Section: Gastroenterology

Original Research Article

PREVALENCE OF HELICOBACTER PYLORI WITH RAPID UREASE TEST KIT AMONG PATIENTS WITH GIT SYMPTOMS IN A PERIPHERAL HOSPITAL

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ABSTRACT

Background: *Helicobacter pylori* (H. pylori) is a common gastric pathogen implicated in various gastrointestinal (GI) disorders, including chronic gastritis, peptic ulcers, iron deficiency anemia, MALT lymphoma, and gastric carcinoma. Rapid Urease Test (RUT) is a simple and cost-effective diagnostic tool for detecting *H. pylori* in gastric biopsies, especially in resource-limited settings.
Objective: To determine the prevalence of *H. pylori* infection using RUT among patients presenting with GI symptoms in a government peripheral hospital in Chennai.
Materials and Methods: This prospective observational study was conducted in March 2025 at the Gastroenterology OPD, Government Peripheral Hospital, Anna Nagar, Chennai. Fifty patients with GI symptoms were enrolled using consecutive sampling. Antral gastric biopsies were collected during endoscopy and subjected to RUT. Positive cases received standard triple therapy. Demographic and clinical data were analyzed using descriptive statistics and chi-square tests.
Results: Out of 50 patients (mean age 50.48 ± 13.11 years), 60% were male. Dyspepsia was the most common symptom (82%). RUT was positive in 92% (46/50) of patients. All patients aged 21–50 years tested positive. Prevalence was slightly lower in the 51–60 (92.3%) and >61 (76.9%) age groups. Males showed a slightly higher positivity rate (93.3%) compared to females (90%), though differences by age and gender were not statistically significant.
Conclusion: This study demonstrated a very high prevalence (92%) of *H. pylori* among symptomatic patients in a low-resource setting, emphasizing the role of environmental factors and the utility of RUT. Larger studies are needed to evaluate risk factors and treatment outcomes.
Keywords: *Helicobacter pylori*, rapid urease test, dyspepsia, prevalence, gastric biopsy, gastrointestinal symptoms, peripheral hospital.

INTRODUCTION

Helicobacter pylori (H. pylori) is a gram-negative, spiral-shaped bacterium that colonizes the gastric mucosa, particularly in the antral region of the stomach. It is closely associated with several gastrointestinal disorders, including chronic gastritis, duodenal and peptic ulcers, iron deficiency anemia of gastrointestinal origin, and mucosa-associated lymphoid tissue (MALT) lymphoma. It is also a known risk factor for gastric carcinoma.[1] The bacterium survives in the acidic gastric environment by producing urease, an enzyme that converts urea to ammonia, thereby neutralizing stomach acid. The global prevalence of H. pylori ranges from 8.9% to 72.8%, with higher rates observed in developing countries due to factors such as poor sanitation, contaminated food and water, and overcrowding.[2] Early diagnosis and treatment are essential to prevent long-term complications. Among various diagnostic methods, the Rapid Urease Test (RUT) is a simple, cost-effective, and reliable tool for detecting H.

pylori in gastric biopsy samples. This study aimed to determine the prevalence of H. pylori among symptomatic patients at a government peripheral hospital in Chennai using RUT.[3]

MATERIALS AND METHODS

This prospective observational study was carried out in March 2025 at the Gastroenterology Outpatient Department, Government Peripheral Hospital, Anna Nagar, Chennai, in collaboration with the Department of Clinical Microbiology, Karpaga Vinayaga Institute of Medical Sciences. Patients presenting with gastrointestinal (GI) symptoms during the study period were screened for eligibility, and a total of 50 participants were enrolled using a consecutive sampling method. A structured checklist guided patient selection. Inclusion criteria were patients of all ages and genders presenting with dyspepsia, iron deficiency anemia of suspected GI origin, abdominal pain, dysphagia, peptic or duodenal ulcer disease, or suspected MALT lymphoma, who consented to undergo endoscopy. Exclusion criteria included patients with non-GI complaints, those who had received antibiotics, bismuth compounds, or proton pump inhibitors within two weeks before endoscopy, patients with active gastrointestinal bleeding, and those unwilling to provide consent.

All eligible patients underwent diagnostic upper gastrointestinal endoscopy performed by a gastroenterologist. Two biopsy specimens were collected from the antral mucosa of the stomach using standard endoscopic forceps. Each specimen was immediately placed in a commercially available Rapid Urease Test (RUT) kit containing urea and a phenol red pH indicator. In the presence of H. pylori, urease activity hydrolyzes urea to ammonia, increasing the pH and resulting in a color change of the medium from yellow to pink or red. Results were observed for up to 24 hours, and categorized as rapid positive (within 2 hours), delayed positive (within 24 hours), or negative (no color change).

Demographic details, presenting complaints, and RUT results were recorded in a structured case record form. Patients testing positive for H. pylori were started on standard 14-day triple therapy consisting of a proton pump inhibitor, amoxicillin, clarithromycin, and metronidazole. Data were analyzed using descriptive statistics and chi-square tests to evaluate associations between age, gender, and infection status. A p-value <0.05 was considered statistically significant.

RESULTS

A total of 50 patients were included in the study. The mean age of the participants was 50.48 ± 13.11 years. The majority of participants were in the age groups 51–60 years and >61 years, each comprising 13 (26%) patients. This was followed by the 41–50 age group with 12 (24%), and the 21–30 and 31–40 age groups with 6 (12%) each.

Table 1: Age Category Distribution

Age Category	Frequency (%)
21 – 30 years	6 (12%)
31 – 40 years	6 (12%)
41 – 50 years	12 (24%)
51 – 60 years	13 (26%)
> 61 years	13 (26%)
Total	100 (100%)

Of the 50 patients, 30 (60.0%) were male and 20 (40.0%) were female.

Table 2: Gender Distribution

Gender	Frequency (%)
Male	30 (60.0%)
Female	20 (40.0%)
Total	50 (100%)

Dyspepsia was the most common symptom observed in 41 (82.0%) patients. Other symptoms included age-related illness (8.0%), dysphagia (4.0%), anemia (4.0%), GERD (2.0%), IBD (2.0%), abdominal pain (2.0%), and diarrhoea (2.0%).

Figure 1: Clinical Symptoms Distribution

A total of 46 patients (92.0%) tested positive, while 4 patients (8.0%) tested negative.

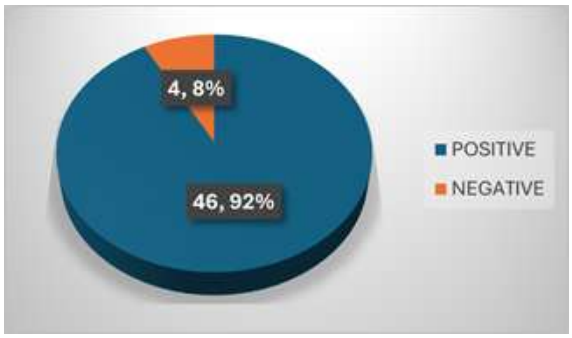

Figure 2: RUT Results Distribution

All patients in the 21–30, 31–40, and 41–50 categories tested positive. Positivity was slightly lower in the 51–60 (92.3%) and >61 (76.9%) groups. This difference was not statistically significant (χ^2 = 1.8088, p = 0.7709).

Table 3: RUT Result by Age Category

Age Category	Positive	Negative	Total
21–30	6 (100%)	0 (0%)	6 (100%)
31–40	6 (100%)	0 (0%)	6 (100%)
41–50	12 (100%)	0 (0%)	12 (100%)
51–60	12 (92.3%)	1 (7.7%)	13 (100%)
> 61	10 (76.9%)	3 (23.1%)	13 (100%)
Total	46 (92.0%)	4 (8.0%)	50 (100%)
χ^2= 1.8088. The *p*-value is .770881			

Among males, 28 (93.3%) were RUT positive, while 18 (90.0%) females tested positive. This difference was also not statistically significant (χ^2 = 0.1812, p = 0.6704).

Table 4: RUT Result by Gender

Gender	Positive	Negative	Total
Male	28 (93.3%)	2 (6.7%)	30 (100%)
Female	18 (90.0%)	2 (10.0%)	20 (100%)
Total	46 (92.0%)	4 (8.0%)	50 (100%)
χ^2= 0.1812. The *p*-value is .670379			

DISCUSSION

This study reported a remarkably high prevalence (92%) of Helicobacter pylori (H. pylori) infection among patients presenting with gastrointestinal symptoms at a government peripheral hospital in Chennai, based on the Rapid Urease Test (RUT). This rate is considerably higher than findings from other Indian and regional studies. For example, Ray et al,[4] (2024) found a 53% prevalence in Puducherry, Sudarshana et al,[5] (2022) reported 43%, and Dhotre et al,[6] (2018) observed 55% among dyspeptic patients. Studies in Sikkim and Nepal also documented lower rates, with Dhakal et al. (2018) reporting 27% and Bhandari et al,[8] (2022) noting 14% overall prevalence (26% by RUT alone). These discrepancies highlight regional variation in H. pylori burden, likely influenced by differences in socioeconomic conditions, sanitation, dietary practices, and healthcare access.

The extraordinarily high rate in this study can be attributed to environmental and socioeconomic factors such as overcrowding, poor sanitation, and limited access to clean water. Being conducted in a government facility serving low-income groups, the study population likely faced heightened exposure risks. The high sensitivity and specificity of RUT, particularly when performed correctly, may also have contributed to the elevated detection rate.

Dyspepsia emerged as the most common presenting complaint in this cohort, affecting 82% of participants. This finding mirrors trends reported by Dhakal et al,[7] (2018), where 74% of infected individuals presented with dyspepsia, and Sudarshana et al,[5] (2022), who observed abdominal discomfort in 80% of cases. Dhotre et al,[6] (2018) and Ray et al,[4] (2024) also identified abdominal pain as a key symptom, with frequent reports of nausea, bloating, and regurgitation. Collectively, these studies reinforce dyspepsia as a central clinical marker for H. pylori, particularly in regions where the infection is endemic.

Regarding gender distribution, males had a slightly higher positivity rate (93.3%) than females (90%), though this difference lacked statistical significance. This trend aligns with Bhandari et al,[8] (2022), who also found a marginally higher rate in males. Dhakal et al,[7] (2018), however, observed a statistically significant higher prevalence among males (31% vs 22%), while Dhotre et al,[6] (2018) reported that 67.3% of positive cases were male. In contrast, Ray et al,[4] (2024) noted a higher prevalence among females (61%). These varying trends suggest that gender-based differences in H. pylori infection may be influenced by sociocultural norms, differential health-seeking behavior, and occupational exposures, rather than being universally consistent.

The age-wise distribution revealed a 100% positivity rate among those aged 21–50, with a slight decline among older individuals, though not statistically significant. This is consistent with findings from Sudarshana et al,[5] (2022), who reported the highest prevalence in the 18–35 age group, and Ray et al.4 (2024), who found elevated infection rates in individuals aged 20–60. Dhotre et al,[6] (2018) reported a mean age of 49.5 years among positive cases. These patterns suggest that infection likely begins in childhood and persists chronically, particularly in developing countries, which may explain the higher rates in younger adults.

Although all patients underwent endoscopy for biopsy collection in this study, the findings did not focus on endoscopic correlations. Other studies, however, have emphasized these associations. Ray et al,[4] (2024) found RUT positivity in 72% of patients with pangastritis and 66% with antral gastritis. Dhakal et al,[7] (2018) associated H. pylori with various findings, including gastritis and duodenal

ulcers (69%). Dhotre et al,[6] (2018) observed 100% positivity in cases of gastric and duodenal ulcers and 84.6% in duodenitis. Bhandari et al,[8] (2022) similarly linked H. pylori with gastric ulcer and gastroduodenitis. These studies affirm the pathogen's role in acid-related upper GI conditions.

Treatment outcomes were not assessed in this study. However, the prescribed regimen consisted of standard triple therapy: a proton pump inhibitor, amoxicillin, clarithromycin, and metronidazole. Literature supports this approach. Ray et al,[4] (2024) reported symptom relief in 85% of treated patients, while Sudarshana et al,[5] (2022) observed a favorable response in 87.2% after a 14-day therapy. Dhotre et al,[6] (2018) emphasized that eradication of H. pylori leads to clinical improvement and reduced recurrence in peptic ulcer disease. These outcomes demonstrate the efficacy of timely diagnosis and appropriate therapy.

Diagnostic accuracy in this study relied solely on RUT, reflecting real-world constraints in resource-limited settings. Uotani and Graham,[9] (2015) highlighted RUT's high sensitivity (80–100%) and specificity (97–99%), especially when both antral and corpus biopsies are taken. Fakhry et al,[10] (2024) found RUT to have 98.2% sensitivity and 100% specificity, showing excellent agreement with histopathology. Nonetheless, multiple authors caution that RUT may be insufficient alone in certain situations, such as post-treatment evaluation or recent antibiotic use. Bhandari et al,[8] (2022) recommended multimodal diagnostic approaches for comprehensive assessment, particularly in ambiguous cases.

CONCLUSION

This study revealed an exceptionally high prevalence (92%) of Helicobacter pylori infection among patients with gastrointestinal symptoms in a government hospital in Chennai. The findings underscore the heavy burden of infection in low-income communities, likely driven by poor sanitation and limited healthcare access. Dyspepsia emerged as the most common symptom, consistent with regional data. While limited by sample size and lack of follow-up, the study highlights the need for improved screening, timely treatment, and public health measures. Future research should involve larger, multicentric studies to explore risk factors, treatment outcomes, and strategies for effective management and prevention of H. pylori infection.

Limitations: The study's limitations include a small sample size, lack of data on socioeconomic and hygiene factors, absence of follow-up for treatment outcomes, and reliance on a single diagnostic method (RUT).

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