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Prevalence of Helicobacter Pylori Infection and Associated Complications at Marjan Hospital, Babylon

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Abstract

Background: Helicobacter pylori (H. pylori) infection affects a broad range of age groups, with varying prevalence influenced by socioeconomic factors. Methodology: A descriptive analytical study was conducted. The study included 64 patients from October 2023 to March 2024 to assess the incidence rate of H. pylori and determine complications associated with the infection among patients. A non-probability convenience sample of 64 patients with H. pylori was selected from Marjan Educational Hospital for Digestive System. Data were collected and analyzed using descriptive and inferential statistical analysis procedures.

Results: Higher infection rates were noted among educated individuals and those from high-income families. The 43-53 age group showed the highest infection rate (43.75%), particularly among females (78.12%). Chronic H. pylori infections correlate strongly with gastrointestinal conditions like gastritis and peptic ulcers. Notably, 31.25% of participants had gastric ulcers and gastroesophageal reflux (GERD). Other conditions associated with H. pylori include gastritis (18.75%), duodenitis (12.5%), and duodenal ulcers (6.25%). Symptoms reported included abdominal pain (59.37%), frequent burping (48.43%), and bloating (42.81%). The most common H. pylori treatments were triple therapy (31.25%), dual therapy (23.43%), antibiotics (20.31%), and proton pump inhibitors (18.75%), with 6.25% receiving no treatment. Conclusion Early detection and treatment of H. pylori infections are crucial for preventing severe gastrointestinal diseases. Current treatment guidelines are evolving to address increasing antibiotic resistance, emphasizing bismuth-based quadruple therapy and susceptibility testing for tailored approaches. This study highlights the continued need for research into H. pylori management and its public health implications.

Keywords: prevalence, Helicobacter Pylori infection, Complications.

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Introduction

Helicobacter pylori (H. pylori) infection is a common human infection, affecting over 50% of the population. Prevalence varies significantly, with higher rates in rural developing areas (over 80%) compared to urban developed areas (under 40%), due to differing socioeconomic and hygienic conditions. H. pylori infection is usually acquired during childhood; infected people usually remain asymptomatic, but about 30% of individuals may develop mild to severe upper gastrointestinal diseases such as gastritis, peptic ulcer, gastric cancer, or mucosa-associated lymphoid tissue (MALT) lymphoma.[1]. Helicobacter pylori (H. pylori) is a gram-negative microaerophilic flagellated bacterium that specifically infects the stomach sat approximately50%oftheworld'spopulation . Helicobacter bacteria are the only known microorganisms that can thrive in the highly acidic environment of the stomach. Its helical shape (hence the name helicobacter) is thought to have evolved to penetrate and colonize the mucus lining. It colonizes and grows in human gastric epithelial tissue and mucus. Infection rates reach 50% in adults in industrialized countries and approximately 90% in the developing world. Untreated, infections persist for life, despite innate and adaptive immune responses [2].

According to Pediatrics, infection with H. pylori can current as abdominal pain, vomiting, and less usually, refractory iron deficiency anemia or failure to thrive. Chronic infection with H. pylori can place the patient at high risk of having peptic ulcers and gastric malignancies. The relative risk of gastric carcinoma is increased about 2-3 times more in an H. pylori-infected person when associated to an uninfected one [3]. Helicobacter pylori bacteria have been implicated as an important agent in the pathogenesis of peptic ulcer disease and are considered an essential factor for the development of gastric cancer. For this reason, the World Health Organization (WHO) has classified this bacterium as carcinogenic [4,5].

The three primary pathogenic mechanisms linked to the virulence factors of *H. pylori* including immune evasion, disease induction and colonization,which is supported by adhesins, flagella, urease and the chemo taxis system. Immune evasion is achieved through protein that promote immune escape. Vacuolating-cytotoxin A (vacA) and cytotoxin-associated gene A (cagA) contribute to disease induction by directly damaging gastric epithelial cells and fostering of clinical diseases[6]

The bacteria can be spread from person to person, mainly via the fecal-oral route. The bacteria and damage to the gastric mucosa can lead to diseases such as peptic ulcers and stomach cancer [7]. According to the findings of different studies, gender, occupation, poor sanitary conditions, overcrowding, and unsafe water supply sources are the factors that influence the prevalence of H. pylori infection[8].

Methodology

A descriptive analytical study was conducted to investigate Helicobacter pylori infection and its complications from October 2024 to March 2025. The study took place at Marjan Educational Hospital with the Center for Digestive System. Utilizing a non-probability convenience sampling method, we included 64 patients diagnosed with H. pylori. A comprehensive questionnaire was developed based on an extensive literature review to collect data. literature. The questionnaire gathered demographic information, including sex, age, residency, education level, and duration of infection, over six months. Additionally, information regarding the infection was documented through positive H. Pylori test results, illustrating the prevalence of the disease among the patient population.

Ethical approval

The institutional ethics committee of the Babylon Health Directorate (Approval No. BH/18/2023) adopted this study protocol. All the participants' legal guardians gave informed consent. Participation was voluntary, and anonymity and confidentiality were assured.

Statistical analysis

Data were statistically analyzed by the Chi-square test. A probability level of 0.05 was accepted as statistically significant. Statistical analyses were carried out using IBM SPSS Statistics version 28. Descriptive statistics (df, standard deviation, frequencies, percentages) were used to characterize participants and provide a description of them. or Fisher's exact test, where appropriate. A p-value of < 0.01 was considered significant.

Results

According to Table (1), the prevalence of Helicobacter pylori infection was higher in females (78.12%) than in males (21.87%), and higher in urban areas (81.25%) than in rural areas This very low P-value indicates a highly significant difference in the distribution of genders within the studied population. Similarly, this low P-value indicates a highly significant difference in the distribution of residency (rural vs. urban).

Table 1 distribution of residences and sex

Variables		Frequent	Present %	χ^2	Df = 1
Gender	Female	50	78.12	20. 25	P-value < 0.001
	Male	14	21.87		
Residency	Rural	12	18.75	25	P-value < 0.001

Table 2 reveals that Helicobacter pylori infection is most common among patients aged 43-53 years (43%). The infection rate was highest among patients with a graduate or postgraduate degree (87.5%). The majority of patients had an infection duration of one to five years (40.62%), and educators were the most affected occupation (46.87%). Additionally, patients with a high economic status had the highest infection rate (53.12%). The results suggest that there is a statistically significant difference in the observed frequencies of different occupations in the dataset, and the occupations are not uniformly distributed.

Table (2) Demographic Feature Pattern

Ratings	Variables	NO.	%	χ^2	P-value
patient age (years)	21-31	18	28.12	16.5	P-value < 0.001
	32-42	12	18.75		
	43-53	28	43.75		
	54-64	6	9.37		
Education	Primary or secondary school	8	12.5	36	P-value < 0.001
	Graduate or postgraduate	56	87.5		
infection period	1-11 month	22	34.37	2.031	P-value > 0.05
	1-5 year	26	40.62		
	more than 6 year	16	25		
Occupation	Educator	30	46.87	54.48	P-value < 0.001 (df = 5)
	Student	12	18.75		
	Housewife	4	6.25		
	Skilled worker	14	21.87		
	Dentist	2	3.12		
	Engineer	2	3.12		
Economic Status	High	34	53.12	11.75	P-value < 0.01
	Moderate	20	31.25		
	Low	10	15.62		

Table 3 shows that H. pylori-related complications from laparoscopic examinations most frequently involve gastric ulcers and gastroesophageal issues (31.25% of the study sample). Duodenal ulcers (6%), gastritis (18.75%), and duodenitis (12.5%)occurred less often.

Table (3) The most common symptoms of Infection by H. Pyloric

Patient Symptoms	Frequent	%	Total
Belly pain or Swelling with Discomfort	38	59.37	64
Loss of Appetite.	21	32.81	64
Bloating.	27	42.81	64
Frequent burping	31	48.43	64
Unexplained weight loss	18	28.12	64
Nausea or Indigestion	22	28.43	64

Table (4): Distribution of Complications of Infection H. Pylori

Complication disease	Frequency	Percent %
Duodenitis	8	12.5
Gastritis	12	18.75
Gastric ulcer	20	31.25
Duodenal ulcer	4	6.25
Gastro esophageal Reflux	20	31.25
Total	64	.

The most common symptoms of H. pylori infection, as shown in Table 4, were abdominal pain or swelling with discomfort (59.37%), frequent burping (48.43%), bloating (42.81%), loss of appetite (32.81%), nausea or indigestion (28.43%), and unexplained weight loss (28.21%).

Table 5 indicates that the most common treatment regimens for H. pylori infection were triple therapy (Pylo kit) at 31.25%, followed by dual therapy (Amoxicillin and Omeprazole) at 23.43%. Antibiotics and PPIs (Nexium or Omeprazole) were used in 20.31% and 18.75% of cases, respectively. while(6.25%) of patients received no treatment.

Table (5) Classification of medication used to treat H. pylori

Type Of Treatment	NO.	%
Triple Therapy (Pylo Kit)	20	31.25
Dual Therapy (Amoxicillin, Omeprazole)	15	23.43
Antibiotic	13	20.31
Proton Pump Inhibitor – PPI (Neuxium or Omeprazole)	12	18.75
No Treatment used	4	6.25
Total	64	

Discussion

The results showed that H. pylori infection affects a wide range of age groups, indicating that all ages are susceptible to the disease, but the infection rate varies by age. Notably, high infection rates were more common among highly educated individuals and those from high socioeconomic backgrounds .These

findings contradict the study by [9], highlighting the variation in the prevalence of the bacteria between countries and populations.

The current study showed that the 43-53 age group had the highest rate of infection (43.75%), aligning with [10]in Babylon Governorate. Moreover, females had a higher rate of infection (78.12%) than males (21.87%).

The 43-53 age group is at a higher risk of infection due to their increased exposure from being highly active in the workforce and community. occupational factors, underlying conditions, immune function changes, and behavioral factors[10]. These factors include increased social interactions, contact with children, certain professions, underlying health conditions(comorbidities), and varying adherence to preventative measures, such as mask-wearing and social distancing[11].

The higher infection rate in females can be attributed to several factors. Biologically, hormonal influences and a stronger immune response may increase susceptibility to infections. Genetically, sex chromosomes play a role in immune function[11]. Societal caregiving roles and a higher prevalence of women in healthcare professions elevate their exposure to pathogens. Additionally, differences in health-seeking behavior may contribute to increased detection rates in females, while males might be underreported due to lower testing rates. Our study showed that females had a higher infection rate than males, which is consistent with the findings of [12]in Al-Diwaniyah Governorate.

Helicobacter pylori infects over half the world's population, with a prevalence varying significantly. Urban areas (81%) show a higher rate than rural areas (18.75%), likely due to differences in socioeconomic and hygiene conditions. Although many infected individuals remain asymptomatic, approximately 64% may develop gastrointestinal diseases such as gastritis, peptic ulcer, gastric cancer, or MALT lymphoma[13,14]. Notably, these findings differ from those reported by [15] The results showed a significant correlation between infection duration and incidence rate (40.62%), consistent with [16] The duration of H. pylori infection strongly correlates with the incidence and severity of gastrointestinal conditions like gastritis and peptic ulcers. While acute infections may present mild symptoms, chronic, untreated infections can persist for years, leading to severe complications. Understanding infection duration is crucial for public health strategies focused on reducing transmission and preventing long-term effects[17,18,19]. Early detection and treatment are essential to mitigating the burden of related gastrointestinal diseases, and future research should explore the natural history of H. pylori infection to improve management strategies[19,20].

This study found a 31.25% prevalence of both gastric ulcers and gastroesophageal reflux (GERD), a finding that contrasts with [19,12]. Global GERD prevalence varies, with higher rates in Western countries; a 2024 study from Sri Lanka reported a prevalence of 25.3%. Key GERD risk factors include age over 50, obesity, smoking, anxiety, and certain medications, with H. pylori infection, hiatal hernia, and increased intra-abdominal pressure also contributing. The study also found gastritis, duodenitis, and duodenal ulcers in 18.75%, 12.5%, and 6.25% of patients, respectively, consistent with [18]. These conditions are often associated with H. pylori infection, a significant risk factor for inflammatory gastrointestinal diseases. Endoscopic biopsies are effective for diagnosis and H. pylori detection[19,21] The study's H. pylori infection symptoms—abdominal pain (59.37%), frequent burping (48.43%), bloating (42.81%), appetite loss (32.81%), nausea (28.43%), and unexplained weight loss (28.21%)—are consistent with previous research [12,14]. H. Helicobacter pylori, a common childhood-acquired bacterial infection, often presents with abdominal pain, nausea, bloating, appetite loss, and frequent burping, though many individuals are asymptomatic. Untreated infections can result in chronic gastritis, peptic ulcers, and elevated stomach cancer risk. These findings reinforce the importance of early detection and management to prevent complications and improve patient outcomes[20,21].

Triple therapy with a PPI, clarithromycin, and amoxicillin is less effective due to rising resistance. Current guidelines recommend bismuth-based quadruple therapy, especially where resistance is [22]. PPIs are crucial for reducing stomach acid, enhancing treatment success. Vonoprazan provides stronger

acid suppression. If standard therapies fail, rifabutin-based triple therapy is used as a rescue option, and tailored therapy is guided by antibiotic susceptibility testing. While triple therapy has historically been a common treatment for H. pylori, the rise of antibiotic resistance necessitates a more nuanced approach [23]. Current guidelines emphasize the importance of considering local resistance patterns, utilizing bismuth quadruple therapy as a first-line option, and exploring alternative and tailored therapies to optimize eradication rates [24]. The findings of [25] likely reflect these evolving trends in H. pylori management.

Conclusions

The observed peak infection rate in the 43-53 age group and the higher infection rate in females highlight the complex interplay of biological, social, and behavioral factors in infection dynamics. Further research is crucial to elucidate the underlying mechanisms and develop targeted prevention and treatment strategies.

Conflicts of interest

There are no conflicts of interest.

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