 (36.3)	23 (47.9)			
Heartburn					
Yes	508 (72.2)	35 (72.9)	0.92	1.03	0.53−1.99
No	195 (27.8)	13 (27.1)			
Haematemesis					
Yes	63 (8.9)	4 (8.3)	0.88	0.92	0.32−2.65
No	640 (91.1)	44 (91.7)			
Weight loss					
Yes	294 (41.8)	25 (52.1)	0.16	1.51	0.84−2.71
No	409 (58.2)	23 (47.9)			
Dysphagia					
Yes	192 (27.3)	12 (25)	0.72	0.88	0.45−1.74
No	511 (72.7)	36 (75)			

EGD = esophagogastroduodenoscopy; OR = odds ratio; CI = confidence interval.

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	
	n (%)	*p*-value	n (%)	*p*-value	n (%)	*p*-value	n (%)	*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)	

*$p < 0.05$.

Discussion

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.[17]

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.[18] 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,[19] 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.[20,21]

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.[18,22,23]

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.[24–26]

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.[25] A study conducted in Indonesia reported decreased quality of life scores among women with functional dyspepsia.[27]

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.[28,29]

A few studies have demonstrated a significant relationship between epigastric pain in patients with dyspepsia infected with *H. pylori* compared with non-infected patients.[22,30]

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.[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.

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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.

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