Cihan University-Erbil Scientific Journal (CUESJ)

Research Article

Prevalence of Anti-*Helicobacter pylori* Antibodies among Students of Cihan University, Erbil

Hadi Mahdi Alsakee*, Sarah Hoshyar Maroof, Gulistan Hussein Muhammad, Asia Sherzad Muhammad, Ilaf Abdulrazaq Rashid, Naza khan Tofiq Sdiq

Department of Biology, Cihan University-Erbil, Kurdistan Region, Iraq

ABSTRACT

Helicobacter pylori is resident in human stomach and causes chronic disease (peptic ulcer and gastritis). The mouth and colon were both known to host a large number of microbes. This study was carried out to investigate the seroprevalence of *H. pylori* infection among Cihan University students. A total of 197 blood samples were collected from the students (53 females and 144 males) from 13 departments of Cihan University, Erbil, and tested for anti-*H. pylori* antibodies, using rapid immunochromatography assay. Among 197 students tested, 44 (22.3%) showed positive reaction for *H. pylori,* 32 males and 12 females. It was non-significantly higher among students with ages ranged between 29 and 32 years old. Twenty-one of infected students were using tap water for drinking. Twenty-six (59.1%) of positive students experienced no symptoms and 18 (40.9%) were symptomatic (13.63% epigastric pain and 27.2% abdominal pain).

Keywords: Anti-*H. pylori* antibodies, *Helicobacter pylori*, immunochromatography assay, prevalence

INTRODUCTION

Helicobacter pylori was originally known as *Campylobacter pylori*, is a Gram-negative, curved rods, and inhabits the human stomach. It was discovered in 1982 by two Australian scientists, Barry Marshall and Robin Warren, who detected it in a person with chronic gastritis and gastric ulcers, a condition not previously believed to have a microbial etiology. It is also linked to the development of duodenal ulcers and stomach cancer.[1] However, over 80% of the cases are asymptomatic, and it may play an important role in the natural stomach ecology.[2] More than 50% of the world's population have *H. pylori* in their upper gastrointestinal tract.[1] The infection rates are higher among people in developing countries compared to other Western countries.[3] Despite high infection rates that reported in certain areas of the world, the incidence of *H. pylori* infection is declining.[4] However, antibiotic resistance is appearing in *H. pylori*, many metronidazole- and clarithromycin-resistant strains are found in most parts of the world.[5]

The way of transmission of *H. pylori* is unclear.[6] Recent studies showed transmission through either fecal-oral or oral-oral route. It may be directly related to the source of drinking water.[1] Infection with *H. pylori* is related to many diseases, for example, iron deficiency anemia, migraine, and coronary heart disease.[7] Epidemiological studies demonstrated that *H. pylori* infection increases with age. It is higher in developing countries and among population with low socioeconomic status.[8]

Epidemiological data suggest strong associations of *H. pylori* infection and carcinoma of stomach and that significantly associated with mucosa-associated lymphoid tissues lymphomas (MALT).[9] The infection is classified as a human carcinogen by the World Health Organization. The risk of cancer is highest among patients, in whom the infection induces chronic gastric inflammation. Treatment of *H. pylori* infection significantly reduced the incidence of carcinoma of stomach and MALT in endemic areas.[10] Since little information concerning *H. pylori* have been published in Erbil, in particular, among university students, the present study was aimed to investigate the prevalence of anti-*H. pylori* antibodies among university students in Erbil as well as studying the risk factors and possible routes of transmission of this bacterium with its relation to the biomass index (body mass index [BMI]).

Corresponding Author:
Hadi Mahdi Alsakee, Department of Biology, Cihan University, Erbil, Kurdistan Region, Iraq. E-mail: hadialsakee@gmail.com

Received: Apr 16, 2019
Accepted: Apr 20, 2019
Published: Jun 30, 2019

DOI: 10.24086/cuesj.v3n1y2019.pp66-70

MATERIALS AND METHODS

Study Design and Setting

The present study was carried out in Cihan University, Erbil in Erbil Governorate, Northern Iraq. The total number of students in Cihan University, Erbil, is 5226 students of both genders divided on 20 departments. The period of the study was 7 months from November 2017 to May 2018.

Random samples of 197 students of both genders (male and female), who are currently studying in Cihan University, Erbil, from different departments were invited to participate in the study. The aims of the study and its significance, for both, the university community and public health, were explained and formal consents were obtained from the participants.

Design of Questioner and Data Collection

A closed-ended questionnaire was designed including information on the participants; age, weight, length, home address, current residence, socioeconomic level, marital status, animal handling (history of animal contact), sources of drinking water, type of meals (homemade and fast food), number of fast-food meals per week, history of other diseases (asthma and allergic manifestation), and history of clinical manifestations (abdominal pain, diarrhea, epigastric pain, vomiting, nausea, and anorexia). The data were collected through direct interview with the students who agreed to participate in the study.

Collection of Blood Specimens and Serum Extraction

Blood specimens were collected from the participants, in clean, sterile, test tubes (without anticoagulants). A specific numeric code was used for each sample. The blood specimens were left to clot at room temperature for an hour, the clotted blood then centrifuged at ×2000 g for 5 min. After centrifugation, the clean supernatant was collected by micropipette and dispensed in a clean sterile 1.5 ml capacity Eppendorf tubes and stored at –50°C until used for the detection of anti-*H. pylori* antibodies.

Detection of Anti-*H. pylori* Antibodies

H. pylori antibodies rapid immunochromatography test (Plasmatec, United Kingdom) was used for qualitative detection of anti-*H. pylori* antibodies in the sera of the participants. The test is one-step rapid chromatography immunoassay.

Statistical Analysis

The collected data were interred into the Microsoft Excel sheets and then translated into codes using a specific designed coding sheet. An expert statistical analysis was done using the Statistical Package for the Social Sciences version 17.0 PC software. The association between two or more categorical variables was analyzed and assessed by Chi-square test. Count and percentages were also used to describe the frequency of different variables between all possible paired combinations of study groups. $P \leq 0.05$ was considered statistically significant.

RESULTS

A total of 197 students from 13 departments of Cihan University, Erbil, were involved in the study (53 biology, 10 computer sciences, 24 law, 5 banking and finance, 14 business administration, 34 international relations, 2 civil engineering, 4 architecture engineering, 12 health administration, 19 accounting, 6 media, 8 English, and 6 translation). Of those students, 44 (22.3%) were revealed positive reactions for anti-*H. pylori* antibodies [Table 1] with no significant ($P > 0.05$) differences between males (22.2%) and females (22.6%) [Table 2].

Eight (18.18%) of the positively reacted tests were of students who are always have house-made meals, whereas 15 (34.11%) of the positively reacted tests were of students who have always had restaurant's fast-food meals. The students who had mixed restaurants and house-made meals constituted 21 (47.72%) of the positive cases. The infection rate was significantly ($P = 0.047$) higher among student who had their meals in the restaurants [Table 3].

Eighteen (40.9%) of the positive cases were with episodes of epigastric pain (13.63%) and abdominal pain (27.27%); however, 59.1% of the students who revealed positive reaction to anti-*H. pylori* antibodies experienced no symptoms. The statistical analysis revealed no significant ($P > 0.05$) differences in respect to clinical manifestations among *H. pylori*-infected students [Table 4].

In regard to BMI, 27 (61.36%) of the students who revealed positive reactions to anti-*H. pylori* antibodies were with normal BMI. The statistical analysis revealed no significant ($P > 0.05$) association of *H. pylori* infection and BMI [Table 5].

Table 1: Prevalence of anti-*Helicobacter pylori* antibodies among Cihan University students according to the academic departments

Department	Number of samples	Number of positive (%)	Number of negative (%)
Biology	53	11 (20.75)	42 (79.25)
Computer sciences	10	0 (0)	10 (100)
Law	24	4 (16.7)	20 (83.3)
Banking	5	2 (40)	3 (60)
Business	14	5 (35.7)	9 (64.3)
International relations	34	9 (26.5)	25 (73.5)
Civil engineering	2	0 (0)	2 (100)
Architecture engineering	4	0 (0)	4 (100)
Health administration	12	0 (0)	12 (100)
Accounting	19	5 (26.3)	14 (73.7)
Media	6	5 (83.3)	1 (16.7)
English	8	3 (37.5)	5 (62.5)
Translation	6	0 (0)	6 (100)
Total	197	44 (22.3)	153 (77.7)

P=0.009

Table 2: Gender distribution of anti-*Helicobacter pylori* antibodies among Cihan University, Erbil, students

Department	Male			Female			Total
	Number of samples	Number of negative (%)	Number of positive (%)	Number of samples	Number of negative (%)	Number of positive (%)	
Biology	27	21 (77.8)	6 (22.2)	26	21 (88.76)	5 (19.24)	53
Computer sciences	9	9 (100)	0 (0)	1	1 (100)	0 (0)	10
Law	19	16 (84.2)	3 (15.8)	5	4 (80)	1 (20)	24
Banking	3	2 (66.67)	1 (33.33)	2	1 (50)	1 (50)	5
Business	12	8 (66.67)	4 (33.33)	2	1 (50)	1 (50)	14
International relations	26	19 (73.1)	7 (26.9)	8	6 (75)	2 (25)	34
Civil engineering	1	1 (100)	0 (0)	1	1 (100)	0 (0)	2
Architecture engineering	3	3 (100)	0 (0)	1	1 (100)	0 (0)	4
Health administration	9	9 (100)	0 (0)	3	3 (100)	0 (0)	12
Accounting	17	12 (70.5)	5 (29.5)	2	2 (100)	0 (0)	19
Media	4	1 (25)	3 (75)	2	0 (0)	2 (100)	6
English	8	5 (62.5)	3 (37.5)	0	0 (0)	0 (0)	8
Translation	6	6 (100)	0 (0)	0	0 (0)	0 (0)	6
Total	144	112 (77.8)	32 (22.2)	53	41 (77.4)	12 (22.6)	197

P=0.350

Table 3: Prevalence of anti-*Helicobacter pylori* antibodies among Cihan University, Erbil, students according to meal type

Feeding habits	Number of positive male (%)	Number of positive female (%)	Total (%)
Homemade	3 (37.5)	5 (62.5)	8 (18.18)
Restaurant	12 (80)	3 (20)	15 (34.1)
Both	17 (80.9)	4 (19.1)	21 (47.72)
Total	32	12	44

P=0.047

Table 4: Clinical manifestations experienced by positively reacted students to anti-*Helicobacter pylori* test

Clinical manifestations	Number of positive male (%)	Number of positive female (%)	Total (%)
Epigastric pain	3 (9.4)	3 (25)	6 (13.63)
Abdominal pain	8 (25)	4 (33.33)	12 (27.27)
Diarrhea	0 (0)	0 (0)	0 (0)
Asymptomatic	21 (65.6)	5 (41.67)	26 (59.1)
Total	32	12	44

P=0.468

Of the 44 *H. pylori*-infected students, 5 (11.36%) had a history of animal handling, whereas 39 (88.64%) of them did not have a history of animal contact. No significant association ($P > 0.05$) of *H. pylori* infection and a history of animal contact [Table 6] was detected.

H. pylori infection rate was higher among students within age groups 29–32 years old (36.84%) followed by the students with age groups ranged between 25–28 years (30.55%) and 21–24 years old (22.99%). However, statistical analysis revealed no significant ($P > 0.05$) differences among different age groups studied in this research, in respect to having *H. pylori* infection [Table 7].

In respect to the sources of drinking water, 21 (47.73%) of *H. pylori*-positive students were routinely using governmental drinking water supply (tap water) comparing with 14 (31.82%) and 9 (20.45%) of the positive students who are always using bottled water and who are using both (tap and bottled) for drinking and cooking purposes, respectively. However, no significant ($P > 0.05$) association of *H. pylori* infection and source of drinking water was noticed [Table 8].

DISCUSSION

H. pylori infection infects more than half of the world's population. The current medical literature is described *H. pylori* as Group 1 carcinogen. The transmission of this infection is rapidly decreasing in developed countries due to improvement in the sanitation.[11,12]

In the present study, the prevalence of anti-*H. pylori* antibodies among university students was 22.3%, similar results were obtained by Al-Madi *et al*.[13] among Saudi medical students.

The prevalence of anti-*H. pylori* according to academic departments was significant ($P = 0.009$) which might be due to the lack of information about *H. pylori* disease which was higher than Howler Medical University students[14] due to the medical background and different lifestyle from rest of the society.

According to the gender distribution, male students were more infected than female students, and this might

be due to meals habit as the males have more fast-food meals in the restaurants than females. However, this finding was inconsistent with that reported by Hooi *et al*.,[15] as in Nasarawa State University, females were more infected due to accumulating risk factors and other social activities such as bed-sharing.[16]

Table 5: Association of *Helicobacter pylori* infection and BMI

BMI	Number of positive students (%)	Number of negative students (%)	Total
<16 (severe thinness)	1 (2.27)	0 (0)	1
16–17 (moderate thinness)	0 (0)	4 (2.61)	4
17–18.5 (mild thinness)	0 (0)	2 (1.3)	2
18.5–25 (normal)	27 (61.36)	95 (62.1)	122
25–30 (overweight)	14 (31.8)	46 (30)	60
30–35 (obese Class I)	2 (4.55)	6 (3.9)	8
35–40 (obese Class II)	0 (0)	0 (0)	0
>40 (obese Class III)	0 (0)	0 (0)	0
Total	44	153	197

P=0.189

Table 6: Association of *H. pylori* infection and history of animal contact

H.phylori-positive students	History of animal contact		Total
	Yes (%)	No (%)	
Male	4 (12.5)	28 (87.5)	32
Female	1 (8.33)	11 (91.67)	12
Total	5 (11.36)	39 (88.64)	44

P=0.468. *H. pylori: Helicobacter pylori*

The prevalence of anti-*H. pylori* antibodies according to feeding habit was significant ($P = 0.047$) which might be due to contamination of food materials with intestinal pathogens including *H. pylori* bacteria.[17]

In the current study, clinical manifestations that experienced by the infected students were non-significantly ($P > 0.05$) associated with *H. pylori* infection and might be due to the existence of more than one strain of the organism that responsible for this illness in Erbil community that needs more investigations to be proven.[18,19]

Association of anti-*H. pylori* antibodies and BMI was non-significant ($P > 0.05$) and this could be explained by the fact that most of the positively reacted students experienced no symptoms. *H. pylori* infection impairs secretion balance of pro-inflammatory cytokines and C-reactive proteins, angiotensinogen, free fatty acids, and leptin hormone, and thus, reactive oxygen species begin to accumulate.[12] Subclinical chronic inflammation induced by *H. pylori* infection occurs through impaired cytokine balance and stimulated macrophages.[20] Thus, BMI was not influenced by the infection as most of the cases were subclinical.

Association of *H. pylori* infection and animal contact was non-significant ($P > 0.05$). This finding might be explained by the fact that human is the natural reservoir of *H. pylori* and this bacterium inhabits the gastric mucosa of human.[16]

According to the age distribution of *H. pylori* infection, students with ages between 29 and 32 years old were more susceptible to be infected. However, this increased frequency was non-significant ($P > 0.05$) comparing with other age groups that studied in this research. Dore *et al.*[21] were found that *H. pylori* infection is increasing with age due to the increased risk and opportunity of acquiring the infection.[21]

H. pylori infection was non-significantly associated with drinking water sources; however, the infection rate was more detected among the students who use tap water for drinking and cooking purposes. This may be due to recent improvement in water basic system and service.

Table 7: Age distribution of *Helicobacter pylori* infection among Cihan University students

Age groups	Total number of samples	Number of positive		Number of negative		Total number of positive (%)
		Female (%)	Male (%)	Female (%)	Male (%)	
17–20	40	2 (13.33)	3 (12.0)	13 (86.67)	22 (88.0)	5 (12.5)
21–24	87	8 (27.58)	12 (20.69)	21 (7.42)	46 (79.31)	20 (22.99)
25–28	36	1 (25.0)	10 (31.25)	3 (75.0)	22 (68.75)	11 (30.55)
29–32	19	1 (25.0)	6 (40.0)	3 (75.0)	9 (60.0)	7 (36.84)
33–36	3	0 (0)	0 (0)	0 (0)	3 (100)	0 (0)
37–40	10	0 (0)	1 (11.11)	1 (100)	8 (88.89)	1 (10)
41–44	1	0 (0)	0 (0)	0 (0)	1 (100)	0 (0)
45–48	1	0 (0)	0 (0)	0 (0)	1 (0)	0 (0)
Total		12	32	41	112	197

$P = 0.601$

Table 8: Association of drinking water sources and *Helicobacter pylori* infection

Source of drinking water	Number of positive male (%)	Number of positive female (%)	Total
Tap water	17 (53.13)	4 (33.33)	21 (47.73)
Bottle water	8 (25.0)	6 (50.0)	14 (31.82)
Both	7 (21.88)	2 (16.67)	9 (20.45)
Total	32	12	44

P=0.601

CONCLUSION

The prevalence of anti-*H. pylori* antibodies is relatively high among students of Cihan University, Erbil, with no significant differences between male and female in respect to having *H. pylori* infection. The infection rate was significantly higher among students from literate and administrative departments than scientific departments. *H. pylori* infection was significantly associated with daily feeding habits of the students. BMI, clinical manifestations, age groups, history of animal contact, and source of drinking water are non-significantly associated with *H. pylori* infection.

Both university and public communities should be aware of infections caused by the pathogen such as gastritis, peptic ulcer, and about its potential association with malignant transformation. *H. pylori* should be listed as a public health challenge in Erbil community by local health authorities and doing further studies to investigate the pathogenesis, strain variations, and drug resistance of the local strains of this bacterium.

REFERENCES

1. M. Amieva and R. M. Jr. Peek. "Pathobiology of *Helicobacter pylori* induced gastric cancer manuel". *Gastroenterology*, vol. 150. no. 1, pp. 64-78, 2017.
2. M. J. Blaser. "Who are we? Indigenous microbes and the ecology of human diseases". *EMBO Reports*, vol. 7, no. 10, pp. 956-960, 2006.
3. L. Fuccio, R. M. Zagari, L. H. Eusebi, L. Laterza, V. Cennamo, L. Ceroni, D. Grilli and F. Bazzoli. "Meta-analysis: Can *Helicobacter pylori* eradication treatment reduce the risk for gastric cancer?" *Annals of Internal Medicine*, vol. 151, no. 2, pp. 121-128, 2009.
4. H. M. Malaty. "Epidemiology of *Helicobacter pylori* infection". Best practice & research. Clinical gastroenterology, vol. 21, no. 2, pp. 205-214, 2007.
5. F. Mégraud. "*H pylori* antibiotic resistance: Prevalence, importance, and advances in testing". *Gut*, vol. 53, no. 9, pp. 1374-1384, 2004.
6. P. Malfertheiner, F. Megraud, C. O'Morain, F. Bazzoli, E. El-Omar, D. Graham, R. Hunt, T. Rokkas, N. Vakil and E. J. Kuipers. "Current concepts in the management of *Helicobacter pylori* infection: The maastricht III consensus report". *Gut*, vol. 56, no. 6, pp. 772-781, 2007.
7. L. M. Brown. "*Helicobacter pylori*: Epidemiology and routes of transmission". *Epidemiologic Reviews*, vol. 22, no. 2, pp. 283-297, 2000.
8. A. Tonkic, M. Tonkic, P. Lehours and F. Megraud. "Epidemiology and diagnosis of *Helicobacter pylori* infection". *Helicobacter*, vol. 17, no. 1, pp. 1-8, 2012.
9. M. I. Pereira and J. A. Medeiros. "Role of *Helicobacter pylori* in gastric mucosa-associated lymphoid tissue lymphomas". *World Journal of Gastroenterology*, vol. 20, no. 3, pp. 684-698, 2014.
10. K. E. L. McColl. "*Helicobacter pylori* infection". *The New England Journal of Medicine*, vol. 362, no. 17, pp. 1597-604, 2004.
11. T. Yucel, D. Aygin, S. Sen and O. Yucel. "The prevalence of *Helicobacter pylori* and related factors among university students in Turkey". *Japanese Journal of Infectious Diseases*, vol. 61, no. 3, pp. 179-183, 2008.
12. A. A. Hassan, G. M. Elnemr, M. A. Almourgi, A. K. Alzahrani, N. Lilian and O. M. Mehanna. "Study of the effect of hypoxia on the prevalence of *Helicobacter pylori* infection among Saudi students at Taif university". *Research Journal of Microbiology*, vol. 4, pp. 18-24, 2017.
13. M. A. Al-Madi, A. Aljebreen, F. Tounesi and A. Abdo. "*Helicobacter pylori* prevalence among medical students in a high endemic area". *Saudi Medical Journal*, vol. 28, no. 6, pp. 896-898, 2007.
14. B. Hussen, S. S. Qader, H. F. Ahmad and S. H. Ahmed. "The prevalence of *Helicobacter pylori* among university students in Iraq". *Indian Journal of Science and Technology*, vol. 6, pp. 4-8, 2013.
15. J. K. Y. Hooi, W. Y. Lai, W. K. Ng, M. M. Y. Suen, F. E. Underwood, D. Tanyingoh, P. Malfertheiner, D. Y. Graham, V. W. S. Wong, J. C. Y. Wu, F. K. L. Chan, J. J. Y. Sung, G. G. Kaplan and S. C. Ng. "Global prevalence of *Helicobacter pylori* infection: Systematic review and meta-analysis". *Gastroenterology*, vol. 153, no. 2, pp. 420-429, 2017.
16. S. Agah, H. Khedmat, M. E. Ghamar-Chehred, R. Hadi and A. Aghaei. "Female gender and *Helicobacter pylori* infection, the most important predisposition factors in a cohort of gastric cancer: A longitudinal study". *Caspian Journal of Internal Medicine*, vol. 7, no. 2, pp. 136-141, 2016.
17. R. M. Nyarango, P. A. Aloo, E. W. Kabiru and B. O. Nyanchongi. "The risk of pathogenic intestinal parasite infections in Kisii municipality, Kenya". *BMC Public Health*, vol. 8, pp. 237, 2008.
18. J. G. Kusters, A. H. M. van Vliet and E. J. Kuipers. "Pathogenesis of *Helicobacter pylori* infection". *Clinical Microbiology Reviews*, vol. 19, no. 3, pp. 449-490, 2006.
19. M. J. Blaser, Y. Chen and J. Reibmann. "Does *Helicobacter pylori* protect against asthma and allergy?" *Gut*, vol. 57, no. 8, pp. 1178-1179, 2008.
20. J. Michalkiewicz, A. Helmin-Basa, R. Grzywa, M. Czerwionka-Szaflarska, A. Szaflarska-Poplawska, G. Mierzwa, A. Marszalek, M. Bodnar, M. Nowak and K. Dzierzanowska-Fangrat. "Innate immunity components and cytokines in gastric mucosa in children with *Helicobacter pylori* infection". *Mediators of Inflammation*, vol. 10, pp. 1-7, 2015.
21. M. P. Dore, H. M. Malaty, D. Y. Graham, G. Fanciulli, G. Delitala and G. Realdi. "Risk factors associated with *Helicobacter pylori* infection among children in a defined geographic area". *Clinical Infectious Diseases*, vol. 35, no. 3, pp. 240-245, 2002.