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## Prevalence of Helicobacter Pylori in Patients Undergoing Gastroduodenoscopy in Birat Medical College Teaching Hospital

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### ABSTRACT

**Introduction:** Helicobacter (H) pylori is a very common infection that causes chronic and active gastritis, peptic ulcer, duodenal ulcer and associated with increased risk of developing gastric cancer and mucosa associated lymphoid tissue lymphoma. H pylori is a definite carcinogen, hence it is important to understand the geographic burden of disease for its ultimate clinical and infrastructural management.

**Objectives:** To find the prevalence of Helicobacter pylori in patients undergoing gastroduodenoscopy in Birat Medical College Teaching Hospital.

**Methodology:** A descriptive cross sectional study was conducted among 126 patients during a period of six months from Jan 2023 to July 2023. All patients that underwent gastroduodenoscopy followed by biopsy were included in the study. Patients taking anti H pylori treatment within two weeks prior evaluation, patients with prior gastric surgery, upper gastrointestinal bleed due to varices, diagnosed malignant ulcers and biopsies of esophagus, biopsies containing only necrotic and only ulcerative tissue were excluded from the study. Processed and stained samples were examined by two pathologist and reported using modified Sydney system. Data obtained was analyzed using SPSS version 23.

**Results:** A total of 126 patients underwent gastroduodenoscopy during the study period. It was seen that Helicobacter pylori infection rate was 22.22% with highest prevalence in patients aged 31-40 years (28.56%) Upper abdominal pain was the most common symptom (68.25%) of cases with 25.58% of helicobacter pylori positive rate in this group.

**Conclusions:** The prevalence of H pylori is 22.22% reinforcing its role in gastroduodenal pathology.

### Introduction

Helicobacter (H) pylori is a very common infection that causes gastroduodenal disease.<sup>1</sup> Among the 50% of normal population exposed to H pylori infection only 10-20% are symptomatic.<sup>1,2</sup> In developing countries its prevalence is higher than 80%.<sup>3</sup> It is Gram negative spiral and flagellated bacilli that usually colonizes in gastric antral mucosa.<sup>4</sup> It causes various diseases like chronic active gastritis, peptic ulcer, duodenal ulcer and associated with increased risk of developing gastric carcinoma and mucosa associated lymphoid tissue (MALT) Lymphoma.<sup>5</sup>

H pylori detection modalities are either invasive or non-invasive. Non-invasive tests include Rapid Urease Test (RUT), Immunoglobulin G, M and A serology, stool antigen test and saliva antigen test.<sup>6,7</sup> Gastroduodenoscopy and subsequent biopsy for histopathology, Polymerase Chain reaction (PCR) and Fluorescent In Situ Hybridization (FISH) are the invasive modalities. Gastroduodenoscopy followed by histopathological examination is regarded as the gold standard and carries high

sensitivity and sensitivity of >90%.<sup>4</sup>

H pylori acquires special attention because of its causal relationship with gastroduodenal disease. The World Health Organization and Internal Agency for Research on Cancer consensus group classified H pylori as a carcinogen.<sup>8</sup> Following this, the understanding and management of the gastritis and other gastroduodenal diseases has remarkably changed. Many researches about its clinical aspects as well as epidemiology has been made, prevalence ranging from 30-67% in our country.<sup>9</sup> Hence this study intends to find the prevalence of H pylori in patients undergoing gastroduodenoscopy in a tertiary care hospital. Hence this study intends to find the prevalence of H pylori in patients undergoing gastroduodenoscopy in a tertiary care hospital in Eastern part of Nepal so that we can understand the geographic burden of disease for its ultimate clinical and infrastructural management.

## Methodology

A descriptive cross sectional study was conducted among the patients presenting to the department of pathology for biopsy evaluation following gastroduodenoscopy during a period of six months from Jan 2023 to July 2023. Ethical clearance was obtained from Institutional Review Committee (IRC) of Birat Medical College Teaching Hospital (IRC – PA-260/2023). All patients who underwent gastroduodenoscopy followed by biopsy were included in the study. Patients taking anti H pylori treatment within two weeks prior evaluation, patients with prior gastric surgery, upper gastrointestinal bleed due to varices, diagnosed malignant ulcers and biopsies of esophagus, biopsies containing only necrotic and only ulcerative tissue were excluded from the study. Consecutive convenient sampling was done where a total of 126 patients underwent gastroduodenoscopy and biopsy during the study period.

Histopathological sample received was fixed in 10 % formalin, processed (alcohol dehydration, clearing and then paraffin embedding) using automated processor. Block was prepared in paraffin wax followed by sectioning into 4-5 micrometer thickness and subsequently was stained by Hematoxylin and eosin. Special stain, Giemsa stain was also done for better visualization of the organisms. It was considered as positive when spiral or curved organisms were present on superficial mucosal layer or deeper crypts. The findings of histopathology were assessed by two pathologists and reported using Modified Sydney System. The histopathological diagnosis included chronic active gastritis, chronic active gastritis with atrophy, chronic active gastritis with intestinal metaplasia (IM), chronic active gastritis with atrophy and IM, Dysplasia, Indefinite for dysplasia and carcinoma. Special type of gastritis was not found, though would be accounted as a separate entity. The grade of gastritis and H pylori was however not included adhering to the objectives of this study.

The collected data was recorded, entered into Microsoft excel and statistical analysis was done using SPSS version 23. P value less than 0.05 was taken as statistically significant.

## Results

A total 126 patients (82 males and 44 females) underwent gastroduodenoscopy followed by biopsy during a period of six months. The age of the patient ranged from 15 years to 80 years with mean age of 39.80±13.20 years. H pylori infection was seen in 12 (28.56%) of patients of 31-40 years of age, though relation of age and H pylori infection rate was not statistically significant. (p value 0.104) (Table 1)

**Table 1:** Age wise distribution of H pylori Infection (n=126)

Age group (years)	Total n (%)	H pylori positive n (%)	H pylori negative n (%)
<20 years	4(3.17)	1 (25.0)	3 (75.0)
21-30	18 (14.29)	3 (16.67)	15 (83.33)
31-40	42 (33.33)	12 (28.57)	30 (71.43)
41-50	32 (25.40)	7 (21.88)	25(78.13)
51-60	18(14.29)	3(16.67)	15 (83.33)
>61	12(9.52)	2 (16.67)	10 (83.33)
Total	126 (100)	28 (22.22)	98 (77.78)

Total 28 (22.22%) patients were infected with H pylori infection out of which 17 (60.71%) were males and 11 (39.29%) were females. Though prevalence of H pylori was higher in males, the difference was not statistically significant. (p value 0.47) (Table 2)

**Table 2:** Sex wise distribution of H pylori infected cases (n=126)

Sex	Total n (%)	H pylori positive n (%)	H pylori negative n (%)
Male	82(65.08)	17 (60.71)	65 (66.33)
Female	44(34.92)	11 (39.29)	33 (33.67)
Total	126 (100)	28 (100)	98 (100)

Upper abdominal pain (68.25%) was the predominant symptom in patients presenting to the hospital. Similarly, majority of the patients with H pylori infection rate was seen in the same group. There were 12 (9.52%) of asymptomatic patients out of which 2 (16.7%) had H pylori infection. (Table 3)

**Table 3:** Clinical presentation and H pylori status (n=126)

Symptoms	Total Cases n (%)	H pylori positive (% of group)
Upper abdominal Pain	86 (68.25)	22 (25.58)
Nausea /Vomiting	48(38.09)	12 (25.0)
Bloating	42(32.33)	9(21.42)
Loss of appetite	2(1.58)	0 (0)
Loss of weight	2(1.58)	1 (50.0)
Asymptomatic	12(9.52)	2(16.66)

On histopathology, majority 68 (53.97%) of patients were diagnosed with chronic active gastritis. H pylori was identified in 23 (33.82%) of patients with Chronic active gastritis. One case of adenocarcinoma was H pylori positive, arising in infective mucosa. (Table 4)

**Table 4:** Association between histopathological diagnosis and H pylori Infection. (n=126)

Histopathological Diagnosis	Total Cases n (%)	H pylori positive (% of group)
Chronic active Gastritis	68 (53.97)	23 (33.82)
Chronic active gastritis with atrophy	18 (14.29)	1 (5.55)
Chronic active gastritis with IM	14 (11.11)	2(14.28)
Chronic active gastritis with Atrophy and IM	10 (7.94)	1 (10.0)
Associated Dysplasia	6(4.76)	0 (0)
Adenocarcinoma	4(3.17)	1 (25.0)

## Discussion

A total of 126 patients enrolled in the study where prevalence of H pylori infection in patients undergoing gastroduodenoscopy were assessed. The associated clinical symptoms and histopathological findings was also assessed.

Our study found H pylori infection rate of 22.2% which is much lower than the global average of 50%.<sup>10</sup> On reviewing the literatures, in the past there has been higher prevalence of H pylori infection in Nepal and in countries of South Asia like India and Bangladesh where there is similar sociocultural background.<sup>8</sup> In India prevalence was 79% in 1991 and 67% in 1994 and in Bangladesh prevalence was 91.7 % in 1997 and 69.7% in 2003.<sup>11-13</sup> In study done in Nepal in 1998 also showed higher prevalence and study by Makaju et al in 2005 showed higher prevalence.<sup>14,15</sup> These studies gives an impact of higher prevalence in developing country like ours might be probably due to poor sanitation and overcrowding.<sup>8</sup> However in the present scenario, low prevalence rate in this study as well as in study by Shakya et al and Umid Shrestha et al. indicates that in the current era the prevalence rate is not high as it was in a decade old data.<sup>4,8</sup> This decreasing trend could be due to the widespread use of over the counter available proton pump inhibitors and antibiotics.<sup>9</sup>

On contrary to this, study by Shrestha et al, Adlekha et al and KC et al still showed higher prevalence of H pylori infection.<sup>9,16,17</sup> Even with the decreasing trend of the prevalence of H pylori infection in the present scenario, these studies showing higher prevalence might be due to the variations in sample size and variation in biopsy site. These facts might also suggest that the intermediate prevalence in the present and most of the studies possibly reflect the urbanization effect in the study population.

Various studies has suggested acquisition of H pylori infection is common in childhood.<sup>18</sup> Present study showed that peak prevalence of H pylori in 31-40 years age group (28.6%)

This could be due to the factor that these economically active population have to face poor sanitation, poor food hygiene and have to be in crowded places, leading to acquire H pylori infection in adulthood. Similar age group was affected in the study by Shokrzadeh et al.<sup>19</sup> Few studies however showed higher prevalence in higher age group.<sup>14</sup> Our study however showed lowest prevalence in older age group (16.7% in >60 years). This

might be due to the enrollment of fewer elder patients in the present study.

In the present study, though males had higher infection rate (60.5% of the positive case) this was not statistically significant. This was consistent with most of the studies by Shakya et al, Bhattarai et al, Adlekha et al, K C et al and Makaju et al.<sup>1,4,9,15,16</sup> The reason for this observed gender difference was not known but better hygiene practice may be the reason for the lower prevalence in females, however, further studies are required for confirmation.<sup>20</sup>

Our data corroborate that upper abdominal pain is most common presenting symptom of H pylori associated gastritis with 25.6% of these cases being positive. These may be due to the various virulence factors in the organism like, urease secretion that converts the acidic environment of the stomach, flagella that assists motility in gastric mucosa, adhesins secretion to adhere and release of effector proteins and toxins that include cytotoxin- associated Gene (A) and vacuolating cytotoxin A that leads to tissue damage and ultimately trigger innate immunity to activate neutrophils and secrete chemokines that further cause damage.<sup>21</sup> However 74.4% of the patients that had upper abdominal pain were H pylori negative. This reflects the need of proper endoscopic as well as histopathological examination to rule out other diseases before empirically starting H pylori regimen. The 9.5% of asymptomatic patients had 16.7% H pylori infection rate. Though low infection rate, it is of major public health problem as disease transmission with complications like carcinoma, lymphoma occurs without warning signs.

Chronic active gastritis was the most common histopathological finding (54% of biopsies) with highest H pylori detection rate (33.8%). Similar finding was seen in study done by KC et al and Shakya et al.<sup>4,9</sup> This probably represents an intersection between the microbial pathogenesis, host inflammatory response and clinical disease manifestations as discussed earlier. The presence of neutrophils in lamina propria, surface of foveolar epithelium, lining and within the pits suggest activity which is one of the supporting features of H pylori infection as seen in the present study.<sup>21</sup>

There is a decreasing trend of H pylori incidence in IM where only 4(28.6%) had positive H pylori infection. Similar finding was seen in study by Makaju et al.<sup>15</sup> This may be due to the change in the microenvironment of gastric mucosa where the organisms are eliminated.<sup>21</sup> H pylori also leads to atrophy, where in the present study, 3 (16.7%) patients had atrophy and 2(20%) patients had both atrophy and IM. Though H pylori is considered as carcinogen, in the present study only single case of adenocarcinoma showed H pylori positive. Thus further study with larger sample size is required for the comparison as well as for correlation.

## Conclusion

The study found a 22.22% prevalence of H. pylori among patients undergoing gastroduodenoscopy, with a higher detection rate in chronic active gastritis, supporting an association between H. pylori infection and gastroduodenal pathology.

## Recommendation

Biopsy evaluation and evaluation for *H. pylori* followed by gastroduodenoscopy in patients with upper GI symptoms may assist in guiding appropriate management.

## Limitation of the study

There are few limitations of the study. Study was carried out at single tertiary care hospital with a very small sample size which may not reflect the large general population. As the study was conducted over short time frame, seasonal variations in *H. pylori* prevalence could not be explored. Hence a metacentric study carried out in extended time frame with larger sample size is needed to provide a precise picture of *H. pylori* prevalence status.

**Conflict of Interest:** None

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