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PREVALENCE OF HELICOBACTER-PYLORI ASSOCIATED GASTRITIS AMONG PATIENTS IN QUETTA DISTRICT, BALOCHISTAN

Original Research

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Acknowledgement: I sincerely thank Dr. Irfana Hassan and my seniors for their invaluable guidance, support, and contributions throughout this research.

Conflict of Interest: None
Grant Support & Financial Support: None

ABSTRACT

Background: *Helicobacter pylori* (H. pylori), a gram-negative bacterium first identified in the early 1980s, has been recognized as a major contributor to various gastrointestinal conditions, including chronic gastritis, peptic ulcers, and gastric malignancies. Its global prevalence varies significantly across regions, with developing countries experiencing higher infection rates due to socioeconomic disparities, poor hygiene, and limited access to healthcare. This study aimed to assess the prevalence of *H. pylori* infection in the Quetta District of Balochistan, Pakistan, and explore its association with demographic and socioeconomic factors.

Objective: The primary objective was to estimate the prevalence of *H. pylori*-associated gastritis among patients in Quetta and to identify potential correlations with demographic factors such as age, gender, and socioeconomic status.

Methods: A cross-sectional study was conducted between November 2024 and December 2024 in the Medicine and Gastroenterology Departments of Sandeman Provincial Hospital (SPH) and Bolan Medical Complex Hospital (BMCH), Quetta. A total of 250 patients aged 18 years and above with symptoms of gastritis were recruited. Demographic details, including age, gender, and socioeconomic status, were recorded using a structured questionnaire. Diagnosis of *H. pylori* infection was confirmed through stool antigen tests and endoscopic biopsy. Statistical analysis was performed using SPSS version 24, with the chi-square test applied to assess associations between variables.

Results: Among 250 participants, 98 (39.2%) were male and 152 (60.8%) were female. The prevalence of *H. pylori* infection was higher in females (62.5%) compared to males (40.8%). The highest infection rate was observed in the 41–50 years age group (68.2%). Socioeconomic status was significantly associated with infection prevalence, with 71.4% of infections occurring in the low socioeconomic group, 34.0% in the middle group, and 20.0% in the high socioeconomic group.

Conclusion: The high prevalence of *H. pylori* infection in Quetta highlights a pressing public health concern, particularly among individuals from lower socioeconomic backgrounds and older age groups. Addressing this issue requires targeted public health interventions, including improved sanitation, health education, and access to effective screening and treatment services.

Keywords: Chronic gastritis, Demographics, *Helicobacter pylori*, Pakistan, Prevalence, Socioeconomic factors, Stomach cancer.

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INTRODUCTION

Helicobacter pylori (H. pylori) is a gram-negative spiral bacterium that has drawn significant scientific attention since its discovery in the early 1980s due to its association with a wide spectrum of gastrointestinal diseases, including gastric cancer, peptic ulcers, and chronic gastritis (1). Despite being one of the most prevalent human pathogens, colonizing nearly half of the global population, its prevalence varies considerably depending on geographic, socioeconomic, and environmental factors (2). In developing nations like Pakistan, infection rates are particularly concerning, with some districts reporting incidences exceeding 50%. Poor sanitation, overcrowded living conditions, and low socioeconomic status are considered major contributors to its transmission (3). Gastritis, an inflammation of the stomach's inner lining, presents in either acute or chronic forms (4). While various factors, including excessive alcohol consumption, prolonged use of nonsteroidal anti-inflammatory drugs (NSAIDs), and autoimmune conditions, contribute to its onset, H. pylori remains the most significant causative agent. Symptoms often include bloating, nausea, vomiting, abdominal discomfort, and burning sensations. Chronic infections left untreated may escalate to peptic ulcers or elevate the risk of developing gastric cancer (5). The prevalence of H. pylori infection in Pakistan has been reported to range from 50% to 90%, especially in underserved populations, underscoring the gravity of the situation in low-resource settings where healthcare access is limited (6,7).

The global burden of H. pylori infection reflects stark regional disparities, with the prevalence among adults in developed nations, such as the United States, being significantly lower—ranging from 20% to 30%—likely due to better hygiene standards and healthcare infrastructure (8). In contrast, developing Asian countries report alarmingly high infection rates, often exceeding 90% (9). Studies conducted in urban centers like Karachi, Pakistan, and New Delhi, India, link the high prevalence of H. pylori infection to suboptimal sanitation practices and densely populated living environments. Further evidence suggests that up to 88.3% of dyspeptic patients in Islamabad tested positive for H. pylori, indicating its widespread impact on gastrointestinal health (10). A Research conducted reinforced these findings by demonstrating a significant association between H. pylori infection and chronic gastritis in dyspeptic patients (11). Despite advancements in diagnostic and treatment strategies, the global prevalence of this infection has remained largely unchanged over the years, as highlighted in recent meta-analyses (12). A systematic review revealed regional differences in infection rates, with Africa reporting the highest prevalence at 70.1% and Oceania the lowest at 24.4% (13). These findings highlight the urgent need for region-specific public health interventions aimed at reducing transmission and improving treatment outcomes. Given the persistently high prevalence of H. pylori infection in underdeveloped regions, this study aims to investigate the burden of H. pylori-associated gastritis in the Quetta District of Balochistan, Pakistan. The objective is to provide evidence-based insights that could inform targeted prevention and treatment strategies, ultimately contributing to improved gastrointestinal health outcomes in this high-risk population.

METHODS

This cross-sectional study was conducted from November 2024 to December 2024 in the Medicine and Gastroenterology Departments of Sandeman Provincial Hospital (SPH) and Bolan Medical Complex Hospital (BMCH), Quetta. The study aimed to assess the prevalence of *Helicobacter pylori* (H. pylori)-associated gastritis among patients presenting with gastritis-related symptoms. A total of 250 patients aged 18 years and above, experiencing clinical symptoms such as bloating, dyspepsia, nausea, and vomiting, were purposively recruited from different localities of Quetta District. Participants were categorized based on age groups ranging from 20–30, 31–40, 41–50, and 51–60 years to ensure adequate representation across different age strata. Informed consent was obtained from all participants prior to enrollment, and ethical approval for the study was granted by the institutional review board (IRB) or ethical committee of the respective hospitals. Data collection involved obtaining demographic information, including age, sex, and socioeconomic status, using a standardized questionnaire administered by trained healthcare personnel. The patients' clinical symptoms were assessed through responses to the questionnaire and general physical examination conducted by a gastroenterologist. To confirm *H. pylori* infection, three diagnostic methods were employed: stool antigen testing, the urease breath test, and endoscopic biopsy. These methods were chosen for their reliability and complementary diagnostic strengths, ensuring the accurate identification of active *H. pylori* infection.

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Laboratory testing incorporated stool antigen tests and endoscopic biopsy as primary diagnostic tools. A positive stool antigen test indicated the presence of *H. pylori* antigens in fecal samples, signifying active infection. Additionally, gastric mucosa samples obtained via endoscopy were stained using the Giemsa staining technique, which revealed the presence of *H. pylori* organisms and signs of chronic active gastritis in infected individuals. This dual diagnostic approach enhanced the sensitivity and specificity of infection detection. The inclusion criteria consisted of patients aged 18 years or older who exhibited symptoms indicative of gastritis, including nausea, bloating, dyspepsia, and abdominal discomfort, and who voluntarily agreed to participate in the study. Exclusion criteria included patients with a history of gastric surgery, as such procedures could alter the stomach's anatomy and affect gastritis outcomes. Furthermore, individuals with other gastrointestinal diseases such as Crohn's disease or inflammatory bowel disease were excluded to minimize confounding factors. Pregnant or lactating women were also excluded to prevent any potential risks to maternal and fetal health. Data analysis was conducted using the Statistical Package for the Social Sciences (SPSS) version 24. Descriptive statistics were applied to summarize demographic characteristics and clinical symptoms of the participants. The chi-square test was employed to examine the relationship between demographic variables and the severity of *H. pylori* infection. A p-value of less than 0.05 was considered statistically significant, providing a measure of the strength of association between variables.

RESULTS

Out of the 250 participants included in the study, 98 (39.2%) were male, and 152 (60.8%) were female, indicating a higher proportion of female participants. The participants were stratified into four age categories: early adulthood (20–30 years), middle adulthood (31–40 years), late middle adulthood (41–50 years), and emerging senior adulthood (51–60 years). The largest proportion of participants, 35.2% (88 individuals), belonged to the 41–50 age group, followed by 24.8% (62 individuals) in the 31–40 age group, while both the 20–30 and 51–60 age groups comprised 20.0% (50 individuals each) of the sample. The prevalence of *Helicobacter pylori* (H. pylori) infection was found to be higher in females compared to males. Among the total participants, 62.5% of female patients tested positive for H. pylori infection, whereas 40.8% of male participants were positive. The highest infection rate, 68.2%, was observed in individuals aged 41–50 years, marking this age group as the most vulnerable to infection. In contrast, lower infection rates were recorded in younger participants aged 20–30 years (20.0%) and those aged 31–40 years (24.8%). Participants aged 51–60 years accounted for 20.0% of the total infection prevalence, indicating a consistent pattern of infection among older adults.

Socioeconomic status emerged as a significant factor influencing H. pylori infection prevalence. Of the total participants, 44.0% belonged to the low socioeconomic status (SES) group, 34.0% to the middle SES group, and 22.0% to the high SES group. The highest prevalence of infection was recorded in the low SES group, with 71.4% testing positive for H. pylori. In the middle SES group, 34.0% of participants were infected, while the high SES group reported a significantly lower prevalence of 20.0%. Among infected individuals, 110 cases were identified in the low SES group, 85 in the middle SES group, and 55 in the high SES group, highlighting a clear inverse relationship between socioeconomic status and infection rates. Gender distribution across socioeconomic groups showed that 18.0% of male participants and 26.0% of female participants were from the low SES category, while 14.0% of males and 20.0% of females were from the middle SES group. The high SES group consisted of 7.2% male participants and 14.8% female participants. The infection rates were notably higher in females across all SES categories, particularly in the low SES group, where female participants showed the highest infection prevalence. These findings demonstrate a clear association between age, gender, socioeconomic status, and the prevalence of *H. pylori* infection. The results suggest that individuals in their late middle adulthood (41–50 years) and those from lower socioeconomic backgrounds are at a higher risk of infection. Furthermore, female participants exhibited a higher prevalence of infection across most age and socioeconomic groups, indicating potential gender-related susceptibility factors.

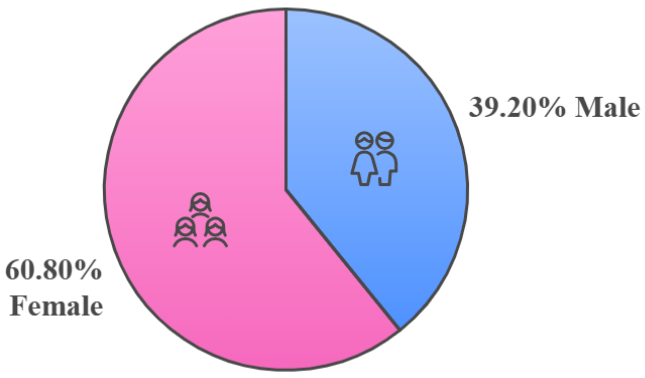

Figure1: Gender Distribution of Participants

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Table 1: Gender Distribution of Participants

Gender	Number of Patients	Percentage (%)
Male	98	39.2
Female	152	60.8
Total	250	100

Table 2: Demographic and H. Pylori Infection Prevalence by Gender and Age Group

Age Group	Male	Total (Male)	Female	Total (Female)	Total	Total Patients (Overall)
20-30	20	8.0%	30	12.0%	50	20.0%
31-40	25	10.0%	37	14.8%	62	24.8%
41-50	35	14.0%	53	21.2%	88	35.2%
51-60	18	7.2%	32	12.8%	50	20.0%
Total	98	39.2%	152	60.8%	250	100.0%

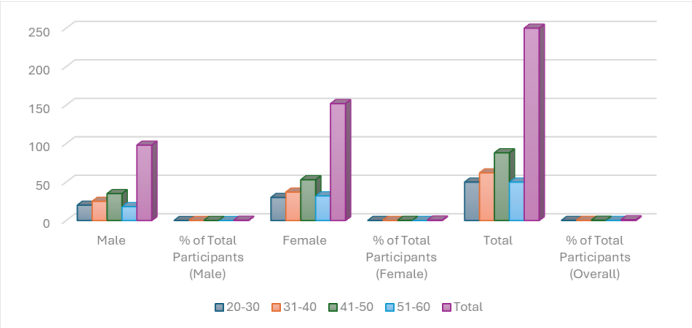

Figure 2: Demographic and H. Pylori Infection Prevalence by Gender and Age Group

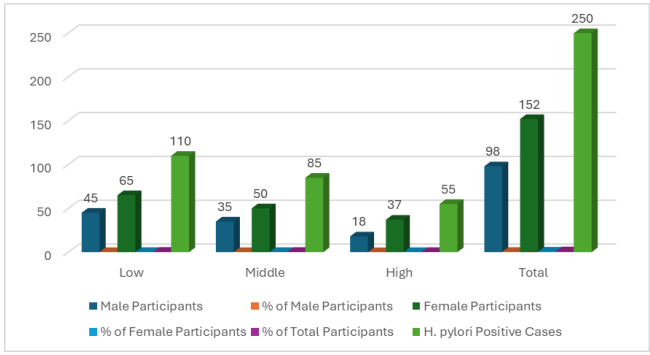

Figure 3: Socioeconomic Status and H. Pylori Infection Prevalence

Table 3: Socioeconomic Status and H. Pylori Infection Prevalence

Socioeconomic Status	Male Patients	% of Male Patients	Female Patients	% of Female Patients	% of Total Patients	H. pylori Positive Cases
Low	45	18.0%	65	26.0%	44.0%	110
Middle	35	14.0%	50	20.0%	34.0%	85
High	18	7.2%	37	14.8%	22.0%	55
Total	98	39.2%	152	60.8%	100.0%	250

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DISCUSSION

The findings of this cross-sectional study revealed a high prevalence of *Helicobacter pylori* (H. pylori) infection among patients with gastritis in the Quetta District of Balochistan, with all participants testing positive for the bacterium. This aligns with existing literature that reports varying prevalence rates of *H. pylori* across different regions of Pakistan, ranging from below 50% to above 90%, reflecting significant regional disparities likely influenced by differences in socioeconomic status, hygiene practices, and access to healthcare services. The association between lower socioeconomic status and higher infection rates, as indicated by the 71.4% prevalence among individuals from low-income groups, underscores the substantial impact of socioeconomic factors on disease burden, consistent with patterns observed in other developing regions (14). Global studies have demonstrated comparable findings, with prevalence rates of *H. pylori* infection varying from 50% to 70% across different populations, depending on access to healthcare, sanitation standards, and economic development. The results of this study support previous observations that individuals from lower socioeconomic backgrounds are more susceptible to infection due to poor living conditions, limited access to clean water, and inadequate hygiene practices. Additionally, age emerged as a significant factor, with the highest infection rates recorded among participants aged 41–50 years. This pattern reflects broader epidemiological trends where the risk of *H. pylori*-related complications, including chronic gastritis and gastric cancer, increases with age (15,16).

Gender distribution in the study indicated a higher infection rate among female participants compared to males, although previous research has suggested that *H. pylori* infection rates are generally similar across genders. This discrepancy could be attributed to social and cultural factors unique to the study population, including differences in healthcare-seeking behavior, exposure to risk factors, or potential selection bias due to the higher participation of women in the study. However, the absence of a biologically established gender predisposition for *H. pylori* infection suggests that the observed differences may not reflect true gender-based susceptibility (17). The relationship between *H. pylori* infection and chronic gastritis observed in this study is consistent with earlier research indicating a strong association between the bacterium and various gastric pathologies. Studies have shown that *H. pylori* infection contributes to mild inflammation, gastric atrophy, and intestinal metaplasia—conditions recognized as precursors to gastric cancer. The high prevalence of chronic gastritis among infected individuals in this study highlights the need for early detection and intervention to prevent long-term complications. Additionally, urbanization and improvements in living standards have been associated with a decline in *H. pylori* infection rates in other populations, suggesting that socioeconomic development could play a pivotal role in controlling the spread of infection in regions like Quetta (18).

One of the strengths of this study lies in its comprehensive diagnostic approach, utilizing stool antigen testing and endoscopic biopsy, both of which are established methods for detecting active *H. pylori* infection. The inclusion of participants from various age groups and socioeconomic backgrounds enhances the generalizability of the findings to the broader population of Quetta. However, the study also has notable limitations. The purposive sampling method and the higher representation of female participants may have introduced selection bias, potentially limiting the applicability of the results to the general population. Additionally, the study did not assess the severity of infection or the presence of comorbid gastrointestinal conditions, which could have provided deeper insights into the clinical significance of the infection (19). Future research should focus on longitudinal studies to monitor infection outcomes over time and evaluate the effectiveness of treatment interventions in reducing the prevalence of *H. pylori*-associated gastritis. Exploring the role of antibiotic resistance and the effectiveness of eradication therapies in different socioeconomic groups could further refine treatment strategies. Public health initiatives aimed at improving sanitation, access to clean water, and health education are essential to curb the spread of infection, particularly in lower socioeconomic communities. The implementation of targeted screening programs for high-risk age groups, alongside efforts to raise awareness about risk factors and preventive measures, could significantly reduce the burden of *H. pylori*-associated diseases in the region (20,21). The study highlights the significant association between *H. pylori* infection and socioeconomic status, age, and gender distribution among patients in Quetta. The findings emphasize the need for comprehensive public health strategies focused on early detection, treatment, and prevention to address the high prevalence of infection and its associated complications.

CONCLUSION

The high prevalence of *Helicobacter pylori* infection and its strong association with chronic gastritis highlight a pressing public health concern that demands immediate and targeted intervention. Effective management strategies should prioritize improved sanitation practices, health education, and routine screening for high-risk populations to mitigate the spread and impact of the infection. Addressing

the growing challenge of antibiotic resistance requires ongoing research and the development of more effective treatment protocols to improve eradication rates. Public awareness campaigns, family-based screening initiatives, and global efforts to monitor resistance patterns are essential for controlling the infection and its associated complications. Tackling *H. pylori* infection demands a comprehensive, multisectoral approach involving collaboration among healthcare professionals, researchers, policymakers, and affected communities to reduce disease burden and enhance population health outcomes.

Author Contribution

Author	Contribution
Muhammad Akhtar Zaman	Substantial Contribution to study design, analysis, acquisition of Data Manuscript Writing Has given Final Approval of the version to be published
Imtiyaz Hashim*	Substantial Contribution to study design, acquisition and interpretation of Data Critical Review and Manuscript Writing Has given Final Approval of the version to be published
Shazia Iqbal	Substantial Contribution to acquisition and interpretation of Data Has given Final Approval of the version to be published
Muhammad Jameel	Contributed to Data Collection and Analysis Has given Final Approval of the version to be published

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