

## Epidemiological Study of *Helicobacter pylori* Infection and Endoscopic Findings in Thailand

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### ABSTRACT

**Background and Aims:** *Helicobacter pylori* infection and its associated diseases are an important health issue, but the data in Thailand was limit. The purpose of this study is to evaluate the prevalence of *H. pylori* infection in Thailand and investigate the association between the infection and demographic characteristics and gastric diseases.

**Methods:** All consecutive patients undergoing upper endoscopy in the King Chulalongkorn Memorial Hospital from 2008 to 2009 were reviewed for demographic data, endoscopic finding, and *H. pylori* infection diagnoses by using rapid urease test.

**Results:** Among 3208 patients included, 1451 (45.2%) were male and 1757 (54.8%) are female with mean age of  $56.5 \pm 15.3$  years. There were 882 cases (27.5%) of peptic ulcers (consisting of GU 530 (16.5%), DU 226 (7.0%), and both GU and DU 126 (3.9%)), 898 cases (28.0%) of GERD, 229 cases (7.1%) of portal hypertension and 25 cases (0.8%) of suspected gastric cancer. *H. pylori* infection was associated with male gender, younger age, duodenal ulcer and both GU and DU ( $p = 0.001, 0.003, 0.006$  and  $0.014$ , respectively). Peptic ulcers are also more commonly found in male and older age group ( $p < 0.001$ ). Gastroduodenitis patients tended to be female and younger compared with their counterparts ( $p < 0.001$ ).

**Conclusions:** *H. pylori* infection was common in Thailand and a major health care problem, even though the trend did seem to have been decreasing. The prevalence of peptic ulcer disease and *H. pylori* infection are varied with age and genders.

**Key words :** *Helicobacter pylori*, gastric ulcer, duodenal ulcer, gastroscopy, endoscopy

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## INTRODUCTION

Ever since the discovery of *Helicobacter pylori*, a gram-negative flagellated bacilli colonizing at gastric luminal surface, our understanding concerning peptic ulcer disease has improved tremendously. *H. pylori* is associated with gastritis, peptic ulcer disease, gastric adenocarcinoma and gastric mucosa-associated lymphoid-tissue (MALT) lymphoma of which eradication of the organism has led to lower incidence<sup>(1)</sup>.

According to the World Health Organization<sup>(2)</sup>, approximately half of the world's populations are infected with this organism. The prevalence is varied due to several factors such as gender, age, ethnicity, geographic area. Cases infected with this organism are more often found in developing areas with poor sanitation<sup>(3)</sup>. For several years the prevalence has been decreasing in several areas because of better sanitation system and *H. pylori* eradication program<sup>(2,4)</sup>. To our knowledge, the data of *Helicobacter pylori* in Thailand is still much limited. Therefore, we aim to establish the up-to-date prevalence of *H. pylori* in Thailand and to evaluate the relationship between infection and various demographic characteristic and endoscopic findings.

## METHODS

The electronic medical records of patients undergoing esophagogastroduodenoscopy (EGD) in the King Chulalongkorn Memorial Hospital (KCMH) between January 2008 and December 2009, were recruited. The endoscopic procedures were operated by gastroenterologists. The recorded data was retrospectively reviewed for demographic data, endoscopic findings and the result of rapid urease test (RUT) on antral biopsy specimens. We excluded untested cases, tested cases without recorded result and follow-up cases. To countercheck the accuracy of electronic records of RUT, a hand-written standardized report was compared with. All statistical calculations were performed using the SPSS statistics 17.0 (IBM Inc, Armonk, NY, USA). The Chi-square test and the Student's *t*-test were used to analyze categorical and quantitative data respectively. Statistical significance was defined as  $p < 0.05$ .

## RESULTS

From January 2008 to December 2009, 3208 patients who had endoscopy with recorded UBT results were identified. There were 1757 female patients

**Table 1.** Demographic and clinical data of patients undergoing EGD from 2008 to 2009.

	Number of patients (n=3208)	Percentage
Gender		
Male	1451	45.2
Female	1757	54.8
Age (year)		
Mean age (mean ± SD)	56.5 ± 15.3	
Male	56.7 ± 15.1	
Female	56.4 ± 15.6	
Range	15 - 99	
Endoscopic findings		
Peptic ulcer disease	882	27.5
Gastric ulcer	530	16.5
Duodenal ulcer	226	7.0
Both DU and GU	126	3.9
Gastroduodenitis* (non-ulcer)	2041	63.6
Gastro-esophageal reflux disease	898	28.0
Suspected gastric cancer	25	0.8
Portal hypertension <sup>†</sup>	229	7.1
<i>H.pylori</i> -positive	888	27.7

\*Considering peptic ulcer disease as major diagnosis, patients with both ulcer and gastroduodenitis were only counted in ulcer group.

<sup>†</sup>The patients with portal hypertension cases comprised esophageal varices, gastric varices and/or portal hypertensive gastropathy.

(54.8%) and 1451 male patients (45.2%). The age ranged from 15 to 99 years old (mean age  $56.5 \pm 15.3$  years) without any statistical significance between genders. Regarding the endoscopic findings, gastroduodenitis was most commonly found with the prevalence of 2041 cases (63.6%). There were 656 cases of gastric ulcer (20.4%), 352 cases of duodenal ulcer (11.0%), 898 cases of GERD (28.0%) and 229 cases of portal hypertension (7.1%). Gastric cancer was suspected in 25 cases (0.8%). *H. pylori* infection was diagnosed in 888 cases (27.7%). Table 1 shows the demographic and clinical data of patients.

The male patients were significantly more often *H. pylori*-positive than their female counterparts ( $p=0.001$ ). Duodenal ulcer and both gastroduodenal ulcer were statistically associated with *H. pylori* infection ( $p=0.006$  and  $p=0.014$ , respectively), although gastric ulcer was not. The presence of *H. pylori* infection in different endoscopic findings and different genders was shown in Table 2.

The mean age of patients with ulcer disease and patients suspected of having gastric cancer were significantly higher ( $p < 0.001$  and  $p=0.008$ , respectively), whereas in gastroduodenitis group and *H. pylori*-infected group the mean age was significantly lower ( $p < 0.001$  and  $p=0.003$ , respectively). There were no difference in age group among patients diagnosed with GERD and portal hypertension when compared with their normal counterparts. The association of age and

endoscopic findings was shown in Table 3.

Male patients were more often diagnosed with gastric ulcer, duodenal ulcer and concurrent gastroduodenal ulcer than female patients ( $p < 0.001$  each). On the other hand, female had more gastroduodenitis than male ( $p < 0.001$ ). The association of different genders and different endoscopic diagnoses was present in Table 4.

## DISCUSSION

The prevalence of *H. pylori* infection in Thailand was decreasing compared with previous studies (27.7%). Studies conducted in Thailand in early 1990s<sup>(5)</sup> and 2000-2002<sup>(6)</sup>, reported *H. pylori* infection in dyspeptic patients of 63.3% and 58%, respectively. The finding could explain by the following reasons. Firstly, our study included all the patients that had been scoped except follow-up cases, while the previous ones included only patients with dyspepsia. Secondly, the *H. pylori* infection has been decreasing due to an improvement of sanitary system and personal hygiene<sup>(3,7)</sup>. Also, anti-secretory drugs such as proton-pump inhibitor (PPI), histamine<sub>2</sub>-receptor antagonist (H<sub>2</sub>RA) are easily accessible in Thailand and patients often take some before visiting a doctor. The effect of these drugs could lead to false-negative test result<sup>(2,8)</sup>.

Our study also confirmed findings of the previous study<sup>(1,4)</sup> that *H. pylori* infection was associated

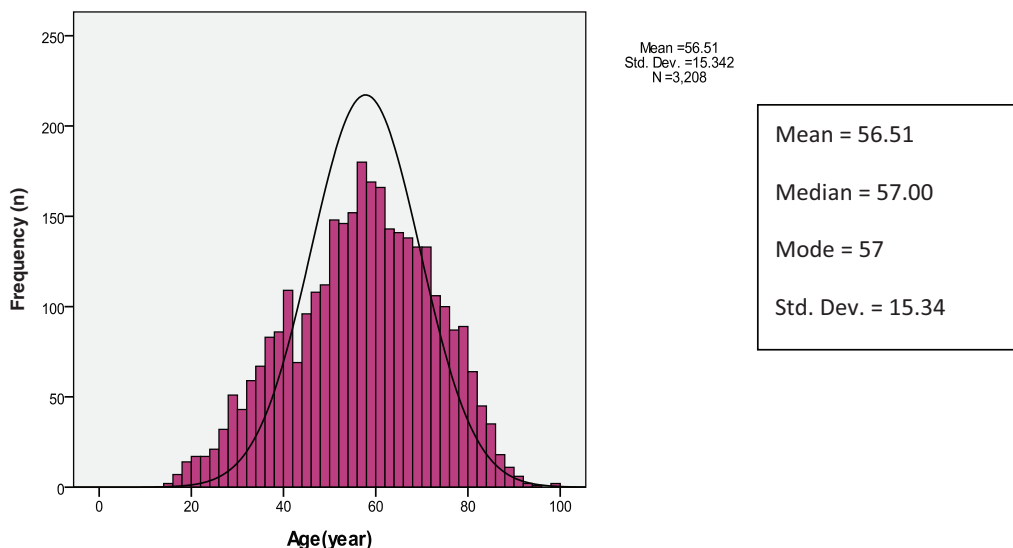


Figure 1. Histogram showing age distribution of patients.

**Table 2.** The presence of *H. pylori* infection in different endoscopic findings compared between men and women.

	<i>H.pylori</i> - positive (%)	<i>H.pylori</i> - negative (%)	<i>p</i> -value
Gender			
Male	445	1006	0.001
Female	443	1314	
Gastric ulcer*			
Positive	196	460	> 0.05
Negative	692	1860	
Duodenal ulcer*			
Positive	119	233	0.006
Negative	769	2087	
Concurrent gastroduodenal ulcer			
Positive	47	79	0.014
Negative	841	2241	
Gastroduodenitis			
Positive	561	1480	> 0.05
Negative	327	840	
Gastro-esophageal reflux disease			
Positive	233	665	> 0.05
Negative	655	1655	
Suspected gastric cancer			
Positive	5	20	> 0.05
Negative	883	2300	
Portal hypertension			
Positive	180	0.027	
Negative	839	2140	

\*some cases had both gastric and duodenal ulcers.

with duodenal ulcer and concurrent gastroduodenal ulcer. There were other possible factors such as drugs and medical history played an important role in the development of ulcer, especially non-steroidal anti-inflammatory drugs (NSAIDs), as well<sup>(9)</sup>. Xia B., et al<sup>(4)</sup> reported the association of non-steroidal anti-inflammatory drugs (NSAIDs) and gastric ulcer, but not with duodenal ulcer. We speculated that gastric ulcer diagnosed in our study was also influenced by other factors such as NSAIDs use. This might explain why gastric ulcer was not statistically associated with *H. pylori* infection in this study.

Compared to female, male patients were more susceptible to acquire *H. pylori* infection and this was accordant with several previous studies<sup>(10,11)</sup>. Also, we found that male patients were diagnosed with peptic ulcer disease more frequently. Similar observation was observed in the study in immigrants of Turkish de-

scend<sup>(7)</sup>. The reason of this relationship was unclear. A previous study has related the male preponderance of *H. pylori* infection to male life style and habits including cigarette smoking and alcohol drinking<sup>(12)</sup>. *H. pylori* was transmitted through fecal-oral route and oral-oral route and poor hygiene, household crowding and low socio-economic status were risk factors for acquiring the infection<sup>(3,10)</sup>. Thus, smokers can acquire infection by handling and sharing of cigarettes. Moreover, smoking reduces protective bicarbonate layer in the gastric lumen making individuals predispose to peptic ulcer disease and susceptible to *H. pylori* infection. Consumption of alcohol also strongly related to *H. pylori* infection. Thai men also needed to serve in the military when they were young. Military recruits lived in crowded area, thus increasing chance of acquiring infection<sup>(7)</sup>.

Contrary to what could be expected from previ-

**Table 3.** The association of age, endoscopic diagnoses and *H. pylori* infection.

	Age (mean age ± SD)	p-value
Gastric ulcer*		
Positive	63.5 ± 14.0	<0.001
Negative	54.7 ± 15.2	
Duodenal ulcer*		
Positive	61.5 ± 15.4	<0.001
Negative	55.9 ± 15.2	
Concurrent gastroduodenal ulcer		
Positive	64.9 ± 14.3	<0.001
Negative	56.2 ± 15.3	
Gastroduodenitis		
Positive	54.2 ± 15.0	<0.001
Negative	60.5 ± 15.1	
Gastro-esophageal reflux disease		
Positive	56.7 ± 16.0	> 0.05
Negative	56.4 ± 15.1	
Suspected gastric cancer		
Positive	64.6 ± 16.4	0.008
Negative	56.5 ± 15.3	
Portal hypertension		
Positive	57.9 ± 11.8	> 0.05
Negative	56.4 ± 15.6	
<i>H. pylori</i> infection		
Positive	55.0 ± 14.5	0.003
Negative	57.1 ± 15.6	

\*some cases had both gastric and duodenal ulcers.

**Table 4.** The association of gender difference and various endoscopic diagnoses.

	Gender		p-value
	Male	Female	
Gastric ulcer*			
Positive	366	290	<0.001
Negative	1085	1467	
Duodenal ulcer*			
Positive	236	116	<0.001
Negative	1215	1641	
Concurrent gastroduodenal ulcer			
Positive	78	48	<0.001
Negative	1373	1709	
Gastroduodenitis			
Positive	810	1231	<0.001
Negative	641	526	
Gastro-esophageal reflux disease			
Positive	412	486	> 0.05
Negative	1039	1271	

\*some cases had both gastric and duodenal ulcers.

ous studies<sup>(9,13)</sup>, the *H. pylori*-positive group was statistically younger than *H. pylori*-negative one. The plausible explanation was that majority of the epidemiological studies of *H. pylori* infection used serology which could not distinguish between ongoing infection and postinfection<sup>(8)</sup>. Another explanation was gastric atrophy and decreased sensitivity level of rapid urease test<sup>(14,15)</sup>. However, this condition presented after long-standing *H. pylori*-gastritis and was tending to occur in older patients.

*H. pylori* infection was known to significantly related to gastric malignancy<sup>(16)</sup>. Our discordant result can be explained by small sample size and the aforementioned limitation of rapid urease test in atrophic gastritis<sup>(14,15)</sup>. This histological step involved in pathogenesis of stomach cancer<sup>(16)</sup>.

According to data from our study and a previous one<sup>(10)</sup>, there was no association between portal hypertension and *Helicobacter pylori* infection. As for the gastroduodenitis, the association with female was not well established in previous studies. Khademolhosseini F, *et al*<sup>(17)</sup> reported female preponderance of non-ulcer dyspepsia (NUD) whereas, the study of Bernersen B, *et al*<sup>(18)</sup> showed no association with different genders.

According to guidelines for the management of dyspepsia, the American College of Gastroenterology<sup>(19)</sup> has recommended either test and treat for *H. pylori* or an empirical treatment with PPI. The test-and-treat strategy was preferred in populations with a moderate to high prevalence of *H. pylori* infection ( $\geq 10\%$ ). Therefore, our finding helps confirm Thai physician to continue choosing the test-and treat regimen in a facility with available resource.

To our knowledge, this study is one of the largest descriptive studies of *H. pylori* infection in Thai people with more than 3000 patients' data reviewed. Since the data was from two years, whether the prevalence of *H. pylori* infection has been decreasing or not cannot be certain. In the future, it is interesting to conduct a study retrieving data from longer time period. By the way, we are well aware that our study method has some limitations including an inability to retrieve some information such as patients' health behavior and concurrent medications around the same time of endoscopy. A prospective study of *H. pylori* infection and gastric diseases or risk factors should be done to further investigate the relationship between them.

## CONCLUSION

*H. pylori* infection is likely to have been decreasing for the past several years, it is still common in Thailand and is considered a major health issue for its strong association with duodenal ulcer and concurrent gastroduodenal ulcer. The prevalence of peptic ulcer disease and *H. pylori* infection are varied with age and genders.

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