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Helicobacter pylori Infection Among Patients Undergoing Upper Gastrointestinal Endoscopy for Dyspepsia

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ABSTRACT

Introduction: *Helicobacter pylori* is associated with the pathogenicity of gastroduodenal mucosal lesions, ulcers, and gastric cancers. The present study was undertaken to study the prevalence of *H. pylori* infection among patients undergoing upper gastrointestinal (UGI) endoscopy for dyspepsia in the Nepalese population.

Methods: A cross-sectional, hospital-based study was conducted among patients presenting with dyspepsia. Each study patient underwent upper gastrointestinal endoscopy followed by a rapid urease test or histopathology from the biopsy sample for *H. pylori* detection. Data analysis was done by SPSS 20.

Results: The mean age of the patients was 43±11.65 years (M: F=1.4:1) with male predominance. The prevalence of *H. pylori* infection was 53.2% among the dyspeptic patients undergoing UGI endoscopy. The *H. pylori* infection was significantly associated with gastritis, duodenitis, gastric ulcer, duodenal ulcer, and gastric cancer ($p \leq 0.05$).

Conclusion: This study demonstrates a high prevalence of *H. pylori* among patients undergoing UGI endoscopy for dyspepsia.

Key Words: *Biopsy; Dyspepsia; Endoscopy, Gastrointestinal; Helicobacter Pylori*

INTRODUCTION

Dyspepsia is a common complaint in general practice and gastrointestinal clinics.[1] Dyspepsia is a term that describes discomfort or pain in the upper abdomen alongside other symptoms that often include bloating, belching, burping, nausea, abdominal distension, increased flatulence, and postprandial fullness. *Helicobacter*

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pylori is a very common human infection. Around, 50% of the normal world population harbors *H. pylori*. However, only 10-20% are symptomatic.[2] This bacterium colonizes human gastric antral mucosa. It causes chronic and active gastritis, peptic ulcer disease and is associated with an increased risk of developing gastric cancer, and mucosa-associated lymphoid tissue lymphoma.[3]

The epidemiology of *H. pylori* in developing countries differs from that observed in developed countries.[4] Exposure occurs in the early years in developing countries and the majority of adults have evidence of previous exposure.[5]

Upper gastrointestinal (UGI) endoscopy is the modality of choice for the evaluation of different abdominal complaints including dyspepsia. Various tests aided with UGI endoscopy are available for the detection of *H. pylori*. The present study was undertaken to study the prevalence of *H. pylori* infection in Nepalese patients undergoing UGI endoscopy for dyspepsia attending a tertiary care teaching hospital of Gandaki region, Nepal.

METHODS

This cross-sectional, hospital-based prospective study was carried out in the unit of Medical Gastroenterology under the Department of Medicine, Manipal Teaching Hospital, Pokhara from November 2020 to October 2021 for 12 months. The sample size was collected using the formula:

Sample size: $Z^2 \times [p \times (1-p)] / e^2$

Where, Z: 1.96 (critical value of the normal distribution for 95% confidence interval); p: sample proportion (prevalence of the disease); e: standard error (0.05); margin of error =5%. The prevalence of *H. pylori* infection among adult patients with dyspepsia in a previously published Nepalese study was 68%.[6] The minimum sample size required with this prevalence and calculated as per the equation was 334.5.5~335. Adding 10% for missing data, the sample size of 369 was reached.

All consecutive patients with dyspepsia aged more than 18 years who underwent examination with UGI endoscopy were enrolled for the study. Patients who had taken *H. pylori* eradication therapy or any antibiotics or proton pump inhibitors in the last 2 weeks were not enrolled. Patients with severe co-morbidities, upper GI bleed and those with known GI cancers, those with incomplete UGI endoscopy, and those who failed to give consent were also excluded.

A detailed clinical history with general physical and abdominal examinations was carried out. Each patient underwent UGI endoscopy (PENTAX EPK 700, PENTAX JAPAN Inc.) and diagnostic findings were documented. Endoscopic biopsies were taken from the antrum of the stomach close to the pylorus and corpus both. The biopsied tissue was inserted in a commercially available rapid urease test (RUT) kit (GASTRO CURE system, KOLKATA, WEST BENGAL, INDIA). A drop of distilled water was placed into the kit. Most turn positive (from yellow to red or pink) if *H. pylori* are present within 120 to 180 minutes. Selective biopsies were taken when encountered with ulcers or endoscopic lesions suspicious of malignancies and subsequently sent for histopathology assessment in the Department of Pathology. The slides were examined and reported by a consultant pathologist. These tissue biopsies also underwent Hematoxylin and Eosin (H&E) staining additionally for detection of *H. pylori. H. pylori* infection was thus diagnosed after endoscopic biopsy followed with RUT or with tissue staining with H&E.

This study was approved by the Institutional Review Board of Manipal College of Medical Sciences (IRB number: MEMG/IRC/414/GA). Informed consent was taken from patients or their relatives for participation in the study. Data were entered in a pre-structured proforma. The data were analyzed using Statistical Packages for the Social Sciences 20. (IBM Corp. Released 2011. IBM SPSS Statistics for Windows, Version 20.0. Armonk, NY: IBM Corp.) All categorical

data were expressed in absolute number and percentage. All numerical continuous data were expressed in mean ±SD. A chi-squared test was used to test for significant differences in proportions (categorical data). All tests were analyzed with a 95% confidence interval and a p-value of <0.05 was considered significant.

RESULTS

Four hundred and eighty-three patients underwent UGI endoscopy for dyspepsia over the study period. Sixty-seven patients with a history of use of antibiotics and/or proton pump inhibitors in the last two weeks and 12 patients with incomplete endoscopy were excluded from the study. A total of 404 patients were finally enrolled for the study. There were 236 males and 168 females (M: F=1.4:1). The rapid urease test was positive for *H. pylori* in 193 patients. In twenty-two patients, *H. pylori* were detected following histopathologic examination with H&E staining. *Helicobacter pylori* were thus detected in a total of 215 patients combining both the test results, showing a prevalence of 53.2% among patients undergoing UGI endoscopies for dyspepsia.

The mean age of subjects was 43±11.65 years with a range of 24 – 85 years of age. The prevalence of H. pylori was 54.7% among male subjects and 51.2% among female subjects. This difference in detection of *H. pylori* in the two sexes was, however, not statistically significant (p>0.05) (Table 1).

Table 1: Prevalence of H. pylori among study subjects

H. pylori	Total (%)	Male (%)	Female (%)
Present	215 (53.2%)	129 (54.7%)	86 (51.2%)
Absent	189 (46.8%)	107 (45.3%)	82 (48.8%)
Total	404 (100%)	236 (100%)	168 (100%)

Patients were classified as per age groups with maximum cases of dyspepsia in 41-60 years (Table 2). The maximum patients detected with *H. pylori* were also from the same age group of 41-60 years.

Table 2: Findings among different age groups

Age Group	*Helicobacter pylori*		
	Positive (n (%))	Negative (n (%))	Total (n (%))
<40 years	54 (25.1%)	46 (24.3%)	103 (25.5%)
41-60 years	128 (59.5%)	109 (57.7%)	235 (58.2%)
≥61 years	33 (15.4%)	34 (18%)	66 (16.3%)
Total	215 (100%)	189 (100%)	404 (100%)

Upper gastrointestinal (UGI) endoscopy was normal and revealed no pathologies in 52 (12.9%) study subjects. Erosive mucosal disease in the form of gastritis and duodenitis followed by duodenal ulcers and gastric ulcers were the most common endoscopic findings. Rest subjects had findings as depicted in Table 3. The prevalence of *H. pylori* in patients with gastritis, duodenitis, peptic ulcer disease, and gastric cancer was 69.5%, 65.1%, 62%, and 33.3% respectively. The *H. pylori* infection was significantly associated with gastritis, duodenitis, gastric ulcer, duodenal ulcer, and gastric cancer (p <0.05).

Table 3: UGI endoscopic findings among study subjects

UGI endoscopy findings	*H. pylori*-positive (%)	*H. pylori*-negative (%)	p-value
Gastric ulcers (n=59)	37(62.7%)	22(37.3%)	0.001
Duodenal ulcers (n=62)	38(61.3%)	24(38.7%)	0.001
Gastritis (n=95)	66(69.5%)	29(30.5%)	<0.001
Duodenitis (n=86)	56(65.1%)	30(34.9%)	<0.001
Esophagitis (n=19)	4(21.1%)	15(78.9%)	0.35
Gastro duodenal polyps (n=6)	1(16.7%)	5(83.3%)	0.21
Gastric cancers (n=9)	3(33.3%)	6(66.7%)	0.05
Duodenal Cancer (n=4)	1(25%)	3(75%)	0.12
Others (n=12)	3(25%)	9(75%)	0.57
Normal Findings (n=52)	6(11.5%)	46(88.5%)	0.79
Total (N=404)	215(100%)	189(100%)	

DISCUSSION

The mean age of subjects in the present study was 43±11.65 years with male predominance (M:F=1.4:1). The mean ages of patients were higher, 44.7 years and 46.3 years in the previously published Nepalese studies.[6,7] All these studies had male predominance.

The majority of patients detected with *H. pylori* were from the age group of 41-60 years in the current study. The prevalence of *H. pylori* was, similarly higher in the same age group by Shakya et al.[8] Our study did not show any significant difference in *H. pylori* prevalence among the gender. This was consistent with the previously published studies.[7-9] A study by Adlekha et al. from India and KC et al. from Nepal also showed no significant sex predilection for *H. pylori* infection.[10,11]

The prevalence of *H. pylori* in patients with dyspepsia was 53.2% in the current study. It was higher, 62% and 68.1% in the previously published studies by Adlekha et al. and KC et al. respectively.[10,11] Seroprevalence *of H. pylori* in Bangladesh and India in two different studies conducted around two decades earlier had an even higher prevalence of 69.7% and 79% respectively.[12,13] This indicates that the prevalence of *H. pylori* in developing South Asian countries is decreasing. This decreasing trend of *H. pylori* prevalence could be due to the widespread use of proton pump inhibitors and antibiotics.

Some studies within Nepal have shown an even lower prevalence rate compared to ours. The prevalence of *H. pylori* infection was 50.47%. by Shrestha et al. and as low as 24.6 % by Shakya et al. respectively.[6,8] This difference in prevalence could be due to the use of various invasive and non-invasive tests performed for *H. pylori* detection in different studies. Some patients who were already on PPI or antibiotics may give false negative reports.

The prevalence of *H. pylori* in patients with gastritis, duodenitis, and peptic ulcer disease was 69.5%, 65.1%, and 62% respectively in the current study. *H. pylori* infection was found in 63.9% of cases of gastritis by KC et al.[11] The prevalence of H. pylori infection was higher, 71% with duodenitis and 86.1% with peptic ulcer in that study.[11] Similarly, a high prevalence of *H. pylori* infection was noted in patients with gastritis, duodenitis, and peptic ulcer diseases in the studies by Shrestha et al. and Joshi et al. respectively.[6,14]

The prevalence of *H. pylori* in patients with gastric cancer was 33.3% in the current study. This was reported as high as 80% by Shrestha

et al. and 60% by KC et al.[6,11]

Upper gastrointestinal (UGI) endoscopy was normal and revealed no pathologies in 12.9% of study subjects in the current study. Normal endoscopy was noted in a higher, 17.87% subjects in the study by Shrestha et al.[6] Functional GI disorders can also present with persistent dyspepsia.

Erosive mucosal disease in the form of gastritis and duodenitis followed by duodenal ulcers and gastric ulcers were the most common endoscopic findings in the current study. These findings were consistent with the previously published Nepalese studies.[8,9,11]

The *H. pylori* infection was significantly associated with gastritis, duodenitis, gastric ulcer, duodenal ulcer, and gastric cancer in the current study ($p < 0.05$).

Significant association of *H. pylori* infection with peptic ulcer and with gastric carcinoma were highlighted by the previously published studies by KC et al. and Joshi et al.[11,14]

The present study had some limitations. Association of *H. pylori* infection with life-style related modifiable factors was not addressed. The association of *H. pylori* in patients with chronic diseases like diabetes mellitus, chronic liver diseases, etc were not studied. Patient follow-up was not done for assessment of the efficacy of *H. pylori* eradication regimens.

CONCLUSION

This study demonstrates a high prevalence of *H. pylori* among patients undergoing UGI endoscopy for dyspepsia. The prevalence of *H. pylori* infection was significantly associated with gastritis, duodenitis, gastric ulcer, duodenal ulcer, and gastric cancer.

CONFLICT OF INTEREST

None

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None

REFERENCES

1. Sobieraj DM, Coleman SM, Coleman CI: US prevalence of upper gastrointestinal symptoms: a systematic literature review. *Am J Manag Care*. 2011;17(11):449-58.
2. Go MF. Natural history and epidemiology of *Helicobacter pylori* infection: Review: Natural history of H. pylori infection. *Aliment Pharmacol Ther*. 2002;16:3–15.http://dx.doi.org/10.1046/j.1365-2036.2002.0160s1003.x
3. Makola D, Peura DA, Crowe SE: *Helicobacter pylori* infection and related gastrointestinal diseases. *J Clin Gastroenterol*.2007;41:548-58. https://doi.org/10.1097/MCG.0b013e318030e3c3
4. Hunt RH, Xiao SD, Megraud F, et al.: *Helicobacter pylori* in developing countries. World Gastroenterology Organisation Global Guidelines. *J Gastrointestin Liver Dis*. 2011;20(3):299-304.
5. Suk FM, Lien GS, Yu TC, Ho YS: Global trends in *Helicobacter pylori* research from 1991 to 2008 analyzed with the Science Citation Index Expanded. *Eur J Gastroenterol Hepatol*. 2011; 23(4):295-301.https://doi.org/10.1097/MEG.0b013e3283457af7
6. Shrestha R, Koirala K, Raj KC, Batajoo KH: *Helicobacter pylori* infection among patients with upper gastrointestinal symptoms: prevalence and relation to endoscopy diagnosis and histopathology. *J Family Med Prim Care*.2014;3(2):154-8.https://doi.org/10.4103/2249-4863.137663
7. Shrestha UK, Ghosh A, Alurkar VM, Kohli SC, Sapkota S. Prevalence of *Helicobacter pylo*ri infection, its correlation with gastroduodenal diseases and the incidence of gastric cancer in Nepal. *J Adv Intern Med*. 2013;2(2):52–60.https://doi.org/10.3126/jaim.v2i2.8777

8. Shakya RP, Regmi S, Adhikari S. Prevalence of *Helicobacter pylori* among patients undergoing gastrodudenoscopy in a hospital in Western Nepal. *J Lumbini Med Coll*. 2017;5(2):69–73.https://doi.org/10.22502/jlmc.v5i2.158
9. Mandal AK, Kafle P, Puri P, et al. An association of *Helicobacter pylori* infection with endoscopic and histological findings in the Nepalese population. *J Family Med Prim Care*. 2019;8(3):1227–31.https://doi.org/10.4103/jfmpc.jfmpc_82_19
10. Adlekha S, Chadha T, Krishnan P, Sumangala B. Prevalence of *Helicobacter pylori* infection among patients undergoing upper gastrointestinal endoscopy in a medical college hospital in Kerala, India. *Ann Med Health Sci Res*. 2013;3(4):559–63.https://doi.org/10.4103/2141-9248.122109
11. K.c. SR, Lakhey A, Koirala K, Amatya GL. Prevalence of *Helicobacter pylori* among patients with dyspepsia and correlation between endoscopic and histological diagnosis. *J Pathol Nepal*. 2016;6(11):942–6.https://doi.org/10.3126/jpn.v6i11.15678
12. Lee CS, Kim DY, Jung CW, Park JY. Prevalence of *Helicobacter pylori* in Bangladesh: Rapid urease test. *The ORION Medical Journal*. 2003;16:104-5.
13. Graham DY, Adam E, Reddy GT, et al. Seroepidemiology of *Helicobacter pylori* infection in India. Comparison of developing and developed countries. *Dig Dis Sci*. 1991;36(8):1084–8.https://doi.org/10.1007/BF01297451
14. Joshi RD, Khadka S, Joshi DM, Kadel A, Dangal G, Dongol Y. Prevalence of *Helicobacter pylori* infection in patients with peptic ulcer disease at Kathmandu Model Hospital. *J Chitwan Med Coll*. 2018;8(4):3–7.https://doi.org/10.3126/jcmc.v8i4.23761