Prevalence Study of *H. pylori* infection in Dyspeptic patients coming to Nepal Medical College Teaching Hospital, Jorpati, Kathmandu

S Shrestha,[1] P Paudel,[1] GB Pradhan,[1] L Shrestha[2] and CL Bhattachan[1]

[1]Department of Surgery, Nepal Medical College Teaching Hospital, Kathmandu, Nepal, [2]Department of Community Medicine, Nepalese Army Institute of Health Sciences, Kathmandu, Nepal

Corresponding author: Dr. Sunil Shrestha, MBBS, MS, (General Surgery) Associate Prof. Department of Surgery, Nepal Medical College Jorpati, Kathmandu, Nepal; e-mail: phoorbari@yahoo.com

ABSTRACT

Helicobacter pylori (*H. pylori*) is one of the most common human infections worldwide particularly in the developing countries. It has been established as etiology of chronic gastritis and peptic ulcer disease, gastric adenocarcinoma and mucosal associated lymphoid tissue lymphoma (MALT). During this decade, there have been some reports showing a decline in global prevalence of *H. pylori* infection and peptic diseases including many Asian countries. Hence to determine prevalence of Helicobacter pylori infection in dyspeptic patients, this descriptive, non-interventional study was carried out at the Endoscopy sub-unit of the Surgery Department from April 2011 to February 2012. Three hundred nineteen dyspeptic patients (Male 161 and female 152) with a mean age of 20.12 years were examined for the presence of *H. pylori* infection by histology staining. The prevalence of *H. pylori* infection was 50.47%. The most common endoscopic findings was gastritis (47.6%) followed by normal findings 57 (17.87%). A total of 8.47% of gastric Ulcer, oesophagitis 5.64% and gastric cancer 0.94% were detected. All three cases of gastric cancer were positive for *H. pylori* infection. Among gastritis, *H. pylori* was observed in 67 (44%) cases and 18 out of 57 (5.6 %) of normal gastric mucosa showed H. pylori. The endoscopic findings such as gastritis, gastric ulcer, duodenal ulcer and gastro duodenal reflux are significantly associated with H pyloric infection. The prevalence of *H. pylori* infection is still high in peptic diseases. *H pylori* infection is significantly correlated with peptic ulcer diseases than with non-ulcer dyspepsia. Further studies are required to establish the *H. pylori* positive cases with that of other tests such as serological detection of anti *H. pylori* antibody by ELISA/ICT and culture to establish a diagnosis quickly without any invasive method and institute proper management thus reducing morbidity.

Keywords: Dyspeptic patients, *H. pylori*, infection.

INTRODUCTION

Helicobacter pylori (*H. pylori*) is a gram negative, spiral, flagellated bacterium with the capability of abundant urease production. *H. pylori* bacterium is usually found under the mucus layer in the gastric pits and in close apposition to gastric epithelial cells.[1] Since the discovery of *H. pylori* by Warren and Marshall,[2] it has been evidently demonstrated that the organism plays a major role in several upper gastrointestinal diseases which present as dyspepsia.[2-4] *H. pylori* infection causes chronic active gastritis in the antrum (antral gastritis), the corpus (corpus gastritis) or in both (pan-gastritis). It is a major etiological factor in peptic ulcer disease, gastric carcinoma, and gastric mucosal associated lymphoid tissue (MALT) lymphoma.[2,5,6]

H. pylori is one of the most common human infections worldwide particularly in the developing countries. It has been established as etiology of chronic gastritis and peptic ulcer disease, gastric adenocarcinoma and mucosal associated lymphoid tissue lymphoma MALT.[7] The organism plays an important role in peptic ulcer diseases. The strong association of *H. pylori* with dyspepsia has caused a major paradigm shift in patients' management.[8] In developing countries, more than 80% of the population is *H. pylori* positive.[9] However, during this decade, there have been some reports showing a decline in global prevalence of *H. pylori* infection and peptic diseases including many Asian countries. Lower socioeconomic status, lower levels of education, poor hygiene and sanitation, household crowding were associated with a higher prevalence of *H. pylori* infection.[10]

There are various diagnostic tests for *H. pylori* which can be broadly classified into invasive and noninvasive tests.[11] Invasive tests utilise endoscopic gastroduodenal biopsy samples for histology, culture, rapid urease test (RUT), polymerase chain reaction and fluorescent in-situ hybridization. The non-invasive tests do not require endoscopy; they include urea breath test, immunoglobulin G, A and M serology, stool antigen test, saliva antibody test[12,13] and urinary antibody test.[14] In Nepal, the non-invasive tests are not generally available.

Histopathology on gastric mucosal biopsies for *H. pylori or* RUT done in Nepal.

The aim of this study was to determine the prevalence of *H. pylori* and association with other factors among the dyspeptic patients attendant at Nepal Medical College Teaching hospital (NMCTH)

MATERIALS AND METHODS

The descriptive, non-interventional study was carried out at the Endoscopy sub-unit of the Surgery Department of NMCTH. Ethical clearance was sought and obtained from the Joint Institutional Review Committee of hospital. Three hundred nineteen patients with dyspeptic symptoms undergoing endoscopy within the period of April 2011 to February 2012 were included in the study using non-probability convenient sampling after obtaining informed consent from them. Patients who were previously treated for *H. pylori* infection or who had received antibiotics, proton pump inhibitors or bismuth compounds in the preceding 4 weeks were excluded. Base line bio-data were obtained. Dyspeptic symptoms included a number of upper abdominal complaints like pain and discomfort, bloating, fullness, early satiety, nausea, anorexia, heartburn, regurgitation and belching. The collected data was entered in a proforma. Oesophago-gastro-duodenoscopy (OGD) was performed on all the participants using Olympus (GFI-XQ20) or Pentax (FG29W) forward-viewing Oesophago-gastro-duodenoscope. Endoscopic features of each patient were recorded. Endoscopic appearance was considered normal if the mucosal was pink in colour, smooth and lustrous. One gastric antral mucosal biopsy was taken for histopathological examination. Although the gold standard for presence or absence of Helicobacter pylori infection is culture but in this study the diagnostic method used was finding of *H. pylori* on histopathology of gastric antrum.

Table-1: Age and sex distribution of patients with Dyspepsia

Age groups	Male	Female	Total
15-24	24	23	47
25-34	45	29	74
35-44	28	30	58
45-54	26	37	63
55-64	15	13	28
65-74	22	15	37
75-84	6	4	10
85 +	1	1	2
	167	152	319

HISTOLOGY

The antral biopsy was fixed in 10% formaldehyde and transferred to the histopathology laboratory for processing. Four micron thick paraffin sections were stained with routine Haematoxylin and Eosin for detection of *H. pylori* and gastritis. Giemsa stain was also used for better yield. Slides were examined microscopically for *H. pylori* by the Pathologist. Presence of Helicobacter-like organisms was regarded as positive while absence was regarded as negative.

RESULTS

Data was analyzed using Statistical Package for Social Sciences, version17.0 (SPSS Inc. Chicago Illinois). Results were presented as means ± standard deviation for quantitative variables and number (percentages) for qualitative variables. Categorical variables were compared with Pearson's Chi-square. Significant P-value was taken as <0.05.

Out of 319 patients (Male 161 and female 152) who underwent endoscopic biopsy and included in the study, a total of 161 (50.4%) patients, Male 93 (58%) and female 68 (42%) were infected by *H. pylori*. The infection by *H. pylori* was significantly higher in males than females ($p<0.05$) with male to female ratio of 1.4:1. The age range of dyspeptic patients was 15-87 years range while the mean age was 42.92 (SD ±16.95) (Table-1). The mean age of the *H. pylori* infected patients was 20.12 years with maximum infected age group is 25-34 years.

The most common endoscopic findings was gastritis (47.6%) followed by normal findings 57 (17.87%). A total of 28 (8.47%) of gastric Ulcer, oesophagitis 18 (5.64%) and gastric cancer 3 (0.94%) were detected. All three cases of gastric cancer were positive for *H. pylori* infection. Among gastritis, *H. pylori* was observed in 67 (44%) cases and 18 out of 57 (5.6 %) of normal

Table-2: Upper gastro intestinal Endoscopy findings in patients with Dyspepsia

SN	Endoscopy findings	Frequency (n = 319)			
		Present		Absent	
		(f)	(%)	(f)	(%)
	Oesophagitis	18	5.64	301	94.36
2.	Gastritis	152	47.65	167	52.35
3.	Gastric Ulcer	28	8.78	291	91.22
4.	Gastric cancer	3	0.94	316	99.06
5.	Duodenal Ulcer	14	4.39	305	95.61
6.	Duodenitis	10	3.13	309	96.87
7.	Gastro duodenal reflux	32	10.03	287	89.97
8.	Normal	57	17.87	262	82.13
9.	Oesophageal varies	7	2.19	312	97.81

Table-3: Association between *H. Pyloric* status and various endoscopic findings among patients with dyspepsia

SN	Endoscopy findings		H. Pyloric				χ^2	P value
			Positive		Negative			
			(f)	(%)	(f)	(%)		
	Oesophagitis	No	153	47.96	148	46.39	.277a	.599
		Yes	8	2.51	10	3.13		
	Gastritis	No	94	29.47	73	22.88	4.745a	.029
		Yes	67	21.00	85	26.65		
3.	Gastric Ulcer	No	137	42.95	154	48.28	15.252a	.000
		Yes	24	7.52	4	1.25		
4.	Gastric cancer	No	158	49.53	158	49.53	2.972a	.085
		Yes	3	0.94	0	0.00		
5.	Duodenal Ulcer	No	150	47.02	154	48.28	4.574a	.032
		Yes	11	3.45	3	0.94		
6.	Duodenitis	No	157	49.22	152	47.65	.453a	.501
		Yes	4	1.25	6	1.88		
7.	Gastro duodenal reflux	No	138	43.26	149	46.71	6.519a	.011
		Yes	23	7.21	9	2.82		
8.	Normal	No	143	44.83	119	37.30	9.908a	.002
		Yes	18	5.64	39	12.23		
9.	Oesophageal varies	No	155	48.59	157	49.22	3.556a	.059
		Yes	6	1.88	1	0.31		

gastric mucosa showed *H. pylori*. The endoscopic findings such as gastritis, gastric ulcer, duodenal ulcer and gastro duodenal reflux are significantly associated with *H. pyloric* positive infection (Table-2 and 3). The results of this study also depict the strong association of Helicobacter pylori infection and dyspepsia even with normal endoscopy.

Association of *H. pyloric* infection and different life style variables are studied. None of the variables are found to be significantly associated with *H. pyloric* infection (Table-4). However, among *H. pyloric* positives habit of alcohol consumption is more (19.75%) followed by smoking habit (18.5%) in compare to those who are negative status (Table-4). Similarly non of the clinical symptoms presented by patients found to be significantly associated with *H. pyloric* infection. Most common clinical symptoms presented by *H. pyloric* positive patients is heart burn (38.%) followed by sour eructation (16.6%) (Table-5).

Table-4: Association between *H. Pyloric* status and various lifestyle findings among patients

SN	Variables		H. Pyloric				χ^2	P value
			Positive		Negative			
			(f)	(%)	(f)	(%)		
1.	Smoking	Yes	59	18.50	41	12.85	.392[a]	.531
		No	121	37.93	98	30.72		
2.	Alcohol	Yes	63	19.75	47	14.73	049[a]	.825
		No	117	36.68	92	28.84		
3.	Tobacco	Yes	39	12.23	24	7.52	1.516[a]	.469
		No	119	37.30	93	29.15		
4.	Diet	Veg	20	6.27	17	5.33	.096[a]	.757
		Non Veg	160	50.16	122	38.24		
5.	Socio economic condition	Poor	14	4.39	8	2.51	.869[a]	.648
		Average	150	47.02	121	37.93		
		Well to do	16	5.02	10	3.13		

Table-5: Association between *H. Pyloric* status and various clinical symptoms presented by Dyspeptic patients

SN	Variables		H. Pyloric				χ^2	P value
			Positive		Negative			
			(f)	(%)	(f)	(%)		
1.	Nausea	No	150	47.02	113	35.42	.225[a]	.635
		Yes	30	9.40	26	8.15		
2.	Vomiting	No	144	45.14	121	37.93	2.772[a]	.096
		Yes	36	11.29	18	5.64		
3.	Water brash	No	139	43.57	114	35.74	1.098[a]	.295
		Yes	41	12.85	25	7.84		
4.	Heart Burn	No	57	17.87	48	15.05	.292[a]	.589
		Yes	123	38.56	91	28.53		
5.	Sour Eructation	No	127	39.81	102	31.97	.309[a]	.578
		Yes	53	16.61	37	11.60		
6.	Freq-belching	No	131	41.07	100	31.35	.004[a]	.950
		Yes	49	15.36	38	11.91		
7.	Periodicity	No	177	55.49	134	42.01	1.195[a]	.274
		Yes	3	0.94	5	1.57		
8.	Weight Loss	No	177	55.49	132	41.38	2.932[a]	.087
		Yes	3	0.94	7	2.19		
9.	Pain relieved after	No	170	53.29	132	41.38	.042[a]	.838
		Yes	10	3.13	7	2.19		
10.	Non-ulcer dyspepsia	No	167	52.35	120	37.62	3.612[a]	.057
		Yes	13	4.08	19	5.96		
11.	Others	No	146	45.77	110	34.48	.193[a]	.660
		Yes	34	10.66	29	9.09		

DISCUSSIONS

H. pylori is a gram-negative, microaerophilic bacterium that can inhabit various areas of the stomach and duodenum. It causes a chronic low-level inflammation of the stomach lining, and is strongly linked to the development of duodenal and gastric ulcers. The diagnosis of *H. pylori* by culture, gram stain and histology, which are biopsy based methods, is well established. In developing countries like Nepal, problems associated with histological diagnosis of *H. pylori* arise because the result depend on the competence of the pathologist, the time spent to examine the slides (inter-observer variability) and the variability of staining techniques.[15] Special stains for biopsy specimens improve visual detection of the bacteria. To mitigate these problems in our study, the service of a Gastrointestinal Pathologist was employed and Giesma stain was used in addition to routine H&E.

Significantly more male were found positive for *H. pylori* than female, which is consistent with Murray *et al*[16] who carried out a study in a geographically distant area from Northern Ireland and found that *H. pylori* infection was more common in males (60.9%) than females (55.2%). Similarly study done at Rajshahi Medical College reported that among the 105 cases, 76 were male (72.3%) and 29 were female (27.6%).[17] This is consistent with study at Dhulikhel hospital, 2005 which reported that out of 224 patients significantly more male infected than female.[18]

In this study among the 319 dyspeptic patients, 31.50% of the 57 patients who had normal gastric mucosa during endoscopy, 44.0% of the 152 gastritis patients, 86.0% of the 28 peptic ulcer patients, all (100%) the gastric cancer patients, 40.0% of the 10 duodenitis patients and 86.0% of the reflux oesophagitis patients were *H. pylori* infected. In a study in Faridpur Medical College,[19] MDU islam reported that 78.0% of normal gastric mucosa patients, 70.0% of the gastritis patients, 80.0% of the peptic ulcer patients, all of the duodenitis patients, 80.0% of the arcinoma stomach patients and 50.0% of the reflux oesophagitis patients were *H. pylori* infected. In a study in BIRDEM,[20] 75% gastritis patients, 78.6% peptic ulcer patients, 25% carcinoma of stomach patients and 50% of reflux oesophagitis patients were *H. pylori* infected. In another study, Chen *el al*[21] reported that out of 170 cases, 34 with normal endoscopic findings, 62 with gastritis,

and 57 were duodenal ulcers, 5 with gastric ulcers, 2 with combined ulcers and 10 with other findings.It has been reported by different authors that 50-90% of normal people are infected by *H. pylori.*[22] *H. pylori* have been found in 90% of patients with chronic gastritis, 95% with duodenal ulcer, 70% with gastric ulcer and 50% with gastric carcinoma.[23]

From the findings of this study, it can be concluded that *H. pylori* infection causes a varieties of gastro-duodenal lesion. However, the normal findings of stomach mucosa among the dyspeptic patients who were infected by *H. pylori* might be due to the fact that there might be some early changes in stomach mucosa which were yet to be detected.

The prevalence of H. pylori infection is still high in dyspeptic diseases. Helicobacter pylori infection is significantly correlated with peptic ulcer diseases than with non-ulcer dyspepsia Further studies are required to establish the *H. pylori* positive cases with that of other tests such as serological detection of anti *H. pylori* antibody by ELISA/ICT and culture to establish a diagnosis quickly without any invasive method and institute proper management thus reducing morbidity.

ACKNOWLEDGEMENTS

The authors would like to thank the staffs of Department of Surgery and Endospic unit of Nepal Medical College Teaching Hospital. I would like to express my sincere thanks to Mr. Dhiraj Adhikari, endoscopy assistant, NMCTH for his continuous help during the procedures. Also would like to thanks for Mr. Prakash, second year MBBS student, Mr. Raj kumar Bajgai and Mr. Raju Karki of Nepalese Army Institute of Health Sciences for data entry process.

REFERENCES

1. Malfertheiner P, Megraud F, O'Morain C *et al*. Current concepts in the management of *H. pylori* infection: the Maastricht III Consensus Report. *Gut* 2007; 56: 772-81.
2. Arents NL, Thijs JC, Kleibeuker JH. A rational approach to uninvestigated dyspepsia in primary care: review of the literature. *Postgrad Med J* 2002; 78: 707-16.
3. Oluwasola AO, Ola SO, Saliu L, Solanke TF. *Helicobacter pylori* infection in South Nigerians: a serological study of dyspeptic patients and healthy individuals. *West Afr J Med* 2002; 21: 138-41.
4. Suerbaum S, Michetti P. *Helicobacter pylori* infection. *New Engl J Med* 2002; 347:1175-86.
5. Bazaldua OV, Schneider FD. Evaluation and management of dyspepsia. *Amer Fam Physician* 1999; 60: 1773-84.
6. van Keeken N, van Hattum E, de Boer WA. Validation of a new, commercially available dry rapid urease test for the diagnosis of *Helicobacter pylori* infection in gastric biopsies. *Netherland J Med* 2006; 64: 329-33.
7. Versalovic J. Helicobacter pylori: Pathology and Diagnostic Strategies. *Amer J Clin Pathol 2003;* 119: 403-42.
8. Jemilohun AC, Otegbayo JA, Ola SO, Oluwasola AO, Akere A. Diagnostic accuracy of rapid urease test for the diagnosis of Helicobactor pylori in gastric biopsies in Nigerians with dyspepsia. African J Clin Exper Microbiol 2011; 12: 62-6
9. Perez-Perez GI, Sack RB, Reid R, Santosham M, Croll J, Blaser MJ. Transient and persistent *Helicobacter pylori* colonization in Native American children. *J Clin Microbiol* 2003; 41: 2401-7.
10. Bardhan PK (). Epidemiological features of *Helicobacter pylori* infection in developing countries. *Clin Infect Dis* 1997; 25: 973-8.
11. Holcombe C. Helicobacter pylori: the African enigma. *Gut* 1992; 33: 429-31.
12. Barbara L, Camilleri M, Corinaldesi R *et al*. Definition and investigation of dyspepsia. Consensus of an international adhoc working party. *Dig Dis Sci* 1989; 34: 1272-6.
13. Gisbert JP, Pajares JM. Diagnosis of *Helicobacter pylori* infection by stool antigen determination: a systematicreview. *Amer J Gastroenterol* 2001; 96: 2829-38.
14. Miwa H, Sato N. Functional dyspepsia and *Helicobacter pylori* infection: a recent consensus up to 1999. *J Gastroenterol Hepatol* 2000; 15:60-65.
15. Laheij RJF, de Boer WA, van Lier HJJ *et al*. Diagnostic performance of biopsy-based methods for determination of *Helicobacter pylori* infection without a reference standard. *J Clin Epidemiol* 2000; 53: 742-6.
16. Murray LJ, McCrum EE, Evans AE, Bamford KB. Epidemiology of *Helicobacter pylori* infection among 4742 randomly selected subjects from Northern Ireland. Int. J. Epidemiol 1997; 26: 880-7.
17. Sultana A, Badruddoza SM, Rahman F. Correlation Between Endoscopic and histological Findings in Different Gastroduodenal Lesion and its Association with *Helicobacter Pylori*. *Anwer Khan Modern Med Coll J* 2011; 2: 6-10.
18. Makaju RK, Tamang MD, Sharma Y, Sharma N, Koju R, Ashraf M. Prevalence of Helicobacter pylori in Dhulikhel Hospital, Kathmandu University Teaching Hospital: a retrospective histopathologic study. *Kathmandu Univ Med J* 2005; 3: 355-9.
19. Islam MDU, Rahman SHZ, Shamsuzzaman SM, Muazzam N, Chowdhury A , Sarkar AR. Comments on Evaluation of Endoscopic Findings and Detection of *H. pylori* Antibody by Serum IgG ELISA. *Faridpur Med Coll J* 2011; 6: 24-7.
20. Kuipers' EJ, Malfertheiner P. *Helicobacter pylori* and nonmalignant diseases. *Lancet* 2004; 9: 29-34.
21. Chen TS, Li FY, Chang FY, Lee SD. Immunoglobulin G Antibody against *Helicobacter pylori*: Clinical Implications of Levels Found in Serum. *Clin Diagn Lab Immunol* 2002; 9: 1044-8.
22. Ahmed N. Gastric metaplasia in the duodenum: Role of inflammation and *Helicobacter pylori.* (M.Phil thesis). Dhaka: Department of Pathology, *Bangabandhu Sheikh Mujib Med Univ* 1999.
23. Rosai J. Ackerman's Surgical Pathology. Vol.1, 8th edition. Mosby, Boston; 1996; 616-66.