

A LOCAL STUDY ON THE PREVALENCE OF HELICOBACTER PYLORI INFECTION AMONG INDIVIDUALS WITH DYSPESIA: A CROSS-SECTIONAL DESCRIPTIVE DESIGN

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Abstract

Background: Affecting approximately half of people worldwide, the gastrointestinal pathogen *Helicobacter pylori* is recognized as the strongest known cause for gastric cancer.

Objective: The objective of this study was to determine the prevalence of *H. Pylori* infection in patients with dyspepsia presented in local tertiary care Hospital.

Material and Methods: This descriptive cross-sectional study was conducted in OPD of Holy Family Hospital Rawalpindi from August 2023 to February 2024. Subjects meeting the specified selection criteria were included in the study. The stool samples of the study participants were tested. All the data were meticulously compiled and subjected to analysis utilizing SPSS version 25.0. The data underwent stratification based on age, gender, and Proton Pump Inhibitor (PPI) usage to ascertain any potential modifying effects. Following the stratification process, the Chi-square test was employed to assess the data. A significance level of $p \leq 0.05$ was deemed as statistically significant.

Results: Total 84 patients out of 192 screenings, with dyspepsia were included. Among 84 patients, 37(44.0%) were males and 47(56.0%) were females. The mean age of patients was 34.5 ± 12.88 years. *H. pylori* was positive in 48(57.1%) among dyspeptic patients. When considering the distribution based on PPI use, 35 individuals (41.7%) reported prior use of PPI, while the remaining 49 individuals (58.3%) had not utilized.

Conclusion: In this patient cohort, 7.1% ($n=48$) were found to have *H. pylori* infection, representing a considerably high rate of occurrence. It is recommended that symptomatic individuals be thoroughly evaluated for *H. pylori*.

Keywords: Dyspepsia, Stool Test, *H. pylori*, PPT, Prevalence.

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Introduction:

Dyspepsia, a term used in clinical practice, is characterized by the presence of a cluster of symptoms that may include pain or burning in the upper abdomen, feeling full after eating, or feeling full too quickly. The source of these symptoms is believed to be within the gastrointestinal tract, despite the absence of any detectable structural or systemic abnormalities. It is worth noting that although dyspeptic individuals may also experience symptoms like nausea and bloating, which could potentially indicate the presence of the condition, the latest definitions of dyspepsia do not consider these particular symptoms as primary or distinguishing features of the disorder.¹⁻² In individuals with dyspeptic symptoms, comprehensive diagnostic evaluation reveals an underlying organic cause in approximately 20-25% of

cases. These causes can include peptic H-pylori gastritis, ulcer disease, Biliary pain, GER, malignancy, pancreatitis or medication-related issues. Conversely, the remaining percentage of patients are classified as having functional dyspepsia, a term used to describe the presence of symptoms persisting for a minimum of three months without a clear structural or biochemical basis for explanation. This differentiation is crucial in clinical practice for appropriate management and treatment strategies.^{3,4}

H. pylori, a spiral-shaped bacterium that thrives in low-oxygen conditions, stains Gram-negative, and tests positive for urease, has evolved specialized mechanisms to survive in the highly acidic environment of the stomach. *H. pylori*'s structure and enzymatic properties enable its survival in the acidic

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stomach environment⁵. *H. pylori* infection is frequently identified as a primary factor contributing to dyspepsia, a common gastrointestinal disorder characterized by symptoms such as abdominal pain, bloating, and discomfort, among others, and multiple research findings confirm that the successful elimination of *H. pylori* from the body leads to a significant amelioration of the symptoms experienced by individuals suffering from dyspepsia.⁶⁻⁷

The main mechanism primarily consists of changes in the secretion of gastric acid and continual inflammation of the gastric mucosa, along with the slowing down of gastric emptying and secretion in the antrum. These alterations in gastric physiology play a crucial role in the pathophysiology of various gastrointestinal disorders.⁸⁻⁹ The *H. pylori* stool antigen test is a readily available, inexpensive, and fast method for detecting the bacteria, among other invasive and non-invasive diagnostic approaches. Endoscopy is the best test for confirming causes of dyspepsia as well as to confirm *H. pylori*. However, it is an expensive and not an easily available test in low-income countries. That's why we conducted this study to diagnose as well as to utilize this test to diagnose it as a cause of dyspepsia.

The *H. pylori* stool antigen test (HPSAT) is a non-invasive and accurate method for diagnosing *H. pylori* infection. It involves collecting stool samples and testing them for the presence of *H. pylori* antigens.¹⁰

In a study, *H. pylori* were found present in 50.89% dyspeptic patients.¹¹ In another study, 88.3% patients were positive for *H. pylori*.¹² In another study, *H. pylori* infection was noted in 73.3% patients.¹³ In another study, the prevalence in dyspeptic patients was found to be 32.9%.¹⁴ Limited research has been conducted to assess the prevalence of *H. pylori* in the local population, specifically focusing on individuals experiencing dyspepsia. The existing studies have presented varying outcomes, indicating a need for further investigation in this area. Our study aimed to determine the frequency of *H. pylori* in patients with dyspepsia attending OPD clinics. This research is significant as *H. pylori* infection is a treatable factor contributing to dyspepsia, and early identification and management can lead to a reduction in morbidity, healthcare costs, and an enhancement in the quality of life for infected individuals.

Material and Method:

Study design: Descriptive study with a cross-sectional design

Setting and duration: Department of gastroenterology, Holy Family Hospital Rawalpindi from August 2023 to February 2024. All the participants were fully informed about the study before providing written informed consent. The study included 84 patients who met the pre-defined selection criteria out of 192 screened.

Inclusion criteria: Patients of both genders, aged 12 to 80 years, experiencing dyspeptic symptoms for more than six months.

Exclusion criteria: Individuals who had been using proton pump inhibitors or any antibiotic treatment within a four-week period prior to their enrollment. Additionally, patients were excluded from the study if they presented with peptic ulcer disease, gallstones, or tested positive for HCV.

Data collection procedure: The determination of the sample size was accomplished using the World Health Organization (WHO) calculator, with a confidence level set at 95%, a margin of error of 10%, and an anticipated percentage of *H. pylori* occurrence amounting to 32.9%.¹⁴ After taking the written consent, the study participants were asked to provide a stool sample for *H. pylori* testing in reference laboratory and tested using the stool antigen test kits (Rapid Immunoassay method, Healgen, USA)

Data analysis: All data collected during the study were organized and analyzed using SPSS v25.0 statistical software. Descriptive statistics such as mean and standard deviation were computed for quantitative variables like age, whereas frequency and percentage distributions were calculated for qualitative variables such as gender, co-morbidities, number of family members, quality of sanitation and area of residence, proton pump inhibitor (PPI) usage, and presence of *H. pylori* infection. The data was stratified based on age, gender, and PPI usage to examine the potential impact of these variables as modifiers. Following the stratification process, the Chi-square test was applied to assess the significance of any associations observed. In this study, a p-value of 0.05 or less was the threshold for statistical significance. The study flow chart is given in figure 1.

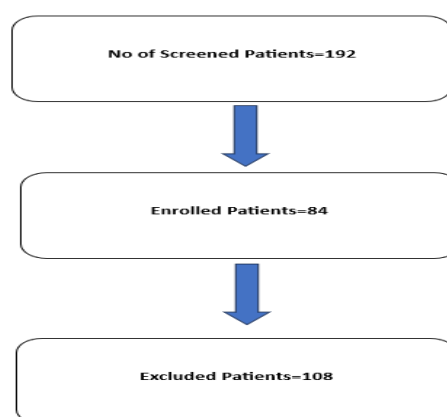


Figure 1: Flow Chart of the Study

Results:

A total of 84 individuals out of 192 screened, presenting with dyspepsia were enrolled in the study. The demographic breakdown revealed that out of the 84 participants, 37 individuals (44.0%) were male,

while 47 individuals (56.0%) were female. The average age of the participants in the study was 34.5 years, with a standard deviation of 12.88 years. This means that while the typical age was 34.5, ages within the group varied, with a typical spread of about 12.88 years around that average.

In terms of age distribution, 78 individuals (92.9%), fell within the age group of 50 years or younger, whereas a smaller proportion, comprising 6 individuals (7.1%), belonged to the age group older than 50 years. When considering the distribution based on proton pump inhibitor (PPI) use, it was found that 35 individuals (41.7%) reported prior use of PPI, while the remaining 49 individuals (58.3%) had not utilized PPI.

Sanitation levels were categorized as excellent (16.7%), good (58.3%), and fair (25.0%). In terms of the distribution based on residence, it was observed that 46 individuals (constituting 54.8%) resided in cantonment area, whereas 38 individuals (45.2%) were identified as residing outside of the cantonment area. The mean household size was 6.03 ± 1.81 member.

Moreover, among the patients included in the study, it was identified that 11 individuals (13.1%) were smokers, 3 individuals (3.6%) had diabetes, 6 individuals (7.1%) were diagnosed with hypertension, and 2 individuals (2.4%) were reported to be on NSAIDs. Among the dyspeptic patients, the presence of *H. pylori* infection was detected in 48 individuals (57.1%). Furthermore, a detailed analysis was conducted to stratify the *H. pylori* status in relation to various demographic and clinical variables, revealing no significant differences observed ($p > 0.05$) between the groups.

Table1: Frequency distribution of demographic variables		
Gender	Frequency	Percent
Male	37	44.0
Female	47	56.0
Total	84	100.0
Age groups		
≤50 years	78	92.9
>50 years	6	7.1
Total	84	100.0
PPI use		
Yes	35	41.7
No	49	58.3
Total	84	100.0
H. Pylori on stool test		
Positive	48	57.1
Negative	36	42.9
Total	84	100.0

Table2: Frequency distribution of different variables		
Sanitation	Frequency	Percent
Excellent	14	16.7
Good	49	58.3
Fair	21	25.0
Total	84	100.0
Residence		
IN-CANTT	46	54.8
OUT-CANTT	38	45.2
Total	84	100.0
Smoker		
Yes	11	13.1
No	73	86.9
Total	84	100.0
Pre-morbid		
Diabetes	3	3.6
Hypertension	6	7.1
Nil	75	89.9
Total	84	100.0
NSAIDS		
Yes	2	2.4
No	82	97.6
Total	84	100.0

Table3: Analysis of H. pylori stratified by different variables				
Variables		H. pylori		p-value
		Positive	Negative	
Gender	Male	25(67.6%)	12(32.4%)	0.087
	Female	23(48.9%)	24(51.1%)	
Age groups	≤50 years	46(59.0%)	32(41.0%)	0.221
	>50 years	2(33.3%)	4(66.7%)	
PPI use	Yes	19(54.3%)	16(45.7%)	0.655
	No	29(59.2%)	20(40.8%)	

Table4: Stratification of H. pylori in different variable

Variables	H. pylori		p-value	
	Positive	Negative		
Sanitation	Excellent	8(16.7%)	6(42.9%)	1.000
	Good	28(58.3%)	21(%)	
	Fair	12(25.0%)	9(%)	
Residence	IN-CANTT	46(54.8%)	19(22.6%)	0.752
	OUT-CANTT	35(41.7%)	17(20.23%)	
Smoker	Yes	6(7.14%)	5(5.95%)	0.852
	No	42(50.0%)	31(36.90%)	
Pre-morbid	DM	3(3.60%)	0(0.0%)	0.299
	HTN	3(3.60%)	3(3.60%)	
	Nil	42(50.0%)	33(39.28%)	
NSAIDs	Yes	1(1.19%)	1(1.19%)	0.836
	No	47(55.95%)	35(41.66%)	

Discussion:

Dyspepsia, a common culprit behind upper gastrointestinal ailments, has long posed a challenge in terms of its definition. Despite the various attempts at modifying the concept of dyspepsia, the fundamental issues surrounding its definition persist without resolution. Moreover, healthcare professionals continue to grapple with both diagnosing and treating this disorder effectively. The coexistence of reflux disease and irritable bowel syndrome (IBS) in many patients further complicates the already intricate process of diagnosing and managing dyspepsia.

Efforts to differentiate between these conditions have been made by focusing on factors such as the localization of symptoms, changes after meals, and alleviating factors. However, relying solely on these characteristics proves insufficient in distinguishing one disorder from another. Recent studies have shed light on this complexity, revealing that a significant proportion of individuals with dyspeptic symptoms and a diagnosis of epigastric pain syndrome (EPS) also exhibited esophageal acid reflux, a finding corroborated by pH monitoring despite no abnormalities detected during endoscopy.¹⁵

H. pylori, a prevalent human infection found worldwide without discrimination based on geographical regions, is believed to affect nearly half of the global population and over eighty percent of individuals in low- and middle-income countries. This bacterium is widely recognized as the primary cause of peptic ulcer disease and a major risk factor for the development of gastric cancer.

Despite the high prevalence of H. pylori, the majority of those infected remain asymptomatic, displaying no signs

or symptoms of the illness. The sole reservoir for this pathogen is humans, and the exact mode of transmission remains elusive. Factors contributing to the acquisition of H. pylori infection include inadequate sanitation, limited access to clean drinking water, substandard personal hygiene practices, and notably, poor living conditions attributable to socioeconomic disparities.¹⁶⁻¹⁷

In this study, 57.1% of people with dyspepsia (upper abdominal discomfort) were found to have an H. pylori infection. The prevalence of H. pylori among dyspeptic patients exhibits significant variability in findings reported across diverse studies conducted globally.¹⁸ For instance, the prevalence of this bacterial infection ranges from approximately 50% to 90% in Bangladesh, while in India, the percentage stands at around 70–90%.

Moreover, studies have revealed H. pylori rates of 70–90% in Africa, 70–90% in Japan, 48.8% in Germany, 26.6% in Switzerland, and 7.1% to 30% in the United States. This wide range of prevalence rates underscores the importance of further research to understand the factors contributing to such disparities and their implications for clinical management strategies.¹⁹

In Iran, Niknam and their team found that a considerable 31.2% of individuals experiencing dyspepsia (which can lead to gastric ulcers and other gastrointestinal issues) had an H. pylori infection. This high prevalence underscores the significance of screening and treating H. pylori infection in individuals presenting with dyspeptic symptoms, as it can lead to serious complications if left untreated. The results of this research emphasize the value of detecting and managing H. pylori infections early to halt the progression of associated illnesses and enhance the overall well-being of individuals with the infection.²⁰

Hamrah et al. presented findings indicating the presence of H. pylori in a significant 75.6% of dyspeptic patients in Afghanistan, shedding light on the prevalence of this bacterial infection in the region. In a separate research endeavor carried out in India, Satpathi et al. documented a slightly lower but still noteworthy frequency of H. Pylori infection, standing at 58.8% among dyspeptic patients, thereby emphasizing the widespread nature of this pathogen in diverse populations.²¹⁻²²

Furthermore, investigations conducted in Pakistan yielded consistent results, with two studies independently reporting a prevalence rate ranging between 50% to 51% for H. pylori in individuals suffering from dyspepsia, underscoring the persistent challenge posed by this bacterium in the realm of gastrointestinal health.

The collective data from these studies underscore the urgent need for further research and public health interventions aimed at addressing the A significant occurrence of H. pylori infection exists in dyspeptic patients worldwide, highlighting the importance of comprehensive strategies to combat this prevalent gastrointestinal pathogen. Understanding the varying prevalence rates of H. pylori in different regions can provide valuable insights for healthcare professionals and policymakers to tailor effective prevention and treatment measures to mitigate the burden of this infection on

affected populations. By elucidating the regional differences in *H. pylori* prevalence, these studies contribute to the growing body of knowledge aimed at enhancing our understanding of the epidemiology and clinical implications of this common bacterial infection.²³⁻²⁴

The evidence provided in the aforementioned study unequivocally demonstrates that the prevalence of *H. pylori* is markedly elevated in low- and middle-income countries (LMICs) compared to affluent nations. This substantial disparity in *H. pylori* incidence between LMICs and high-income countries underscores the importance of socioeconomic factors in the prevalence of this bacterial infection. Our research findings not only support but further bolster the notion that *H. pylori* is a condition that disproportionately affects populations in less developed regions of the world.

Conclusion:

This study reveals a high prevalence of *H. pylori* infection, with 57.1% of the study population testing positive. This underscores the importance of promptly evaluating individuals presenting with dyspeptic symptoms for *H. pylori* infection, as it appears to be a common underlying cause in this population. Detecting and treating the condition early may stop more severe problems in the digestive tract from arising.

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