

Prevalence and Clinical Implications of Helicobacter Pylori Infection in Dyspepsia Patients: A Cross-Sectional Study

Helicobacter Pylori Infection in Dyspepsia

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ABSTRACT

Objective: To determine the prevalence of *H. pylori* infection among patients presenting with dyspepsia and to describe their demographic and clinical characteristics.

Study Design: Descriptive cross-sectional study

Place and Duration of Study: This study was conducted at the outpatient department of Saidu Teaching Hospital from October 9, 2021, to April 9, 2022.

Methods: A total of 179 consecutive patients with dyspeptic symptoms were enrolled using non-probability consecutive sampling. Demographic data, socioeconomic status, comorbidities, smoking history, and anthropometric measurements were recorded.

Results: The mean age of participants was 34.1 ± 8.9 years. Males constituted 64.2%, while females accounted for 35.8%. Most patients (62%) resided in urban areas. Smoking was reported in 17.3%, and 34.1% belonged to low socioeconomic status. Diabetes mellitus was present in 22.9% of cases. The mean body mass index was 25.9 ± 3.8 kg/m², with 15.1% classified as obese. *H. pylori* infection was detected in 49.7% of patients.

Conclusion: Nearly half of dyspeptic patients were infected with *H. pylori*, indicating a substantial disease burden in this population.

Key Words: Dyspepsia, Helicobacter pylori, prevalence, gastritis, peptic ulcer disease, Pakistan

Citation of article: Fakhrealam, Jabbar A, Khan S, Uzair M, Mumtaz M, Khalid F. Prevalence and Clinical Implications of Helicobacter Pylori Infection in Dyspepsia Patients: A Cross-Sectional Study. Med Forum 2026;37(1):37-41. doi:10.60110/medforum.370107.

INTRODUCTION

Dyspepsia, commonly characterized by epigastric pain, is associated with various symptoms such as early satiety, epigastric burning, and discomfort following meals. The underlying causes of dyspepsia are diverse, with gastroesophageal conditions, particularly peptic ulcers and gastroesophageal reflux disease (GERD), being the most prevalent. Helicobacter pylori (*H. pylori*) gastritis is recognized as one of the primary etiological factors in dyspepsia¹. *H. pylori* is the most widespread chronic bacterial infection in humans², affecting individuals globally, regardless of age. It is estimated that approximately 50% of the world's population is infected, with higher rates of infection

occurring in developing countries, typically acquired at a younger age. In these regions, the prevalence in adults can exceed 80% by the age of 50 years³. *H. pylori* infection is closely associated with a range of significant upper gastrointestinal disorders, including chronic gastritis, peptic ulcer disease, and gastric malignancy. The incidence of *H. pylori* infection is strongly influenced by socioeconomic factors, explaining its higher prevalence in developing nations compared to developed countries like the United States⁴. *H. pylori* is a microaerophilic, gram-negative bacterium with a distinctive spiral shape. Its primary sites of infection are the stomach and duodenum. Biochemically, it is characterized by catalase, oxidase, and urease activity, with urease playing a central role in both the bacterium's survival and its ability to colonize the gastric mucosa. Urease, which constitutes more than 5% of the bacterium's total protein content, is critical for its pathogenicity and serves as the basis for several diagnostic tests, both invasive and non-invasive, used to detect *H. pylori* infection⁵. The mode of transmission of *H. pylori* remains uncertain, though current evidence suggests that the bacterium is primarily transmitted from person to person via oral-oral or fecal-oral routes⁶. Humans are the primary reservoir for the infection. The clinical consequences of *H. pylori* infection are significant, as it is associated with chronic gastritis, gastric mucosal atrophy, peptic ulcers, mucosa-

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Received: July, 2025

Reviewed: August-September, 2025

Accepted: October, 2025

associated lymphoid tissue (MALT) lymphoma, and gastric cancer (GC). Approximately 20% of individuals infected with *H. pylori* develop precancerous lesions, though only 2% ultimately progress to gastric cancer. The development of gastric cancer is influenced by various factors, including host genetic predisposition, environmental conditions, and the virulence of the infecting *H. pylori* strain^{7,8}. While primary care physicians are generally trained in the diagnosis and management of *H. pylori* infection through various educational programs⁹, surveys have indicated that their understanding of the bacterium's pathophysiology, diagnostic approaches, and therapeutic options remains inconsistent.

METHODS

This study was a descriptive cross-sectional analysis aimed at evaluating the prevalence of *Helicobacter pylori* (*H. pylori*) infection among patients presenting with dyspepsia. The study was conducted from October 9, 2021, to April 9, 2022, at the outpatient department (OPD) of Saidu Teaching Hospital, Swat. A non-probability consecutive sampling technique was employed for patient selection. The sample size for this study was calculated using Daniel's formula for health sciences research, considering an expected prevalence of *H. pylori* infection of 65% among dyspeptic patients. Based on this prevalence, the calculated minimum sample size was 179 participants, which was sufficient to provide meaningful statistical power for the analysis.

Inclusion Criteria: The study included patients aged between 18 to 50 years, both male and female, who were diagnosed with dyspepsia according to standard clinical definitions. Dyspepsia was characterized by epigastric pain, discomfort, or a feeling of fullness after meals, without any obvious structural, organic, or systemic pathology identified in routine clinical assessments.

Exclusion Criteria: Patients were excluded from the study if they had a history of significant comorbid conditions such as chronic liver disease, upper gastrointestinal bleeding, hepatic encephalopathy, pancreatic disease, gallbladder disease, or any serious concurrent illnesses that could affect the study outcomes.

Data Collection: The study protocol was approved by both the CPSP (College of Physicians and Surgeons Pakistan) and the hospital's ethical review committee, ensuring that all ethical guidelines were followed. Informed consent was obtained from all participants after they were fully briefed on the study's objectives, procedures, and potential risks. Each participant underwent a detailed history-taking process and a clinical examination. This included gathering demographic data such as age, gender, and socioeconomic status (SES), as well as lifestyle factors like smoking status and body mass index (BMI). Blood

samples were collected from each participant for *H. pylori* detection using enzyme-linked immunosorbent assay (ELISA), a widely used and reliable method for diagnosing *H. pylori* infection. All data were meticulously recorded in a pre-designed proforma to ensure uniformity and consistency across the study.

Data Analysis: The collected data were analyzed using MS excel version 2016. Descriptive statistical methods were employed to summarize the demographic and clinical characteristics of the study sample. Categorical variables, including gender, educational status, and *H. pylori* positivity, were expressed as frequencies and percentages. For continuous variables such as age and BMI, the data were analyzed using stratification by key factors such as gender, smoking status, SES, and other relevant variables.

RESULTS

The largest portion of the sample, 41.3%, fell within the 20-30 years' age group (Figure 1). This suggests that the study was predominantly composed of younger participants, reflecting either a younger population in the healthcare setting or an increased prevalence of dyspepsia in this age group. Following this, 33.5% of the participants were in the 30-40 years' age range, with 25.1% being in the 40-50 years' group.

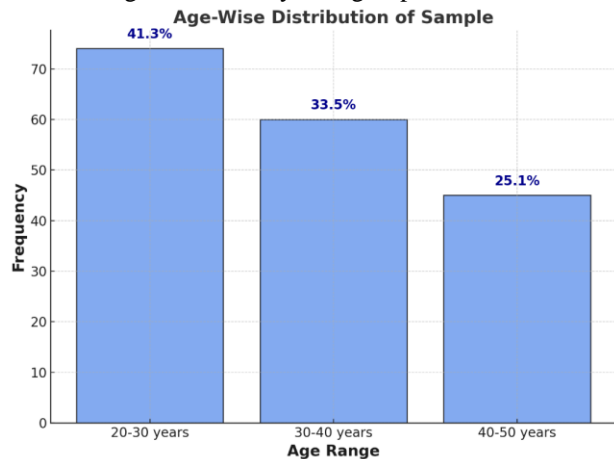


Figure.No.1. Age-wise distribution of the sample, showing the highest frequency in the 20-30 years' age group (41.3%), followed by the 30-40 years' group (33.5%), and the lowest in the 40-50 years range (25.1%).

The gender distribution of the sample revealed a significant male predominance, with 64.2% of the participants being male and 35.8% female (Figure 2). This suggests a skewed gender representation, which could reflect the general demographics of dyspepsia patients in the population sampled, or a trend within the healthcare setting.

The residence distribution of the sample showed that 62.0% of participants were from urban areas, while 38.0% were from rural areas (Figure 3). This urban-rural divide may be indicative of a broader trend where individuals from urban areas have easier access to

healthcare facilities, possibly leading to higher rates of diagnosis or treatment for dyspepsia.

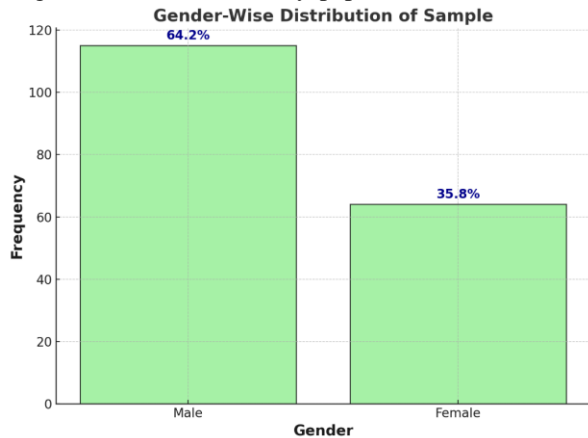


Figure.No.2: Gender-wise distribution of the sample, with a majority of males (64.2%) compared to females (35.8%).

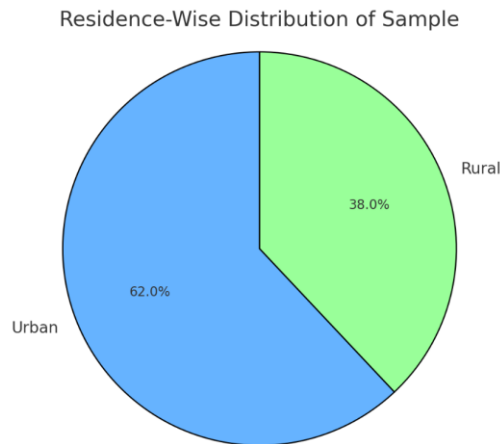


Figure.No.3: Residence-wise distribution of the sample, with 62.0% of participants residing in urban areas and 38.0% in rural areas

The distribution of participants by socioeconomic status (SES) showed that 52.0% of the sample came from the middle SES group, followed by 34.1% from the low SES group, and 14.0% from the high SES group (Table 1). This distribution indicates that most participants were from a middle-income background, which could have various implications.

Table No. 1: SES-Wise Distribution of Sample (n=179)

SES	Frequency	Percent
Low	61	34.1%
Middle	93	52.0%
High	25	14.0%
Total	179	100%

The sample's diabetes status revealed that the majority of participants (77.1%) were non-diabetic, while 22.9% had diabetes (Table 2). This distribution is relevant

because diabetes can affect the gastrointestinal system and may contribute to the development of dyspepsia.

Table No. 2: DM-Wise Distribution of Sample (n=179)

DM	Frequency	Percent
Yes	41	22.9%
No	138	77.1%
Total	179	100%

DISCUSSION

The results of this study provide important insights into the prevalence of *H. pylori* infection and its associations with various factors, shedding light on its implications for gastrointestinal health. The findings reflect patterns that are consistent with broader trends observed globally while also highlighting unique features of the sample population. In terms of age, the study found the highest prevalence of *H. pylori* infection among participants aged 41-60 years, with 38.7% testing positive for the infection. This aligns with previous studies that show middle-aged individuals tend to have the highest rates of *H. pylori* infection, likely due to the cumulative effect of ongoing exposure over time. The prevalence in this age group was notably higher than that in individuals over 60 years (19.5%), which supports the idea that *H. pylori* infection tends to accumulate as people age, with infections commonly acquired during early adulthood. These findings are consistent with studies conducted in regions like Nigeria, where the highest rates of *H. pylori* infection are also observed in the fourth and fifth decades of life^{10,11}. Regarding gender, the study revealed a significant male predominance, with 64.2% of participants being male. This trend might suggest gender-based differences in *H. pylori* prevalence, as several studies indicate that lifestyle factors, such as dietary habits, smoking, and alcohol consumption, could contribute to higher rates of infection in men. However, it is worth noting that while this study found no significant gender differences, other research has highlighted that females might be at greater risk for developing gastric cancer as a result of *H. pylori* infection, which further complicates the relationship between gender and infection outcomes¹². This calls for further investigation into gender-specific factors that could influence the clinical outcomes of *H. pylori* infections. The study also explored the relationship between *H. pylori* infection and socioeconomic status (SES), finding that the majority of participants (52%) came from middle-income backgrounds, followed by 34.1% from lower-income groups. This distribution is consistent with the well-established link between low SES and higher rates of *H. pylori* infection. Individuals

from lower SES groups often live in overcrowded conditions with limited access to sanitation and healthcare, which increases their exposure to the bacteria. Additionally, urban participants (62%) were more represented in this study, which may reflect better access to healthcare and diagnostic services in urban areas. As urbanization has been associated with improved hygiene and greater healthcare accessibility, these factors could be contributing to the observed patterns of *H. pylori* prevalence¹³. Smoking habits were also assessed in this study, and it was found that a large proportion of participants (82.7%) were non-smokers. Smoking is a well-established risk factor for gastrointestinal diseases, including *H. pylori* infection, as it exacerbates symptoms and weakens the stomach's protective mechanisms. The relatively low prevalence of smoking in this sample suggests that other lifestyle factors, such as diet and healthcare access, may be more influential in the development and prevalence of *H. pylori* infection in this population¹⁴. While smoking may not have been a predominant factor in this study, its role as an exacerbating factor for *H. pylori* and other gastrointestinal conditions should not be overlooked in future research. In terms of Body Mass Index (BMI), the study found that most participants (39.1%) had a normal BMI, while 29.6% were overweight and 15.1% were obese¹⁵. Obesity has been shown to contribute to several gastrointestinal disorders, and it is plausible that overweight and obese individuals may be more susceptible to *H. pylori* infection due to factors like altered gastric acid secretion¹⁶⁻¹⁸. The findings of this study suggest that while BMI was not a primary factor in *H. pylori* prevalence, its potential role in influencing gastrointestinal health outcomes, particularly in the context of infection, warrants further investigation.

CONCLUSION

Helicobacter pylori infection is a prevalent and significant health concern among patients with dyspepsia, affecting individuals across a broad spectrum of age groups, genders, and socioeconomic statuses. The high prevalence of this infection underscores its importance in the pathophysiology of dyspepsia and related gastrointestinal disorders. Given the widespread nature of *H. pylori* infection in our population, it is crucial to conduct further research to identify the underlying risk factors contributing to this burden. Understanding these factors will be pivotal in developing targeted interventions and refining clinical strategies for the prevention, diagnosis, and management of *H. pylori*-related diseases.

Author's Contribution:

Concept & Design or acquisition of analysis or interpretation of data:	Fakhrealam, Abdul Jabbar, Sajid Khan
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Final Approval of version:	All the above authors
Agreement to accountable for all aspects of work:	All the above authors

Conflict of Interest: The study has no conflict of interest to declare by any author.

Source of Funding: None

Ethical Approval: No.SGTH/21/381 Dated 80.09.2021

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