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Original Research Article

Prevalence and demographic distribution of *Helicobacter pylori* infection among dyspeptic patients attending a tertiary care hospital in Bangladesh

Swarna Paul*, Shaheen Akhter Chowdhury, Masuma Jannat, Showmik Paul[4], Shamim Ara Rima[5], Boosra Harun Prima[6], Saurav Das[7], Puja Mitra[8], Zannatul Ferdous Tania[9], Ayesha Ahmed Khan[10]

[1]Department of Microbiology, Chittagong Medical College, Chattogram, Bangladesh
[2]Department of Laboratory Medicine, Chittagong Medical College, Chattogram, Bangladesh
[3]Department of Forensic Medicine, Noakhali Medical College, Noakhali, Bangladesh
[4]Department of Biochemistry, Chandpur Medical College, Chandpur, Bangladesh
[5]Department of Oral Microbiology, Dental Unit, Rajshahi Medical College, Rajshahi, Bangladesh
[6]Department of Microbiology, Chattogram Maa O Shishu Hospital, Chattogram, Bangladesh
[7]Kutubdia Upazilla Health Complex, Cox's Bazar, Bangladesh
[8]Anowara Upazilla Health Complex, Chattogram, Bangladesh
[9]Department of Virology, Chittagong Medical College, Chattogram, Bangladesh
[10]Department of Microbiology, Institute of Applied and Health Sciences, Chattogram, Bangladesh

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***Correspondence:**
Dr. Swarna Paul,
E-mail: dr.swarnapaul@gmail.com

ABSTRACT

Background: *Helicobacter pylori* are a Gram-negative, spiral-shaped bacterium that colonizes the human stomach and is one of the most common chronic infections worldwide. It plays a critical role in the pathogenesis of various gastrointestinal disorders. Therefore, this study aims to determine the prevalence of *H. pylori* infection among dyspeptic patients attending a tertiary care hospital in Bangladesh and to analyze its demographic distribution.
Methods: This cross-sectional descriptive study was conducted in the Department of Microbiology, Chittagong Medical College, Chattogram, from January 2021 to December 2021. Suspected PUD patients with dyspepsia attending outdoors and admitted to the Department of Gastroenterology, CMCH were included. Among them, upper GI endoscopy was done in 130 symptomatic patients. SPSS (Statistical Package for Social Sciences) for Windows version 20 software was used for analysis.
Results: In this study of 130 dyspeptic patients, the majority (55.4%) were aged 20–40 years, with a male predominance (male-to-female ratio 1.45:1) and a mean age of 39.56±14.38 years. *Helicobacter pylori* were detected in 67.7% of patients by culture and in 74.6% by PCR, indicating the higher sensitivity of molecular diagnostics. Endoscopic evaluation revealed normal findings in 40% of cases, while antral gastritis (31.5%) was the most common abnormality, followed by duodenal ulcer (9.2%), gastric ulcer (8.4%), antral erosion (8.4%) and reflux oesophagitis (2.3%).
Conclusions: The present study highlights the significant prevalence of *Helicobacter pylori* infection among dyspeptic patients, particularly in individuals below the age of 40. The findings underscore the importance of age and gender as key demographic factors associated with *H. pylori* infection, with a noticeable male predominance and a higher prevalence in younger age groups.

Keywords: Culture, Dyspepsia, Demography, Gastroenterology, *Helicobacter pylori*

INTRODUCTION

Helicobacter pylori is a Gram-negative, spiral-shaped bacterium that colonizes the human gastric mucosa and has been implicated as a major etiological agent in various gastrointestinal diseases, including chronic gastritis, peptic ulcer disease, mucosa-associated lymphoid tissue (MALT) lymphoma and gastric carcinoma.[1] Globally, *H. pylori* infects more than 50% of the population, with a significantly higher prevalence in developing countries due to factors such as overcrowding, poor sanitation and limited access to healthcare.[2] In Bangladesh, where gastrointestinal complaints are frequent and access to standardized diagnostic tools remains uneven, understanding the prevalence and demographic patterns of *H. pylori* infection is crucial for guiding public health policy and clinical management strategies. Dyspepsia, defined as pain or discomfort centered in the upper abdomen, is one of the most common symptoms prompting consultation in outpatient settings.

While its etiology is multifactorial, *H. pylori* infection remains one of the most identifiable and treatable causes of both functional and organic dyspepsia.[3] In resource-limited settings like Bangladesh, empirical treatment of dyspepsia based on *H. pylori* prevalence has become a common practice, which makes local epidemiological data essential for evidence-based treatment approaches.[4] Several studies conducted across South Asia and other developing regions have demonstrated a high prevalence of *H. pylori* infection, often ranging from 60% to over 90% in dyspeptic patients.[5] The variation in prevalence is influenced by diagnostic methods, geographic location and socio-demographic characteristics such as age, gender, socioeconomic status and living conditions.[6] Studies in Bangladesh report prevalence rates ranging from 60% to 85% among dyspeptic patients, depending on the population studied and diagnostic techniques employed.[7]

Demographic factors play a significant role in the acquisition and persistence of *H. pylori* infection. Age-related differences are particularly notable, with acquisition often occurring in early childhood in developing countries, leading to high infection rates among adults.[8] Gender differences, though inconsistently reported, have shown slightly higher prevalence among males in some studies, potentially linked to behavioral and environmental exposures.[9] Low socioeconomic status, large family size, use of untreated water and poor hygiene have all been identified as risk factors for *H. pylori* infection in multiple epidemiological studies.[10]

The diagnostic approach to *H. pylori* detection includes invasive techniques such as endoscopy with biopsy for rapid urease test, histopathology or culture and non-invasive methods like urea breath test (UBT), stool antigen test and serology.[11] Despite numerous global studies, data specific to Bangladesh remain limited and fragmented. Given the unique environmental, socio-economic and healthcare delivery challenges in Bangladesh, localized data are imperative to design appropriate diagnostic and therapeutic protocols. Furthermore, with the increasing concern over antibiotic resistance and treatment failures, a detailed understanding of *H. pylori* prevalence concerning demographic profiles can inform targeted eradication strategies.[12] Therefore, this study aims to determine the prevalence of *H. pylori* infection among dyspeptic patients attending a tertiary care hospital in Bangladesh and to analyze its demographic distribution.

METHODS

This cross-sectional descriptive study was conducted in the Department of Microbiology, Chittagong Medical College, Chattogram over one year from January 2021 to December 2021. Suspected PUD patients with dyspepsia attending outdoors and admitted to the Department of Gastroenterology, CMCH were included. Among them, upper GI endoscopy was done in 130 symptomatic patients in the Department of Gastroenterology.

A purposive sampling technique was adopted in this study. All relevant history, thorough physical examination, clinical findings and laboratory records of every subject were systematically recorded in a pre-designed data sheet form for subsequent analysis by the computer program SPSS version 20. All the data were checked and edited after collection. Continuous variables were reported as the means±SD and the categorical variables were reported as percentages. Baseline characteristics were compared by the $\chi 2$ test (Chi-square test) for categorical data. Statistical significance was defined as $p<0.05$ and the confidence interval was set at 95% level. SPSS (Statistical Package for Social Sciences) for Windows version 20 software was used for analysis. Informed written consent was taken from the patients. Ethical clearance was taken from the Institutional Review Board.

Inclusion criteria

Patients with clinical features of PUD (e.g. nausea, vomiting, burning epigastric pain, etc). Endoscopically proved gastritis/ulcer/erosion.

Exclusion criteria

Patients who received bismuth compounds or, PPI in the previous 2 weeks, antibiotics in the previous 1 month or, *H. pylori* eradication therapy in the previous 6 months. Patients having peptic ulcer with active bleeding or perforation, regular users of NSAID or steroids and having co-morbid conditions (cardiac arrhythmia, congestive cardiac failure).

RESULTS

Table 1 shows the age and sex distribution of patients presenting with dyspepsia based on endoscopic findings. The majority of subjects (55.4%) were between 20–40 years of age, with the lowest incidence observed in those

over 60 years (11.5%). The mean age was 39.56±14.38 years. There was a male predominance with a male-to-female ratio of 1.45:1.

Table 2 presents the culture-based detection of Helicobacter pylori. Out of 130 patients, 88 (67.69%) tested positive for *H. pylori* using culture methods, whereas 42 (32.31%) showed no growth of the organism. Table 3 summarizes the detection of *H. pylori* by nested PCR. Among 130 patients, 97 (74.62%) were PCR-positive for *H. pylori*, while 33 (25.38%) tested negative, indicating higher sensitivity of PCR compared to culture.

Table 4 presents the distribution of endoscopic findings among the study subjects. The most common finding was normal endoscopy (40%), followed by antral gastritis (31.5%). Ulcerative and erosive lesions such as duodenal ulcer, gastric ulcer and antral erosion each occurred in fewer than 10% of cases. Reflux oesophagitis was the least common, seen in only 2.3% of patients.

Table 1: Distribution of age and sex among the study subjects (n=130).

Age in groups (in years)	Male (N, %)	Female (N, %)	Total (%)
20–40	43 (33.1)	29 (22.3)	72 (55.4)
40–60	22 (16.9)	21 (16.2)	43 (33.1)
>60	12 (9.2)	3 (2.3)	15 (11.5)
Mean±SD	--	--	39.56±14.38
Male:Female ratio	--	--	1.45:1

Table 2: Result of culture for the detection of *H. pylori* (n=130).

Culture result	No. of subjects	(%)
Positive	88	67.69
Negative	42	32.31

Table 3: Result of PCR for the detection of *H. pylori* (n=130).

PCR result	No. of subjects	(%)
Positive	97	74.62
Negative	33	25.38

Table 4: Distribution of endoscopic findings among the study subjects (n=130).

Endoscopic findings	No. of subjects	(%)
Normal	52	40.00
Antral gastritis	41	31.53
Duodenal ulcer	12	9.23
Gastric ulcer	11	8.46
Antral erosion	11	8.46
Reflux oesophagitis	3	2.31

DISCUSSION

In our study of 130 dyspeptic patients, the mean age was 39.56±14.38 years, with the majority of patients (55.4%) falling in the 20–40 year age group. This aligns with findings from previous studies that show a similar age distribution in patients presenting with dyspepsia.[3] The male-to-female ratio in our cohort was 1.45:1, suggesting a male predominance, a trend also seen in other studies of dyspeptic populations, where males tend to outnumber females.[13] The detection of Helicobacter pylori, a well-established etiological factor for peptic ulcers and gastritis, was of particular interest in our study. Among the 130 patients, 67.7% tested positive for *H. pylori* using traditional culture methods, while PCR identified the bacteria in 74.6% of the cases. The higher sensitivity of PCR compared to culture in detecting *H. pylori* aligns with findings from several studies, where PCR has consistently shown greater accuracy, particularly in detecting low bacterial loads or cases where culture may be negative due to factors such as prior antibiotic use.[11] Our study also underscores the utility of molecular methods like PCR, which not only improves diagnostic yield but also provides a faster, more reliable alternative to conventional methods such as rapid urease tests or histology. Similar findings were reported in a meta-analysis, which highlighted the superior sensitivity of PCR over traditional diagnostic methods.[14] PCR can detect even low levels of bacterial DNA, which can sometimes be missed by culture or biopsy, particularly in cases of gastritis or non-ulcer

dyspepsia.[15] Endoscopic examination revealed normal mucosa in 40% of the study population, while antral gastritis was the most common abnormal finding, identified in 31.5% of cases. Other lesions included duodenal ulcers (9.2%), gastric ulcers (8.2%), antral erosions (8.2%) and reflux oesophagitis (2.3%). These results reflect the common pattern observed in dyspeptic patients worldwide, where normal endoscopic findings and functional dyspepsia predominate, followed by gastritis and peptic ulcer disease.[3,11]

Similar studies have also shown a high prevalence of normal findings in endoscopy, ranging from 30% to 60%, indicating that many dyspeptic symptoms may arise from functional causes rather than structural abnormalities.[16] The 31.5% prevalence of antral gastritis in our cohort is consistent with other studies that have shown gastritis to be the most frequent finding in dyspeptic patients, particularly those infected with *H. pylori*.[17] In fact, *H. pylori* is closely associated with the development of chronic gastritis, which can progress to more serious conditions such as gastric ulcers and even gastric cancer in the long term.[18] The observed prevalence of peptic ulcers (duodenal and gastric) in our study (17.3%) also falls within the range reported in other dyspepsia studies, where ulcer prevalence has been documented at around 10–20%.[19] A striking feature of our study was the low incidence of reflux oesophagitis (2.3%), which contrasts with findings from studies conducted in Western populations, where gastroesophageal reflux disease (GERD) is a common cause of dyspepsia.[20] This discrepancy may be due to regional variations in the causes of dyspepsia or differences in dietary habits, lifestyle factors or even genetic predispositions between populations. The higher prevalence of normal endoscopic findings in our study reflects the global trend of increasing recognition of functional dyspepsia (FD), a condition defined by persistent or recurrent dyspeptic symptoms without any detectable structural abnormalities.[21] In fact, FD is now considered the most common cause of dyspepsia worldwide.

The study was conducted in a single hospital with a small sample size due to covid pandemic situation. So, the results may not represent the whole community.

CONCLUSION

The present study highlights the significant prevalence of *Helicobacter pylori* infection among dyspeptic patients, particularly in individuals below the age of 40. The findings underscore the importance of age and gender as key demographic factors associated with *H. pylori* infection, with a noticeable male predominance and a higher prevalence in younger age groups.

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