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HISTOPATHOLOGICAL CORRELATION WITH HELICOBACTER PYLORI IN MALIGNANT AND NON-MALIGNANT GASTROINTESTINAL DISORDERS.

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ABSTRACT

BACKGROUND: Gastrointestinal (GI) disorders, ranging from benign to malignant, are major global health concerns. *Helicobacter pylori* infection is a key risk factor for GI diseases, especially gastric cancer. **OBJECTIVE:** To evaluate the prevalence of malignant and non-malignant gastrointestinal disorders in GI biopsies and to determine the prevalence of *H. pylori* and its relationship with histopathological findings. **METHODS:** This retrospective observational study enrolled 363 patients who underwent gastrointestinal biopsies at the Pathology Department of Hayatabad Medical Complex, Peshawar. Histopathological diagnoses were classified as malignant or non-malignant, with *H. pylori* presence confirmed through Giemsa staining. SPSS version 26 was used to analyze the associations between *H. pylori*, patient demographics, and histopathological outcomes using Chi-square tests, with statistical significance set at $p<0.05$. **RESULTS:** Among the 363 patients, 88.4% (n=321) presented with non-malignant conditions, with chronic non-specific gastritis being the most frequent (55.3%). Malignant diagnoses accounted for 11.6% (n=42), with adenocarcinoma being the predominant malignancy about 7.7% (n=28). *H. pylori* infection was detected in 10.2% (n=37) of cases, showing a significant association with non-malignant conditions (p=0.019), particularly in patients aged 19–49 years. However, there was no significant association between *H. pylori* and malignancy (p=0.225) or with gender (p=0.225). **CONCLUSION:** This study highlights the predominance of non-malignant GI disorders, with *H. pylori* infection significantly linked to inflammatory conditions but not to malignancy. Age was a significant factor in *H. pylori* prevalence, underscoring the importance of age-targeted screening.

KEYWORDS: *Helicobacter pylori*, Gastrointestinal Malignancy, Biopsy, Histopathology.

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INTRODUCTION

Gastrointestinal (GI) disorders, which encompass a spectrum from benign inflammatory diseases to malignant neoplasms, continue to be significant contributors to global morbidity and mortality [1]. Colorectal cancer (CRC), one of the most common malignant GI tumors, ranks third in incidence and fourth in

mortality worldwide, accounting for 881,000 deaths in 2018, or 9.8% of global cancer deaths [2]. Approximately 1.8 million new CRC cases were diagnosed in 2018, per the World Health Organization report [3]. Gastric cancer (GC) ranks as the fifth most common cancer globally and is the third leading cause of cancer-related deaths, with the highest rates observed in East Asia, Russia and South America [4]. Men experience higher incidence rates, and approximately 75% of all cases and deaths occur in Asia [5,6]. In Iran, GC accounts for 8,000 deaths annually (Hedayati), while in the United States, around 27,000 new diagnoses are reported each year [7]. In 2020, 1,089,103 new cases of stomach cancer were globally recorded, with the highest incidence rates in Mongolia, Japan, and South Korea, and mortality highest in Mongolia, Tajikistan, and China [6].

Adenocarcinomas represent 95% of all stomach cancer cases, predominantly arising in the distal stomach and strongly linked to chronic *Helicobacter pylori* (*H. pylori*) infection 8. Research suggests *H. pylori* may also be associated with an elevated risk of CRC, with a meta-analysis indicating a 20-40% increased CRC risk in *H. pylori*-positive individuals [2]. Risk factors for GC include smoking, alcohol use, high salt intake, consumption of salt-preserved foods, low fruit and vegetable intake, male gender, and age over 50 or 60, with higher prevalence in socioeconomically disadvantaged regions [8,9]. *H. pylori* is the most prevalent infection globally and a major cause of chronic gastritis, chronic non-specific inflammation, glandular atrophy, and intestinal metaplasia, reinforcing the need to understand its role in GI pathology [10–12]. The World Health Organization's International Agency for Cancer Research classifies *H. pylori* as a Group 1 carcinogen and the primary cause of GC 3. Infection rates range from 20% to 80% globally, with higher rates in developing nations [13].

Endoscopic biopsy and subsequent histopathological assessment are the gold standards for evaluating GI symptoms, offering a definitive diagnosis in conditions such as dyspepsia, epigastric pain, and GI bleeding [14]. The major indications for GIT endoscopic biopsy include evaluation of dyspepsia, odynophagia, dysplasia, peptic ulcer disease, infections, inflammatory disorders, vascular disorders, mechanical conditions, toxic and physical reactions including radiation injury, and neoplasms [14,15]. Gastric and intestinal biopsies play an essential role in differentiating between malignant and benign conditions, providing insights into pathologies such as chronic gastritis, intestinal metaplasia, and adenocarcinoma [16].

Histopathological evaluation of gastric and intestinal biopsies is crucial for distinguishing between malignant and benign conditions, significantly informing clinical decision-making. Assessing the prevalence of *H. pylori* and its association with specific histopathological features can improve diagnostic precision and patient care. The objective of the study was to evaluate the prevalence of malignant and non-malignant gastrointestinal disorders in Gastrointestinal biopsies, to assess the prevalence of *H. pylori* and its relationship with histopathological findings. We aim to provide valuable insights into the histopathological characteristics of gastrointestinal biopsies, ultimately guiding future diagnostic and therapeutic strategies.

METHODS

This retrospective observational study was conducted in the Pathology Department at Hayatabad Medical Complex, Peshawar, targeting patients who underwent gastric and intestinal biopsies during our study period from October 2023 to March 2024. The sample size of 363 was calculated using OpenEpi, based on a 97% confidence interval, a 5% margin of error, and an anticipated gastrointestinal cancer

frequency of 26%, with reference to a population of 2,481,000 [17]. The inclusion criteria of the study consisted of individuals of any age and gender who presented with various gastrointestinal biopsies including gastric, esophageal, small and large intestinal biopsies. Inclusion criteria also encompassed patients with complete clinical, endoscopic, and histopathological data, while exclusion criteria involved cases with incomplete biopsy data or inadequate tissue samples for histological evaluation.

Data was gathered from hospital medical records and histopathology department. Data regarding patient demographics (age, gender), clinical symptoms, endoscopic findings, and histopathological results were collected through a structured questionnaire. Biopsy specimens were obtained through endoscopic or surgical procedures, with diagnoses categorized as malignant or non-malignant. Non-malignant findings comprised conditions like chronic non-specific gastritis (CNCG), pangastritis, rectal polyps, and chronic non-specific duodenitis and colitis, while malignant diagnoses included adenocarcinoma, cholangiocarcinoma, gastrointestinal stromal tumors, and squamous cell carcinoma. The presence of *H. pylori* was confirmed through biopsy-based tests, including Giemsa staining or immunohistochemistry. Ethical approval was secured from the Institutional Review Board (IRB) of Hayatabad Medical Complex, Peshawar, and informed consent was obtained from all participants to ensure data confidentiality.

Data analysis was conducted using SPSS version 26. Frequencies and percentages were used to summarize qualitative variables such as patient demographics, symptomatology, and biopsy findings. The Chi-square test was applied to evaluate associations between clinical symptoms, endoscopic findings, and histopathological outcomes, as well as to assess the relationship between *H. pylori* infection and specific histopathological changes. A p-value of less than 0.05 deemed statistically significant.

RESULTS

A total of 363 participants were enrolled with the age of the participants ranged from 1 year to 83 years, with a mean age of 38.08 years (SD±16.88). The age groups were categorized as follows: 9.6% (n=35) of participants were under 18 years old, 25.6% (n=93) were between 19 and 29 years, 22.9% (n=83) fell in the 30 to 39 age range, 12.9% (n=47) were between 40 and 49 years, 14.6% (n=53) were in the 50 to 59 age group, and 14.3% (n=52) were over 60 years old. This distribution shows that the majority of participants were within the 19 to 39-year age range, accounting for nearly half of the sample. In terms of gender, 69.7% of the participants were male (n=253), and 30.3% were female (n=110), indicating a predominance of male participants in the study (table 1).

TABLE 8 DISTRIBUTION OF PARTICIPANTS BY AGE AND GENDER

Variable	Category	Percentage & Frequency
Age	Under 18 years	9.6% (n=35)
	19-29 years	25.6% (n=93)
	30-39 years	22.9% (n=83)
	40-49 years	12.9% (n=47)
	50-59 years	14.6% (n=53)
	Over 60 years	14.3% (n=52)
Gender	Male	69.7% (n=253)
	Female	30.3% (n=110)

The most common biopsy site was the gastric region, accounting for 44.6% of the samples. This was followed by the duodenum (20.9%) and the colon (12.4%). Other biopsy sites included the rectum (9.9%), esophagus (4.1%), and gastroesophageal junction (1.7%). Less common biopsy locations were the anal region (2.2%), ileum (1.1%), sigmoid

(1.7%), jejunum (0.6%), bile duct (0.6%), and cecum (0.3%). This distribution highlights that the majority of the biopsies were from the upper gastrointestinal tract, particularly the gastric and duodenal regions (table 2).

TABLE 9 DISTRIBUTION OF BIOPSY SITES

Biopsy Site	Percentage (%)	Frequency (n)
Gastric	44.6	162
Duodenum	20.9	76
Colon	12.4	45
Rectum	9.9	36
Esophagus	4.1	15
Gastroesophageal Junction	1.7	6
Anal Region	2.2	8
Ileum	1.1	4
Sigmoid	1.7	6
Jejunum	0.6	2
Bile Duct	0.6	2
Cecum	0.3	1

A variety of clinical symptoms were reported among the participants, with a total of 332 cases documented. The most common symptom was epigastric pain, observed in 87 participants (24.0%), followed by dyspepsia in 60 participants (16.5%). Anemia was reported in 52 cases (14.3%), and bleeding occurred in 45 cases (12.4%). Other symptoms included dysphagia in 17 cases (4.7%), abdominal pain and vomiting (each about 5.0%, n=18), and weight loss in 13 cases (3.6%). Less frequent symptoms included intestinal obstruction in 7 cases (1.9%), polypoidal growth in 6 cases (1.7%), and diarrhea in 8 cases (2.2%). Finally, Barrett's esophagus was noted in 1 case (0.3%) (table 3).

TABLE 10 PREVALENCE AND FREQUENCY OF CLINICAL SYMPTOMS.

Symptom	Percentage (%)	Frequency (n)
Epigastric Pain	24.0	80
Dyspepsia	16.5	55
Anemia	14.3	47
Bleeding	12.4	41
Dysphagia	4.7	16
Abdominal Pain	5.0	18
Vomiting	5.0	18
Weight Loss	3.6	13
Intestinal Obstruction	1.9	7
Polypoidal Growth	1.7	6
Diarrhea	2.2	8
Barrett's Esophagus	0.3	1

The diagnoses of the 363 biopsy samples revealed that the majority were non-malignant conditions (88.4%, n=321), while malignant tumors accounted for 11.6% (n=42). The presence of *Helicobacter pylori* (*H. pylori*) was evaluated in a total of 363 biopsy samples. Among these, 89.8% (n=326) tested negative for *H. pylori*, indicating that a significant majority of the samples did not show evidence of this bacterium. Conversely 10.2% (n=37) were found to be positive for *H. pylori* (Figure 4).

Table 11 Distribution of Biopsy Diagnoses and H. Pylori Results

Category	Percentage (%)	Frequency (n)
Benign	88.4	321
Malignant	11.6	42
Positive for H. Pylori	10.2	37
Negative for H. Pylori	89.8	326

The histopathological analysis showed a variety of diagnoses, among the non-malignant conditions the most common finding was chronic non-specific chronic

gastritis (CNCG), occurring in 39.5% (n=143) of cases. Chronic non-specific duodenitis was the second most frequent non-malignant diagnosis, accounting for 10.7% (n=39) of cases. Rectal polyps appeared in 4.7% (n=17) of cases, followed by chronic active colitis in 6.6% (n=24), and villous atrophy in 2.2% (n=8). Other less common but notable findings included unremarkable normal mucosa in 3.6% (n=13) and reflex esophagitis in 1.4% (n=5). Additional non-malignant conditions identified were intraepithelial lymphocytosis, gastrointestinal stromal tumors, lymphangioma, hyperplastic polyps, and anal polyps, each contributing 0.8% (n=3) of cases. Barrett's esophagus, ganglion cells seen, parasitic infections, and Granulomatous inflammation were also identified, each occurring in 0.8% (n=3) of cases. Finally, less than 1% of cases presented with Meckel's diverticulum (0.6%, n=2), celiac disease (0.6%, n=2), haemorrhoids (0.3%, n=1), and Hamartomatous pancreatic tissue (0.3%, n=1).

Among the malignant tumors, adenocarcinoma was the most frequently observed, accounting for 7.7% (n=28) of the total cases, followed by squamous cell tumors at 1.7% (n=6) and cholangiocarcinoma at 0.6% (n=2). Additional rare malignant findings included neuroendocrine tumors, malignant melanoma, and signet ring cell carcinoma, each occurring in less than 1% of the cases. The complete histopathological diagnosis is presented in Table 1

.

TABLE 12. PREVALENCE OF MALIGNANT AND NON-MALIGNANT DISORDERS AMONG PARTICIPANTS

Diagnosis		**Percentage (n)**
Malignant Disorders	Adenocarcinoma	7.7% (28)
	Cholangiocarcinoma	0.6% (2)
	GI Stromal Tumor	0.8% (3)
	Squamous Cell Tumor	1.7% **(**6)
	Malignant Melanoma	0.3% (1)
	Neuroendocrine Tumor	0.3% (1)
	Signet Ring Cell Tumor	0.3% (1)
	Total	11.6% (42)
Non-Malignant Disorders	CNCG	39.5% (143)
	Pangastritis	3.0% (11)
	Chronic Active Gastritis	6.9% (25)
	Intraepithelial Lymphocytosis	0.8% (3)
	Polyps	7.2% (26)
	Chronic Non-Specific Duodenitis	10.6% (39)
	Unremarkable Normal Mucosa	3.6% (13)
	Chronic Active Colitis	6.6% (24)
	Perforation	1.5% (5)
	Meckel's Diverticulum	0.65% (2)
	Villous Atrophy	2.2% (8)
	Celiac Disease	0.65% (2)
	Hamartomatous Pancreatic Tissue	0.3% (1)
	Granulomatous Inflammation	0.3% (1)
	Other conditions	4.9% (18)
	Total	88.4% (321)

In terms of activity in the biopsies, about 56.3% showed no activity, while mild activity was observed in 35.4% of the samples. Moderate and severe activity were less common, accounting for 6.8% and 1.6%, respectively. Regarding glandular atrophy, about 81.3% did not show glandular atrophy. Mild atrophy was present in 15.8% of cases, while moderate and severe atrophy were rare, appearing in 1.8% and 1.2% of cases, respectively. For intestinal metaplasia, about 89.9% of biopsies showed no signs of metaplasia, with mild and moderate metaplasia observed in 6.8% and 3.4% of cases, respectively (table 6).

TABLE 13 DISTRIBUTION OF ACTIVITY, GLANDULAR ATROPHY, AND INTESTINAL METAPLASIA IN BIOPSY SAMPLES.

Variable	Category	Percentage
Activity	Not Seen	56.3%
	Mild	35.4%
	Moderate	6.8%
	Severe	1.6%
Glandular Atrophy	Not Seen	81.3%
	Mild	15.8%
	Moderate	1.8%
	Severe	1.2%
Intestinal Metaplasia	Not Seen	89.9%
	Mild	6.8%
	Moderate	3.4%

The crosstabulation between Age Groups and *H. pylori* status using Chi-square test revealed notable findings. Among the total of 363 participants, the distribution of *H. pylori* status across different age groups was as follows: in the group under 18 years, all 35 participants tested negative for *H. pylori*. For those aged 19—29 years, 13 were positive. The 30—39 age group, 8 were positive, while in the 40 to 49 age group, there were 9 positive cases. In the 50 to 59 age group, 47 tested negative and 6 tested positive, and finally, among participants over 60 years, 51 were negative and only 1 was positive. A Pearson Chi-Square test indicated a statistically significant association between age groups and *H. pylori* status, with a Chi-Square value of 13.533 (df = 5, p = 0.019). In examining the relationship between Gender and *H. pylori* status, the Chi-Square test yielded a value of 1.470 (df = 1, p = 0.225), indicating no significant association between gender and *H. pylori* status (Table 2). The crosstabulation analysis examining the relationship between *H. pylori* status and various clinical parameters by Chi-square test revealed significant findings across multiple diagnoses. Among the total of 363 participants, all 37 participants who tested positive for *H. pylori* had a benign diagnosis. The Pearson Chi-Square test showed a significant association between *H. pylori* status and diagnosis, with a Chi-Square value of 5.391 (df = 1, p = 0.020), suggesting that *H. pylori* positivity is more prevalent in non-malignant cases. In the context of histopathological analysis, a striking difference was noted between negative and positive *H. pylori* cases. Out of 363 cases, 142 negative cases were identified as chronic non-atrophic gastritis, while positive cases predominantly fell under categories such as chronic active gastritis (25 cases) and adenocarcinoma

TABLE 14. PREVALENCE OF H. PYLORI AMONG DIFFERENT AGE GROUPS AND GENDER.

Variable		***Helicobacter pylori***			
		Negative	Positive	Total	p-value
Age groups	<18 Years	35	0	35	0.019
	19--29 Years	80	13	93	
	30--39 Years	75	8	83	
	40--49 Years	38	9	47	
	50--59 Years	47	6	53	
	>60 Years	51	1	52	
	Total	326	37	363	
Gender	Male	224	29	253	0.225
	Female	102	8	110	
	Total	326	37	363	

(28 cases). The Chi-Square test yielded a highly significant result (Chi-Square = 333.117, df = 28, p < 0.001), indicating a strong correlation between H. pylori status and various histopathological outcomes.

Regarding glandular atrophy, the Chi-Square test showed no significant association (Chi-Square = 7.526, df = 3, p = 0.057), suggesting that while there may be a trend, the relationship is not statistically significant. For intestinal metaplasia, Chi-Square test did not reveal a significant association (Chi-Square = 3.858, df = 2, p = 0.145), suggesting no substantial correlation between H. pylori presence and intestinal metaplasia. The relationship between H. pylori and activity showed a significant correlation, Pearson Chi-Square value of 57.153 (df = 3, p < 0.001) indicates a strong association between H. pylori status and histopathological activity, suggesting that H. pylori infection may contribute to increased histological activity in the stomach (Table 3)

The crosstab analysis followed by Chi-square test examined the relationships between age groups, gender, and various diagnoses, specifically focusing on intestinal metaplasia, glandular atrophy, and activity. A significant association was found between age groups and diagnosis, with the Pearson Chi-Square value of 48.175 (p < 0.001). Notably, the prevalence of malignant cases increased with age, particularly in individuals aged 50-59 (14 malignant) and those over 60 (16 malignant), while younger age groups exhibited primarily benign cases. The Chi-Square test for this relationship resulted in a Pearson Chi-Square value of 14.174 (p = 0.512), indicating no statistically significant association between age and activity levels. The analysis revealed no significant relationship between age groups and intestinal metaplasia (Pearson Chi-Square = 16.686, p = 0.082).

However, a significant linear association was observed (p = 0.022), suggesting a trend in intestinal metaplasia severity across age groups. For glandular atrophy, with no significant relationship found (Pearson Chi-Square = 23.353, p = 0.077).

TABLE 15. CORRELATION OF H. PYLORI WITH HISTOPATHOLOGICAL DIAGNOSIS, GLANDULAR ATROPHY AND INTESTINAL METAPLASIA.

		H. pylori		
Variable		Negative	Positive	p-values
Diagnosis	Benign	284	37	0.020
	Malignant	42	0	
	Total	326	37	
Histopathological	CNCG	142	1	<0.001
Analysis	Pangastritis	1	10	
	Chronic active gastritis	0	25	
	Adenocarcinoma	28	0	
	Anal polyps	5	1	
	Chronic active colitis	24	0	
	Villous Atrophy	8	0	
	Other	118	0	
	Total	326	37	
Intestinal metaplasia	Not Seen	103	30	0.145
	Mild	5	5	
	Moderate	4	1	
	Total	112	36	
Activity	Not Seen	107	1	<0.001
	Mild	43	25	
	Moderate	5	8	
	Severe	1	2	
	Total	156	36	
Glandular Atrophy	Not Seen	114	25	0.057
	Mild	18	9	
	Moderate	1	2	
	Severe	2	0	
	Total	135	36	

Nonetheless, the data indicated a trend where mild atrophy was more prevalent in younger adults, while older age groups showed varied severity levels.

The crosstab indicated a marginal association between gender and diagnosis, with a Pearson Chi-Square value of 3.544 (p = 0.060). Males exhibited a higher prevalence of non-malignant (229) compared to malignant cases (24), while females showed a lower ratio of non-malignant (92) to malignant (18) cases. No significant relationship found between gender and the presence or severity of intestinal metaplasia (Pearson Chi-Square = 0.157, p = 0.925). The analysis of glandular atrophy revealed no significant association with gender (Pearson Chi-Square = 1.132, p = 0.769). In the examination of activity levels, no significant relationship was identified (Pearson Chi-Square = 2.928, p = 0.403) (Table 4).

TABLE 16. ASSOCIATION OF AGE AND GENDER OF PARTICIPANTS WITH HISTOPATHOLOGICAL ANALYSIS.

Variable		Age groups (years)							Gender		
		<18	19-29	30-39	40-49	50-59	>60	*p*	Male	Female	*p*
Diagnosis	Non-malignant	35	93	74	44	39	36	<0.001	229	92	0.06
	Malignant	0	0	9	3	14	16		24	18	
	Total	35	93	83	47	53	52		253	110	
Activity	Not Seen	8	29	23	16	13	19	0.512	71	37	0.40
	Mild	1	20	18	11	11	7		48	20	
	Moderate	0	5	3	2	2	1		7	6	
	Severe	1	0	1	1	0	0		1	2	
	Total	10	54	45	30	26	27		127	65	
Glandular Atrophy	Not Seen	5	41	35	22	18	18	0.077	90	49	0.76
	Mild	1	8	4	4	7	3		17	10	
	Moderate	0	0	1	2	0	0		2	1	
	Severe	0	0	0	0	0	2		2	0	
	Total	6	49	40	28	25	23		111	60	
Intestinal metaplasia	Not Seen	6	39	32	20	19	17	0.022	87	46	0.92
	Mild	0	4	1	1	3	1		7	3	
	Moderate	0	0	0	2	0	3		3	2	
	Total	6	43	33	23	22	21		97	51	

DISCUSSION

The histopathological analysis of 363 gastrointestinal (GI) biopsy samples revealed a significant distribution of both malignant and non-malignant disorders, with non-malignant conditions making up the majority of cases (88.3%, n=321). This high prevalence of non-malignant conditions aligns with previous studies, which highlight that chronic inflammatory conditions of the GI tract are more common than malignancies in routine clinical practice [14].

Our study fount that epigastric pain (24.0%) and dyspepsia (16.5%) were the most common clinical symptoms, with anemia and bleeding also frequently reported, at 14.3% and 12.4%, respectively. These findings suggest that such symptoms may be indicative of underlying GI pathology and highlighting need for further investigation, particularly when persistent or recurrent. In comparison to our study, where gastric biopsies were also the most common, accounting for 44.6% of specimens, followed by duodenal biopsies at 20.9% and esophageal biopsies at 4.1%, Parikh et al. reported higher proportions in each category. In their findings, gastric biopsies comprised 66.6% of upper GI specimens, followed by duodenal biopsies at 22.6% and esophageal biopsies at 10.6% [14].

Singh et al. reported a prevalence of *Helicobacter pylori* infection at 45% in their study, and Wang et al reported *H. pylori* prevalence about 50% in China. In contrast, our study found a significantly lower prevalence of *H. pylori*, with only 10.2% (n=37) of cases testing positive [3,18]. Mezmale et al. reported a higher *H. pylori* prevalence of 53%, with a relatively balanced distribution between genders (52.6% in men and 57.6% in women). This is notably higher than the prevalence observed in our study, where *H. pylori* positivity was 10.2%. Additionally, similar to Mezmale et al.'s findings, our study found a significant association between *H. pylori* infection and age groups (p=0.019),

underscoring the relevance of age as a potential factor in *H. pylori* infection rates. However, unlike Mezmale et al., who found a gender-based disparity, our study did not observe a statistically significant association between *H. pylori* and gender (p=0.225) [19.]

In comparison to our study, where 88.4% of cases were diagnosed as non-malignant, with chronic non-specific gastritis (CNCG) being the most common finding at 39.5%, Parikh et al. reported a slightly higher prevalence of non-malignant disorders at 91.3%. Additionally, chronic non-specific duodenitis was seen in 19.3% of their samples. Among malignant cases, they observed signet ring carcinoma in 2.6% of cases and adenocarcinoma in 1.2%. In comparison, our study similarly showed chronic non-specific gastritis as the predominant non-malignant finding but at a higher rate of 39.5% (n=143), and chronic non-specific duodenitis accounted for 10.7% (n=39). In terms of malignancies, adenocarcinoma emerged as the most common type in our cohort, with a prevalence of 7.7% (n=28), while signet ring cell carcinoma was much rarer, observed in only 0.3% (n=1) of cases. Moreover, Parikh et al., reported that squamous cell carcinoma was identified in 5 out of 150 cases, highlighting its presence among their malignant findings. In contrast, our study found squamous cell carcinoma was less frequent, representing only 1.7% (n=6) of our malignant diagnoses [14].

A notable finding in this study was the association between age and the presence of gastrointestinal malignancy, which is consistent with Hedayati et al., reported age as risk factor for gastrointestinal malignancy 20. The Pearson Chi-Square test revealed a significant correlation (p<0.001), the prevalence of malignant cases increased with age, particularly in individuals aged 50-59 (14 malignant) and those over 60 (16 malignant), while younger age groups exhibited primarily benign cases (P<0.001).

Wang et al., reported *H. pylori* related gastritis in 34.99% of cases which is in line with our findings of *H. pylori* gastritis about 39.5% [3]. Hedayati et al. reported a gastritis prevalence of 37.5% and, similar to our findings, did not identify a significant association between *H. pylori* and malignancy. However, they observed a significant relationship between gender and malignancy, indicating that gender played a role in the likelihood of malignancy. In contrast, our study found no significant association between gender and the incidence of malignancy (p = 0.060), suggesting that gender may not be a predictive factor for malignancy in our population [20].

Histopathologically, *H. pylori* positivity was significantly associated with chronic active gastritis, with 25 of the 37 positive cases falling into this category (p < 0.001). Zhao et al. identified *Helicobacter pylori* infection as a significant risk factor for adenocarcinoma, highlighting its association with an increased incidence of malignant changes [2]. In our study, however, all cases testing positive for *H. pylori* were observed in benign conditions (p=0.020), reinforcing strong linkage to non-malignant conditions, none of the cases were associated with adenocarcinoma or other malignancies.

Wang et al. reported no association between *H. pylori* and specific histopathological characteristics. In contrast, our study identified a significant relationship between *H. pylori* status and certain histopathological features, such as histological activity levels (p < 0.001) and specific diagnoses, with a notable association between *H. pylori* positivity and chronic active gastritis (p < 0.001) [3]. Although glandular atrophy did not show a significant association with *H. pylori* status (p=0.057), a trend toward increased mild atrophy in younger participants and varying severity levels in older participants was noted. The relationship between intestinal metaplasia and *H. pylori* status was also not statistically significant

(p=0.145), yet a significant linear association across age groups was observed (p=0.022), suggesting a trend of increased metaplasia severity with advancing age.

Gender analysis revealed no statistically significant difference in the incidence of malignant disorders between males and females (p=0.060), which is in contrast to Hedayati et al., [20]. Although males had a slightly higher occurrence of malignancies (6.6%) in our study compared to females (5.0%), this difference was not statistically significant. However, this finding aligns with global data showing a higher risk of GI cancers in males, potentially due to lifestyle factors such as higher rates of smoking and alcohol consumption, as well as dietary differences. The lack of significant associations between gender and other histopathological findings, such as intestinal metaplasia (p=0.925), glandular atrophy (p=0.769), and inflammatory activity (p=0.403), suggests that both sexes share a similar risk profile for these non-malignant disorders.

Our study has several limitations, including its retrospective design, which may introduce selection and recall biases and limit the control over potential confounding factors. Additionally, the reliance on available medical records could restrict the depth of analysis due to incomplete documentation or missing data. Another limitation is that the sample was taken from a single center, which may limit the generalizability of the findings to other populations or settings. Future studies should consider prospective designs to minimize bias and enhance data accuracy by enabling comprehensive, real-time data collection. Expanding the sample size across multiple centers would improve generalizability and help determine regional or demographic variations in gastrointestinal disorders. Incorporating advanced diagnostic methods, such as PCR or urease breath tests, for *H. pylori* detection could yield more accurate correlations between infection and gastrointestinal pathology.

CONCLUSION

Our study highlights the predominance of non-malignant disorders in GI biopsies, with CNCG being the most common. The strong association between age and the incidence of malignancies underscores the importance of targeted screening for older populations. While gender did not show a significant correlation with malignancy risk, the slightly higher rate in males warrants attention to gender-specific lifestyle risk factors. The prevalence of *Helicobacter pylori* infection, particularly among younger adults, and its strong association with chronic gastritis emphasizes the need for routine screening in symptomatic individuals. Moreover, the significant correlation between *H. pylori* and increased histological activity supports its role in exacerbating inflammation, which may contribute to chronic GI pathology if untreated. Although this study found no significant link between *H. pylori* infection and premalignant conditions like glandular atrophy or intestinal metaplasia, the observed increase in metaplasia severity with age suggests that age-related factors may contribute to malignant transformation. These findings collectively emphasize the need for both preventive measures and early diagnostic strategies to improve GI health outcomes.

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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

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