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CORRELATION PATTERNS OF SYMPTOMS AND PREVALENCE RATE OF HELICOBACTER PYLORI AMONG SUSPECTED GASTRITIS PATIENTS AT BAYAZID ROKHAN TEACHING HOSPITAL, KABUL, AFGHANISTAN

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Abstract

Background: *Gastritis, an inflammation of the stomach lining, is commonly caused by Helicobacter pylori (H. pylori), particularly in low-income regions due to poor sanitation. H. pylori infection increases the risk of peptic ulcers and gastric cancer, making its study in Kabul, Afghanistan, crucial for public health.*

Aims: *This study assessed H. pylori prevalence among suspected gastritis patients at Bayazid Rokhan Teaching Hospital and analyzed its correlation with demographic factors and gastrointestinal symptoms.*

Methodology: *A cross-sectional study was conducted on 246 patients from November 2023 to January 2024. Stool samples were analyzed using antigen detection tests, and data were processed with SPSS 26 to determine infection prevalence and symptom correlations.*

Results: *H. pylori infection was found in 67.9% of patients, with a higher rate in females (51.5%) and the highest prevalence in the 19–28 age group (32.3%). Epigastric pain (66.5%), nausea (63.5%), and heartburn (60.5%) were significantly associated with infection.*

Conclusion: *H. pylori-induced gastritis is prevalent in Kabul, necessitating improved hygiene, routine screening, and targeted treatments. Further research should focus on multimodal diagnostics and resistance-based therapies..*

INTRODUCTION

Gastritis which is the inflammation of the stomach lining, and it can be chronic or acute. The most common causes of acute gastritis are irritants such as alcohol, no steroidal anti-inflammatory drugs (NSAIDs), and infections. In distinction, chronic gastritis is primarily associated to *Helicobacter pylori* (H. pylori) infection, as well as some autoimmune disorders (1). This inflammation weakens the stomach's protective lining, increasing susceptibility to ulcers and, in severe cases, gastric sarcoma. Symptoms of gastritis vary depending on severity and type but characteristically include nausea, vomiting,

bloating, indigestion, loss of appetite, and abdominal discomfort (2). If it is left untreated, gastritis can lead to complications such as stomach bleeding.

H. pylori infection, excessive alcohol consumption, prolonged NSAID use, stress, bile reflux, and autoimmune disorders are the significant factors which mainly contribute to gastritis. In low income regions, where poor sanitation and overcrowding exists, the most common of gastritis is H. *Pylori* (3). Beyond its individual health effects, gastritis also executes a significant financial burden, especially in economically deprived nations. In such regions, *H. pylori*-linked gastritis is highly dominant, with infection rates beyond 70% in some areas (4). This high incidence rate is mainly due to inadequate sanitation, poor hygiene practices, and the consumption of contaminated water. The financial burden comprises both direct costs—such as hospital visits, medications, and diagnostic tests—as well as indirect costs related to the productivity and activities lost due to the suffering (5). In many low and middle income countries (LMICs), ineffective public health measures further exacerbate this condition.

H. pylori, a gram-negative bacterium that inhabits the stomach lining and interrupts the stomach's natural defense mechanisms, leading to increased acid production and obstinate inflammation. Research strongly associates *H. pylori* infection with peptic ulcers, duodenal ulcers, and gastric cancer (7). The main rout of transmission of this bacterium are oral-oral and fecal-oral transmission, making poor sanitation and overcrowding significant risk factors. Globally, Asia, Africa, and Latin America reports the highest rates of *H. pylori* infection cases.

In Kabul, Afghanistan, the prevalence of gastritis reflects the patterns observed in other low-income regions. Poor sanitation, limited access to clean water, and widespread *H. pylori* infection contribute to a high disease burden (8). A recent study in Afghanistan found that over 60% of dyspeptic patients tested positive for *H. pylori*, highlighting the urgent need for targeted public health measures (9). The nonappearance of routine screening programs and the limited availability of effective treatments further complicate the issue.

Given these challenges, this study aimed to assess the prevalence of *H. pylori*-induced gastritis among patients with suspected gastritis at Bayazid Rokhan Teaching Hospital using antigen detection methods. This study focuses on this hospital to provide region-specific insights into infection prevalence rate, thereby informing future intervention strategies to reduce hospital-acquired infections in LMICs.

Methodology

We conducted this cross-sectional hospital-based study at Bayazid Rokhan Teaching Hospital in Kabul, Afghanistan, to assess correlation patterns of symptoms and prevalence rate of *H. Pylori* among patients suspected of gastritis using antigen detection methods (10). Patients visiting the hospital's gastrointestinal clinic were selected for participation. Bayazid Rokhan Teaching Hospital, is located on 3rd Street, Karte Nawe, Kabul. The study included 246 male and female patients who visited the gastrointestinal clinic between November 2023 and January 2024.

A combination of purposive and randomized sampling techniques was used for participant selection. The study considered previous prevalence rates of *H. pylori* infection reported at the hospital using antibody detection methods by Ayodele et al. The required sample size was determined using Cochran's sample size formula, commonly applied in epidemiological studies to ensure statistical reliability (11). A standard normal deviation of 1.96, reflecting a 95% confidence level, was used. With a population prevalence rate of 19.6% (0.196) and a margin of error of 0.05, the sample size was calculated as 242.

Participants included were individuals who presented with gastritis symptoms and provided informed consent. Those without gastritis symptoms were excluded. Stool samples were collected in sterile containers labeled with patient information and analyzed within 24 hours using *Helicobacter pylori* antigen and fecal occult blood screening kits. The On-Site *H. pylori* Ag Rapid Test (USA) and the ROSTEC Rapid Diagnostic Test for Fecal Occult Blood (FOB) were used for diagnosis. Stool antigen testing is a widely accepted, non-invasive diagnostic tool with high sensitivity and specificity (12).

Data analysis was conducted using SPSS 26 to determine the frequency of *H. pylori* infections among symptomatic gastritis patients. Results were

then organized into tables for easy interpretation and comparison.

Result:

A total of 246 patients attending Bayazid Rokhan Teaching Hospital in the 8th Area of Kabul, Afghanistan, were enrolled in this study. The sociodemographic characteristics of the participants are summarized in Table 1. Among them, 124 (50.4%) were male, and 122 (49.6%) were female (Figure 1).

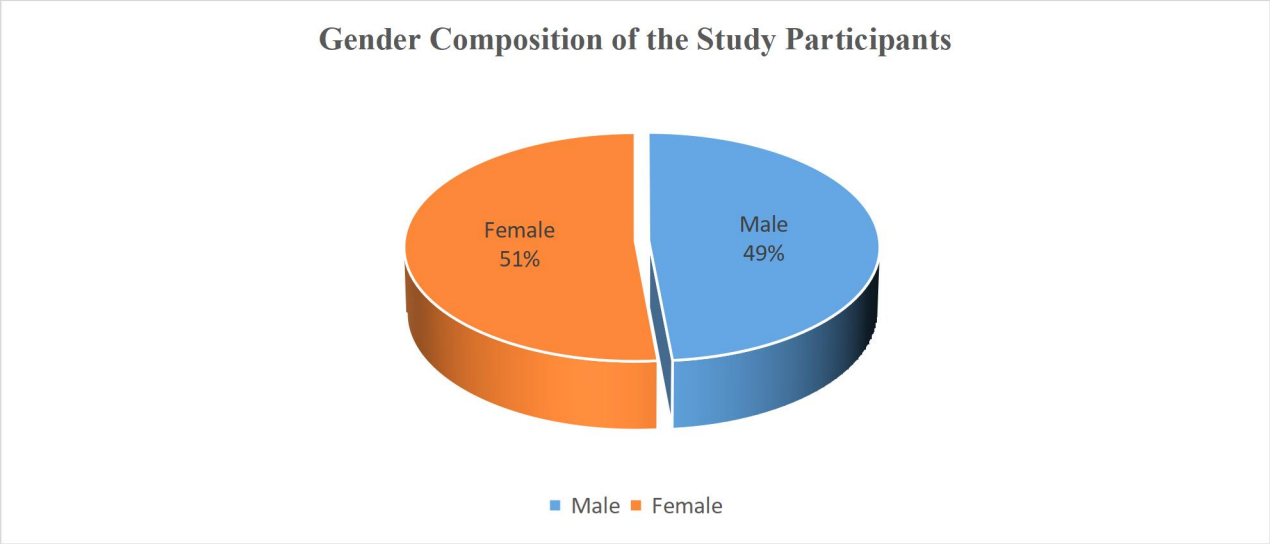

Figure 1 Gender Composition of the Study Participants

The participants were categorized into different age groups, with 46 (18.7%) individuals aged ≤18 years, 66 (26.8%) aged 19–28 years, 58 (23.6%) aged 29–38 years, 46 (18.7%) aged 39–48 years, and 30 (12.2%) aged 49–60 years.

Table 1 Demographic Distribution of Participants by Gender and Age

		n	n%
gender	male	124	50.4%
	female	122	49.6%
Age	≤18	46	18.7%
	19-28	66	26.8%
	29-38	58	23.6%
	39-48	46	18.7%
	49-60	30	12.2%

Table 2 presents the prevalence of Helicobacter pylori (H. pylori) infection among different gender and age groups, categorizing individuals into H. pylori positive and H. pylori negative cases. The data includes both absolute counts and column-wise percentages. Among infected individuals, 51.5% are female and 48.5% are male, whereas among non-infected individuals, 54.4% are male and 45.6% are female, indicating a slightly higher prevalence among females. In terms of age distribution, the 19-28 age group has the highest proportion of H. pylori positive cases (32.3%), while the 49-60 age group has the lowest (12.0%). Among H. pylori negative individuals, the highest proportions are in the 29-38 (25.3%) and 39-48 (24.1%) age groups, with the lowest in the 19-28 group (15.2%). This suggests that H. pylori infection is more prevalent in younger individuals, particularly those aged 19-28, and slightly more common in females within this study population.

Table 2 Prevalence of H. pylori Infection by Gender and Age Group

		H. pylori			
		Positive		Negative	
		n	n %	n	n %
Gender	Male	81	48.5%	43	54.4%
	Female	86	51.5%	36	45.6%
Age	≤18	28	16.8%	18	22.8%
	19-28	54	32.3%	12	15.2%
	29-38	38	22.8%	20	25.3%
	39-48	27	16.2%	19	24.1%
	49-60	20	12.0%	10	12.7%

Table 3 presents the relationship between Helicobacter pylori (H. pylori) infection and various gastrointestinal symptoms, including nausea, vomiting, belching, anorexia, Epigastric pain, heartburn, and abdominal pain. The data is categorized into H. pylori positive and H. pylori negative cases, providing absolute counts and corresponding percentages for each symptom.

Among H. pylori-positive individuals, 63.5% reported nausea, a proportion nearly identical to that observed in H. pylori-negative individuals (63.3%), suggesting no significant association. Vomiting was reported by 28.1% of H. pylori-positive individuals compared to 32.9% of H. pylori-negative individuals, indicating that vomiting may not be a predominant symptom of infection. Belching was more common in the H. pylori-positive group (41.3%) than in the negative group (36.7%), but the difference is not substantial. Anorexia was more frequently observed in H. pylori-negative individuals (67.1%) than in those who tested positive (55.7%), which is an unexpected trend.

Symptoms such as Epigastric pain (66.5%), heartburn (60.5%), and abdominal pain (59.3%) were all more prevalent among H. pylori-positive individuals than among the negative group, where Epigastric pain (77.2%) was the most commonly reported symptom. Notably, abdominal pain was also common among both groups, with a slightly higher prevalence in the negative cases (60.8%) compared to the positive cases (59.3%). Additionally, an unusual entry, "3.00", appears under belching and abdominal pain, possibly indicating a data entry or categorization error.

Overall, while Epigastric pain and heartburn appear to be strongly associated with H. pylori infection, other symptoms such as nausea and vomiting show minimal variation between positive and negative cases.

Table 3 Association of H. pylori Infection with Gastrointestinal Symptoms

		H. pylori			
		Positive		Negative	
		n	n%	n	n%
Nausea	Yes	106	63.5%	50	63.3%
	NO	61	36.5%	29	36.7%
Vomiting	Yes	47	28.1%	26	32.9%
	No	120	71.9%	53	67.1%
Belching	YES	69	41.3%	29	36.7%
	NO	98	58.7%	49	62.0%
Anorexia	Yes	93	55.7%	53	67.1%
	No	74	44.3%	26	32.9%
Epigastric pain	Yes	111	66.5%	61	77.2%
	No	56	33.5%	18	22.8%
Heartburning	Yes	101	60.5%	49	62.0%

	No	66	39.5%	30	38.0%
Abdominal pain	Yes	99	59.3%	48	60.8%
	No	67	40.1%	31	39.2%

Discussion

This study was conducted at Bayazid Rokhan Teaching Hospital in Kabul, Afghanistan, and found that *H. pylori* infection was present in 67.9% of the 246 patients suspected with gastritis due to *H. Pylori*. Remarkably, the infection rate was slightly higher among females (51.5%) with respect to males (48.5%). The most affected age groups were individuals aged 19-28 years (32.3%) and 29-38 years (22.8%), indicating that younger populations are more vulnerable. These results are consistent with research conducted in Andkhoy, Afghanistan, where *H. pylori* prevalence was reported at 75.6% (13), as well as findings from Paktia, Afghanistan, which established a strong correlation between chronic gastritis and *H. pylori* infection (14).

H. pylori remains widespread on a global scale, predominantly in developing countries where poor sanitation, overpopulation, and restricted access to clean water facilitate its transmission (15). Studies in Iran and Pakistan have reported prevalence rates ranging between 60-80%, consistent with findings from Afghanistan (16). In Iran, a study conducted in Mashhad found an H. pylori seroprevalence of 72.3% among gastritis patients, emphasizing the influence of environmental and dietary factors (17). Similarly, research in Pakistan documented a prevalence rate of 66%, with higher infection rates among lower-income populations (18). In contrast, developed countries report significantly lower prevalence rates (30-40%), largely due to improved sanitation, healthcare infrastructure, and lifestyle changes (19). For example, a study in the United States found a much lower H. pylori prevalence among resettled refugees, suggesting that better living conditions and healthcare accessibility contribute to reducing transmission (20).

The study also found a slightly higher prevalence among females (51.5%), a finding that contradicts some previous research indicating that males tend to have higher infection rates (21). This discrepancy may be influenced by hormonal and genetic factors, as suggested by a systematic review that explored sex-based susceptibility to H. pylori infection (21). Regarding age distribution, the highest infection rate was observed in the 19-28 age group (32.3%), reinforcing existing evidence that H. pylori is often acquired during childhood and persists into adulthood (22).

The study also investigated the relationship between H. pylori infection and gastrointestinal symptoms, identifying strong associations with Epigastric pain (66.5% among positive cases and 77.2% in negative cases), nausea (63.5%), and heartburn (60.5%). These findings align with previous studies demonstrating that H. pylori infection increases gastric acid production, leading to gastritis and peptic ulcer-related symptoms (23). However, the presence of these symptoms in H. pylori-negative individuals suggests that other factors, such as dietary habits, stress, and non-bacterial causes of gastritis, may also contribute to these symptoms.

The high prevalence of H. pylori in Afghanistan underscores the urgent need for improved hygiene, better access to clean water, and enhanced healthcare services. Additionally, antibiotic resistance remains a growing challenge in H. pylori treatment, necessitating updated treatment regimens that consider local resistance patterns (24). This concern is further highlighted by findings from Muhammad et al. (2019), emphasizing the importance of resistance-based treatment strategies to improve eradication success rates.

Despite the valuable insights provided, the study has several limitations that should be acknowledged. The cross-sectional design limits the ability to establish causality between H. pylori infection and specific symptoms, and reliance on a single diagnostic method may have affected the accuracy of prevalence estimates. Future research should incorporate multiple diagnostic techniques and longitudinal study designs to provide a more comprehensive understanding of H. pylori infection patterns and its associated risk factors (25).

Conclusion

This study highlights the high prevalence of H. pylori infection (67.9%) among gastritis patients in Kabul, Afghanistan, with a slightly higher rate in females than males and the highest infection rate observed among younger individuals aged 19-28. The strong association between H. pylori and symptoms such as Epigastric pain, nausea, and heartburn reinforces its role in gastric inflammation and ulcer development. However, the presence of these symptoms in H. pylori-negative individuals suggests that other factors, such as dietary habits and stress, may also contribute to gastritis.

These findings emphasize the urgent need for improved diagnostic capabilities, public health initiatives, and targeted treatment strategies to reduce H. pylori transmission and manage associated diseases effectively. Additionally, antibiotic resistance remains a growing concern, requiring updated treatment protocols based on local resistance patterns. While the study provides valuable insights, its cross-sectional design and reliance on a single diagnostic method limit the ability to establish causal relationships. Future research should focus on longitudinal studies and multiple diagnostic approaches to gain a deeper understanding of infection trends and treatment effectiveness.

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Recommendations

To mitigate H. pylori transmission, targeted interventions should focus on enhancing hygiene practices, improving sanitation, and increasing public health awareness. Routine screening in high-risk populations and the adoption of more accessible and accurate diagnostic techniques are essential for early detection. Additionally, optimized treatment regimens that address antibiotic resistance should be implemented to improve eradication rates. Future research should incorporate longitudinal studies and multimodal diagnostic approaches to deepen the understanding of infection dynamics and therapeutic outcomes.

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