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Insights into H. pylori: A Retrospective Study Examining Demographic Influences, Symptomatology, and Endoscopic Patterns

1. Dr. Imtiyaz Ahmad
Assistant Professor
Department of Surgery,Integral Institute of Medical Sciences & Research,
Integral University, Lucknow, UP, India

2. Dr. Syed Belal Hassan,
Associate Professor
Department of Community Medicine,
Integral Institute of Medical Sciences & Research,
Integral University, Lucknow, UP, India

3. Dr. Syed Fiza Mustaqueem
Associate Professor
Department of Pathology,Integral Institute of Medical Sciences & Research,
Integral University, Lucknow, UP, India

4. Dr. Ausaf Ahmad (Corresponding Author)
Associate Professor
Department of Community Medicine,
Integral Institute of Medical Sciences & Research,Integral University, Lucknow, UP, India
ausafahmad86@gmail.com

Abstract:

Introduction: Helicobacter Pylori (H. pylori) is a crucial factor in studying and managing Dyspepsia symptoms, also known for its carcinogenic potential. Its widespread prevalence in communities based on urban or rural sampling and socio-economic factors prompts an investigation into its association with endoscopy findings and patients' clinical profiles. This study aimed to investigate the clinical profile by examining the symptoms for endoscopy and determining its association with findings on Upper Gastrointestinal Endoscopy (UGIE), along with the presence or absence of H. pylori.

Material & Methods: It was a retrospective cohort study based on the UGIE performed at the tertiary care hospital. The subjects with no specific interventions related to the study were employed during the course of the investigation. Patients exhibiting symptoms of dyspepsia, difficulty in swallowing, blood in vomiting, unexplained weight loss, loss of appetite, and upper abdominal discomfort were included in the study.

Results: Gender distribution shows 68(52.7%) males and 52(47.7%) females among H. pylori-positive patients. The residence factor indicates similar H. pylori positivity rates among rural and urban residents. Majority of individuals, both males, and females reported prevalent symptoms such as epigastric pain, while stomach ulcers were the least reported among both genders. Pyloric antrum findings exhibited 47.2% in H. pylori-positive, Pan-gastritis, however, indicating a statistically significant association with H. pylori infection, with 62.7% in positive cases.

Conclusion: The study reveals common endoscopic findings like pan-gastritis and varices, suggesting potential associations with H. pylori infection. Stomach ulcers and inflamed gallbladder are less frequent. Discussions on normal endoscopy findings prompt considerations on the link between functional dyspepsia and endoscopic outcomes. Symptomatology, particularly epigastric pain, shows varying associations with H. pylori infection status.

Keywords: H. pylori, endoscopy, stomach ulcers, dyspepsia, epigastric pain, varices,

INTRODUCTION:

Helicobacter pylori, an oxygen-sensitive bacterium with a helical structure, is classified as Gram-negative. It resides in the stomach of healthy individuals and is asymptomatic in approximately 50% of the global population. This distinctive bacterium thrives in the acidic environment of gastric fluid. Its connection to gastric ulcers was elucidated by B Marshall and R Warren during the 1980s, ultimately earning them the Nobel Prize in 2005 for their ground breaking discovery (1). Helicobacter pylori has earned classification as a class I carcinogen by the International Agency for Research on Cancer and is directly linked to gastric cancer. (2,3) The pathogenesis and outcomes of diseases associated with H. pylori are intricate, relying on a complex interplay among bacterial virulence factors, host responses, and environmental influences. Among host factors, the state of the gastroduodenal mucosa and immunological responses, reflected in alterations in serum IgG and serum IgE, play crucial roles. Bacterial virulence is contingent on various factors, with the cytotoxin-associated gene A protein (CagA), encoded by the cytotoxin-associated gene A (cagA), identified as the primary virulence factor associated with more severe clinical outcomes. CagA is further categorized into Western-type and East Asian-type, with the latter being more strongly associated with gastric cancer due to its

heightened capacity to induce cytoskeleton changes. (4) Helicobacter pylori has been associated with the onset of various disorders affecting the digestive tract, such as persistent active gastritis, peptic ulceration, gastric cancer, and mucosa-associated lymphoid tissue lymphoma. The outcome of these conditions hinges on numerous factors, including the bacterial genotype, host physiology and genetics, and environmental aspects like dietary habits. Ongoing research endeavors aim to unravel the intricacies of H. pylori infection, seeking to elucidate why certain individuals exhibit asymptomatic infections while others present clinical manifestations. Recent years have underscored the importance of addressing H. pylori infection in individuals with gastrointestinal concerns. Clinical trials have demonstrated that eradicating the infection can prevent the recurrence of duodenal ulcer and, to a lesser extent, gastric ulcer. Furthermore, it has proven effective in treating early-stage mucosa-associated lymphoid tissue lymphoma and diminishing the likelihood of developing gastric cancer in individuals at high risk (5). Furthermore, if the infection is detected, early treatment initiation for its eradication is crucial, aiming to provide patients with a symptom-free period post-treatment. The study discussed herein was conducted in patients suspected to be experiencing gastroduodenal symptoms and signs. This study was carried out in patients suspected to be suffering from gastroduodenal symptoms and signs to identify the endoscopic findings in such cases and to understand whether the signs and symptoms, or the endoscopic findings bear a relation with presence or absence of H. pylori.

MATERIAL & METHODS:

The study was conducted at the Integral Institute of Medical Sciences & Research, Lucknow, over the course of a year. It was a retrospective descriptive study based on the UGIE performed in the institution. The subjects of the study were patients included who attended the gastroenterology outpatient section between study period and those referred from other wards, who were screened by a Gastroenterologist for UGIE. The information is de-identified, ensuring the confidentiality of all patients is preserved. As a retrospective study, no specific interventions related to the study were implemented during the course of the investigation. Patients exhibiting symptoms of dyspepsia, difficulty in swallowing, blood in vomiting, unexplained weight loss, loss of appetite, and upper abdominal discomfort were included in the study. Cases with missing or incomplete data were excluded. The data was categorized based on various factors such as gender, symptoms, findings, and the presence or absence of H. Pylori. The study encompassed a spectrum of medical conditions diagnosed using the investigative modality of UGIE. Biopsy and detection of H. Pylori using rapid urease test were carried out to ascertain the presence or absence of H. pylori Infection. The goal was to understand the association between the signs and symptoms, or the endoscopic findings, and the presence or absence of H. pylori. This understanding is crucial for the effective treatment and management of gastroduodenal diseases.

Statistical analysis:

Data entry and analysis was performed using the Microsoft Excel and SPSS Version 16.0. The findings were presented using descriptive statistics such as number, percentage and bar graph for categorical data and mean and standard deviation was used to present continuous data. Chi square test were used to evaluate association between the signs and symptoms, or the endoscopic findings, and the presence or absence of H. pylori. Comparison of continuous variables, Independent samples t-test for normal distributed data and a non-parametric alternative Mann-Whitney U-test used for non-normal data. P value <0.05 was considered as significant.

RESULTS:

This study is based on medical records of the 248 cases in which endoscopy was performed. The table 1outlines the demographic distribution of patients with a focus on H. pylori infection status and various variables. The average age at diagnosis for H. pylori-positive patients stands at 56, compared to 50 for H. pylori-negative individuals, with an overall average age of 53. Gender distribution shows 68(52.7%) males and 52(47.7%) females among H. pylori-positive patients. The residence factor indicates similar H. pylori positivity rates among rural 64(48.9%) and urban 56 (47.9%) residents. In terms of BMI, H. pylori-positive patients exhibit a slightly higher mean BMI (29.2) compared to H. pylori-negative patients (28.6), but the difference is not statistically significant ($p=0.666$). Regarding comorbidities, there is no significant association between H. pylori infection and hypertension ($p = 0.548$). However, a noteworthy finding is the significant association between diabetes and H. pylori infection ($p = 0.023$), with 65(56.0%) of diabetic patients being H. pylori-positive compared to 55 (41.7%) in non-diabetic individuals. Furthermore, no significant associations are found between H. pylori infection and alcohol consumption or tobacco/cigarette use, with p-values of 0.290 and 0.701, respectively.

The presented figure 1 shows the gender-specific distribution of H. pylori symptoms. In total, 129 males and 119 females were included in the study. Among male population, dyspepsia was reported by 8 (6.2%), while 9 females (7.6%) experienced this symptom. Dysphagia affected 14 males (10.9%) and 8 females (6.7%), and stent removal occurred in 2 males (1.6%) and 3 females (2.5%). Epigastric pain emerged as a prevalent symptom, reported by 45 males (34.9%) and 50 females (42.0%). Long-term liver ailment affected 8 males (6.2%) and 4 females (3.4%). Gastritis was observed in 24 males (18.6%) and 23 females (19.3%), while increased portal blood pressure was noted in 2 males (1.6%) and 3 females (2.5%). Pain in the upper abdomen was reported by 19 males (14.7%) and 14 females (11.8%). Stomach ulcers were found in 2 males (1.6%) and 3 females (2.5%), and an inflamed gallbladder affected 5 males (3.9%) and 2 females (1.7%).

The figure 2 depicts the endoscopic findings with a focus on gender-specific (total, 129 males and 119 females) distribution. Varices were observed in 14 males (10.9%) and 5 females (4.2%), with pyloric antrum findings noted

in 20 males (15.5%) and 16 females (13.4%). Hiatus hernia affected 7 males (5.4%) and 3 females (2.5%), while oesophageal stricture was observed in 4 males (3.1%) and 4 females (3.4%). Gastric-duodenal irritation was reported in 9 males (7.0%) and 11 females (9.2%), and gastric mucosal prolapse affected 3 males (2.3%) and 4 females (3.4%). Gastric reflux inflammation and reflux oesophagitis were noted in 2 males (1.6%) and 3 females (2.5%), and 4 males (3.1%) and 8 females (6.7%), respectively. Biliary reflux affected 3 males (2.3%) and 2 females (1.7%), while pan-gastritis was found in 38 males (29.5%) and 37 females (31.1%). Normal endoscopic findings were recorded in 25 males (19.4%) and 26 females (21.8%).

Table 1: Demographic distribution of patients

Variables	Category	H. Pylori		Total (n=248)	P value
		Positive (n=120)	Negative (n=128)		
Age at diagnosis (in years)	Average	56	50	53	0.515*
	Minimum	19	11	11	
	Maximum	85	89	88	
Gender n(%)	Male	68 (52.7)	61 (47.3)	129 (100.0)	0.155#
	Female	52 (43.7)	67 (56.3)	119 (100.0)	
Residence n(%)	Rural	64 (48.9)	67 (51.1)	131 (100.0)	0.876#
	Urban	56 (47.9)	61 (52.1)	117 (100.0)	
BMI	Mean ± SD	29.2± 9.8	28.6 ±11.9	28.5 ± 12.5	0.666@
Hypertension n(%)	Positive	58 (50.4)	57 (49.6)	115 (100.0)	0.548#
	Negative	62 (46.6)	71 (53.4)	133 (100.0)	
Diabetes n(%)	Yes	65 (56.0)	51 (44.0)	116 (100.0)	**0.023#**
	No	55 (41.7)	77 (58.3)	132 (100.0)	
Alcohol n(%)	Yes	32 (43.2)	42 (56.8)	74 (100.0)	0.290#
	No	88 (50.6)	86 (49.4)	174 (100.0)	
Tobacco/ Cigarette n(%)	Never	33 (44.6)	41 (55.4)	74 (100.0)	0.701#
	Current	30 (51.7)	28 (48.3)	58(100.0)	
	Past	57 (49.1)	59 (50.9)	116 (100.0)	

* Mann-Whitney U-test, # Chi-Square test, @Independent t test

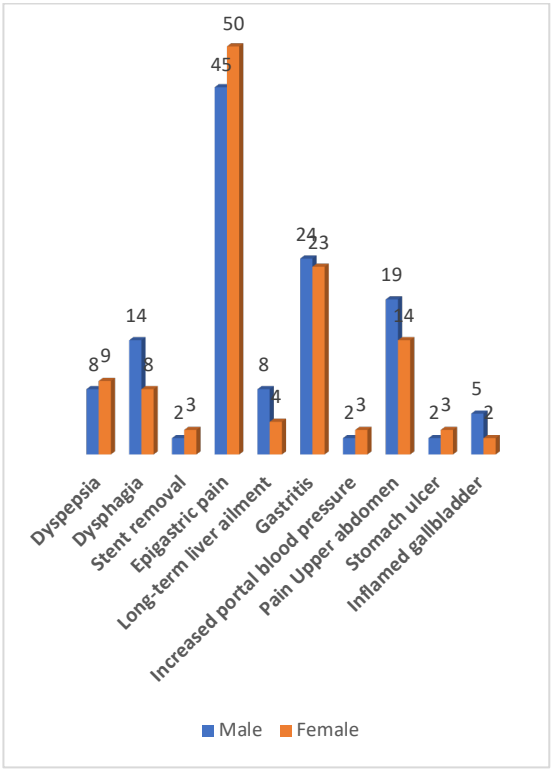

Figure 1: Frequency distribution of symptoms of patients

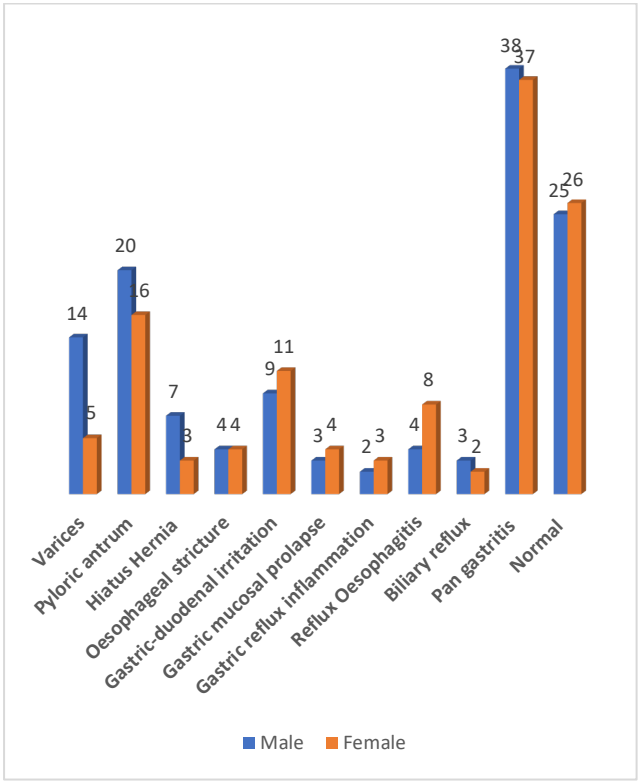

Figure 2: Frequency distribution of endoscopic findings

Table 2 : Association of symptoms with presence or absence of H. Pylori

Symptoms	H. Pylori		Total (n=248) n(%)	P value#
	Positive (n=120) n(%)	Negative (n=128) n(%)		
Dysphagia	8(36.4)	14(63.6)	22(100.0)	0.237
Long-term liver ailment	5(41.7)	7(58.3)	12(100.0)	0.632
Dyspepsia	7(41.2)	10(58.8)	17(100.0)	0.537
Stent Removal	2(40.0)	3(60.0)	5(100.0)	0.704
Epigastric pain	51(53.7)	44(46.3)	95(100.0)	0.188
Gastritis	27(57.4)	20(42.6)	47(100.0)	0.167
Increased portal blood pressure	2(40.0)	3(60.0)	5(100.0)	0.704
Pain Upper Abdomen	19(57.6)	14(42.4)	33(100.0)	0.256
Inflamed gallbladder	3(42.9)	4(57.1)	7(100.0)	0.766
Stomach ulcer	3(60.0)	2(40.0)	5(100.0)	0.599

Chi-Square test

Table 3: Association of endoscopy findings with presence or absence of H. Pylori

Diagnosis	H. Pylori		Total (n=248) n(%)	P value#
	Positive (n=120) n(%)	Negative (n=128) n(%)		
Varices	10(52.6)	9(47.4)	19(100.0)	0.700
Hiatus Hernia	4(40.0)	6(60.0)	10(100.0)	0.587
Pyloric antrum	17(47.2)	19(52.8)	36(100.0)	0.879
Oesophageal stricture	2(25.0)	6(75.0)	8(100.0)	0.178
Pan gastritis	47(62.7)	28(37.3)	75(100.0)	**0.003**
Gastric-duodenal irritation	10(50.0)	10(50.0)	20(100.0)	0.880
Gastric mucosal prolapse	5(71.4)	2(28.6)	7(100.0)	0.215
Reflux Oesophagitis	6(50.0)	6(50.0)	12(100.0)	0.908
Biliary reflux	2(40.0)	3(60.0)	5(100.0)	0.704
Gastric reflux inflammation	2(40.0)	3(60.0)	5(100.0)	0.704
Normal	19(37.3)	32(62.7)	51(100.0)	0.074

Chi-Square test

Table 2 shows that the association between symptoms and the presence or absence of H. pylori infection. For dysphagia, 36.4% of H. pylori-positive cases were observed, contrasting with 63.6% in the negative group, resulting in an overall occurrence of 22 cases. Similarly, for long-term liver ailment, the distribution shows 41.7% in H. pylori-positive cases and 58.3% in negative cases. Dyspepsia, with 41.2% in H. pylori-positive and 58.8% in negative cases, exhibited 17 cases. Stent removal showed 40.0% in H. pylori-positive cases and 60.0% in negative cases, while epigastric pain, with 53.7% in H. pylori-positive and 46.3% in negative cases, had a total of 95 cases. Gastritis, characterized by 57.4% in H. pylori-positive and 42.6% in negative cases. Increased portal blood pressure showed 40.0% in H. pylori-positive cases and 60.0% in negative cases. Pain in the upper abdomen, inflamed gallbladder, and stomach ulcer displayed similar patterns, each showing no significant association with H. pylori infection.

Table 3 presents detailed exploration of the association between endoscopy findings and the presence or absence of H. pylori infection. For varices, 52.6% of H. pylori-positive cases were observed, with 47.4% in the negative group, resulting in an overall 19 cases. Regarding hiatus hernia, the distribution shows 40.0% in H. pylori-positive cases and 60.0% in negative cases. Pyloric antrum findings exhibited 47.2% in H. pylori-positive and 52.8% in negative cases. For Oesophageal stricture, the distribution showed 25.0% in H. pylori-positive cases and 75.0% in negative cases, with a P value of 0.178, suggesting no significant association. Pan-gastritis, however, exhibited a notable association with H. pylori infection, with 62.7% in positive cases and 37.3% in negative cases, resulting in a P value of 0.003, indicating a statistically significant association. Gastric-duodenal irritation showed 50.0% in both H. pylori-positive and negative cases. Gastric mucosal prolapse exhibited 71.4% in H. pylori-positive cases and 28.6% in negative cases. Reflux esophagitis, biliary reflux, and gastric reflux inflammation displayed similar patterns, each showing no significant association with H. pylori infection based on their respective P values. Normal endoscopy findings were recorded in 37.3% of H. pylori-positive cases and 62.7% of negative cases, with a P value of 0.074, suggesting a marginal significant association.

DISCUSSION:

This retrospective study delves into the intricacies of H. pylori infection and its associations, drawing insights from the medical records of 248 cases that underwent endoscopy. The demographic distribution unfolds a nuanced narrative, emphasizing an average age of 56 among H. pylori-positive patients. A notable connection emerges between H. pylori infection and diabetes, reflecting the complex interplay of inflammation in Type 2 Diabetes Mellitus (T2DM) associated with H. pylori infection (6). The contentious link between H. pylori infection and diabetes surfaces, with conflicting findings in various studies, showcasing a diversity of perspectives on the prevalence of infection in diabetic patients (7-12). While hypertension, alcohol, and tobacco use do not

exhibit significant associations with H. pylori infection, the study sheds light on the multifaceted relationships between H. pylori infection and demographic factors, Body Mass Index (BMI), and comorbidities. Intriguingly, the study unveils a male dominance (52.0%) in the endoscopic unit, a finding that contrasts with some prior studies and prompts contemplation on the potential influence of health-seeking behaviors across diverse regions and study designs (13-16). The study accentuates the complexity surrounding the understanding and management of chronic abdominal pain and dyspepsia, especially in the context of limited healthcare resources in developing countries like India. The emergence of H. pylori poses fresh challenges to community health, with indications that it might serve as a precursor to malignancy, as evidenced by a reported malignancy detection rate of 1.4% in Asian dyspeptics. The prevalence of H. pylori in the community, ranging between 50% and 80% in developing countries, further underscores its public health implications (17-20). Turning the focus to endoscopic findings, the study unravels prevalent occurrences of pan-gastritis, varices, pyloric antrum findings, and hiatus hernia. On the flip side, stomach ulcers and inflamed gallbladder emerge as the least reported findings in both genders. Varices exhibit a higher prevalence in positive cases, emphasizing their potential association with H. pylori infection. However, other findings like hiatus hernia, pyloric antrum findings, and gastric-duodenal irritation do not show significant associations. The study reveals esophageal stricture to be more common in negative cases, aligning with broader trends observed in gastritis prevalence across various studies (16, 21-24). The narrative extends to the indications for upper gastrointestinal endoscopy, showcasing its pivotal role in diagnosing and treating diverse conditions such as dyspeptic symptoms, upper gastrointestinal bleeding, foreign body removal, and variceal screening in portal hypertension cases. Gastritis emerges as the most common finding, accompanied by a spectrum of other findings like esophagitis, gastric ulcer, duodenal ulcer, biliary gastritis, and gastric mass. The variability in normal findings across different studies prompts a critical exploration of the potential overutilization of endoscopy in routine medical practice (13-15, 26). The exploration of prevalent symptoms among individuals in the study population accentuates the prominence of epigastric pain, with stomach ulcers being the least reported. Dysphagia and long-term liver ailment exhibit higher prevalence in H. pylori-negative cases, whereas dyspepsia, stent removal, and increased portal blood pressure show stronger associations with H. pylori-negative cases. Conversely, epigastric pain, gastritis, and inflamed gallbladder manifest higher occurrences in H. pylori-positive cases. Pain in the upper abdomen, inflamed gallbladder, and stomach ulcers display similar patterns, lacking significant associations with H. pylori infection. Notably, gastric mucosal prolapse is more prevalent in positive cases, adding a distinctive dimension to the symptomatology (Reference 27). The study underscores the significance of normal endoscopy findings, recording a prevalence of 37.3% in H. pylori-positive cases. The complex relationship between functional dyspepsia and normal findings raises intriguing questions, reflecting the ongoing debates in the literature (Reference 28). A substantial percentage of normal findings, as reported in the study and highlighted in other research, fuels discussions around potential overutilization of endoscopy in routine practice (22, 30). The varying prevalence of normal findings in studies conducted in different healthcare settings prompts reflections on case selection strategies, adherence to guidelines, and the role of alarming symptoms in shaping endoscopy practices (13, 21). The study delves into the nuanced realm of oesophageal stricture, revealing a prevalence of 25.0% in H. pylori-positive cases with no significant association. The subjective nature of classifying oesophageal strictures as mild, moderate, or severe based on endoscopic ease introduces an element of complexity to the findings (Reference 31). The intriguing association between pyloric antrum findings and pan-gastritis with H. pylori infection unfolds, aligning with the microbial residence in the superficial mucous layer and gastric pits. However, the retrospective nature of the study prompts reflections on potential data gaps and limitations in capturing detailed symptoms, examination findings, and laboratory results. The call for prospective studies with larger, multicenter samples echoes the need for a more comprehensive understanding and generalization of the study's findings.

CONCLUSION:

In conclusion, this retrospective study provides a complex interconnection involving H. pylori infection, demographic factors, symptoms and endoscopic findings. Endoscopic findings reveal prevalent occurrences such as pan-gastritis and varices, contrasting with less frequent reports of stomach ulcers and inflamed gallbladder. The higher prevalence of varices in positive cases suggests potential associations with H. pylori infection, while other findings exhibit diverse patterns. The prevalence of normal endoscopy findings triggered discussions on the relationship between functional dyspepsia and endoscopic outcomes. Symptomatology underscores the prominence of epigastric pain, unveiling varying associations between specific symptoms and H. pylori infection status. Acknowledging the retrospective nature and potential data gaps, the study calls for future prospective studies with larger, multicenter samples. Overall, this study significantly contributes to the discourse on H. pylori infection, endoscopic outcomes, and their implications for clinical practice and public health.

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