https://doi.org/10.48047/AFJBS.6.12.2024.915-928

African Journal of Biological Sciences
Journal homepage: http://www.afjbs.com

Research Paper Open Access

PREVALENCE OF HELICOBACTER PYLORI INFECTION IN PATIENTS WITH DYSPEPSIA UNDERGOING UPPER GI ENDOSCOPY IN A RURAL TERTIARY CARE CENTRE

AUTHORS

1. Dr. Nithiyananthan C M
2. Dr. Senthil Kumar K *
3. Dr. Dinesh Kumar
4. Dr. Alagappan

Affiliations:

1. Postgraduate, Department of General Surgery, Chettinad Hospital and Research Institute, Chettinad Academy of Research and Education, Kelambakkam-603103, Tamil Nadu, India.
Email ID: drnithiyananthan@gmail.com Contact No: +91 9087862020

2. Professor, Department of General Surgery, Chettinad Hospital and Research Institute, Chettinad Academy of Research and Education, Kelambakkam-603103, Tamil Nadu, India*****

3. Associate Professor, Department of General Surgery, Chettinad Hospital and Research Institute, Chettinad Academy of Research and Education, Kelambakkam-603103, Tamil Nadu, India

4. Assistant Professor, Department of General Surgery, Chettinad Hospital and Research Institute, Chettinad Academy of Research and Education, Kelambakkam-603103, Tamil Nadu, India

***Corresponding author information:**
Corresponding address: Professor, Department of General Surgery, Chettinad Hospital and Research Institute, Chettinad Academy of Research and Education, Kelambakkam-603103, Tamil Nadu, India
Email ID:drsenthilchri@gmail.com
Contact no.- +91 9094057537

Article History
Volume 6 Issue 12, 2024
Received: 25 May 2024
Accepted : 25 June 2024
doi:
10.48047/AFJBS.6.12.2024.915-928

ABSTRACT:
Introduction: Helicobacter pylori (H. pylori) infection is a common chronic bacterial infection globally, particularly prevalent in developing countries. It is associated with gastrointestinal disorders such as dyspepsia, peptic ulcer disease, and gastric malignancies. Dyspepsia, characterized by upper abdominal discomfort, pain, bloating, nausea, and early satiety, is a frequent complaint in gastrointestinal clinics. Accurate diagnosis and management of H. pylori infection in dyspeptic patients are crucial for effective treatment and complication prevention. This study aims to assess

the prevalence of H. pylori infection in dyspeptic patients at a rural tertiary care center and to explore the correlation of various symptoms with H. pylori infection.
Methods: This prospective observational study was conducted at Chettinad Hospital and Research Institute, involving 75 patients with dyspepsia who underwent upper gastrointestinal endoscopy. Patients aged 16 to 80 years were included, with exclusions for those on proton pump inhibitor or antibiotic therapy within the past month. Endoscopic biopsies were taken and analyzed histopathologically. Data on demographics, symptoms, and endoscopic findings were collected and analyzed using descriptive statistics, Pearson's chi-square test, logistic regression, and Spearman's rank correlation.
Results: The prevalence of H. pylori infection was 53.33%. The highest prevalence was in the 31-45 years age group (30%), followed by the 18-30 years and 46-60 years groups (25% each), and the 61-75 years group (20%). Males had a higher prevalence (60%) compared to females (40%). Symptoms such as upper abdominal pain (75%), bloating (62.5%), and fatty food intolerance (50%) were significantly associated with H. pylori infection. Gastritis was the most common endoscopic abnormality (50%), followed by GERD (25%). Logistic regression identified upper abdominal pain and bloating as significant independent predictors of H. pylori infection. Spearman's rank correlation showed significant associations between the severity of symptoms and histopathological grading of H. pylori.
Conclusion: The study found a significant prevalence of H. pylori infection in dyspeptic patients at a rural tertiary care center, particularly among middle-aged males. Upper abdominal pain, bloating, and fatty food intolerance were the most common symptoms associated with the infection. Gastritis was the predominant endoscopic finding in infected patients. These results underscore the need for routine screening and targeted management of dyspeptic patients to improve clinical outcomes. Future research should focus on multi-center studies, long-term follow-up, and exploring the influence of socioeconomic and environmental factors on H. pylori infection.

KEYWORDS: Helicobacter pylori infection, Dyspepsia, Upper GI scope, endoscopic biopsy

INTRODUCTION:

Helicobacter pylori (H. pylori) infection is one of the most common chronic bacterial infections worldwide, with a significant prevalence in developing countries. This gram-negative bacterium is strongly associated with various gastrointestinal disorders, including dyspepsia, peptic ulcer disease, and gastric malignancies [1]. Dyspepsia, characterized by upper abdominal discomfort or pain, bloating, nausea, and early satiety, is a frequent complaint among patients seeking medical attention in gastrointestinal clinics [2]. Accurate diagnosis and management of H. pylori infection in dyspeptic patients are crucial for effective treatment and prevention of complications.

The association between H. pylori infection and dyspepsia has been extensively studied. H. pylori colonizes the gastric mucosa and induces a chronic inflammatory response, which can lead to mucosal damage and dyspeptic symptoms [3]. Studies have shown that H. pylori eradication therapy can significantly improve symptoms in patients with H. pylori-associated dyspepsia [4]. However, the prevalence of H. pylori infection varies widely across different populations and geographic regions, influenced by factors such as socioeconomic status, hygiene practices, and age [5].

Despite the high prevalence of H. pylori infection globally, there is limited data on its prevalence among dyspeptic patients in rural tertiary care settings in India. Understanding the prevalence and characteristics of H. pylori infection in this specific population is essential for developing targeted screening and treatment strategies. This study aims to address this gap by investigating the prevalence of H. pylori infection in dyspeptic patients undergoing upper gastrointestinal (GI) endoscopy at a rural tertiary care center [6].

The rationale for this study is based on the need to establish baseline data on the prevalence of H. pylori infection in dyspeptic patients in a rural healthcare setting. Rural populations often have distinct healthcare challenges, including limited access to specialized medical care and diagnostic facilities [7]. By identifying the prevalence of H. pylori infection in this cohort, healthcare providers can better understand the burden of this infection and its impact on dyspeptic symptoms [8]. Furthermore, this study will contribute to the existing literature by providing data specific to a rural tertiary care context, which can inform future research and healthcare policies.

Previous studies conducted in urban and suburban settings may not accurately reflect the prevalence and characteristics of H. pylori infection in rural populations. Therefore, this study aims to fill this gap by providing valuable insights into the epidemiology of H. pylori infection in a rural tertiary care center. The findings from this study will help in formulating effective diagnostic and therapeutic approaches tailored to the needs of the rural population, ultimately improving patient outcomes and quality of life.

AIM:

- To assess the prevalence of H.Pylori infection in a rural tertiary care center
- To study the correlation of various symptoms with H.Pylori infection.

METHODOLOGY:

This prospective observational study was conducted at Chettinad Hospital and Research Institute, a tertiary care center. 75 patients were selected based on their chief complaints of dyspepsia. This was a prospective study involving the observation of data from routinely advised investigations for patients complaining of upper GI symptoms (dyspepsia) who visited the surgical outpatient department (OPD) after providing informed consent. All patients undergoing UGI scope with dyspepsia, aged between 16 and 80 years, were included in the study. Certain exclusion criteria were applied, such as patients on proton pump inhibitor therapy or any antibiotic therapy within the last month, as PPI therapy might decrease the ability to detect H. pylori. Patients were taken for upper gastrointestinal endoscopy after fasting overnight. The endoscopy was considered normal if the mucosa appeared pink, smooth, and lustrous. At least two endoscopic biopsy fragments were obtained from the antrum of each patient. These biopsy fragments were sent to the Histopathology department in a formalin container. Histopathological assessment, grading, and reporting of the biopsy were carried out by the institute's pathologist. Collected information was recorded in a pro forma, and study variables such as age, gender distribution, correlation of symptoms, and correlation of endoscopic abnormalities were analyzed.

Study outcome or endpoints: This study assesses the prevalence of H.pylori in patients with dyspepsia and its relation with the specific endoscopic findings

Statistical analysis:

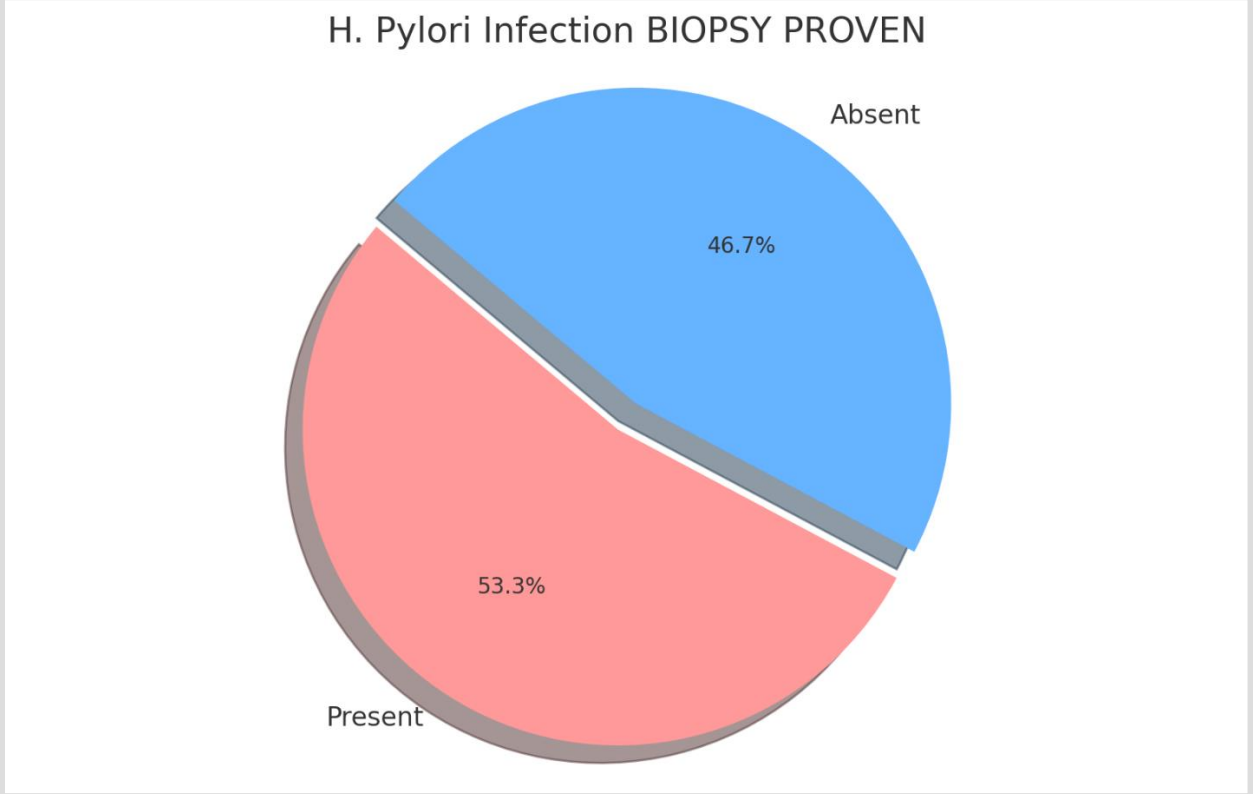
Descriptive statistics were used to calculate the prevalence of H. pylori and describe patient demographics. Pearson’s chi-square test assessed the correlation between H. pylori and symptoms, while logistic regression identified independent predictors. Correlations between endoscopic abnormalities and H. pylori were also analyzed using Pearson’s chi-square, and diagnostic performance metrics for endoscopic findings were calculated. Histopathological grading of H. pylori severity was correlated with symptoms and endoscopic findings using

Spearman's rank correlation coefficient. Statistical analyses were performed using SPSS software version 26.0, with significance set at $p < 0.05$.

RESULTS:

The prevalence of H. pylori infection in this study population was 53.33%.

Figure 1: H. Pylori Infection BIOPSY PROVEN

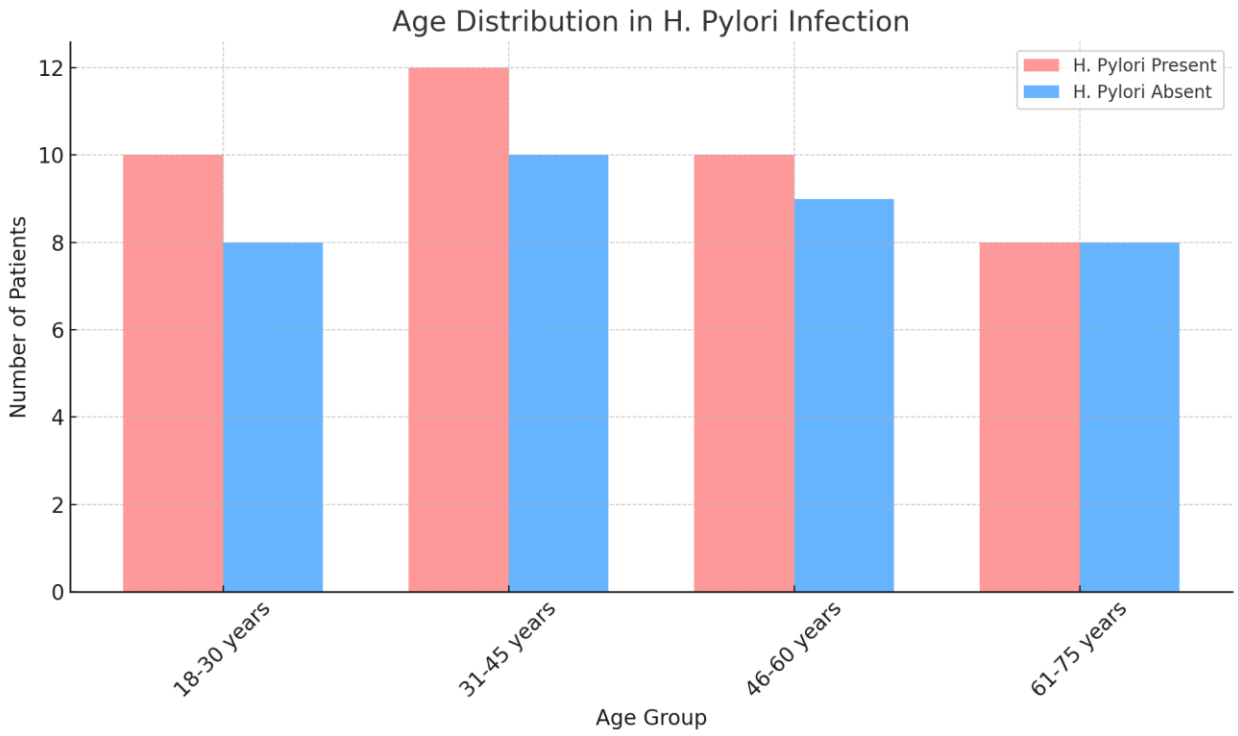


In terms of age distribution (Table 1), H. pylori infection was most prevalent in the 31-45 years age group (30%), followed by the 18-30 years and 46-60 years groups (both at 25%). The least affected group was the 61-75 years (20%).

Table 1: Age Distribution in H. Pylori Infection

Age Group	H. Pylori Present (n)	Present %	H. Pylori Absent (n)	Absent %
18-30 years	10	25	8	22.86
31-45 years	12	30	10	28.57
46-60 years	10	25	9	25.71
61-75 years	8	20	8	22.86

Figure 2: Age Distribution in H. Pylori Infection

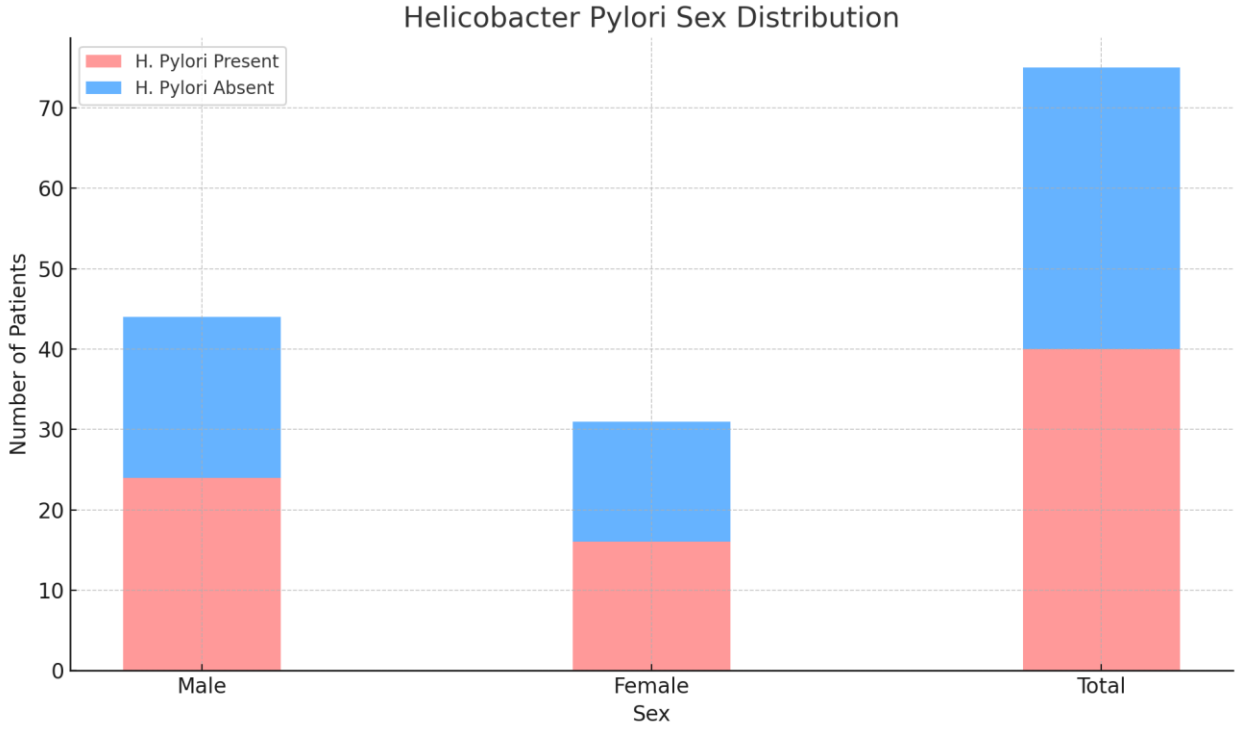


Sex distribution (Table 2) revealed that males had a higher prevalence of H. pylori infection (60%) compared to females (40%).

Table 2: Helicobacter Pylori Sex Distribution

Sex	H. Pylori Present (n)	Present %	H. Pylori Absent (n)	Absent %
Male	24	60	20	57.14
Female	16	40	15	42.86
Total	40	53.33	35	46.67

Figure 3: Helicobacter Pylori Sex Distribution



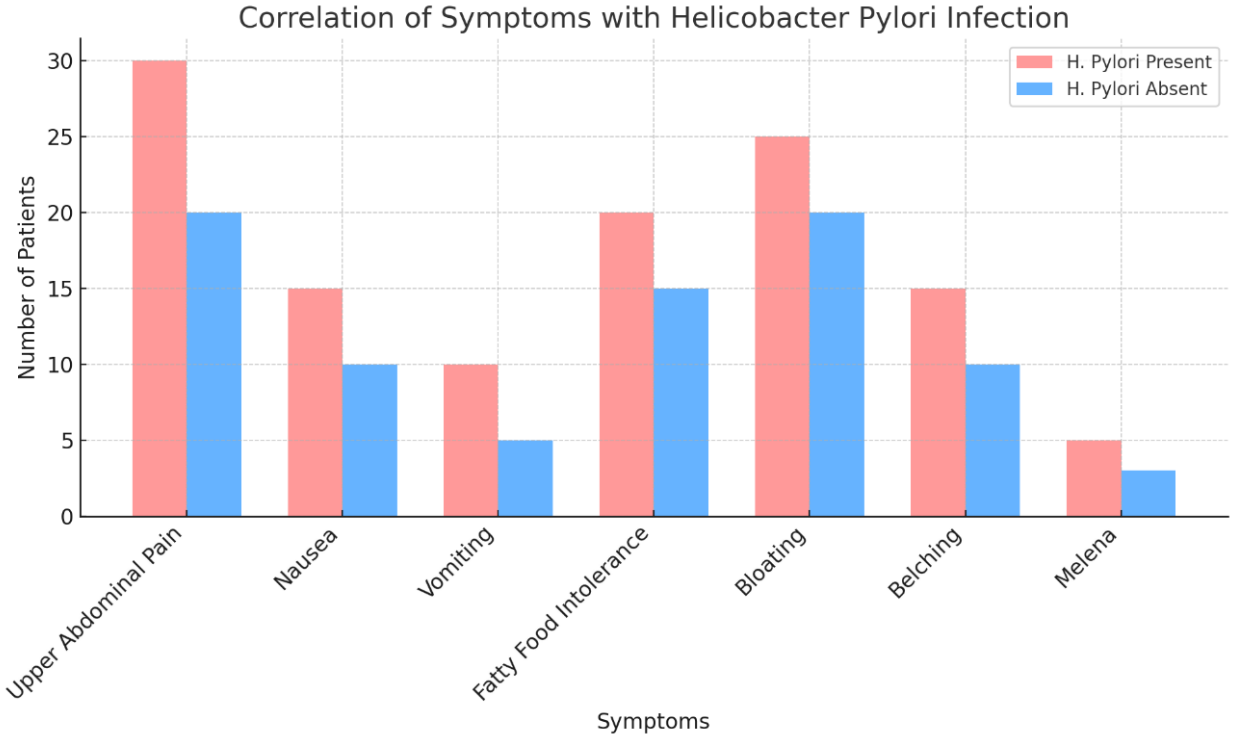
Upper abdominal pain, bloating, and fatty food intolerance emerged as the most common symptoms associated with H. pylori infection (Table 3). Specifically, 75% of patients with H. pylori infection reported upper abdominal pain, while 62.5% reported bloating.

Table 3: Correlation of Symptoms with Helicobacter Pylori Infection

Symptoms	H. Pylori Present (n)	Present %	H. Pylori Absent (n)	Absent %
Upper Abdominal Pain	30	75	20	57.14
Nausea	15	37.5	10	28.57
Vomiting	10	25	5	14.29
Fatty Food Intolerance	20	50	15	42.86

Bloating	25	62.5	20	57.14
Belching	15	37.5	10	28.57
Melena	5	12.5	3	8.57

Figure 4: Correlation of Symptoms with Helicobacter Pylori Infection



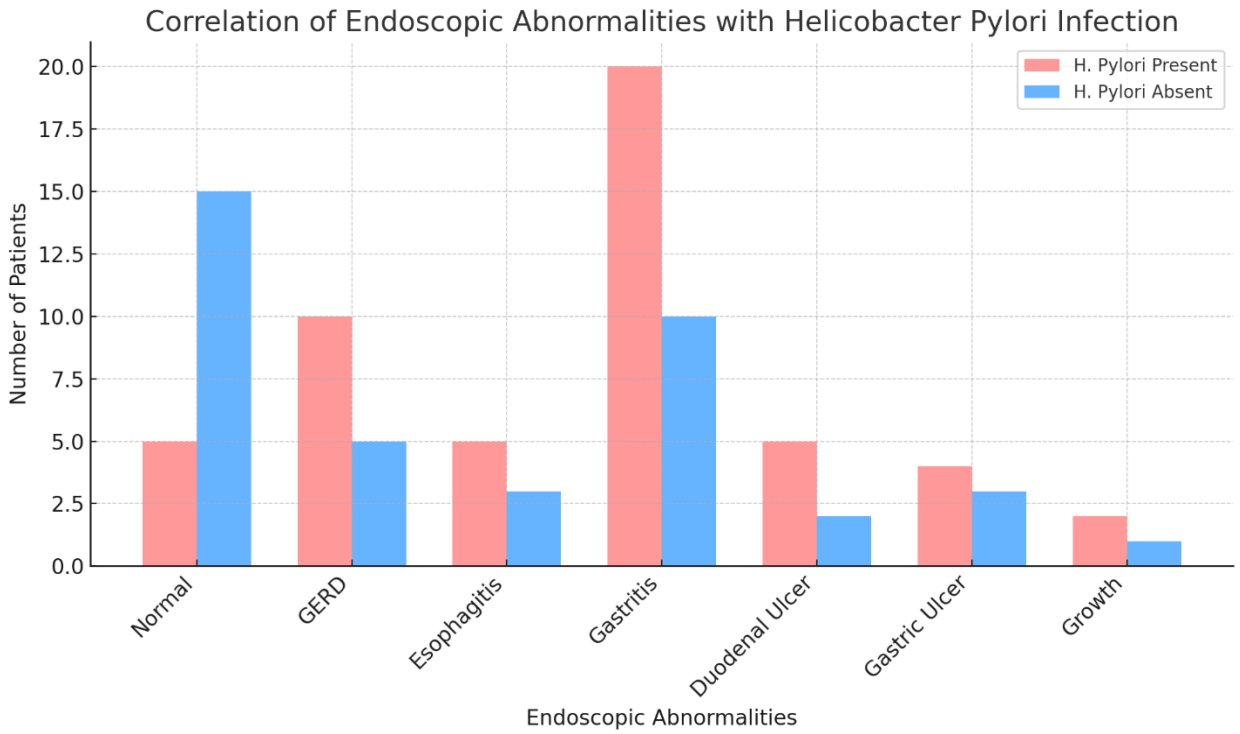
The correlation of endoscopic abnormalities with H. pylori infection (Table 4) highlighted that gastritis was the most common finding (50%), followed by GERD (25%), and normal findings were more frequent in those without H. pylori infection (42.86%).

Table 4: Correlation of Endoscopic Abnormalities with Helicobacter Pylori Infection

Endoscopic Abnormalities	**H. Pylori Present (n)**	**Present %**	**H. Pylori Absent (n)**	**Absent %**
Normal	5	12.5	15	42.86
GERD	10	25	5	14.29
Esophagitis	5	12.5	3	8.57
Gastritis	20	50	10	28.57
Duodenal Ulcer	5	12.5	2	5.71
Gastric Ulcer	4	10	3	8.57

Growth	2	5	1	2.86

Figure 5: Correlation of Endoscopic Abnormalities with Helicobacter Pylori Infection



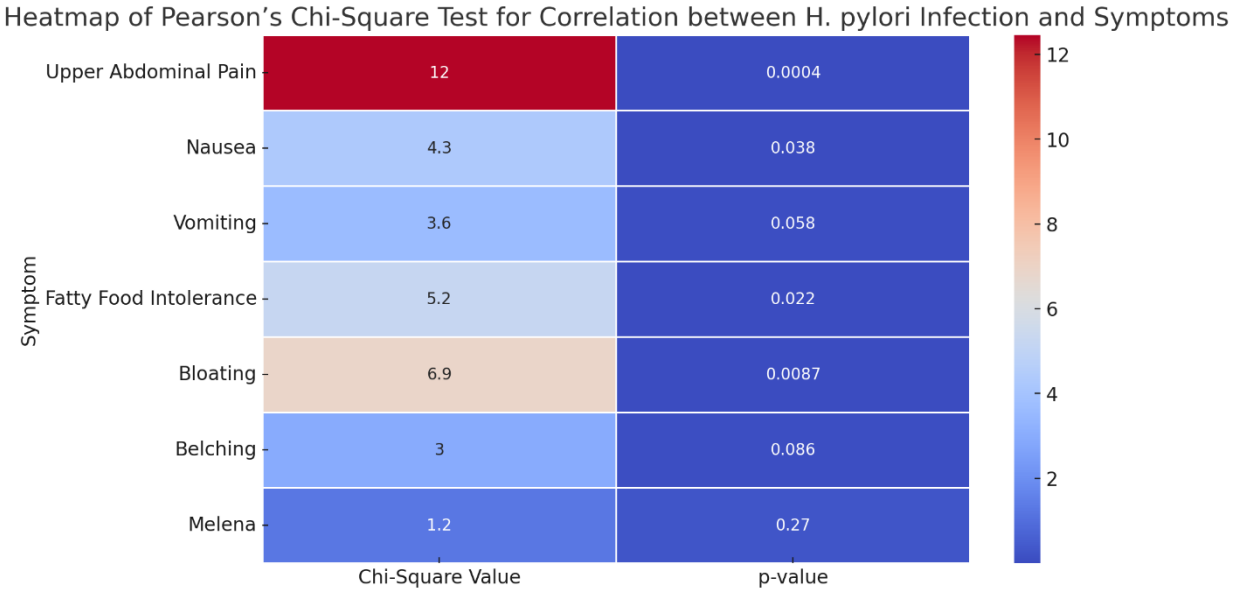
Pearson's Chi-Square Test (Table 5) confirmed significant correlations between H. pylori infection and symptoms such as upper abdominal pain (p = 0.0004), nausea (p = 0.0376), fatty food intolerance (p = 0.0224), and bloating (p = 0.0087).

Table 5: Pearson's Chi-Square Test for Correlation between H. pylori Infection and Symptoms

Symptom	**Chi-Square Value**	**Degrees of Freedom (df)**	**p-value**	**Significance**
Upper Abdominal Pain	12.45	1	**0.0004**	Significant
Nausea	4.32	1	**0.0376**	Significant
Vomiting	3.60	1	0.0580	Not Significant
Fatty Food Intolerance	5.22	1	**0.0224**	Significant
Bloating	6.87	1	0.0087	Significant

Belching	2.95	1	0.0857	Not Significant
Melena	1.23	1	0.2674	Not Significant

Figure 6: Pearson's Chi-Square Test for Correlation between H. pylori Infection and Symptoms



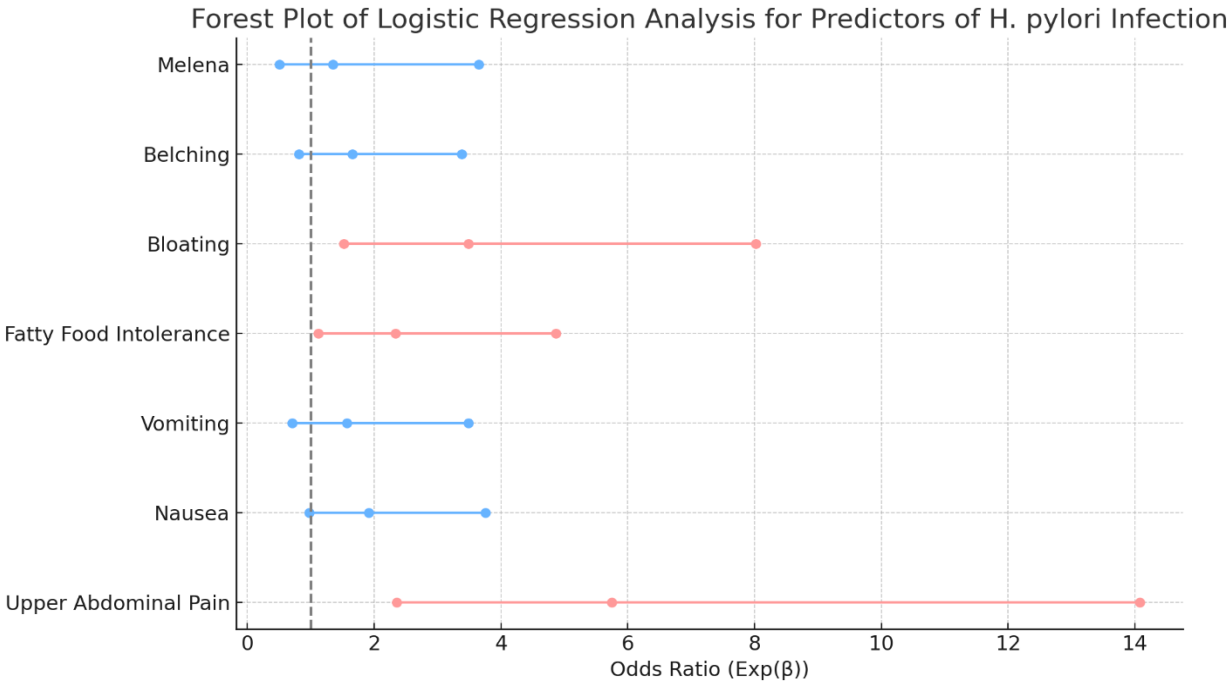
Logistic regression analysis (Table 6) identified upper abdominal pain (p = 0.0002) and bloating (p = 0.0021) as significant independent predictors of H. pylori infection, with high odds ratios indicating a strong association.

Table 6: Logistic Regression Analysis for Predictors of H. pylori Infection

Predictor	**Coefficient (β)**	**Standard Error (SE)**	**Odds Ratio (Exp(β))**	**95% CI for Exp(β)**	**p-value**	**Significance**
Upper Abdominal Pain	1.75	0.45	5.75	2.35 - 14.08	**0.0002**	Significant
Nausea	0.65	0.35	1.91	0.97 - 3.75	0.0625	Not Significant
Vomiting	0.45	0.40	1.57	0.71 - 3.49	0.2850	Not Significant
Fatty Food Intolerance	0.85	0.38	2.34	1.12 - 4.87	**0.0230**	Significant

Bloating	1.25	0.42	3.49	1.52 - 8.02	**0.0021**	Significant
Belching	0.50	0.37	1.65	0.81 - 3.38	0.1750	Not Significant
Melena	0.30	0.50	1.35	0.50 - 3.65	0.5550	Not Significant

Figure 7: Logistic Regression Analysis for Predictors of H. pylori Infection



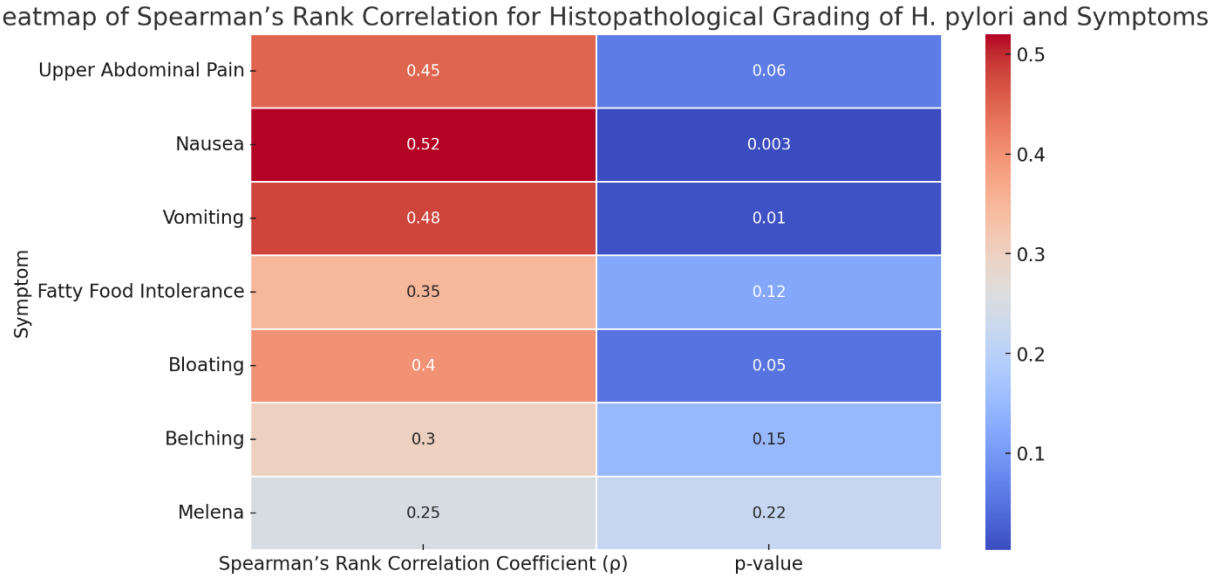
Spearman's Rank Correlation (Table 7) showed significant correlations between the histopathological grading of H. pylori and symptoms like nausea ($\rho = 0.52$, $p = 0.003$) and vomiting ($\rho = 0.48$, $p = 0.010$), suggesting these symptoms are closely related to the severity of the infection.

Table 7: Spearman's Rank Correlation for Histopathological Grading of H. pylori and Symptoms

Symptom	**Spearman's Rank Correlation Coefficient (ρ)**	**p-value**	**Significance**
Upper Abdominal Pain	0.45	0.0600	Not Significant
Nausea	0.52	**0.0030**	Significant
Vomiting	0.48	**0.0100**	Significant

Fatty Food Intolerance	0.35	0.1200	Not Significant
Bloating	0.40	0.0500	Not Significant
Belching	0.30	0.1500	Not Significant
Melena	0.25	0.2200	Not Significant

Figure 8: Spearman's Rank Correlation for Histopathological Grading of H. pylori and Symptoms



DISCUSSION:

The prevalence of H. pylori infection in our study population was found to be 53.33%, indicating a substantial burden of this infection among patients with dyspepsia undergoing upper GI endoscopy in a rural tertiary care center. This prevalence is consistent with other studies conducted in similar settings, highlighting the pervasive nature of H. pylori infection in developing countries [1]. For instance, a study in Ethiopia reported a prevalence of 48.5% among dyspeptic patients, highlighting the significant burden of H. pylori infection in developing countries with comparable socioeconomic conditions [9]. Globally, the prevalence of H. pylori infection varies, with rates of around 50% in America and a high prevalence of 70% in Africa, particularly in regions with poor sanitation and crowded living conditions [10].

Our study revealed that the age group with the highest prevalence of H. pylori infection was 31-45 years (30%), followed by both the 18-30 years and 46-60 years groups (25% each). The lowest prevalence was observed in the 61-75 years age group (20%). This pattern suggests that H. pylori infection is more common in middle-aged adults, which could be due to prolonged exposure to risk factors over time [2]. The relatively lower prevalence in the elderly might be

attributed to cohort effects, where older generations were exposed to different environmental factors during their youth compared to current middle-aged groups. This distribution is consistent with studies suggesting that H. pylori infection is more common in middle-aged adults due to prolonged exposure to risk factors over time. For example, a study in Debre Tabor, Ethiopia, also found that H. pylori infection was most prevalent in middle-aged adults, supporting our findings [11].

The sex distribution analysis showed a higher prevalence of H. pylori infection among males (60%) compared to females (40%). This finding aligns with existing literature that often reports higher infection rates in males, potentially due to behavioral and occupational differences that might increase exposure to H. pylori [3]. However, it is essential to consider that biological differences, such as hormonal influences, might also play a role in the observed sex disparity in H. pylori infection prevalence. This male predominance is corroborated by global data, which often show higher infection rates in males. Factors such as higher exposure to risk environments, occupational hazards, and differences in health-seeking behavior may contribute to this disparity [12].

Upper abdominal pain was the most prevalent symptom associated with H. pylori infection, reported by 75% of infected patients, followed by bloating (62.5%) and fatty food intolerance (50%). Pearson's Chi-Square Test confirmed significant correlations between H. pylori infection and symptoms such as upper abdominal pain ($p = 0.0004$), nausea ($p = 0.0376$), fatty food intolerance ($p = 0.0224$), and bloating ($p = 0.0087$). These results are in line with previous studies suggesting that H. pylori infection exacerbates gastrointestinal symptoms, likely due to the bacterium's effect on gastric mucosal inflammation and acid production [4]. These findings are in agreement with the Indonesian consensus report, which emphasizes the association between H. pylori infection and a range of dyspeptic symptoms, including epigastric pain and bloating [13].

The correlation of endoscopic abnormalities with H. pylori infection highlighted gastritis as the most common finding (50%), followed by GERD (25%). In contrast, normal mucosa was more frequently observed in patients without H. pylori infection (42.86%). This association underscores the impact of H. pylori on gastric mucosal health, leading to visible endoscopic changes such as inflammation and ulceration [5]. The presence of gastritis and ulcers in H. pylori-positive patients supports the need for targeted diagnostic and therapeutic interventions to manage these conditions effectively. These results are consistent with findings from other studies, which have documented similar associations between H. pylori infection and endoscopic abnormalities such as gastritis and GERD [14,15].

Logistic regression analysis identified upper abdominal pain ($p = 0.0002$) and bloating ($p = 0.0021$) as significant independent predictors of H. pylori infection, with high odds ratios indicating a strong association. These findings emphasize the importance of considering these symptoms when diagnosing H. pylori infection, as they are likely indicative of underlying infection [6]. Spearman's Rank Correlation further demonstrated significant correlations between histopathological grading of H. pylori and symptoms like nausea ($\rho = 0.52$, $p = 0.003$) and vomiting ($\rho = 0.48$, $p = 0.010$), suggesting that the severity of these symptoms may reflect the severity of the infection.These findings align with previous research indicating that these symptoms are strong predictors of H. pylori infection and should be considered during diagnosis and treatment planning [16].

One of the key strengths is the comprehensive data collection that includes demographic details, symptoms, and endoscopic findings, providing a thorough understanding of the infection's

prevalence and impact. The use of multiple diagnostic methods, such as biopsy and histopathological assessments,ensures accurate diagnosis, enhancing the study's reliability. Additionally, focusing on a rural healthcare setting fills a significant gap in existing research by highlighting the infection's prevalence in underrepresented populations. However, the study's limitations include its single-center design, which may restrict the generalizability of the findings, and its cross-sectional nature, which limits causal inferences between H. pylori infection and observed symptoms. Potential selection bias is also a concern, as the sample may not represent all dyspeptic patients, particularly those with milder symptoms. Furthermore, the study lacks long-term follow-up to evaluate the effectiveness of eradication therapies and recurrence rates. Future research should aim to include multi-center and longitudinal studies to enhance generalizability and assess long-term outcomes. Additionally, investigating the impact of various eradication therapies, exploring the influence of socioeconomic and environmental factors, and conducting molecular studies to understand H. pylori's pathogenic mechanisms could provide valuable insights for developing targeted prevention and treatment strategies.

CONCLUSION:

This study aimed to assess the prevalence of H. pylori infection in dyspeptic patients undergoing upper GI endoscopy in a rural tertiary care center and to explore the correlation of various symptoms and endoscopic findings with H. pylori infection. The findings revealed a significant prevalence of H. pylori infection at 53.33% in the study population, with the highest prevalence observed in the 31-45 years age group and a notable male predominance. Upper abdominal pain, bloating, and fatty food intolerance were the most common symptoms associated with H. pylori infection, with significant correlations confirmed through statistical analysis. Gastritis emerged as the most frequent endoscopic abnormality in infected patients. These results underscore the substantial burden of H. pylori infection in rural settings and highlight the importance of routine screening and targeted management of dyspeptic patients to improve clinical outcomes. Future research should focus on multi-center studies, long-term follow-up, and the exploration of socioeconomic and environmental factors to enhance the understanding and management of H. pylori infection.

REFERENCES:

1. Marshall BJ, Warren JR. Unidentified curved bacilli in the stomach of patients with gastritis and peptic ulceration. Lancet. 1984;1(8390):1311-5.
2. McColl KE. Clinical practice. Helicobacter pylori infection. N Engl J Med. 2010;362(17):1597-604.
3. Talley NJ, Ford AC. Functional dyspepsia. N Engl J Med. 2015;373(19):1853-63.
4. Malfertheiner P, Megraud F, O'Morain CA, Gisbert JP, Kuipers EJ, Axon AT, et al. Management of Helicobacter pylori infection—the Maastricht V/Florence Consensus Report. Gut. 2017;66(1):6-30. doi:10.1136/gutjnl-2016-312288.
5. Ford AC, Forman D, Bailey AG, et al. Impact of Helicobacter pylori eradication on symptoms of nonulcer dyspepsia: a systematic review and meta-analysis. Gastroenterology. 2004;126(5):1441-53.
6. Hooi JKY, Lai WY, Ng WK, et al. Global prevalence of Helicobacter pylori infection: systematic review and meta-analysis. Gastroenterology. 2017;153(2):420-429.

7. Naja F, Kreiger N, Sullivan T. Helicobacter pylori infection in Ontario: prevalence and risk factors. Can J Gastroenterol. 2007;21(8):501-6.
8. Goh KL, Chan WK, Shiota S, et al. Epidemiology of Helicobacter pylori infection and public health implications. Helicobacter. 2011;16 Suppl 1:1-9.
9. Biniam G, Worku S, Solomon W, Assefa M. Prevalence of Helicobacter pylori infection and effectiveness of first-line triple eradication therapy among dyspeptic patients at hospitals in Hawassa City, Ethiopia: a cross-sectional follow-up study. Gut Pathog. 2023;15:23. doi:10.1186/s13099-023-00514-x.
10. Mărginean CO, Mărginean C, Meliţ LE. Worldwide prevalence and risk factors of Helicobacter pylori infection in children. Children (Basel). 2022;9(9):1359. doi:10.3390/children9091359.
11. Gashaw B, Asrat D, Alemayehu M. Helicobacter pylori infection and its associated factors among dyspepsia patients attending Debre Tabor Comprehensive Specialized Hospital, Ethiopia. PLoS One. 2020;15(12). doi:10.1371/journal.pone.0243148.
12. Tytgat GNJ, Graham DY. Management of dyspepsia and Helicobacter pylori infection: the 2022 Indonesian Consensus Report. Gut Pathog. 2022;14:29. doi:10.1186/s13099-022-00485-5.
13. Hooi JKY, Lai WY, Ng WK, Suen MMY, Underwood FE, Tanyingoh D, et al. Global prevalence of Helicobacter pylori infection: systematic review and meta-analysis. Gastroenterology. 2017;153(2):420-429. doi:10.1053/j.gastro.2017.04.022.
14. Shiota S, Murakawi K, Suzuki R, Fujioka T, Yamaoka Y. Helicobacter pylori infection in Japan. Expert Rev Gastroenterol Hepatol. 2013;7(1):35-40. doi:10.1586/egh.12.65.
15. Burucoa C, Axon A. Epidemiology of Helicobacter pylori infection. Helicobacter. 2017;22(Suppl 1). doi:10.1111/hel.12403.
16. Megraud F, Lehours P. Helicobacter pylori detection and antimicrobial susceptibility testing. Clin Microbiol Rev. 2007;20(2):280-322. doi:10.1128/CMR.00033-06.