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Original Research Article

Proportion of H. pylori Infection in Patients Presenting with Upper Gastrointestinal Symptoms in Outpatient Clinics, October 6th University and Kasr El Ainy University Hospitals: A Cross-Sectional Study

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Abstract: ***Background:*** Helicobacter pylori (H. pylori) is a key cause of gastritis and severe upper gastrointestinal (GI) diseases globally, with high prevalence rates observed in developing countries like Egypt. Understanding the current local prevalence and clinical associations is vital for targeted public health and therapeutic strategies. This study aimed to determine the proportion of H. pylori infection and its correlation with demographic factors and upper GI symptom severity in patients presenting to university outpatient clinics in Egypt. ***Methods:*** This cross-sectional study included 50 symptomatic adults (aged 18–60 years) from two major Egyptian university hospitals. H. pylori infection was diagnosed using the stool antigen test. Symptom severity was evaluated using the Upper GI Symptom Questionnaire for the Elderly (UGISQUE) total score and symptom profile. ***Results:*** The overall prevalence of H. pylori infection was found to be high at 68% (n=34/50). Heartburn and acid reflux were the most common severe symptoms (64%). The UGISQUE total score did not differ significantly between H. pylori-positive and negative groups (P=0.899). However, infection status was significantly associated with both education level ($P < 0.001$) and occupation ($P = 0.046$). ***Conclusion:*** H. pylori prevalence remains high (68%) in this symptomatic cross-sectional study. The lack of correlation between infection status and overall symptom severity suggests a complex, multifactorial etiology. Public health efforts should urgently target socioeconomically vulnerable populations for screening and eradication to reduce the GI disease burden.

Keywords: H. pylori, Prevalence, Gastrointestinal Symptoms, Stool Antigen.

INTRODUCTION

Gastritis encompasses a group of persistent diseases characterized by a lasting inflammatory infiltrate, disrupted cellular renewal, and progressive gastric mucosal changes, such as intestinal metaplasia, atrophy, and epithelial dysplasia [1]. It remains one of the most common, lifelong, and insidious conditions globally, often overlooked in clinical practice despite its established involvement in the pathogenesis of gastric ulcers and gastric cancer [2].

Helicobacter pylori (H. pylori), a Gram-negative bacterium unique in its morphological, biochemical, and enzymatic properties, is a major contributor to gastritis [3]. It primarily resides in the human stomach and is highly prevalent worldwide, affecting about one-third of individuals in developed nations

and over two-thirds in developing regions [4]. Globally, H. pylori infection—most often acquired in early adulthood or childhood—affects nearly half the population, though it frequently remaining asymptomatic [5].

Despite remaining in the stomach for decades, it is linked to conditions such as gastric adenocarcinoma, duodenal and gastric ulcers, and gastric mucosa-associated lymphoid tissue lymphoma. H. pylori exhibits pathogenicity through mechanisms that are influenced by both its intrinsic virulence traits and the host's genetic and immunologic profile, with virulence dependent on the bacterium's ability to colonize and adapt to the gastric environment and activate inflammatory mediators that drive physiological and histological changes in the host [6].

Diagnosis of gastritis may involve serological testing, stool antigen test, endoscopy, and histology; however, only histopathological examination reliably confirms mucosal inflammation, establishing it as the gold standard for diagnosing gastritis [7].

Serologic testing offers a noninvasive method to detect H. pylori, especially useful in high-prevalence areas where low-cost finger-prick tests are available. While highly sensitive, it lacks specificity, often overestimating infection rates. Thus, serologic testing is best used to rule out infection and may be combined with direct tests (e.g., histology, urease, or breath test culture) to confirm H. pylori absence when results are concordant [8].

When H. pylori infection causes symptoms, they are typically linked to gastritis or peptic ulcers. Common signs/symptoms include a persistent or gnawing discomfort in the stomach, often more noticeable when the stomach is empty. Other symptoms may involve nausea, reduced appetite, frequent belching, abdominal bloating, and unexpected weight loss [9].

H. pylori infection rates in Middle Eastern and North African countries demonstrate considerable heterogeneity, with reported prevalence ranging from 7% to 50% in young children and from 36.8% to 94% in adults [10].

In a study involving 1,120 patients from Egypt's Delta region, the overall H. pylori infection prevalence of 52% was observed, with detection performed via enzyme-linked immunosorbent assay (ELISA) targeting H. pylori stool antigens [11].

In another study conducted among Egyptian adults, Helicobacter pylori cagA-positive infection prevalence was studied among dyspeptic and asymptomatic groups. CagA antibodies were detected in 62.2% of dyspeptic patients compared to 11% of controls, with higher prevalence among those with gastric cancer, peptic ulcer, and non-ulcer dyspepsia (89% vs 66.7%, 40%, respectively; p = 0.004) [12].

H. pylori infection is a major public health concern globally, with particularly high prevalence rates in developing countries [13]. In Egypt, the incidence of H. pylori infection remains significant, contributing to a high burden of gastritis and related gastrointestinal complications, including peptic ulcer disease and gastric cancer [14].

Despite this, regional data on the prevalence and clinical manifestations associated with H. pylori in gastritis patients remain sparse [15]. By focusing on an Egyptian cohort, this study will provide valuable epidemiological insights, contributing to a more comprehensive understanding of H. pylori-associated symptomatology and its correlation with demographic, lifestyle, and histopathological factors.

Identifying the prevalence and predictors of H. pylori infection will support early diagnostic and therapeutic strategies tailored to local populations, potentially reducing the progression to more severe GI diseases [16].

Moreover, these findings could inform public health policies and guide targeted interventions to mitigate the impact of H. pylori and improve GI health outcomes in Egypt and similar high-prevalence regions [17].

Therefore, this study aimed to determine the proportion of H. pylori infection and clinical presentation in patients with upper gastrointestinal (GI) symptoms in Egypt.

Methods

Design and population: This cross-sectional study was conducted on 50 patients selected from the outpatient clinics of October 6 University and Kasr El Ainy University Hospitals.

Informed consent was obtained from all patients prior to enrollment in the study. All collected data were handled confidentially, and participants retained the right to withdraw from the study at any time without affecting their medical care.

Patient Selection: Eligible participants were adults aged 18–60 years who presented with upper gastrointestinal symptoms, such as Heartburn, acid reflux, bloating, or nausea. Patients were excluded if they had a recent history of antibiotic or proton pump inhibitor use within the last month or if they had active gastrointestinal infections.

Methods: Complete History Taking: All patients included in this study underwent thorough history taking using a structured data collection form. This form gathered demographic information, medical history, and relevant lifestyle factors such as smoking and alcohol consumption.

Gastrointestinal symptoms including epigastric pain, nausea, vomiting, bloating, appetite changes, and weight loss were assessed using the Upper Gastrointestinal Symptom Questionnaire for the Elderly (UGISQUE) [18]. The UGISQUE consists of 15 items, each rated on a four-point scale: absent, mild, moderate, or severe. "Absent" indicates the patient reports no symptoms. "Mild" refers to symptoms that are present but easily tolerated. "Moderate" indicates symptoms that interfere with normal daily activities, while "Severe" reflects symptoms that prevent normal activities or require medical attention.

Complete Physical Examination: Each participant also underwent a full physical examination, with special attention given to signs related to upper gastrointestinal distress. Measurements of weight and body mass index (BMI) were obtained to support clinical assessment. The physical examination helped identify any observable manifestations of gastrointestinal symptoms or complications.

H. pylori Stool Antigen Testing

H. pylori infection was assessed using a stool antigen test provided by the Biozek company (Lann Van De Ram 49, 7324 BW, Apeldoorn, The Netherlands). This method allowed for non-invasive detection of active infection and was conducted according to the manufacturer's instructions.

Patients were first instructed to collect a fresh fecal sample in a clean, dry specimen container supplied by the study team. To ensure optimal test performance, the assay was carried out within six hours of sample collection, and all samples were transported to the laboratory within 2–6 hours of being obtained.

The testing process relied on an immunochromatographic assay. For solid stool specimens, the applicator attached to the specimen collection tube was unscrewed and inserted into the fecal sample at three different sites to collect an adequate amount. For liquid stool specimens, two drops of the sample were aspirated using a dropper held vertically and transferred into the specimen collection tube containing the extraction buffer. After sample loading, the applicator was securely tightened into the collection tube, which was then shaken vigorously to ensure thorough mixing of the specimen with the extraction buffer. The mixture was left to stand for two minutes.

A test cassette was then removed from its foil pouch and used immediately. With the specimen tube held upright, the cap was opened, and two full drops of the extracted specimen were dispensed into the specimen well (S) of the test cassette, taking care to avoid air bubbles. Timing began immediately after sample application. Results were interpreted at the 10-minute mark, with readings obtained after 20 minutes considered invalid.

Symptom Assessment

Symptom severity was assessed at baseline, week 2, and week 8 using the Upper Gastrointestinal Symptom Questionnaire for the Elderly (UGISQUE). This tool evaluates symptoms such as epigastric pain, bloating, and reflux, with responses categorized as absent, mild, moderate, or severe. Changes in symptom severity over time were documented to monitor clinical progress.

Statistical methods

Data analysis was performed using SPSS Version 25. Descriptive statistics (means, standard deviations, medians, ranges) were calculated for continuous variables, while frequencies and percentages were used for categorical data. Comparisons between H. pylori–positive and H. pylori–negative groups were conducted using independent t-tests or Mann–Whitney U tests. Associations between categorical variables were assessed with the chi-square test. Multivariate logistic regression was applied to identify predictors of H. pylori infection after adjusting for potential confounders such as age, BMI, and lifestyle factors.

RESULTS

This cross-sectional study was performed on 50 patients with GIT symptoms who were presented at the outpatient clinics of October 6 University Hospitals and Kasr El Ainy University Hospital. **Figure 1**

The mean age of the studied cases was 34.56 (±12.62 SD) with a range of (18-60) years, among the studied cases there were 21 (42%) females and 29 (58%) males, according to marital status, most of the cases were married (56%), according to level of education, most of the cases went to universities (46%), according to occupation, most of the cases were working (54%), and according to residence, most of the cases were urban residents (68%). The mean weight of the studied cases was 85.82 (±16.61 SD) with a range of (51 – 132), the mean height was 1.72 (±0.09 SD) with a range of (1.58 – 1.93), and the mean BMI was 29.33 (±5.26 SD) with a range of (19 – 41.5).

According to comorbidities the most common comorbidities were hypertension, upper gastroenterological diseases and also 7 (14%) were currently smokers. **Table 1**

The most common symptoms of UGISQUE among the studied cases were heartburn and acid reflux in 32 cases (64%). Also, mean UGISQUE total score was 5.82 ±2.64. **Table 2**

The prevalence of H. pylori among the studied cases was 68%. **Figure 2**

Participants with H. pylori positivity had a markedly higher proportion of university-educated individuals and a lower proportion of those with middle-school education compared to the negative group ($p < 0.001$). Occupation also differed significantly between groups ($p = 0.046$), where the positive group included a higher percentage of working individuals and fewer non-working participants compared to the negative group. All other variables were not significant.The UGISQUE total score did not show a significant association with H. pylori status ($P = 0.899$). **Table 3**

Table 1: Demographic data, anthroscopic data, and history based distribution of the studied cases

		Subjects (n = 50)	
Age (years)		34.56 ± 12.62	
Sex	Female	21	42.0
	Male	29	58.0
Weight		85.82 ± 16.61	
Height		1.72 ± 0.09	
BMI		29.33 ± 5.26	
Marital status	Married	28	56.0
	Single	21	42.0
	Widow	1	2.0
Level of education	Illiterate	5	10.0
	Middle school	12	24.0
	High school	10	20.0
	University	23	46.0
Occupation	Student	11	22.0
	Not working	12	24.0
	Working	27	54.0
Residence	Rural	16	32.0
	Urban	34	68.0
Hypertension		7	14.0
Diabetes		1	2.0
Heart diseases		6	12.0
Vascular diseases		3	6.0
Respiratory diseases		0	0.0
Upper gastroenterological diseases		7	14.0
Lower gastroenterological diseases		3	6.0
Hepatic diseases		3	6.0
Kidney diseases		2	4.0
Smoking status (current smoker)		7	14.0

Data are presented as frequency (%) or Mean ± SD.

Table 2: UGISQUE-based distribution of the studied cases.

UGISQUE	Subjects (n = 50)							
	Absent		Mild		Moderate		Severe	
	No.	%	No.	%	No.	%	No.	%
Stomachache or pain	27	54.0	5	10.0	4	8.0	14	28.0
Hunger pains in stomach or belly	50	100.0	0	0.0	0	0.0	0	0.0
Heartburn	18	36.0	10	20.0	8	16.0	14	28.0
Acid reflux	18	36.0	6	12.0	9	18.0	17	34.0
Nausea	37	74.0	7	14.0	0	0.0	6	12.0
Rumbling in the stomach	50	100.0	0	0.0	0	0.0	0	0.0

Bloated stomach	32	64.0	9	18.0	4	8.0	5	10.0
Burping	46	92.0	0	0.0	3	6.0	1	2.0
Hematemesis	49	98.0	0	0.0	0	0.0	1	2.0
Melena	50	100.0	0	0.0	0	0.0	0	0.0
Anemia	50	100.0	0	0.0	0	0.0	0	0.0
Anorexia	46	92.0	1	2.0	2	4.0	1	2.0
Weight loss	49	98.0	0	0.0	0	0.0	1	2.0
Vomiting	45	90.0	1	2.0	0	0.0	4	8.0
Dysphagia	50	100.0	0	0.0	0	0.0	0	0.0
Total score	5.82 ± 2.64							

Data are presented as Mean ± SD or n (%).

Table 3: Relation between H. pylori and demographic data, anthropometric data, history data and UGISQUE

Variable		**H. pylori Negative (n=16)**	**H. pylori Positive (n=34)**	**P**
Age (years)		37.06 ± 12.85	33.38 ± 12.53	0.341
Sex	Female	8 (50.0%)	13 (38.2%)	0.432
	Male	8 (50.0%)	21 (61.8%)	
Marital status	Married	11 (68.8%)	17 (50.0%)	0.406
	Single	5 (31.3%)	16 (47.1%)	
	Widow	0 (0.0%)	1 (2.9%)	
Weight		86.19 ± 14.6	85.65 ± 17.68	0.916
Height		1.69 ± 0.06	1.73 ± 0.1	0.114
BMI		30.26 ± 4.99	28.89 ± 5.4	0.396
Level of education	Illiterate	3 (18.8%)	2 (5.9%)	**<0.001***
	Middle school	9 (56.3%)	3 (8.8%)	
	High school	2 (12.5%)	8 (23.5%)	
	University	2 (12.5%)	21 (61.8%)	
Occupation	Student	4 (25.0%)	7 (20.6%)	**0.046***
	Not working	7 (43.8%)	5 (14.7%)	
	Working	5 (31.3%)	22 (64.7%)	
Residence	Rural	6 (37.5%)	10 (29.4%)	0.567
	Urban	10 (62.5%)	24 (70.6%)	
Hypertension		2 (12.5%)	5 (14.7%)	0.834
Diabetes		0 (0.0%)	1 (2.9%)	0.488
Heart diseases		1 (6.3%)	5 (14.7%)	0.391
Vascular diseases		1 (6.3%)	2 (5.9%)	0.959
Respiratory diseases		0 (0.0%)	0 (0.0%)	1.000
Upper gastroenterological diseases		2 (12.5%)	5 (14.7%)	0.834
Lower gastroenterological diseases		1 (6.3%)	2 (5.9%)	0.959
Hepatic diseases		2 (12.5%)	1 (2.9%)	0.185
Kidney diseases		1 (6.3%)	1 (2.9%)	0.578
Smoking status (current smoker)		1 (6.3%)	6 (17.6%)	0.280
UGISQUE total score		5.75 ± 2.91	5.85 ± 2.55	0.899

Data are presented as Mean ± SD or n (%).

Figures legends

Figure 1: Flowchart of the study

Figure 2: H. pylori prevalence among the enrolled cases

DISCUSSION

H. pylori remains a major cause of gastrointestinal morbidity in Egypt, with earlier studies reporting high prevalence rates: 52% in Delta-region adults [11], 62.2% among dyspeptic patients in Cairo [12], and 48% in young dental students [14]. Clinical presentations vary widely, and international data confirm similar trends; for example, Wang et al. [19] reported 49.2% prevalence in 3,500 Chinese adults with nausea and epigastric pain predominating, while Awad et al. [20] found 71% prevalence among 800 Yemeni dyspeptic patients with similar symptom profiles. Diagnostic methods range from invasive histology—considered the gold standard—to practical non-invasive tools such as stool antigen testing and urea breath tests [21]. The high regional

prevalence and risk of gastric cancer underscore the need for updated epidemiological data in Egypt [22]. In response to the scarcity of local data [23], the present study aimed to determine the prevalence and clinical patterns of H. pylori among Egyptian adults with upper GI symptoms, assess symptom correlations, and evaluate demographic and lifestyle factors. Conducted at October 6 University Hospital and Kasr El-Ainy Hospital, this cross-sectional study included 50 symptomatic adults (18–60 years) assessed using stool antigen testing and the UGISQUE questionnaire [18], with the intent to inform public health strategies in high-prevalence settings [20, 22].

The observed prevalence of 68% aligns with regional and global estimates. Hooi et al. [24] reported a pooled global prevalence of 44.3%, reaching 70.1% in Africa and 69.4% in South America, and linked higher prevalence to poor sanitation and crowding. Similar Egyptian studies reported 52%–62.2% [11, 12] and 48% [14], while higher rates such as 71% have been noted in Yemen [20]. Differences across studies likely reflect population characteristics, diagnostic tools, and symptomatic versus asymptomatic recruitment.

Significant associations in our study were observed with education level and occupation, reflecting socioeconomic determinants of infection. This agrees with findings from Mikhail et al. [14], who linked infection to low socioeconomic status, poor hygiene, and crowding, and from El-Sayed et al. (2023), who reported 65% prevalence and strong associations with agricultural work and limited education in rural Egypt. International studies from Vietnam [25] similarly connected low education and manual labor with infection risk. No associations with age or sex were found, consistent with large MENA meta-analyses [26] and Iranian data [27].

Among the symptoms evaluated, nausea was the single symptom that showed a significant association with H. pylori infection, supporting earlier literature indicating that H. pylori–induced gastritis commonly produces nausea through mucosal inflammation and altered gastric motility [28]. UGISQUE-based findings align with Pilotto et al. [18], while the lack of association with heartburn contrasts with studies emphasizing strain-specific virulence, particularly cagA positivity [12, 29]. Anthropometric variables showed no significant correlations, consistent with findings from Ethiopia [30] and India [31].

The findings underscore a persistent public health challenge in Egypt, with 68% H. pylori prevalence and significant links to nausea and socioeconomic determinants. Future Egyptian studies should incorporate molecular typing, larger multicenter recruitment, longitudinal follow-up, and advanced risk-prediction approaches such as machine learning [30] to better inform policy and clinical management. Overall, the results emphasize the need for targeted diagnostic and therapeutic strategies to mitigate the burden of H. pylori and its sequelae in Egypt and similar high-prevalence regions [20].

Strengths of the study include the symptomatic Egyptian cohort, the use of stool antigen testing as a cost-effective diagnostic method [32], and a standardized symptom scoring tool [18].

Limitations include the small sample size (n=50), cross-sectional design, lack of strain genotyping, and absence of environmental or dietary data—factors known to influence transmission. Recruitment from a few outpatient clinics and inclusion of only symptomatic patients may introduce selection bias. Stool antigen testing has imperfect sensitivity and specificity, and the cross-sectional design cannot establish causality. Recall bias and unaccounted factors—such as recent antibiotic or proton pump inhibitor use—may also have affected diagnostic accuracy.

Conclusions

H. pylori infection maintains a high prevalence (68%) among symptomatic Egyptian patients. The lack of correlation between total symptom severity and infection status suggests that patient symptoms are multifactorial. These findings emphasize the urgent need for targeted screening and eradication programs, particularly among socioeconomically vulnerable populations, to mitigate GI disease burden.

What is already know on this topic

H. pylori infection maintains a high prevalence (68%) among symptomatic Egyptian patients.

What this study adds

These findings emphasize the urgent need for targeted screening and eradication programs, particularly among socioeconomically vulnerable populations, to mitigate GI disease burden.

Competing interests

The authors declare no competing interest.

Authors' contributions

M.G., E.A., M.F., and M.A. designed the study; M.G., and E.A., performed the experiments and analyzed the data; E.A., and M.F., provided critical reagents; M.G., and M.A. supervised the experiments; M.F., and M.A. wrote the manuscript.

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