

Seroprevalence of Helicobacter Pylori Infection among Patients with Gastroduodenal Disorders in Erbil City

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Abstract

Background: More than half of the world's population is influenced by Helicobacter pylori infection. The infection is commonly obtained during childhood but may stay asymptomatic, with long-term clinical consequences such as gastritis, peptic ulcer illness, and stomach cancer.

Objective: To determine the prevalence rate of Helicobacter pylori infection and related variables such as age, gender, residency, blood group, Rhesus factors and previous infection among patients presenting with gastroduodenal disorders in Erbil city.

Patients and Methods: Out of 240 blood samples from patients with gastroduodenal disorders admitted to Rzgary Teaching Hospital in Erbil, Iraq from July to August 2019 were collected and screened for anti-Helicobacter pylori antibodies by rapid immunochromatographic assay, and blood groups of patients were determined by using hemagglutination test. For each study subject, a questionnaire sheet was prepared and used.

Results: The overall prevalence rate of Helicobacter pylori infection among 240 patients with gastroduodenal disorders was 128 (53.3%). A significant relationship between Helicobacter pylori infection and gender (male 43.75% and female 59.72%) was recorded ($P < 0.05$). The highest rate of Helicobacter pylori infection was founded among the age group over 50 years, but there were no significant differences between them ($P > 0.05$). Prevalence was significantly higher among rural areas (60.4%) than the urban areas (48.6%) ($P < 0.05$). There was a significant association between Helicobacter pylori infection and ABO blood group phenotypes ($P < 0.05$), but there is no significant association between Helicobacter pylori infection and the type of Rhesus factor ($P > 0.05$). Prevalence was significantly higher among the previous infection (78.5%) than non-previous infection (23.6%) ($P < 0.05$).

Conclusion: We found that in Erbil city, the seropositivity of anti-Helicobacter pylori antibody was high among patients with the gastroduodenal disorder. The high prevalence of Helicobacter pylori was founded in the women, elderly, rural area, O blood group, positive Rhesus factor and patients with the previous infection.

Keywords: Seroprevalence, Helicobacter, pylori, gastroduodenal, disorder, Immunochromatographic assay, Erbil city.

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Introduction

Gastroduodenal infections in humans are correlated with Helicobacter pylori (*H. pylori*) and Infection with *H. pylori* is highly prevalent globally and nearly half the population of the world is infected with it [20].

It is Gram-negative, helical-shaped, microaerophilic, oxidase, catalase, and urease-positive bacterium which usually colonize the human stomach (Christian et al., 2019). The Production of ammonia by this bacteria and release of biochemicals such as proteases, vacuolating cytotoxin A and phospholipases contribute significantly to its inflammatory and carcinogenic potential [25].

Infections with *H. pylori* are believed to happen soon in life and the infection involves several medical circumstances including gastritis, gastric cancer, gastric adenocarcinoma, lymphoma and peptic ulcer disease [4]. Patients with *H. pylori* are generally asymptomatic and no particular clinical signs and symptoms were outlined. Common signs and symptoms, however, include nausea, vomiting, abdominal pain, heartburn, diarrhoea, evening starvation and bad breath [22].

Almost 70%-90% of the population harbour *H. pylori* in developing countries, the majority of which is obtained during childhood, while the incidence in developed countries is smaller, varying from 30% to 40% [23]. Unclean food and water can distribute it and oral-oral or faecal-oral interaction is the most prevalent path of *H. pylori* infection [22]. It has been found that

Ethnicity, socioeconomic status, urban residents, age, bad hygiene circumstances, overcrowding, bad nutrition, bad water supply, and low mother education play a significant role in the transmission of *H. pylori* [37].

There are several techniques for diagnosing *H. pylori* infection that are invasive and noninvasive. The invasive method includes endoscopy and biopsy [histological examination, Rapid Urease Test], and Polymerase Chain Reaction. Non-invasive methods include the Urea Breath Test, stool antigen testing, and serological tests [22]. One of the serological techniques is an immunochromatographic technique which is commonly used for the diagnosis of *H. pylori* because of its low cost and easy availability at any laboratory [39].

Epidemiological data on the prevalence of *H. pylori* infection to be very scattered in most developing countries including Iraq. The prevalence of *H. pylori* in the neighboring countries was found to be 49.7% in Kuwait [5], 69.0% in Turkey [9], 30.1% in Oman [16], 53% in Yemen [19], 25% in Jordan [3], 71.33% in Saudi Arabia [7], 61.87% in Iran [38], 42.1% in Lebanon (Khalife et al., 2017), and 41% in The United Arab Emirates [33]. As well as, in other countries the prevalence of *H. pylori* was found to be 56.9% in Kosovo [46], 64.39% in Cameroon [34], 81.7% in Nigeria [28] 47% in Pakistan [39], 27% in India [25] and 24.3% in Uganda [4].

In Iraq the incidence of *H. pylori* infection was 55.8% in Erbil [28], 54.5% in Basrah

city [18], 59.2% in Baghdad city [13], 51.% in Hilla city [14], %55.8% in Tikrit city [15], 51.2% in Sulaimani city [35], 49.62% in Kirkuk city [1], 51.11% in Misan city [6], 61.32 in Mosul city [8], and finally 28% in Duhok city [45] were observed.

The objective of this study was to evaluate the seroprevalence rate of anti-*H. pylori* antibodies among patients with gastroduodenal disorders and its association with some of the epidemiological variables associated with this infection in Erbil city, Iraq.

Patients and Methods

Sample collection

This cross-sectional study was carried out on 240 patients with gastroduodenal disorders (gastroesophageal reflux, gastric inflammation, duodenal inflammation, intestinal dysmotility, nausea and vomiting disorders, epigastric pain, and epigastric burning) 96 males and 144 females ranging in age from 18 to 70 years, hospitalized Rzgary Teaching Hospital over a period of two months, starting from 15 June 2019 to 10 August 2019 in Erbil city.

Blood samples were collected from each patient in sterile disposable screw-cap containers. These were labeled with number, date, and name of each subject. A questionnaire containing demographic, clinical, previous infection and environmental data was obtained from each case. The existence of *H. pylori* was investigated by using an immunochromatographic test.

H. pylori antibody

Detection For serum samples collect blood in a tube without anticoagulant and allow it to clot. After collection, the blood samples were tested immediately by immunochromatographic assay (Camp Medica Group, Bucharest, Romania, 2018) for the qualitative detection of IgG antibodies specific to *H. pylori* in human serum and were done according to instructions of the manufacturers.

Test Procedure

1-Draw the sample into the pipette, then dispense 80-120 μ L of serum or plasma into the sample well of the cassette.

2-Draw the sample into the pipette, then dispense 50 μ L of whole blood and add 1 drop of diluent provided into the sample well. Use the dropper bottle provided, not the sample pipette.

3-Wait for 10 minutes and then read results. It is important that the background is clear before the result is read. Do not read results after 20 minutes.

Interpretation of Results

1-Negative: Only one colored band appears on the control (C) region. No apparent band on the test (T) region.

2-Positive: In addition to a pink colored control (C) band, a distinct pink colored band will appear in the test (T) region, as shown in figure (1).

3-Invalid: A total absence of color in either regions or no colored line appears in the control (C) region is an indication of procedure error and/or test reagent deterioration.

ABO blood group detection

The ABO blood group was determined for each patient by the conventional hemagglutination test using the anti- A, anti- B, and anti-D sera (Torax Biosciences, United Kingdom, 2019). The ABO blood grouping procedure is based on the principle of agglutination or clumping as the patient's

blood is reacted with anti-A, anti-B and anti-Rh antibodies separately.

Statistical analysis

The data were analyzed using Statistical Package for the Social Sciences (SPSS), version 21.0. The proportion and their frequencies were checked by applying the chi-square (χ^2) test. P-value < 0.05 was considered significant.



Figure (1): Results of immunochromatographic test: A- Negative Result (left) B- Positive Result (right)

Results

A total of 240 patients were included in the present study Figure (2), were found

128(53.3%) and 112(46.7) seropositive and seronegative cases, respectively.

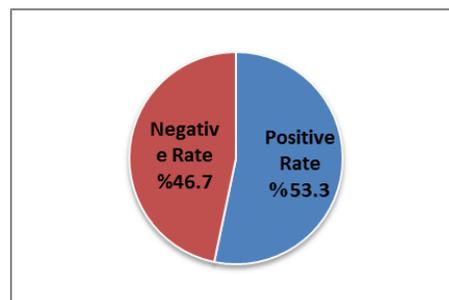


Figure (2): Frequency of anti-*H. pylori* antibodies in sera of surveyed patients

As shown in Table (1), in 240 blood samples, there were 128(53.3%) seropositive cases, the high seropositivity in females was 86(59.72%) and low seropositivity in males

was 42(43.75%). Statistically, a significant difference was observed between males and females ($P < 0.05$).

Table (1): Seroprevalence of anti-*H. pylori* antibodies in relation to gender

Genders	Test No. (%)		Totals
	Positive (%)	Negative (%)	
Male	42 (43.75)	54 (56.25)	96 (40%)
Female	86 (59.72)	58 (40.28)	144 (60%)
Total	128 (53.3)	112 (46.7)	240 (100%)
The <i>p</i> -value is 0.015106. This result is significant at <i>p</i> < 0.05.			

Seroprevalence of anti-*H. pylori* antibodies according to the age groups were shown in Table (2). The percentage of the seropositivity increased with the age from (42.85%) in < 20

years old to (60%) in > 50 years old. Statistical analysis was shown, that there is no significant difference between age groups and seropositivity of *H. pylori* infection among patients (*P* > 0.05).

Table (2): Seroprevalence of anti-*H. pylori* antibodies in relation to age groups

age groups (years)	Test No. (%)		Total
	Positive (%)	Negative (%)	
<20	18 (42.85)	24 (57.15)	42 (17.5%)
21-30	23 (44.23)	29 (55.77)	52 (21.67%)
31-40	25 (50)	25 (50)	50 (20.83%)
41-50	30 (53.57)	26 (46.43)	56 (23.33%)
50>	24 (60)	16 (40)	40 (16.67%)
Total	128 (53.3)	112 (46.7)	240 (100%)
The <i>p</i> -value is 0.487805. The result is <i>not</i> significant at <i>p</i> < 0.05.			

Table (3) shows the prevalence of *H. pylori* seropositivity in relation to residence area. Among patients with the gastroduodenal disorder, the high seropositivity 58(60.4%) was observed in rural areas, while the low

seropositivity 70(48.6%) was recorded in urban areas. Statistical analysis showed no significant difference between the two groups (*P* > 0.05).

Table (3): Seroprevalence of anti-*H. pylori* antibodies in relation to residency

Residency	Test No. (%)		Total
	Positive (%)	Negative (%)	
Urban	70 (48.6)	74 (51.4)	144 (60%)
Rural	58 (60.4)	38 (39.6)	96 (40%)
Total	128 (53.3)	112 (46.7)	240 (100%)
The <i>p</i> -value is 0.072502. This result is <i>not</i> significant at <i>p</i> < 0.05.			

As illustrated in the Table (4), the highest seropositivity was founded in the O blood group (65%), followed by A blood group (54.17%), B blood group (45.5%) and AB

blood group (31.82%). Statistical analysis showed a significant difference between *H. pylori* infection and blood groups (*P* < 0.05).

Table (4): Seroprevalence of anti-*H. pylori* antibodies in relation to blood groups

Blood group	Test No. (%)		Total
	Positive (%)	Negative (%)	
A	39 (54.17)	33 (45.83)	72 (30%)
B	30 (45.5)	36 (54.5)	66 (27.5%)
AB	7 (31.82)	15 (68.18)	22 (9.17%)
O	52 (65)	28 (35)	80 (33.33)
Total	128 (53.3)	112 (46.7)	240 (100%)

The *p*-value is 0.017469. The result is significant at $p < 0.05$.

Table (5) shows the rate of *H. pylori* infection was higher in Rhesus factor positive (53.8%) as compared to Rhesus factor negative (50%) with no significant differences between *H. pylori* infection and Rhesus factor ($P > 0.05$).

Table (5): Seroprevalence of anti-*H. pylori* antibodies in relation to Rhesus factor

Rhesus factor	Test No. (%)		Total
	Positive (%)	Negative (%)	
Rhesus ve+	114 (53.8)	98 (46.2)	212 (88.33%)
Rhesus ve-	14 (50)	14 (50)	28 (11.67%)
Total	128 (53.3)	112 (46.7)	240 (100%)

The *p*-value is 0.706785. This result is not significant at $p < 0.05$.

Table (6) shows the prevalence of *H. pylori* seropositivity in relation to the previous infection with *H. pylori*. The high seropositivity 102(78.5%) was found in patients with the previous infection and the low seropositivity 26(23.6%) was observed in patients without previous infection. A Significant difference ($P < 0.05$) was observed between both groups.

Table (6): Seroprevalence of anti-*H. pylori* antibodies in relation to the previous infection

Previous infection	Test No. (%)		Total
	Positive (%)	Negative (%)	
Yes	102 (78.5)	28 (21.5)	130 (54.17%)
No	26 (23.6)	84 (76.4)	110 (45.83%)
Total	128 (53.3)	112 (46.7)	240 (100%)

The *p*-value is 0.000 This result is significant at $p < 0.05$.

Discussion

The present research reveals that the overall percentage of *H. pylori* infection was (53.3%). This is comparable with other studies in which *H. pylori* infection has been reported such as 55.8% in Erbil city [28],

55.8% in Tikrit city [15], 51.2% in Sulaimani city [35], and 54.5% in Basrah city [18], while higher percentage than our findings were observed in Baghdad-Iraq and Mosul-Iraq (71.3%) and (61.32%), respectively

[26],[8]. In addition, lower *H. pylori* prevalence rates have been reported by 11.3% in Erbil-Iraq [11] and 28% in Duhok-Iraq [45]. These differences could be clarified by the patient's age and health, amount of specimens, population cultural practices, socioeconomic status, ethnicity, testing methods and geographic allocation [7], [44].

The rate of infection with *H. pylori* in female patients (59.72%) is significantly higher than in male study participants (43.75%) ($P=0.015$). It was reported in some studies that the higher rate of *H. pylori* infection was found in females and similarly this difference was usually significant ([21], [39], [40]. In comparison to the results in Baghdad-Iraq, Sulaimani-Iraq and Misan-Iraq, there is no significant association between the frequency of *H. pylori* and sex Al-Mossawei et al., 2013, [35], [6]. The hormonal variation between the two genders may explain these results or may be related to social reasons that females are more concerned with food preparation than males and spend more time in the kitchen [28], [35].

According to the age groups, a non-significant association between the rate of *H. pylori* infection and age groups was noticed ($P=0.487$). The percentage of seropositivity increased with the age from (42.85%) in less than twenty years old to (60%) in more than fifty years old. This result is consistent with other previous research that demonstrated a high incidence of *H. pylori* infection in more than 50 years ([42], [26], [10], but it differs from other studies conducted in Diyala-Iraq

and Mosul-Iraq [27], [8]. The differences between the present results and the results of the other researchs may be attributed to the patient's nutritional status, socioeconomic status, insufficient sanitation, water supply and environment condition [13].

Our study showed that the risk of *H. pylori* infection was higher but not significant ($P=0.072$) among participants who live in rural (60.4%) than those live in urban areas (48.6%). This agree with other studies in Erbil-Iraq [12] and in Misan-Iraq [6] and disagrees with the study conducted in Tanzania [31]. These variations between rural and urban patients could be due to bad water supply, bad sewage disposal, social habits of the population and low education [17], [31].

The rate of *H. pylori* infection was significantly higher for type O blood (65%) compared to other blood types (A=54.17%, B=45.5%, and AB=31.82%) ($P=0.017$). This study found that patients with O blood group were more susceptible to *H. pylori* infection and AB blood group was less prone to infection. This results was consistent with other studies that conducted in Ethiopia and Nigeria [43], [24], and contrary to some previous studies that performed in Egypt and Erbil-Iraq explaining that the O blood group did not act as a risk factor for *H. pylori* infection [41], [36]. The higher susceptibility of O blood group individuals to *H. pylori* infection is most probably due to the higher frequency of secretor status in O blood group individuals or may be due to the H antigen represents an important receptor expressed in

the gastroduodenal mucosal cells to which adheres and enhances colonization of *H. pylori* [30].

This study shows that 53.8% Rh-positive patients and 50% Rh-negative patients were positive for *H. pylori*, and therefore showed no strong differences between those that were positive and negative, indicating that the presence of *H. pylori* is not associated with Rhesus factor, which is in agreement with other studies in Baghdad-Iraq and Iran [2], [38].

It was evident that a significant difference was observed between previous infection and non-previous infection in the frequency of *H. pylori* infection ($P=0.00$), seropositivity was more prevalent among patients with prior infection (78.5%) than non-previous infection ones (23.6%). No study was done including the same or different results.

Conclusion

The prevalence of *H. pylori* seropositivity was high among surveyed population in Erbil city. Higher frequency of anti-*H. pylori* antibodies was found among rural dwellers, females and patients with O blood group. The seroprevalence of anti-*H. pylori* antibodies was found to be increased with the age group. Patients with the previous infection had a high rate of *H. pylori* seropositivity. No significant relationship was observed between *H. pylori* infection and Rhesus factors.

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