

Frequency of Helicobacter pylori (H. pylori) in Patients Operated for Duodenal Ulcer Perforation

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Abstract: *Helicobacter pylori* infection is a well-recognized cause of peptic ulcer disease and may contribute to serious complications such as duodenal ulcer perforation. The burden of *H. pylori*-associated perforation varies across populations and remains clinically relevant in developing countries. **Objective:** To determine the prevalence of *Helicobacter pylori* infection among patients presenting with duodenal ulcer perforation. **Methods:** A descriptive cross-sectional study was conducted in the Department of Surgery, Holy Family Hospital, Rawalpindi, from April 2025 to June 2025. A total of 94 patients aged 18–70 years presenting with acute abdominal pain and confirmed duodenal ulcer perforation were enrolled, irrespective of gender. Patients with malignant or traumatic perforation, frequent use of salicylates or non-steroidal anti-inflammatory drugs in the preceding six months, pregnancy or lactation, recurrent gastric complications, ongoing antibiotic therapy, circulatory failure (systolic blood pressure <90 mmHg and diastolic blood pressure <60 mmHg), HIV infection, or other immunosuppressive conditions were excluded. *Helicobacter pylori* infection was assessed using the carbon-labeled urea breath test. A delta value $\geq 4.0\%$ above baseline after 30 minutes was considered a positive result. Data were analyzed using SPSS, and descriptive statistics were calculated for demographic and clinical variables. **Results:** The mean age of the participants was 45.07 ± 10.67 years (range 18–70 years). Most patients (54.26%) were aged 46–70 years. There was a male predominance, with 58 males (61.70%) and 36 females (38.30%), resulting in a male-to-female ratio of 1.6:1. *Helicobacter pylori* infection was detected in 36 patients (38.30%) who underwent surgery for duodenal ulcer perforation. **Conclusion:** *Helicobacter pylori* infection was identified in a considerable proportion of patients presenting with duodenal ulcer perforation. The findings suggest that *H. pylori* may contribute to the occurrence of perforated peptic ulcer disease in the local population, highlighting the importance of screening and eradication strategies.

Keywords: duodenal ulcer, perforation, *H. pylori*

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Introduction

There is a serious health risk associated with the uncommon perforation of a duodenal ulcer. Mortality rates range from 8% to 25%, according to an extensive study. Since the first example was noted by Muralto in 1688 and painstakingly documented by Lenepneau, this ailment has been the subject of centuries of research (1). A typical method for fixing perforations is the omental patch, which Cellan-Jones initially described in 1929. According to historical sources, laparoscopic surgical methods for treating duodenal ulcers were investigated as early as 1904. This lengthy history highlights advances in medical science despite obstacles and provides insights into the current state of medical knowledge and treatments for this condition (2).

Due to the growing usage of proton pump inhibitors and *Helicobacter pylori* eradication therapy, peptic ulcer disease has recently decreased (3). Perforation and other ulcer complications, as well as potential reasons like aging and NSAID use, continue to raise concerns. Procedures like ERCP are contributing to an increase in iatrogenic duodenal perforations. The treatment of duodenal ulcers is still up for dispute, and survival rates are impacted by delayed diagnosis (4). Until 1983, the main causes of ulcers were thought to be diet, stress, and stomach acid. But when Warren and Marshall connected *Helicobacter pylori* to peptic ulcers, everything changed (5). About 50% of people worldwide have an *H. pylori* infection, with the frequency falling in industrialized and developing countries.

According to reports, *H. pylori* infections are present in 92%, 66.6%, and 70% of individuals with duodenal perforation (6-8). According to one study, 56.5% of patients who underwent surgery for a perforated duodenal ulcer also had an *H. pylori* infection (9). A study found that 60.3% of people had an *H. pylori* infection (10). Another study found that the prevalence of *H. pylori* was 52% (11). In addition, another study reported

an observed rate of 41.3% for *H. pylori* infection (12). Lastly, another study found a 70% observed rate of *H. pylori* infection (13).

The present study aims to determine the prevalence of *H. Pylori* in patients with duodenal perforation. In our community, *H. Pylori* is not uncommon, and, as previously mentioned, research has shown that the prevalence of duodenal perforation may vary by region. Few studies have also found a link between duodenal perforation and *H. pylori*. This study will determine the prevalence of duodenal perforation in local patients. This study will help the surgeons in the region assist us in assessing the scope of the issue locally and developing future research strategies.

Methodology

This descriptive cross-sectional study was done from April 2025 to June 2025 at the Department of General Surgery, Holy Family Hospital, Rawalpindi. A total of 94 patients who met the inclusion criteria were selected using non-probability, consecutive sampling following approval by the institutional ethical review committee. Every patient will be asked for their informed permission. Using a 95% confidence level and a 10% margin of error, the WHO calculator estimates a sample size of 94, assuming an expected *H. pylori* prevalence of 41.3%. Regardless of gender, all patients between the ages of 18 and 70 who presented with acute abdominal pain (defined as pain on the visual analogue scale greater than 3, vomiting during one or more episodes of any severity, and complete constipation) and duodenal ulcer perforation (defined as a breach in the integrity of the duodenal wall (of any size) as determined by naked eye examination after surgery) were included. Patients who were already receiving *Helicobacter pylori* eradication therapy, had a malignant ulcer with a perforation, had a traumatic perforation, had used salicylates or non-steroidal anti-inflammatory drugs frequently (three



times per week or more) within the previous six months, were pregnant or lactating, had recurrent gastric complications, were taking antibiotics because these medications can alter risk and produce bias, had circulatory failure, HIV patients, or had other immunosuppression were not included. Name, age, and gender were among the demographic details that were documented. If a patient's delta above baseline value was $\geq 4.0\%$ after 30 minutes, they were deemed to have a positive *H. pylori* test result. The patient did not have to pay for the Urea Breath Test. Following a definitive diagnosis, patients underwent emergency surgery. GA was administered to each patient. An upper midline incision was used to perform an exploratory laparotomy. Two intraperitoneal drains were inserted, one in the subhepatic region and one in the pelvis, after peritoneal lavage with three to four liters of normal saline. Patients were prescribed intravenous third-generation cephalosporins, rigorous hydration and electrolyte balance, and appropriate analgesia in the immediate postoperative period. On the second or third day, the drains were removed.

Patients were permitted to have liquid diets on the fourth or fifth day. Following surgery, blood samples were obtained from these patients and sent to a laboratory for testing for *H. pylori* antibodies. Eradication therapy was administered to all patients with *H. pylori*. At the time of discharge, all patients received postoperative *H. pylori* eradication therapy, which included 500 mg of clarithromycin BD for 7 days, 400 mg of metronidazole TDS for 7 days, and 20 mg of omeprazole OD for 14 days. A pre-made pro forma was used to gather all the data.

SPSS v25.0 was used to enter and analyze all data. The Mean \pm S.D. was used to describe age. Frequencies and percentages were used to describe *H. Pylori*, smoking, domicile, gender, and socioeconomic level. To address effect modifiers, data were stratified by age, gender, smoking

status, place of residence, and socioeconomic position. The Chi-Square test was applied after stratification. A p-value of less than 0.05 was deemed significant.

Results

The study's participants ranged in age from 18 to 70, with a mean age of 45.07 ± 10.67 years. 51 patients, or 54.26% of the total, were aged 46-70. With a male-to-female ratio of 1.6:1, 58 (61.70%) of the 94 patients were men, and 36 (38.30%) were women. Table I displays the distribution of patients with additional confounding variables.

36 (38.30%) of the patients in our study who underwent surgery for a duodenal ulcer perforation had *Helicobacter pylori* (*H. pylori*) (Figure 1). Table II displays the stratification of *Helicobacter pylori* (*H. pylori*) by age, gender, smoking status, domicile, and socioeconomic status

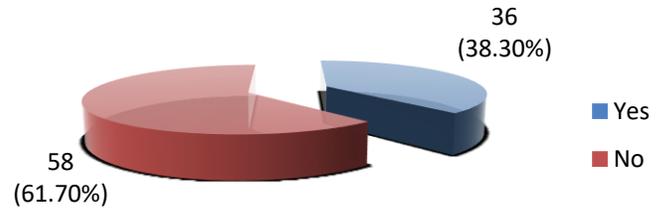


Figure 1: Frequency of Helicobacter pylori (*H. pylori*) in patients operated for duodenal ulcer perforation (n=94).

Table 1: Distribution of patients with other confounding variables (n=94)

Confounding variables		Frequency	%age
Age (years)	18-45	43	45.74
	46-70	51	54.26
Gender	Male	58	61.70
	Female	36	38.30
Place of residence	Rural	35	37.23
	Urban	59	62.77
Socioeconomic status	Low	27	28.72
	Middle	46	48.94
	High	21	22.34
Smoking	Yes	51	54.26
	No	43	45.74

Table 2: Stratification of Helicobacter pylori (*H. pylori*) with respect to age, gender, smoking, place of residence, and socioeconomic status.

		Yes (n=36)	No (n=58)	P-value
Age (years)	18-45	15 (34.88%)	28 (65.12%)	0.532
	46-70	21 (41.18%)	30 (58.82%)	
Gender	Male	27 (46.55%)	31 (53.45%)	0.037
	Female	09 (25.0%)	27 (75.0%)	
Residence	Rural	14 (40.0%)	21 (60.0%)	0.794
	Urban	22 (37.29%)	37 (62.71%)	
Socioeconomic status	Low	10 (37.04%)	17 (62.96%)	0.230
	Middle	05 (23.81%)	16 (76.19%)	
	High	21 (45.65%)	25 (54.35%)	
Smoking	Yes	20 (39.22%)	31 (60.78%)	0.842
	No	16 (37.21%)	27 (62.79%)	

Discussion

Perforated peptic ulcers are not only a local problem; they are a common emergency medical disease that is associated with a significant risk of

death, especially in older individuals (14). To improve patient outcomes and lower mortality rates, prompt surgical repair of the perforation is essential, as is thorough sepsis care. Effective care requires prompt identification and treatment because postponements can result in

complications such as systemic infection and peritonitis, which drastically impair prognosis. To maximize recovery and survival for afflicted individuals, healthcare personnel must maintain a high index of suspicion and be ready to initiate immediate medical and surgical therapy.

According to a study by Sonnenberg et al (15). Silent perforations—which are defined as perforations that happen without the usual signs of a peptic ulcer, such as abrupt, intense abdominal pain—occur 77.27% of the time. NSAID use and H. pylori infection were found to be major risk factors. The risk of perforation of PUD can be decreased by H. pylori screening and antiulcer medication use. In both industrialized and developing nations, the frequency of H. pylori infection tends to rise with age and is impacted by socioeconomic level. Given that early childhood is when H. pylori infections first appear and that they rarely clear on their own, prevalence in children can often be a good indicator of overall prevalence.

According to Rahatullah HS et al (16). H. pylori-infected women can have a major impact on the infection rates of their offspring. Socioeconomic status and early childhood housing conditions have been identified as significant predictors of the infection rate in both adults and children. Compared with developed nations such as the US, Australia, and France, where infection rates range from 20% to 25%, Saudi Arabia, India, and Vietnam have H. pylori infection rates of 60% to 80% (17).

In contrast to the findings of Tadesse M et al (18). Who claimed a prevalence of 80.6%, and Naeem M et al (19). In a study reporting a prevalence of 51.85%, we found that 38.30% of cases had an H. pylori infection. Although the relationship between H. pylori infection and perforated ulcers remains controversial, the link between the two is well established for stomach ulcers.

According to reports, H. pylori infections are present in 92%, 66.6%, and 70% of individuals with duodenal perforation (6-8). According to one study, 56.5% of patients who underwent surgery for a perforated duodenal ulcer also had an H. pylori infection (9). A study found that 60.3% of people had an H. pylori infection (10). In addition, another study reported an observed rate of 41.3% for H. pylori infection (12). Lastly, another study found a 70% observed rate of H. pylori infection (13).

The prevalence of H. pylori is influenced by age, race, and geography. Both industrialized and developing nations have seen age-related increases in the prevalence of H. pylori infection, which have been associated with socioeconomic status. Furthermore, because the initial H. pylori infection is typically acquired in early infancy and is seldom resolved on its own, changes in childhood prevalence may be good indicators of overall prevalence. Numerous further studies reported similar results, noting the prevalence rates in various nations listed below: The frequency of H. pylori infection is believed to be significantly influenced by socioeconomic position, personal hygiene, and the number of infected family members (20, 21).

It is important to acknowledge some of the limitations of our research. Stool antigen assays for H. pylori detection may yield false-positive results due to cross-reactions with the normal gut flora (22). Additionally, we did not assess the potential impact of antibiotic resistance on H. pylori eradication rates, which could influence treatment for patients with duodenal ulcers.

Conclusion

In our population, duodenal perforation due to peptic ulcer disease caused by H. Pylori is common. It is a major disaster, and we recommend further research to determine risk factors associated with this elevated H. Pylori load and preventive actions to halt its spread and associated morbidity.

Declarations

Data Availability statement

All data generated or analysed during the study are included in the manuscript.

Ethics approval and consent to participate

Approved by the department concerned. (IRBEC-HFHISB-41d-24)

Consent for publication

Approved

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Conflict of interest

The authors declared no conflict of interest.

Author Contribution

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Manuscript drafting, Study Design,

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Review of Literature, Data entry, Data analysis, and drafting an article.

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Conception of Study, Development of Research Methodology Design

AN (Senior Registrar General Surgery)

Study Design, manuscript review, and critical input.

AK (Associate Professor)

Manuscript drafting, Study Design,

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Review of Literature, Data entry, Data analysis, and drafting an article.

All authors reviewed the results and approved the final version of the manuscript. They are also accountable for the study's integrity.

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