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PREVALENCE AND HISTOPATHOLOGICAL PATTERN OF HELICOBACTER PYLORI IN PATIENTS PRESENTING WITH GASTROINTESTINAL SYMPTOMS: A CLINICAL STUDY.

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ABSTRACT

BACKGROUND: Gastritis, peptic ulcers, and the possibility of developing into cancer are among the gastrointestinal conditions that are significantly influenced by *Helicobacter pylori H. pylori.* This study aimed to evaluate the prevalence of *H. pylori* and its associated histopathological findings in patients with gastrointestinal symptoms. **OBJECTIVE:** To assess the prevalence of H. pylori and association with histopathological findings among gastrointestinal symptomatic patients. **METHODS:** A descriptive cross-sectional study conducted at Khyber Teaching Hospital, Peshawar. About 310 patients were enrolled using non-probability convenient sampling technique. *H. pylori* stool antigen testing and histological analysis of stomach biopsy samples were examined. Data collected was analyzed by SPSS version 22, with p <0.05 considered significant. **RESULTS:** In this study, 310 patients were assessed, comprising 171 females 55.2% and 139 males 44.8%. The highest infection rates were observed in the age groups of 31 to 45 18.3% and 19 to 30 15.0%, with an overall positive rate of 16.4%. Histopathological analysis revealed that 134 patients 43.23% had chronic non-specific gastritis, while 140 cases 45.16% presented with Helicobacter pylori-associated pangastritis. There was a significant correlation of H. pylori with histopathological severity was observed p=0.012. However, no significant association of stool antigen test with age p=0.946 and gender p=0.377 was observed. **CONCLUSION:** Pangastritis and chronic gastritis are the main symptoms of the extremely common Helicobacter pylori infection. Early identification and treatment are essential to prevent complications, even though severe results such as MALT lymphoma are uncommon. Controlling the risks of infection requires routine screening.

KEYWORD: Helicobacter pylori, Histopathological patterns, Gastrointestinal symptoms, Gastritis, Histopathology

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INTRODUCTION

Gram-negative *Helicobacter pylori*, also known as *H pylori*, are a bacillus that primarily colonizes human stomach mucus in early childhood and continues to do so throughout life [1]. With an estimated incidence of more than 90% in underdeveloped nations, *H pylori* infection affects half of the world's population [2]. About half of all people on the globe are susceptible to *Helicobacter pylori*, an opportunistic, gram-negative, flagellated bacterium that have been identified as a significant risk factor for the emergence of gastric adenocarcinoma, peptic ulcers, chronic gastritis, gastric carcinoma and mucosa-associated 2 lymphoid tissue MALT lymphoma [3]. It is a significant contributing factor to the emergence of further and digestive issues [4]. The amount of stomach biopsies that pathologists must do has increased significantly due to facility modernization and the rise in the number of specialists, such as gastroenterologists and endoscopists, in developing nations. To accurately diagnose and proceed with the care of these six illnesses, upper GI endoscopy combined with stomach biopsy for histological investigation is crucial [5].

According to the research, people with a positive *H pylori* test may have a 2% greater risk of distal gastric cancer and a 10–20% increased risk of peptic ulcer disease.6 This explains why the World Health Organization has designated *H pylori* infection as a Class 1 carcinogen.7,8 It is important to keep an eye out for any early indications of cancer in those who are more vulnerable, and to implement appropriate treatment strategies and preventive measures.[7]

Currently, treating an *H pylori* infection is done so regardless of whether the patient has symptoms or an illness brought on by the infection. The number of helicobacter studies conducted annually has risen from 200 to 1500.[9] In Pakistan, *H pylori* infection is more common in asymptomatic persons than in the general population, accounting for about 58% of cases.[10] Approximately 90% of people with *H pylori* are said to be free of any symptoms or consequences related to the infection.[6,11] Several studies have identified various potential risk factors associated with the higher incidence of *H pylori*, including age, poor hygiene, living in overcrowded conditions, socioeconomic status, alcohol and/or smoking, use of NSAIDs, blood group O, elevated BMI, and a significant family history of gastric cancer.[11] The aim of this study is to examine the histopathological characteristics present in patients with gastrointestinal symptoms and to determine the prevalence of *Helicobacter pylori* infection among them. This study seeks to enhance understanding of *H pylori*'s role in gastrointestinal diseases by exploring the association between histological findings and the presence of the bacterium.

MATERIALS AND METHODS

A study with a cross-sectional design was carried out in Khyber Teaching Hospital, Peshawar., from June 2023 to May 2024. A total of 310 patients enrolled in the study using a non-probability convenient sampling technique. Stool antigen testing and histological examination were performed. Patients of any age and gender having both a stomach biopsy and a stool antigen test for *H pylori* experiencing gastrointestinal symptoms were included in the research. Patients with insufficient medical data and those who had previously received *H pylori* therapy were excluded. Retrospective data collection was conducted from the medical records of 310 patients who had gastric biopsy and stool antigen testing to detect *Helicobacter pylori H pylori*. The patients had presented with gastrointestinal symptoms. Age and gender were among the demographic information that was noted for every patient. The stool antigen test findings were categorized as not tested NT, positive, or negative. The presence of inflammation, glandular atrophy, and intestinal metaplasia was examined in the histopathological results from the stomach samples. Based on a histological examination utilizing hematoxylin and eosin H&E and Giemsa staining procedures, the degree of inflammation was classified as mild, moderate, or severe. Each patient's clinical complaints, including dyspepsia, epigastric discomfort, and diarrhea, were also recorded. Data collected was thoroughly examined and assembled for further statistical analysis. Confidentiality of data was strictly maintained.

SPSS version 22 was used for data analysis. To evaluate the relationship between categorical variables, the Chi-square test was used, and descriptive statistics were calculated for quantitative variables. The significance criterion for interpretation was set at $p < 0.05$. Correlations between histopathological results and *Helicobacter pylori* infection was assessed using Chi-square test.

RESULT

Among the 310 patients enrolled, about 171 55.2% were female and 139 44.8% males. Females are represented slightly compared to males in the study population as shown in Figure 1. With n=56 51.3% females and n=53 48.6% male, the age group of 31 to 45 years old constituted the greatest portion of the sample, making up 35.2% of the total. With n=55 56.7% females and n=42 43.2% men, or 31.3% of the sample, the 19–30 age group was the second biggest. There were twenty-four women and eighteen men in the 46–60 age range, and twenty-one women and eighteen men in the 60+ group. The age group that made up the least percentage of the sample, consisting of n=8 34.7% men and n=15 65.2% females, was 0-18 years old.

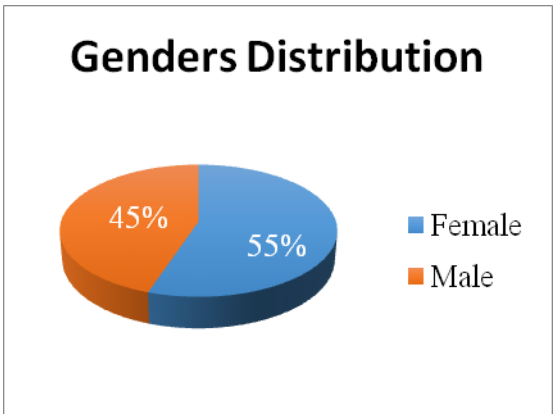

Figure 1: genders wise distribution of *Helicobacter pylori*

A total of 310 individuals enrolled were tested for *Helicobacter pylori* Stool Antigen, 259 83.5% were positive while 51 16.5% were tested negative for H. pylori antigen. Among the individuals aged ≤18, 4 17.4% had positive results. Among patients in the 19–30 age range, 15 individuals 15% tested positive. In the 46–60 age group, seven patients 16.7% exhibited positive outcomes. Out of 39 patients, 5 12.8% tested positive in the group of patients 60+ aged, as shown in Table 1.

Table 1: Distribution of *Helicobacter pylori* Stool Antigen Test Results Across Age Groups

Age Groups	Negative	Positive	Total
≤18 years	19 82.6%	4 17.4%	7.4% 23
19-30 years	82 85%	15 15%	31.2% 97
31-45 years	89 81.7%	20 18.3%	35% 109
46-60 years	35 83.3%	7 16.7%	13% 42
>60 years	34 87.2%	5 12.8%	12.5% 39
Total	259 83.5%	51 16.4%	310

The histopathological results showed that, *Helicobacter pylori*-associated pangastritis accounted for 140 cases 45.16%, making it the most prevalent diagnosis. The second most common result, seen in 134 instances 43.2% was chronic nonspecific chronic gastritis CNCG. There was 15 cases 4.8% of Chronic specific gastritis and *H pylori*-associated mild gastritis, respectively. Exuberant lymphoid infiltration was seen in n=3 0.97%, whereas MALT lymphoma, *H pylori*-associated gastritis, and hyperplastic polyps were detected in 1 case each 0.32% as shown in Table 2.

Table 2: Frequency and Percentage of Histopathological Diagnoses among Study Patients

Histopathological finding	Number of records
H pylori associated Pangastritis	45.16% 140
Chronic Non-specific Gastritis	43.2% 134
H pylori associated mild gastritis	4.8% 15
Chronic specific gastritis	4.8% 15
Exuberant Lymphoid infiltrate	0.97% 3
hyperplastic polyp	0.32% 1
H pylori associated chronic active gastritis	0.32% 1
MALT lymphoma	0.32% 1

Based on the degree of gastritis, the histopathological results were divided into several categories. Of the 56 individuals with moderate gastritis, 44 78.6% had negative tests, while 12 21.4% had positive tests. Of the 21 patients in the mild to moderate gastritis group, 17 81.0% tested negative and 4 19.0% tested positive. Sixty-four patients were diagnosed with moderate gastritis; 48 75.0% of them were negative, and 16 25.0% were positive, which was the greatest percentage of positive cases in any group. One patient tested positive and the other negative for moderate-to-severe gastritis, while both patients in a group with a comparable label tested negative. With 155 patients, the "Not Seen" group was the biggest; its positive rate was modest, with 141 91.0% testing negative and 14 9.0% testing positive. The "Not Seen" group had no noteworthy histological findings. The positivity rate 40% was greatest among all groups among the 10 patients with severe gastritis, 6 60.0% of whom tested negative and 4 40.0% of whom tested positive as shown in Table 3.

Table 3: Comparison of Stool *H pylori* Test Positivity Across Different Histopathological Categories

H pylori	Not Seen	Mild	Mild to Moderate	Moderate	Moderate to severe	Severe	P-value
Negative	141	44	17	48	3	6	0.012
Positive	14	12	4	16	1	4	0.011
Total	155	56	21	64	4	10	

The association between Stool Ag test with age and gender was assessed using cross-tabulation and Chi-square test. Among the age groups, individuals aged 31-45 years had the highest number of positive results 20 cases. A Chi-Square test was conducted to assess whether there was a significant association between age and Stool Antigen Test results. The test yielded a Pearson Chi-Square value of 0.745 and a p-value of 0.946. There is no statistically significant relationship between Age Groups and Stool Antigen Test results, suggesting that age does not significantly affect test outcomes in this dataset. The Stool Antigen Test results were distributed between female and male participants, with 140 females and 119 males testing negative, and 31 females and 20 males testing positive. The test shows a Pearson Chi-Square value of 0.780 and a p-value of 0.377. Similar to the Age Groups analysis, the p-value here exceeds 0.05, indicating no statistically significant association between Gender and Stool Antigen Test results Table 4.

Table 4: Association of Stool Ag test with Age and Gender of the participants

Variable		Stool Ag Test			
		Negative	Positive	Total	p-value
Age Groups	<18 years	19	4	23	0.946
	19-30 years	82	15	97	
	31-45 years	89	20	109	
	46-60 years	35	7	42	
	>60 years	34	5	39	
	Total	259	51	310	
Gender	Female	140	31	171	0.377
	Male	119	20	139	
	Total	259	51	310	

Further, we assessed the duodenal abnormality with glandular atrophy, among the patients with no abnormality in the duodenum n=190, the majority 93.1% showed no glandular atrophy, 5.9% showed mild atrophy, and 1.1% showed moderate atrophy, according to the examination of glandular atrophy in relation to other histological abnormalities. Of the 110 patients diagnosed with duodenal chronic nonspecific duodenitis CNSD, 98.2% did not exhibit glandular atrophy, and just 1.8% did so mildly. None of the patients n = 2 with moderate duodenal villous atrophy n = 2 or those with severe duodenal villous atrophy n = 2 had any symptoms of glandular atrophy. As in the case of modest duodenal villous atrophy n=1 and a patient with exuberant lymphoid hyperplasia of the duodenum n=1, no glandular atrophy was seen.

Furthermore, a single patient n=1 with duodenal CNSD and moderate gastritis linked to *H pylori* showed signs of minor glandular atrophy 100%. There was no glandular atrophy 100% in other

uncommon disorders, such as duodenal lymphangiectasia n=1, villous atrophy compatible with celiac disease n=1, and a duodenal biopsy consistent with celiac disease n=1. No glandular atrophy was found in other disorders, such as lymphoid hyperplasia, celiac disease, and severe and partial villous atrophy Table 5.

Table 5: Prevalence of Glandular Atrophy with Duodenal Findings

Duodenal Findings	n	Nil	Mild	Moderate
No abnormality observed	200	93.1%	5.9%	1.1%
Chronic non-specific duodenitis CNSD	110	98.2%	1.8%	
Severe Villous atrophy	2	100%		
Partial Villous Atrophy	2	100%		
Mild Villous Atrophy	1		100%	
Exuberant lymphoid hyperplasia	1	100%		
H pylori associated CNSD	1		100%	
Lymphangiectasia	1	100%		
Villous Atrophy consistent with Celiac disease	1	100%		
Celiac disease	1	100%		
Total	310			

DISCUSSION

The prevalence and histological correlations of *Helicobacter pylori* infection in patients presenting with gastrointestinal symptoms are explored in this study. Consistent with and building upon recent research, the results provide insights into the link between *H pylori* infection and different levels of stomach inflammation. Generally, the middle-aged individuals appear to have a greater prevalence of *H pylori* infection, as indicated by the group of people aged 31 to 45 having the largest number of positive cases 18.3%, n=20. A comparatively lower frequency in younger and older individuals was shown by the comparatively smaller number of positive cases seen in the <18 and >60 age groups.

The distribution of genders and age groups is consistent with literature on the prevalence of *H pylori*. According to our study finding, there are more female 55.2% than male 44.8%, which is compatible with Shaiban and Nayyef 2024, study that suggests female frequently have greater rates of *H pylori* infection, especially in older age groups similarly Muhammad and Afridi *et al.* 2020 found that 54.05% of 111 patients had a notable frequency of *H pylori* in females. [12,13] According to our findings, the majority of the sample belonged to the age category of 31 to 45 years. This is comparable with the findings of Waqar et al., who discovered that 47% of patients with *H pylori* were between the ages of 26 and 40.[14]

Our study found no statistically significant relationship between Stool antigen test and age p=0.946, suggesting that age did not influence the likelihood of a positive Stool Antigen Test outcome. Gender also revealed no significant association with test results p=0.377, indicating that test positivity was similar across both genders. According to earlier Lakhiar *et al.,* 2018 *H pylori* is a key contributor to gastrointestinal conditions such peptic ulcers and chronic gastritis.[15] These results are in line with those discoveries. Serious illnesses such as MALT lymphoma are uncommon, which is consistent with research by Kurtuluş et al. 2017 indicating that although *H pylori* is widespread, the development of serious problems is less prevalent. [16] As demonstrated by Rangaswamy & Rubby 2016 and

Srinivasan et al. 2016, early identification and treatment are critical to halting the progression of *H pylori*-related illnesses.[17,18]

According to this study, 45.2% of patients had *H pylori*-associated pangastritis, whereas 43.2% of patients had chronic nonspecific chronic gastritis CNCG as compared Nguefak *et al.,* 2024 identified pangastritis as the predominant manifestation of long-term *H pylori* infection.[19]

With 93.1% of patients exhibiting no noticeable atrophic alterations, glandular atrophy was absent in the majority of instances. Wang *et al.,* 2021 research, which discovered that glandular atrophy typically develops in later stages of chronic *H pylori* infection, is in contrast to the uncommon incidence of atrophy even in individuals with moderate to severe inflammation. The low rates of atrophy in this group may be due to early identification and treatment, which stopped the injury from getting worse and causing deeper mucosal damage.[20]

Finally, the significance of early management is underscored by the association shown between *H pylori* positive and histological severity. Individuals who experienced moderate to severe inflammation had a higher probability of testing positive for *H pylori*; of those with mild gastritis, 25% 16/64 tested positive, whereas only 9% 14/155 of patients showed no discernible inflammation. These results are consistent with recent guidelines released by the Katelaris *et al.,* 2023, which support the early removal of *H pylori* in at-risk individuals in order to stop the condition from getting worse and lessen the risk of stomach problems. [21]

CONCLUSION

The results of this study indicate that *Helicobacter pylori* infection is widespread in individuals presenting with gastrointestinal symptoms. The most common histological findings are pangastritis associated with *H pylori* and chronic nonspecific gastritis. Although *H pylori* is common, the development of malignancy is still uncommon, as seen by the low occurrence of serious illnesses such as MALT lymphoma. These results highlight how crucial early diagnosis and treatment are in avoiding problems. Effective risk management for chronic *H pylori* infection requires routine screening and prompt action.

ETHICS APPROVAL: The ERC gave ethical review approval.

CONSENT TO PARTICIPATE: written and verbal consent was taken from subjects and next of kin.

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AUTHORS' CONTRIBUTIONS:

All persons who meet authorship criteria are listed as authors, and all authors certify that they have participated in the work to take public responsibility of this manuscript. All authors read and approved the final manuscript.

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