RESEARCH ARTICLE

SEROPREVALENCE OF *Helicobacter pylori* INFECTION AND ITS RELATION TO ABO/ RHESUS BLOOD GROUPS IN DIYALA, IRAQ

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ABSTRACT

Background: Studies on the association between *H. pylori* infection and ABO/Rhesus blood groups have obtained controversial results.

Objectives: To determine the association between *H. pylori* seropositivity among asymptomatic healthy persons and ABO/Rhesus blood groups, as well as certain demographic factors in Diyala province.

Subjects and methods: This study was conducted in Diyala province for the period from November / 2010 to August 2011. 90 apparently healthy individuals were included. The age range was (14-43) years. 47 of them were males and 43 were females. ABO and Rh blood groups were determined by a standard hem agglutination test. Then sera were separated and submitted for the detection of anti-*H.pylori* IgG by enzyme linked immunosorbant assay (ELISA). Data were statistically analyzed.

Results: the results showed that the anti-*H.pylori* IgG seroprevalence was (80%). The seroprevalence rate was significantly higher in female compared to male (86% vs 74.5%, p= 0.001). The highest infection rate was among the age group 24-33 years, with statistically insignificant difference (p= 0.10). The anti-*H.pylori* seropositivity rate among the A, B, AB, and O blood groups was 76.5%, 75%, 100% and 82.9% respectively (p= 0.5). the anti-*H.pylori* IgG positivity rate was higher in Rh negative as compared to Rh positive phenotypes (87.5% *vs* 79.3%,(p= 0.50). the anti-*H.pylori* IgG positivity rate was significantly higher (p= 0.05) among subjects with secondary school level as compared to other educational levels.

Conclusion: It can be concluded that ABO and Rh blood groups may partly influence the rate of *H.pylori* infection, especially in female gender.

INTRODUCTION

Helicobacter pylori, is a Gram-negative, microaerophilic bacterium found in the stomach. *H. pylori* infection represents a key factor in the etiology of various gastrointestinal diseases, ranging from chronic active gastritis without clinical symptoms to peptic ulceration, gastric adenocarcinoma, and gastric mucosa-associated lymphoid tissue lymphoma as well as extragastric manifestations (Venkateshwari *et al*., 2011; Figura *et al*., 2010). However, over 80 % of individuals infected with the bacterium are asymptomatic and it has been postulated that it may play an important role in the natural stomach ecology (Ford and Axon, 2010). More than 50% of the world's population harbor *H. pylori* in their upper gastrointestinal tract with more prevalent infection in developing countries, and decreasing in western countries

(Frenck and Clemens, 2003). Controversies about the associations of the ABO and Rh phenotypes and infection by this bacillus have been presented. It has suggested that ABO blood groups, age, and gender influence seropositivity for *H. pylori* infection (Jaff, 2011). In a another study, it has been found that patients in blood groups A and O were more prone to *H. pylori* infection than in other blood groups, and patients in the AB blood group were less prone to *H. pylori* infection compared with other blood groups affirming that *H. pylori* infection can be related to ABO blood group, age, gender, and smoking (Kanbay *et al*., 2005).On the contrary, the seroprevalence of anti-*H. pylori* and anti-CagA antibodies did not significantly differ between ABO blood groups or Rh status. However, within blood group A, the prevalence of anti-*H. pylori* and anti-CagA was significantly higher in males compare to females (Jafarzadeh *et al*., 2007). Similarly, no association between H. pylori infection and ABO blood groups (Wu *et al*., 2003).

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MATERIALS AND METHODS

This study was conducted in Baquba-Diyala province for the period from November / 2010 to August 2011. 90 apparently healthy individuals were included. The mean age was 23.2 ± 5.2 years, with an age range (14-43) years. 47 of them were males with a mean age (24.7 ± 5.2) years, and 43 females with a mean age (21.5 ± 4.8) years. All subjects were interviewed by means of a structured questionnaire for general demographic factors gender, age, residence, educational levels. 4-5 milliliters blood sample was collected from each subject in plane plastic test tubes by vein puncture. ABO and Rh blood groups were determined by a standard hemagglutination (Optima GmbH, Bammental, Germany) test. The rest of the blood sample was left in room temperature (15-25 ^{0}C) to clot. Sera were separated by centrifugation at 3000 rotation/minute for 5 minutes. Detection of anti-*H.pylori* IgG was done by ELISA technique (Nova Tec-Immunodiagnostic GmBH-Germany). Data were statistically analyzed. Positive or negative cases were determined by comparing the absorbance value of each sample in this study with that of the cut-off control value, samples with an absorbance value less than the cut-off value were considered as negative; samples with a value above the cut-off value were considered positive. Statistical analysis was performed using SPSS version -15 (SPSS Inc, Chicago, USA). Chi-square was used for paired comparison, and P - value of < 0.05 was considered significance.

RESULTS

Among the 90 apparently healthy individuals enrolled in the present study, the sera of 72(80%) were positive for Anti *H.pylori* IgG, and 18(20%) were negative. Additionally, out of 43 females 37 (86%) were positive for Anti *H.pylori* IgG and 6 (13.9%) were negative. In males, 35(74.5%) out of 47 were positive, and 12 (25.5%) were negative. Females had significantly higher rate of infection as compared to males (p= 0.001), Table (1).

Table 1. Anti- *H.pylori* seropositivity according to gender

| gender | Anti *H.pylori* IgG | | Total | P value |
	Positive (%)	Negative (%)		
Female	37 (86.0%)	6 (13.9%)	43 (47.8%)	
Male	35 (74.5%)	12 (25.5%)	47 (52.2%)	0.001
Total	72 (80%)	18 (20%)	90 (100%)	

The anti-*H.pylori* IgG positivity rate among the age group (24.33) years was (89.3%), which was the highest as compared to other age groups. However, the difference among age groups was statistically insignificant (p= 0.10), Table (2).

Table 2. Anti- *H.pylori* seropositivity according to age

| Age (Ys) | Anti *H.pylori* IgG | | Total | P value |
	Positive (%)	Negative (%)		
14-23	44 (75.8%)	14 (24.1%)	58 (64.4%)	
24-33	25 (89.3%)	3 (10.7%)	28 (31.1%)	0.10
34-43	3 (75%)	1 (25%)	4 (4.4%)	[NS]
Total	72 (80%)	18 (20%)	90 (100)	

Table (3) revealed that the anti-*H.pylori* seropositivity rate among the A, B, AB, and O blood groups was 76.5%, 75%, 100% and 82.9% respectively. Accordingly, the highest

infection rate was among the AB blood group followed by the O blood group. In spite of that difference in the infection rate according to ABO blood groups was statistically insignificant (p= 0.5).

Table 3. Anti- *H.pylori* seropositivity according to ABO blood groups

| ABO group | Anti *H.pylori* IgG | | Total | P value |
	Positive (%)	Negative (%)		
A	13 (76.5%)	4 (23.5%)	17 (18.9%)	
B	21 (75%)	7 (23%)	28 (31.1%)	0.5
AB	4 (100 %)	0 (0%)	4 (4.4%)	[NS]
O	34 (82.9%)	7 (17.1%)	41 (45.5%)	
Total	72 (80%)	18 (20%)	90 (100%)	

Regarding the Rh phenotypes, the anti-*H.pylori* IgG positivity rate was higher in Rh negative as compared to Rh positive phenotypes (87.5% *vs* 79.3%),but the difference was statistically insignificant (p= 0.50), Table (4).

Table 4. Anti- *H.pylori* seropositivity according to Rh phenotype

| Rh group | Anti *H.pylori* IgG | | Total | P value |
	Positive (%)	Negative (%)		
Rh +	65 (79.3%)	17 (20.7%)	82 (91.1%)	
Rh -	7 (87.5%)	1 (12.5%)	8 (8.9)	0.50
Total	72 (80%)	18 (20%)	90 (100%)	[NS]

Although the *H.pylori* seropositivity rate was higher in subjects from rural areas as compared to those from urban areas (85.7% vs 70.6%), the difference between the two groups was statistically insignificant, Table (5).

Table 5. Anti- *H.pylori* seropositivity according to residence

| Residence | Anti *H.pylori* IgG | | Total | P value |
	Positive (%)	Negative (%)		
Urban	24 (70.6%)	10 (29.4%)	34 (37.8%)	0.10
Rural	48 (85.7%)	8 (14.3%)	56 (62.2%)	[NS]
Total	72 (80%)	18 (20%)	90 (100)	

Table (6) showed that the *H.pylori* seropositivity was significantly higher among subjects with secondary school educational level as compared to other educational groups (p= 0.05).

Table 6. Anti- *H.pylori* seropositivity according to educational level

| Educational Level | Anti *H.pylori* IgG | | Total | P value |
	Positive (%)	Negative (%)		
illiterate	3 (50%)	3 (50%)	6 (6.7%)	
primary	32 (86.5%)	5 (13.5%)	37 (41.1%)	
secondary	17 (89.5%)	2 (10.5%)	19 (21.1%)	0.05
High	20 (71.4%)	8 (28.6%)	28 (31.1%)	
Total	72 (80%)	18 (20%)	90 (100%)	

DISCUSSION

It is well known that blood group antigens are related to the development of peptic ulcer and gastric carcinoma (Edgren *et al.*, 2010). Since, determination of specific antibodies in sera and detection of *H. pylori* antigen in stool were comparable (Tatemichi *et al.*, 2009; Bhuiyan *et al.*, 2009). This study sought to determine the relationship between *H. pylori* as detected by anti-*H.pylori* IgG and ABO/Rhesus blood groups, and its relevance with other demographic factors in Baquba-Diyala province. The overall seroprevalence of anti-*H.pylori*

IgG among randomly selected individuals from Baquba city was 80%. However, variable results had been obtained by previous studies. In a study on patients with dyspepsia symptoms referred from an outpatient clinic in Erbil city showed that 64.8% of patients were seropositive for *H. pylori* infection using ELISA technique (Jaff, 2011). Among children aged 1-15 years tested for the presence of antibody to *H. pylori* by ELISA, the overall seroprevalence of *H. pylori* infection was 46.6% (Jafarzadeh *et al*., 2007). In another study on randomly selected Turkish patients attended outpatient clinic, the anti-*H.pylori* IgG seropositivity rate was 50.5% (Kanbay *et al*., 2005). Additionally, epidemiological studies on *H. pylori* infection published from April 2009 through March 2010 revealed that the prevalence of infection varied between 7 and 87% and was lower in European studies (Ford and Axon, 2010). In developing countries, it was established that *H. pylori* infection was associated with many unique challenges not encountered in an industrialized setting. The 20% prevalence of infection rate among adolescents in the United States compared to infection rates exceeding 90% by 5 years of age in parts of the developing world.

Furthermore, treatment of *H. pylori* within the developing world presents increased difficulties due to the frequency of antibiotic resistance as well as the frequency of recurrence after successful treatment (Frenck and Clemens, 2003). The significantly higher sero prevalence of anti-*H.pylori* IgG among females obtained in the present study. These results are consistent with that reported by other studies (Jaff, 2011; Kanbay *et al*., 2005; Petrovic *et al*., 2011; Seyda *et al*., 2007; de Mattos *et al*., 2002), but inconsistent with that reported by others (Jafarzadeh *et al*., 2007; Robertson *et al*., 2003; Sasidharan and Uyub, 2009; Us and Hascelik, 1998 ; Yucel *et al*., 2008). Although it was non-significant, the seropositivity of *H. pylori* IgG was higher in the age group 24-33 years. It has been obvious from the literature that different studies had reported varied results and does not related to age (Jaff, 2011; Jafarzadeh *et al*., 2007; Petrovic *et al*., 2011; Seyda *et al*., 2007; Sasidharan and Uyub, 2009; Us and Hascelik, 1998). However, several studies have documented an increased infection rate by age (Kanbay *et al*., 2005; Wu *et al*., 2003; Robertson *et al*., 2003; Us and Hascelik, 1998; Bhuiyan *et al*., 2009). These controversies may be attributed to the geographical areas, the characteristics of subjects included, and the laboratory procedure employed.

The present study revealed that the highest *H. pylori* infection rate was among the AB followed by the O blood group with no significant difference as compared to other blood groups. Similar results as no association between blood group and *H.pylori* infection have been reported by other workers (Jafarzadeh *et al*., 2007; Wu *et al*., 2003; Petrovic *et al*., 2011; Seyda *et al*., 2007 ; Robertson *et al*., 2003 ; Sasidharan and Uyub, 2009). However, other studies have documented an association of *H.pylori* infection with blood group A (Kanbay *et al*., 2005; Bhuiyan *et al*., 2009), and with blood group O (Jaff, 2011; Mattos *et al*., 2002; Risch *et al*., 2010). Regarding the association with Rh phenotypes, our results found that higher infection rate was associated with Rh negative compared to Rh positive. These results were inconsistent with other studies which documented an association with Rh positive (Jaff, 2011; Petrovic *et al*., 2011), and consistent with other studies that reported an association with Rh negative (Jafarzadeh *et al*., 2007; Seyda   *et al*., 2007). Regarding the association between *H.pylori* infection and residence, our results were consistent with other workers who reported a higher infection rate among rural areas (Frenck and Clemens, 2003; Seyda *et al*., 2007). However, most of previous studies found no association in this regard (Jaff, 2011; Sasidharan and Uyub, 2009; Us and Hascelik, 1998). The effect of educational levels on the infection rate by *H. pylori* was significantly found among those with secondary school level. These results were similar to that reported by (Wu *et al*., 2003), who found that *H. pylori* infection was increased during high school, that may be due to increase of interpersonal social activities. On the contrary, it has been reported that *H. pylori* infection was significantly increased among household members and low socioeconomic status (Seyda *et al*., 2007; Us and Hascelik, 1998). It can be concluded that ABO and Rh blood groups may partly influence the rate of *H.pylori* infection, especially in female gender.

Acknowledgements

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