Malaysian Journal of Medicine and Health Sciences (ISSN 1675-8544); Vol. 11 (1) Januay 2015: 11-17

Prevalence of *Helicobacter Pylori* Infection among Patients Attending Gastroenterology Endoscopy Unit at Serdang Hospital

Chieng Jin Yu*,[1] Pan Yan,[2] Loong Yik Yee[1]

[1] Department of Medicine, Faculty of Medicine and Health Science, Universiti Putra Malaysia, 43400 UPM Serdang, *Selangor, Malaysia*

[2]Department of Biomedical Science, the University of Nottingham Malaysia Campus, Semenyih, Selangor, Malaysia

ABSTRACT

To study the prevalence of *Helicobacter Pylori (H. pylori)* infection, according to ethnicity, gender and endoscopic findings among the patients underwent the oesophago-gastro-duodenoscopes (OGDS) at gastroenterology endoscopy unit, Hospital Serdang, Selangor, Malaysia. The database of all whom underwent OGDS at the gastroenterology endoscopy unit, Hospital Serdang from 1st August 2010 to 31st July 2012 was collected and assessed, retrospectively. A total of 924 patients who underwent OGDS were analyzed for the *H. pylori* infection by using *Campylobacter*-like organism (CLO) test. 130 (14.07%) tested positive, and their data were further studied according to gender, ethnicity, age group, initial indication for OGDS and endoscopic finding. The prevalence rate among males was 15.15% (70/462), while it was 12.99% (60/462) among females. In terms of ethnics, *H. pylori* infection was commonly found among Indian and Chinese with prevalence rate of 25.13% (50/199) and 17.41% (51/293) respectively. These figures are significantly higher than the 6.01% (25/416) for Malays. The age group (31-50 years old) had the highest prevalence rate of *H. Pylori* infection, which is of 18.55% (41/221). No significant difference was observed among initial indications for OGDS. Erosions were the commonest finding in *H. pylori* positive group with rate of 51.54% (67/130). However, erosions were not uncommon in *H. pylori* negative group as well with the rate of 48.61% (386/794). *H. pylori* infection rate among Malaysians was generally low, with the highest rate in Indians, followed by Chinese and relatively low in Malays. No significant difference between the prevalence rate of *H. pylori* infection in male and that in female was found. Erosions were equally common in either *H. pylori* positive or *H. pylori* negative group.

Keywords: Oesophago-gastro-duodenoscopes (OGDS), Helicobacter Pylori, Malaysia.

INTRODUCTION

Helicobacter pylori (*H. pylori*) is a common transmissible bacterial human pathogen. *H. pylori* infection is well recognized as a major causative organism for peptic ulcer disease and gastric cancer in human beings.[1,2]

The prevalence of *H. pylori* infection varies worldwide being lower in developed countries than of many developing countries.[3,4] There is great difference in its prevalence among different ethnic groups, even within the same country.[5] Malaysia is a multiracial country, composed of three major ethnic groups, namely Malay, Chinese and Indian.[1] Each ethnic group has their own unique lifestyle, religious and cultural practice. Quite a number of studies conducted in Malaysia have consistently shown a higher prevalence of *H. pylori* infection among non-Malays than in Malays.[6,7,8]

Few countries reported declines in *H. pylori* infection over the past few decades. Nakajima et al. reported a drop in *H. pylori* seroprevalence among the subjects undergoing annual health checks from 70.5% to 52.7% over a 17-year period.[9] While a U.S. study had concluded the declining endoscopic *H. pylori* prevalence in their rural locality over the past decade.[10]

Low socioeconomic status associated with high-density living and inferior hygienic conditions are believed to be main factors causing the transmission of *H. pylori*. A UK study found that the ethnic origin was significantly associated with *H. pylori* infection, in which the rate for non-UK birth (69%) was markedly higher if compared with (40%) UK birth.[1,11] In Israel, the *H. pylori* prevalence rate among Arab Isrealis living in three villages in northern Israel coherent with the socioeconomic status of the village, although they are from the same ethnic group.[12]

*Corresponding author: Dr. Chieng Jin Yu
cjy511@yahoo.com

H. pylori infection is thought to be commoner in elders. Several epidemiologic studies on elderly people, with a mean age of approximately 70 years, reported a prevalence of nearly 60% in asymptomatic subjects13,14 and more than 70% among the most elderly patients with gastrointestinal diseases.15,16

The *H. pylori* infection transmission mechanism is oral-oral or fecal-oral, as well as through contaminated water[17] because of poor socioeconomic and hygienic conditions

H. pylori is strongly linked to the development of chronic gastritis, and peptic ulcer disease. Moreover, *H. pylori* is well recognized as a class I carcinogen by the International Agency for Research on Cancer (IARC) because chronic gastric mucosal inflammation and atrophy can further bring to malignant transformation.[18,19]

The aim of this study is to elucidate the prevalence of *H. pylori* infection, according to ethnicity, gender, age group, initial indication for OGDS and endoscopic finding in 924 patients attending oesophago-gastro-duodenoscopes (OGDS) at gastroenterology endoscopy unit, Hospital Serdang.

PATIENTS AND METHODS

This study was approved by the Ethics Committee of both Universiti Putra Malaysia and Hospital Serdang (Ministry of Health). The Demographic variables (the patient's gender/age/race), the indication for OGDS, the endoscopic finding, and the result of Rapid Urease Test for *H. pylori* Infection were collected from the gastroenterology endoscopy unit, Hospital Serdang, retrospectively. All endoscopies were performed by experienced endoscopists using the Olympus GIF video endoscope.

Campylobacter-like organism (CLO) test was used as a Rapid Urease Test for *H. pylori* infection. Endoscopic mucosal biopsies from stomach (2 samples from the antrum, and 2 samples from the corpus) were inoculated into the medium which contained urea and phenol red, a dye that turns pink in a pH of 6.0 or greater (The pH will rise above 6.0 when HP presents as *H. pylori* metabolizes urea to ammonia). The test was read at 24 H.

A total of 924 patients that attended for OGDS with CLO test at the gastroenterology endoscopy unit, Hospital Serdang during the period from 1st August 2010 till 31st July 2012 were studied. All of the patients were categorized to age group as ≤ 30, 31-50, 51-70, and ≥ 71 years old of age Ethnic group were arranged as Malay, Chinese, Indian and others (Sikh, Bumiputra including both Sabahan and Sarawakian, and foreigners).

Indications for OGDS were grouped to dyspepsia (epigastric pain/bloatness/reflux syndrome), anemia and others (to rule out malignancy/to assess portal hypertension/to assess ulcer healing/for endoscopic procedure).

OGDS findings were subdivided into erosions (oesophagitis/gastritis/duodenitis), ulcer disease (esophageal/gastric/duodenal ulcer), growth lesion (polyp/tumour/malignancy), normal and other findings (portal hypertensive gastropathy/oesophageal or fundal varices/angiodysplasia/hiatus hernia).

All the data collected above were further compared between those with CLO test positive and those with CLO test negative.

Unpaired t-test was performed to analyze the data collected using GraphPad Prism version 6.01 for Windows, GraphPad Software, San Diego California USA, www.graphpad.com. P value <0.05 is considered significant.

RESULTS

The 924 patients comprised 416 Malays, 293 Chinese, 199 Indians and 16 others were analyzed for the *H. pylori* infection by using CLO test.

Among 924 patients, 130 (14.07%) tested positive for CLO test, and their data were subsequently studied according to gender, ethnicity, initial indication for OGDS and endoscopic finding. These consisted of 70 males and 60 females.

H. pylori infection rates in relation to gender

The prevalence rate among males was 15.15% while it was 12.99% for females. This shows not significant difference in gender between CLO positive cases (P>0.05).

Table 1: *H. pylori* infection rates in relation to gender

Gender	Total	*H. pylori* positive (%)	*H. pylori* negative (%)	Significance
Male	462	70/462 (15.15)	392/462 (84.85)	P >0.05, not significant
Female	462	60/462 (12.99)	402/462 (87.01)	

H. pylori infection rates in relation to ethnic origin

Among the patients in each ethnic group, 25.13% Indians, 17.41% Chinese, 6.01% Malays tested positive for CLO test. No significant difference in ethnic group between CLO positive with whole (P>0.05).

Table 2: *H. pylori* infection rates in relation to ethnic origin

Race	Total	*H. pylori* positive (%)	*H. pylori* negative (%)	Significance
Malay	416	25/416 (6.01)	391/416 (93.99)	P >0.05, not significant
Chinese	293	51/293 (17.41)	242/293 (82.59)	
Indian	199	50/199 (25.13)	149/199 (74.87)	
Others	16	4/16 (25.00)	12/16 (75.00)	

H. pylori infection rates in relation to age group

The age group 31-50 had the highest prevalence of *H. pylori* infection, which is of 18.55%. No significant difference in age group between CLO positive with whole (P>0.05).

Table 3: *H. pylori* infection rates in relation to age group

Age group (years old)	Total	*H. pylori* positive (%)	*H. pylori* negative (%)	Significance
≤ 30	55	7/55 (12.73)	48/55 (87.27)	P >0.05, not significant
31-50	221	41/221 (18.55)	180/221 (81.45)	
51-70	461	62/461 (13.45)	399/461 (86.55)	
≥ 71	187	20/187 (10.7)	167/187 (89.3)	

H. pylori infection rates in relation to indication of OGDS

The major indication of the patients referred for OGDS in Hospital Serdang was workup for the anemia.

Table 4: *H. pylori* infection rates in relation to indication of OGDS

Indication	Total	*H. pylori* positive (%)
dyspepsia (epigastric pain/bloatness/reflux syndrome)	257	43/257 (16.73)
anemia	385	56/385 (14.55)
others (to rule out malignancy/ to assess portal hypertension/ to assess ulcer healing/for endoscopic procedure)	282	31/282 (10.99)

H. pylori infection rates in relation to endoscopic finding

Erosions were commonly found in *H. pylori* positive group comprising 51.54% (67/130). However erosions were common in *H. pylori* negative group with rate of 48.61% (386/794). Surprisingly, ulcer disease was found equally common in those with *H. pylori* negative group with rate 13.22% (105/794) and those with *H. pylori* positive with rate 12.31% (16/130). This means that there is no significant difference in endoscopic findings between CLO positive with whole (P>0.05)

Table 5: *H. pylori* infection rate in relation to endoscopic finding

Endoscopic finding	Total	*H. pylori* positive (%)	*H. pylori* negative (%)	Significance
Erosions	453	67/130 (51.54)	386/794 (48.61)	P〉0.05，not significant
Ulcer disease	121	16/130 (12.31)	105/794 (13.22)	

DISCUSSION

Various studies carried out in Malaysia and Singapore reported an overall high prevalence rate of *H. pylori* infection between 26-60%.[6,20] However, our study showed that *H. pylori* infection rate of 14.2% among patients attending OGDS in gastroenterology endoscopy unit, Hospital Serdang. This is coherent with the few studies that have shown conclusively reducing in the prevalence rate of *H. pylori* infection in Asia.[1] In the Philippines, the decline in PUD prevalence was associated with a corresponding decrease in *H. pylori* prevalence.[21] Improving personal hygiene, living condition and economic status definitely have played an important role here. Moreover, the increased use of anti- *H. pylori* eradication therapy may lead to the reduction of the prevalence of *H. pylori* infection.[22]

There was an obvious difference in *H. pylori* infection prevalence rates among ethnic groups in Malaysia, being highest in Indians followed by Chinese and relatively low in Malays. This may reflect that *H. pylori* infections are closely tied to socioeconomic, cultural and religious practices of the different races in Malaysia. There was a high prevalence of *H. pylori* among Indians, and *H. pylori* infection was believed to be associated with gastric cancer.

Opposing this view, according to other published journals, the prevalence of gastric cancer among Indians was low and this paradox is known as the "Indian enigma".[2]

Malays have the lowest *H. pylori* infection compared with Chinese and Indians, which is comparable to previous reports of patients who underwent OGDS in Kelantan, Kuala Lumpur and Singapore.[1,20] The potential gastroprotective and anticancer activity of curies and chilies are believed to play an important role leading to low prevalence of *H. pylori* infection in Malays.[7,23] Moreover, the Malays also consume a lot of herbs which could be protective against *H. pylori* infection.[7] The exact reason still needs to be further investigated. Few studies demonstrate that there are strong correlations between *H. pylori* infection and smoking[24,25,26], and also between *H. pylori* infection and alcohol consumption.[27,28] Drinking alcohol is strictly prohibited by the rules of Islam which is practiced by Malays hence factor causing *H. pylori* infection prevalence is lowered.[1,7]

Our study showed that the *H. pylori* prevalence amongst Indians is 25.13%, which was the highest among the whole population. *H. pylori* genetic, host and environmental factors may play a role in influencing the disease outcome.

Malaysia is a multiracial country, composed of mainly Malay, Chinese and Indian. [1] The latter two groups are the descendents of immigrants from Southern China and Southern India. [1] This definitely reflects the high prevalence rates in Southern China and Southern India, and that the original immigrants passed the *H. pylori* infection to successive generations that born in Malaysia.[2] However, our study has once again proven that the prevalence of *H. pylori* infection in Chinese and Indian in Malaysia were lower when compared with Chinese from Southern China.[30] This fact was further supported by a study which reported Chinese immigrant in Melbourne, Australia shows seroprevalence that was different from immigrants of various birth place, those born in Malaysia or Singapore have lower (43%) than those in China and Hong Kong (68.2%), Vietnam (68.4%).[1,31] The socioeconomic status of each ethnic group was not further detailed in our study.

Gender did not prove to be a significant risk factor for *H. pylori* infection in our study, although earlier studies have shown male has higher prevalence of *Helicobacter pylori* infection.[1,29] The reason for the possible gender difference is unknown but may relate to males having poorer hygiene than females, and males are outdoors more than females, which brings more risks of infection. Morever, more males are known to be exposed to the risky behaviours such as smoking[24-26] and alcohol drinking.[27,28]

The relative risk of patients in the middle age (31-50 years) group to get the infection is greater compared to others. This is not coherent with some studies which conclude that the infection is commoner in elder patients. This could be explained by the elder groups have received the *H. pylori* eradication before. The middle age group tends to have more outdoor social activities, and thus higher opportunity to be exposed to the *H. pylori* infection.

Our study did not show any significant difference between prevalence rate of erosion in *H. pylori* positive group and *H. pylori* negative group. This may be due to our limitation that several endoscopists were involved in reporting the endoscopic findings.

As we know, *H. pylori* infection plays a crucial role in the pathogenesis of peptic ulcer disease and carcinoma of the stomach.[1,2] The data were confirmed by multivariate logistic regression analysis. What was interesting was that our data suggest that the endoscopic ulcer disease in *H. pylori* negative group is almost the same if compared with those in *H. pylori* positive group. Once again, this is not coherent with most previous studies which support the close relationship between the *H. pylori* infection with ulcer disease.

CLO test provides 99% sensitivity and 100% specificity.[32] However it depends on the patient being off antacid therapy. One more limitation of our study was that insufficient details of the patients with regards to drugs especially antacid and antibiotic consumed were obtained.

CONCLUSION

H. pylori infection rate among Malaysians is low and declining. *H. pylori* infection prevalence rates vary among ethnic groups in Malaysia, being highest in Indians followed by Chinese and lowest in Malays. In this study, we found that the age group 31-50 years old of age has the highest prevalence rate of *H. pylori* infection. Gender is not a significant risk factor for *H. pylori* infection. No significant difference between prevalence rate of either erosion or ulcer disease in both *H. pylori* positive group and *H. pylori* negative group was discovered.

The limitations of this study include insufficient details of the patients with regards to drugs consumed and several endoscopists were involved in reporting the endoscopic findings. More studies are required to obtain a clearer understanding of the role of other important co-factors affecting risk such as dietary factors, co morbidities, co medication and host genetic predisposition in the Malaysian population.

ACKNOWLEDGEMENT

We acknowledge the excellent contribution of the doctors and nurses of Gastroenterology Endoscopy Unit, Serdang Hospital, Malaysia for performing the OGDS and providing clinical and demographic data.

CONFLICT OF INTEREST STATEMENT:

We declare that we have no conflict of interest.

REFERENCES

1. Sasidharan S, Ghayethry B, Ravichandran M, Latha LY, Lachumy SJ, Khoo ML, Rao SGS. Prevalence of *Helicobacter pylori* infection among patients referred for endoscopy: Gender and ethnic differences in Kedah, Malaysia. *Asian Pac J Trop Dis* 2012; 2, 1, 55-59.

2. Goh KL. Epidemiology of *Helicobacter Pylori* Infection in Malaysia – Observations in a Multiracial Asian Population. *Malays J Med Sci* 2009; 64: 187-192.

3. Akcam M. Helicobacter Pylori and micronutrients. *Indian Pediatr* 2010; 47: 119-126.

4. Pandeya N, Whiteman DC. Australian Cancer Study. Prevalence and determinants of Helicobacter Pylori sero-positivity in the Australian adult community. *J Gastroen Hepatol* 2011; 26: 1283-1289.

5. Lee YY. Helicobacter pylori infection in a low prevalence population – what can we learn? Microbial pathogens and strategies for combating them: science, technology and education December 2013; 1668-1674.

6. Goh KL. Prevalence and risk factors for *Helicobacter Pylori* infection in a multi-racial dyspeptic Malaysian population undergoing endoscopy. *J Gastroen Hepatol* 1997; 12: S29-S35.

7. Sasidharan S, UyubAM, Azlan AA. Further evidence of ethnic and gender differences for *Helicobacter Pylori* infection among endoscoped patients. *T Roy Soc Trop Med H* 2008; 102: 1226-1232.

8. Uyub AM, Raj SM, Visvanathan R, Nazim M, Aiyar S, Anuar AK, Mansur M. Helicobacter pylori infection in north-eastern peninsular Malaysia. Evidence for an unusually low prevalence. Scand J Gastroenterol 1994. 29: 209–213.

9. Nakajima S, Nishiyama Y, Yamaoka M, Yasuoka T, Cho E. Changes in the prevalence of *Helicobacter pylori* infection and gastrointestinal diseases in the past 17 years. J Gastroenterol Hepatol. 2010; 25(Suppl 1): S99–110.

10. McJunkin B, Sissoko M, Levien J, Upchurch J, Ahmed A. Dramatic decline in prevalence of Helicobacter pyloriand peptic ulcer disease in an endoscopy-referral population. Am J Med. 2011 Mar;124(3):260-4.

11. Elviss NC, Owen RJ, Breathnach A, Palmer C, Shetty N. *Helicobacter pylori* antibiotic-resistance patterns and risk factors in adult dyspeptic patients from ethnically diverse populations in central and south London during 2000. *J Med Microbiol* 2005; 54: 567-574.

12. Muhsen K, Athamna A, Bialik A, Alpert G, Cohen D. Presence of *Helicobacter pylori* in a sibling is associated with a long-term increased risk of *H. pylori* infection in Israeli Arab children. *Helicobacter*. 2010; 15: 108–13.

13. Pilotto, A., Fabrello, R., Franceschi, M., Scagnelli, M., Soffiati, F., et al."Helicobacter pylori infection in asymptomatic elderly subjects living at home or in a nursing home: effects on gastric function and nutritional status" Age Ageing 25, 245-249.

14. Regev, A., Fraser, G. M., Braun, M., Maoz, E., Leibovici, L., et al."Seroprevalence of Helicobacter pylori and length of stay in a nursing home" *Helicobacter* 4, 89-93.

15. Pilotto, A.”Helicobacter pylori-associated peptic ulcer disease in older patients: current management strategies” Drugs Aging 18, 487-494.

16. Pilotto, A., & Salles, N.”Helicobacter pylori infection in geriatrics” *Helicobacter* 1, 56-62.

17. Parsonnet J, Shmuely H, Haggerty T. Fecal and oral shedding of Helicobacter Pylori from healthy infected adults. JAMA. 1999; 282: 2240-5.

18. P. Correa, “Human gastric carcinogenesis: a multistep and multifactorial process—first American Cancer Society Award lecture on cancer epidemiology and prevention,” *Cancer Res.* 1992; vol. 52, no. 24, pp. 6735–6740.

19. J. G. Fox and T. C. Wang, “Inflammation, atrophy, and gastric cancer,” *J. Clin. Invest.* 2007; vol. 117, no. 1, pp. 60–69.

20. Kang JY, Wee A, Math MV et al. *Helicobacter Pylori* and gastritis in patients with peptic ulcer and non-ulcer dyspepsia: ethnic differences in Singapore. *Gut* 1990; 31: 850-853.

21. Wong SN, Sollano JD, Chan MM, Carpio RE, Tady CS et.al. Changing trends in peptic ulcer prevalence in a tertiary care setting in the Philippines: a seven-year study. *J Gastroenterol Hepatol.* 2005 Apr; 20(4): 628-32.

22. Tkachenko MA, Zhannat NZ, Erman LV, Blashenkova EL, Isachenko SV, Isachenko OB, Graham DY, Malaty HM. Dramatic changes in the prevalence of Helicobacter infection during childhood: a 10-year follow-up study in Russia. *J Pediatr Gastroenterol Nutr*. 2007 Oct; 45(4): 428-32.

23. Duvoix A, Blasius R, Delhale S, Schnekenburger M, Morceau F, Henry E, Dicato M, Diederich M. Chemopreventive and therapeutic effects of curcumin. *Cancer Lett*. 2005; 223: 181-90.

24. Sasidharan S, Lachumy SJ, RavichandranM, Latha LY, Gegu SR. Epidemiology of *Helicobacter pylori* infection among multiracial community in Northern Peninsular, Malaysia: effect of age across race and gender. *Asian Pac J Trop Med* 2011; 4: 72-75.

25. Xiao-Qin Wang, Hong Yan, Paul D Terry, Jian-Sheng Wang, Li Cheng, Wen-An Wu, Sen-Ke Hu. Interactions between CagA and smoking in gastric cancer. *World J Gastroentero* 2011; 17: 3330-3334.

26. Cardenas VM, Graham DY. Smoking and Helicobacter pylori infection in a sample of U.S. adults. *Epidemiology*. 2005 Jul; 16(4): 586-90.

27. Wang MY, Yue JY, Zhang YX, Liu XD, Gao XZ. *Helicobacter Pylori* infection in asymptomatic HBV carriers, alcohol users and normal adult population in Shandong Province, China. *Clin Res Hepatol Gas* 2011; 35: 560-562.

28. J A Sánchez-Cuén, A B Irineo Cabrales, G Bernal Magaña, F J Peraza Garay. Helicobacter pylori infection and its association with alcohol consumption: A case-control study. *Rev Gastroenterol Mex*. 2013; 78: 144-50 - Vol. 78 Num.03.

29. de Martel C, Parsonnet J. Helicobacter pylori infection and gender: a meta-analysis of population-based prevalence surveys. *Dig Dis Sci*. 2006 Dec; 51(12): 2292-301.

30. Chen J, Bu XL, Wang QY, Hu PJ, Chen MH. Decreasing seroprevalence of *Helicobacter Pylori* infection during 1993-2003 in Guangzhou, Southern China. *Helicobacter* 2007; 12: 164-169.

31. Chow TK, Lambert JR, Wahlqvist ML, Hsu-Hage BH. *Helicobacter pylori* in Melbourne Chinese immigrants: evidence for oral-oral transmission via chopsticks. *J Gastroen Hepatol* 1995; 10: 562-569.

32. Wong BCY, Wong WM, Wang WH, Tang VSY, Young J. An evaluation of invasive and non-invasive tests for the diagnosis of Helicobacter pylori infection in Chinese. *Aliment. Pharmacol. Ther.* 2001; 15: 505±511.