



## Frequency of Helicobacter Pylori Infection in Patients with Dyspepsia

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### ARTICLE INFO

#### Keywords

Helicobacter pylori, Dyspepsia, Infection prevalence, Gastrointestinal disorders

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#### Declaration

**Authors' Contribution:** All authors equally contributed to the study and approved the final manuscript.

**Conflict of Interest:** No conflict of interest.

**Funding:** No funding received by the authors.

#### Article History

Received: 05-01-2025    Revised: 17-03-2025  
Accepted: 05-04-2025    Published: 04-05-2025

### ABSTRACT

**Background:** Helicobacter pylori (*H. pylori*) is a gram-negative bacterium commonly associated with gastrointestinal disorders, including dyspepsia, peptic ulcers, and gastritis. **Objective:** This study aimed to determine the frequency of *H. pylori* infection in patients with dyspepsia and explore its relationship with demographic and clinical factors. **Methods:** A cross-sectional study was conducted at Unit I, Department of Medicine, Benazir Bhutto Hospital, Rawalpindi. A total of 150 dyspeptic patients, aged 20-70 years, were enrolled using non-probability consecutive sampling. Data were collected on demographic and clinical characteristics, including age, gender, BMI, hypertension, diabetes, smoking history, and family history of dyspepsia. **Results:** The study found a 45% prevalence of Helicobacter pylori infection in dyspeptic patients. The infection was more common in patients aged 40-60 years and those with a BMI  $\geq 30$  kg/m<sup>2</sup>. The infection rate was significantly higher in patients with peptic ulcer disease (60%), while lower rates were observed in those with gastroesophageal reflux disease (38%) and other causes of dyspepsia (33%). There was no significant difference in *H. pylori* infection based on the duration of symptoms, with infection rates ranging from 42% to 48% across the 1-12, 13-24, and 25-36-month duration groups. The T-test analysis revealed a significant difference in BMI between *H. pylori* positive ( $27.2 \pm 4.5$  kg/m<sup>2</sup>) and negative ( $24.8 \pm 3.9$  kg/m<sup>2</sup>) groups ( $p = 0.002$ ), but no significant differences were found in age ( $p = 0.08$ ) or symptom duration ( $p = 0.12$ ). **Conclusion:** It is concluded that *H. pylori* infection is prevalent in dyspeptic patients, with significant associations observed with age and BMI. These findings highlight the need for *H. pylori* screening in dyspeptic patients, particularly those with higher BMI and from lower socioeconomic backgrounds.

### INTRODUCTION

Functional dyspepsia is defined in the ROMA IV criteria as one or more of the following symptoms persisting for the past 3 months with symptom onset at least 6 months ago: postprandial fullness, early satiation, epigastric pain, and epigastric burning [1]. Functional dyspepsia is a common gastric disease that can be associated with Helicobacter pylori (*H. Pylori*) infection [2]. *H. pylori* infection is often associated with dyspepsia symptoms, and it has been reported that eradication of *H. pylori* improves the symptoms. *H. pylori* is a gram-negative, spiral-shaped, urease-producing bacterium with multiple unipolar flagella [1]. Humans are a major reservoir for *H. pylori*; however, there are no data on the prevalence of *H. pylori* among dyspeptic patients who have experienced natural disasters [3]. *H. pylori* colonizes the gastric mucosa, which is thought to be acquired in childhood. Infection with *H. pylori* has been associated with peptic ulcer disease, chronic gastritis, and gastric malignancy [4].

One study, conducted in Saudi Arabia, frequency of *H. pylori* was reported in 30.1% of patient with dyspepsia [5]. Another study, conducted in Uganda, frequency of *H. pylori* in 36% of patients with dyspepsia [6]. But in a Pakistani study, the frequency of *H. pylori* was reported in 50.89% patients with dyspepsia [7]. Another study, conducted in Pakistan, frequency of *H. pylori* in 64.4% patients with dyspepsia [8]. But one study, conducted in Afghanistan, reported that the frequency of *H. pylori* was reported in 75.6% of patients with dyspepsia [9]. The rationale of this study is to determine the frequency of Helicobacter pylori infection in patients with dyspepsia. Literature showed that there is variability in the frequency of *H. pylori* infection in different populations around the world. Helicobacter pylori (*H. pylori*) is a gram-negative bacterium that colonizes the gastric mucosa and is known to be a major cause of various gastrointestinal disorders, including dyspepsia, peptic ulcers, and gastritis [10]. Dyspepsia, commonly referred to as indigestion, encompasses a variety of

symptoms such as upper abdominal discomfort, bloating, nausea, and heartburn. It affects a significant proportion of the global population, with estimates suggesting that approximately 25% to 40% of individuals experience symptoms related to dyspepsia at some point in their lives [11]. Even in Pakistan, two different studies showed different prevalence of *H. pylori* infection in dyspepsia patients, although the prevalence is high [12]. Therefore, we want to conduct this study to get the evidence and confirm whether the frequency of *H. pylori* infection is higher or lower, as feeding habit and risk of dyspepsia also increases. This will help to attain magnitude for the local population, improve our practice and in future, we will implement the findings of this study in local setting.

### Objective

To determine the frequency of *Helicobacter pylori* infection in patients with dyspepsia.

### METHODOLOGY

This cross-sectional study was conducted at Unit I, Department of Medicine, Benazir Bhutto Hospital, Rawalpindi during January 2024 to June 2024.

### Sample Size

By using WHO calculator, sample size of 150 patients is calculated with 95% confidence level, 7.5% margin of error and percentage of *H. pylori* i.e. 30.1% in patient with dyspepsia. Data were collected through non-Probability, Consecutive sampling technique.

### Inclusion Criteria

Patients of age 20-70 years, both genders, diagnosed with dyspepsia (as per operational definition)

### Exclusion Criteria

Patients who used omeprazole 2 weeks prior to endoscopy and those who used antibiotics 4 weeks prior to endoscopy (on medical record), pregnancy, severe heart failure (EF<30%)

### Data Collection

A total of 150 patients who met the inclusion criteria were recruited from the OPD. Each participant provided informed consent before their inclusion in the study. Data were collected on various demographic and clinical factors, including age, gender, body mass index (BMI), duration of symptoms, and the presence of conditions such as hypertension (blood pressure  $\geq 140/90$  mmHg), diabetes (blood sugar  $> 200$  mg/dl), and a history of smoking (greater than five pack-years). The family history of dyspepsia, prior history of ulcers, occupation, lifestyle, residence, and socioeconomic status were also recorded. The cause of dyspepsia, whether peptic ulcer disease or gastroesophageal reflux disease (GERD), was documented. Following data collection, each patient underwent endoscopy, during which a biopsy sample was taken. These samples were then sent to the hospital

laboratory, where Giemsa staining was used to detect the presence of *Helicobacter pylori*. The results of the biopsy were reviewed, and patients found to be infected with *H. pylori* were treated according to standard clinical protocols.

### Data Analysis

Data collected in the study were entered and analyzed using SPSS version 26.0. To assess the normality of the data, the Shapiro-Wilk test was applied. Quantitative variables such as age, BMI, and duration of symptoms were summarized using means and standard deviations, while qualitative variables such as gender, hypertension, diabetes, smoking history, family history of dyspepsia, and other clinical factors were presented as frequencies and percentages. Stratification of data was performed based on variables such as age, gender, BMI, duration of symptoms, cause of dyspepsia, and other relevant factors. After stratification, the chi-square test was used to compare the frequency of *Helicobacter pylori* infection in different stratified groups. A p-value of  $\leq 0.05$  was considered statistically significant, indicating that any observed differences in infection rates were not due to chance.

### RESULTS

Data were collected from 150 patients. In terms of age, the highest prevalence of *H. pylori* infection (50%) was observed in the 40-60 years age group, while the lowest (38%) was in the 20-39 years group. Males had a slightly higher infection rate (48%) compared to females (40%). Regarding BMI, individuals with a BMI  $\geq 30$  kg/m<sup>2</sup> had a higher infection rate (55%) compared to those with a BMI  $< 30$  kg/m<sup>2</sup> (42%). Hypertension and family history of dyspepsia did not show substantial differences in infection rates, with infection rates being 47% in hypertensive patients and 48% in those with a family history of dyspepsia.

**Table 1**

*Frequency of Helicobacter pylori Infection by Demographic and Clinical Characteristics*

Demographic and Clinical Characteristics		Group 1 ( <i>H. pylori</i> Positive)	Group 2 ( <i>H. pylori</i> Negative)
Age Group	20-39 years	38% (33/80)	62% (47/80)
	40-60 years	50% (35/70)	50% (35/70)
Gender	Male	48% (43/90)	52% (47/90)
	Female	40% (27/60)	60% (33/60)
BMI	$\geq 30$ kg/m <sup>2</sup>	55% (11/20)	45% (9/20)
	$< 30$ kg/m <sup>2</sup>	42% (57/130)	58% (73/130)
Hypertension	Hypertension (+) (BP $\geq 140/90$ )	47% (31/67)	53% (36/67)
	Hypertension (-)	43% (37/83)	57% (46/83)
Smoking History	Smoking (+) ( $\geq 5$ pack years)	50% (16/33)	50% (17/33)
	Smoking (-)	44% (52/117)	56% (65/117)
Family History of Dyspepsia	Yes	48% (23/48)	52% (25/48)
	No	43% (45/102)	57% (57/102)

The highest prevalence of *H. pylori* infection was found in patients with peptic ulcer disease, with 60% (18/30) testing positive for the bacterium. In contrast, gastroesophageal reflux disease (GERD) showed a lower infection rate of 38% (20/53). Functional dyspepsia had a moderate prevalence of *H. pylori* infection, with 44% (30/67) of patients testing positive. The lowest infection rate was observed in patients with other causes of dyspepsia, where only 33% (10/30) were *H. pylori* positive.

**Table 2**

*Frequency of Helicobacter pylori Infection by Cause of Dyspepsia*

Cause of Dyspepsia	<i>H. pylori</i> Positive (%)	<i>H. pylori</i> Negative (%)
Peptic Ulcer Disease	60% (18/30)	40% (12/30)
Gastroesophageal Reflux Disease (GERD)	38% (20/53)	62% (33/53)
Functional Dyspepsia	44% (30/67)	56% (37/67)
Others	33% (10/30)	67% (20/30)

The analysis of symptom duration in relation to *H. pylori* infection revealed no significant differences between the groups. In patients with symptoms lasting 1-12 months, 42% (29/69) tested positive for *H. pylori*, while 58% (40/69) tested negative. Among patients with symptoms lasting 13-24 months, 46% (20/43) were *H. pylori* positive, and 54% (23/43) were negative. In the group with symptoms lasting 25-36 months, 48% (19/38) were positive for *H. pylori*, and 52% (19/38) were negative.

**Table 3**

*Helicobacter pylori Infection and Symptom Duration*

Duration of Symptoms	<i>H. pylori</i> Positive (%)	<i>H. pylori</i> Negative (%)
1-12 months	42% (29/69)	58% (40/69)
13-24 months	46% (20/43)	54% (23/43)
25-36 months	48% (19/38)	52% (19/38)

The mean age of the *H. pylori* positive group ( $43.8 \pm 10.2$  years) was slightly higher than the *H. pylori* negative group ( $41.2 \pm 9.3$  years), but the difference was not statistically significant ( $t = 1.77$ ,  $p = 0.08$ ). However, there was a significant difference in BMI, with the *H. pylori* positive group having a higher mean BMI ( $27.2 \pm 4.5$  kg/m<sup>2</sup>) compared to the negative group ( $24.8 \pm 3.9$  kg/m<sup>2</sup>), with a p-value of 0.002. In terms of symptom duration, the mean duration was longer in the *H. pylori* positive group ( $13.2 \pm 7.1$  months) compared to the negative group ( $11.6 \pm 6.4$  months), but this difference was not statistically significant ( $t = 1.58$ ,  $p = 0.12$ ).

**Table 4**

*T-Test Results for Age Comparison Between H. pylori Positive and Negative Groups*

Variable	<i>H. pylori</i> +ve (Mean $\pm$ SD)	<i>H. pylori</i> -ve (Mean $\pm$ SD)	t-Statistic	p-value
Age (Years)	43.8 $\pm$ 10.2	41.2 $\pm$ 9.3	1.77	0.08
BMI (kg/m <sup>2</sup> )	27.2 $\pm$ 4.5	24.8 $\pm$ 3.9	3.11	0.002
Duration of Symptoms (Months)	13.2 $\pm$ 7.1	11.6 $\pm$ 6.4	1.58	0.12

## DISCUSSION

*Helicobacter pylori* (*H. pylori*) is a significant causative agent of various gastrointestinal disorders, including dyspepsia, peptic ulcers, and gastritis. The purpose of this study was to determine how frequently *H. pylori* infected patients who suffered from dyspepsia and to examine the connection between patient demographics and clinical characteristics alongside lifestyle behaviors of these patients. The research shows *H. pylori* infection affects 45% of dyspepsia patients while multiple studies demonstrate high levels of infection in this group [12]. Findings showing a total *H. pylori* infection rate of 45% in dyspeptic patients from this study match with infection rate results reported by several nearby and international studies which detected *H. pylori* from 30% to 60% of dyspeptic patients. The high rate of infections among this patient cohort demonstrates *H. pylori*'s vital position in causing dyspepsia while requiring additional research about its pathogenic contribution to this condition [13]. The research showed through stratified analysis that both age of patients and their BMI directly related to *H. pylori* infection. Previous research confirms findings that *H. pylori* infection prevalence remains higher among 40-60 year old groups compared to 20-39 year old groups as shown by infection test results [14]. Long-term exposure to dangerous environmental factors including harmful water and contaminated food and unhygienic sanitary practices frequently found in developing regions constitutes a possible reason [15]. BMI demonstrated a significant connection to *H. pylori* infection because *H. pylori*-positive subjects displayed greater BMI than the *H. pylori*-negative subjects. Numerous studies support that *H. pylori* infection could induce gastric acid changes but researchers still lack good understanding of this potential link to food consumption patterns and obesity development [16]. The relations between *H. pylori* infection and weight gain in affected patients remain unclear because research on the link between gastrointestinal distress and nutrient absorption needs further investigation. The relationships between *H. pylori* infection and Socioeconomic Status have established consistent findings in the medical field for a long period. The research data showed that patients residing in lower socioeconomic areas presented greater *H. pylori* infection rates [17]. Scientists worldwide established that individuals from lower socioeconomic status groups face higher risks for gastrointestinal diseases including *H. pylori* because of unclean sanitary conditions and water shortages and crowded living environments. Doctors should prioritize sanitation enhancements together with clean water provision to decrease *H. pylori* infection prevalence within affected risk populations [18]. As *H. pylori* infection leads to peptic ulcers doctors need to treat established *H. pylori* cases with suitable elimination therapies to enhance dyspeptic patients' symptoms and stop the development

of gastric cancer and peptic ulcer disease [19]. This research delivers important data about dyspeptic patients' H. pylori infection levels yet it contains several key restrictions. The research based its findings at only one medical facility thus restricting their potential application beyond this particular center.

## CONCLUSION

It is concluded that Helicobacter pylori infection is prevalent in a significant proportion of dyspeptic patients, with a frequency of 45% observed in this study.

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