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ABO typing as a risk factor in *Helicobacter pylori* infection in adults

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ABSTRACT

Background: Blood group carbohydrates are proposed to influence the risk of acquiring *Helicobacter pylori (H. pylori)* by effects on adhesion to the gastric mucosa. The objective of this study was to evaluate the association between ABO blood groups and *H. pylori* infection in adults. **Materials and methods:** Cross sectional study was carried out on 300 individuals at Al Shomali general hospital, Babylon, Iraq. ABO and Rhesus (Rh) blood groups were determined for all participants by standardized hemagglutination methods. Detection of *H. pylori* IgG antibodies in blood serum was performed by rapid strip test specific to *H. pylori.* **Results:** The current study included 300 persons. They were divided in to two groups; *H. pylori* positive group 174 (58%) and *H. pylori* negative group 126 (42%). Blood group O considered as a risk factor associated with *H. pylori* infections; the odds ratio (OR) was 2.15 (95 CI: 1.29- 3.58; p= 0.003). Blood group B considered as a risk factor associated with *H. pylori* infections the OR was 1.84 (95 CI: 1.09- 3.11; p= 0.029). Blood type AB was predominant in only 10 (5.74%) of 174 of positive group. Whereas it was 40 (31.74%) of 126 of negative group; the OR was 0.13 (95 CI: 0.06- 0.27; p< 0.001). **Conclusion:** Blood group O and B are considered as a risk factor associated with *H. pylori* infections. Blood group AB is considered as a protective factor against *H. pylori* infections. Blood type A has no effect.

Introduction

Warren and Marshall in 1983, suggested a role for *Helicobacter pylori* (*H. pylori*) infections in the pathogenesis of gastro-duodenal disease. In just over 20 years, many points of the pathogenesis of *H. pylori* infection have been discussed. *Helicobacter pylori* enters the digestive tract through the mouth and attaches to the gastric mucosa, causing a continual infection that is known to be nearly associated with the evolution of disorders such as atrophic gastritis, gastric ulcers, stomach cancer. These bacteria can recognize and bind to blood group antigens expressed on the surface of the gastric mucosa, which may play a critical role in the persistence of infection [1].

Helicobacter pylori is a spiral, gram negative, microaerophilic bacterium, known to colonize the mucous membrane of the human stomach. This organism is a widespread chronic bacterial infection in over 50% of the world's population. About 70% of the population in developing countries and 25–50% in developed countries were infected with *H. pylori*. In general, *H. pylori* infection obtained in early life and may persist for life duration if untreated. Person to person transmission of *H. pylori* occurs through

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contaminated water or food,[2] that resemble some other pathogens [3-5].

Humans are the main container of *H. pylori*. Poor hygiene, poor diets, poor water supply, geographical distribution, gender, ethnicity, age, educational level, and socioeconomic status have been found to play an important role in *H. pylori* infection. Some of the different virulence factors of *H. pylori*, such as urease, flagella, vacuolating cytotoxin A, and cytotoxin associated gene A, are playing a significant role in infestation, colonization, and cell propagation. Infection of *H. pylori* can be diagnosed by invasive procedures such as culture, histology, and rapid urease test and by noninvasive tests include urea breath test, serology, urinary antibody test, and stool antigen test which avoids detection of past infection with *H. pylori* [2].

Helicobacter pylori is a spiral bacterium which lives within the mucosal layer of the stomach and duodenum. The presence of *H. pylori* in the gut may result in server health problems although as many as 80% of infected individuals will never present with clinical symptoms. Infection has been shown to occur between family members [6].

Helicobacter pylori bacteria can recognize and bind to blood group antigens expressed on the surface of the gastric mucosa. The involvement of blood group carbohydrates as facilitating factors for infection by this bacillus may play a critical role in the persistence of infection. In Brazilian patients submitted to upper gastrointestinal endoscopy, it has been demonstrated that infection by this gram-negative bacillus is associated with ABO blood groups,[7] ABO antigens can be associated with different diseases [8-9].

The purpose of the current study was to evaluate the association between ABO blood types in adults and *H pylori* infections to determine which one group is represent a risk factor to this type of infection.

Materials and Methods

This cross-sectional study was carried out on 300 individuals in Al Shomali General Hospital/ Babylon city. Detection of *Helicobacter pylori* antibodies (ABON Biopharm, China) was carried out by using blood serum on global kit of *H. pylori* one step test device utilizes a combination of *H. pylori* antigen coated particles and anti-human IgG to qualitatively and selectively detects *H. pylori* antibodies in serum just within ten minutes.

Interpretation of results was based on the position and number of line appearing on the test kit. Positive results were read as having two distinct red lines, one red line on the control region (C) and another line in the test region (T). On the other hand the negative result was read as having one red line only on the control region (C) and no apparent red line in the test region (T).

Preparation of slide agglutination ABO blood grouping and Rhesus (Rh) (Citra Santa Coloma, Spain) according to the method used by Landsteiner and Wiener, ABO and Rh blood groups were determined for sero-positive and sero-negative subjects, using standardized haemaglutination methods as a slide agglutination test. First the blood samples collected in a sterile anti-coagulated ethylene diamine tetra acetic acid (EDTA), a drop of each blood sample, was placed on each part of the rocking tile. Equal drops of anti-sera A, B, and D were placed on each section. Sterile glass rod was used for mixing each well. The results were interpreted as agglutination.

Results

The total numbers of participants in the current study were 300 persons. They were divided in to two groups; *H. pylori* positive group 174 (58%) and *H. pylori* negative group 126 (42%). From total of 300 persons, 114 (38%) were males and 186 (62%) were females. The age of participants ranged from 7- 63 years divided in to four groups 7-21 years, 21-35 years, 35-49 years, and 49-63 years. The distribution of persons to these age groups were 66 (22%), 138 (46%), 66 (22%), and 30 (10%) respectively **(Figure 1)**.

ABO types and *H. pylori* blood type O was predominant in 70 (40.22%) of 174 of positive group. Whereas, it was 30 (23.8%) of 126 of negative group. The OR was 2.15 (95 CI: 1.29- 3.58; p= 0.003). Blood group O considered as a risk factor associated with *H. pylori* infections.

Blood type A was predominant in 34 (19.54%) of 174 of positive group. While it was 28 (22.22%) of 126 of negative group. The OR was 0.85 (95 CI: 0.48- 1.49; p= 0.56). Blood group A is not considered as a risk factor associated with *H. pylori* infections.

Blood type B was predominant in 60 (34.48%) of 174 of positive group. Whereas, it was 28 (22.22%) of 126 negative group. The OR was 1.84 (95 CI: 1.09- 3.11; p= 0.029). Blood group B

considered as a risk factor associated with *H. pylori* infections.

Blood type AB was predominant in only 10 (5.74%) of 174 of positive group. While, it was 40 (31.74%) of 126 in the negative group. The OD was 0.13 (95 CI: 0.06- 0.27;p< 0.001). Blood group AB considered as a protective factor against *H. pylori* infections **(Figure 2)**.

No statistically significant association between ABO types and ages (p= 0.27) as well as no significant differences in males and females regarding ages (p= 0.15) was noted in this study**.**

Figure 1. Distribution of age groups of patients.

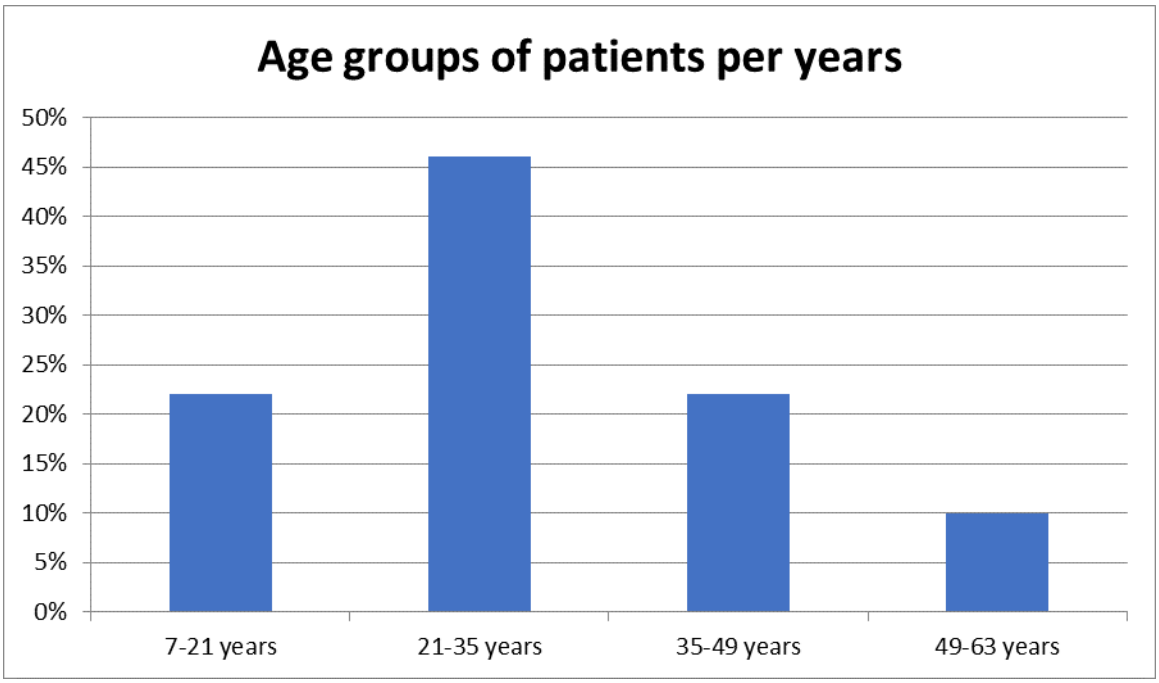
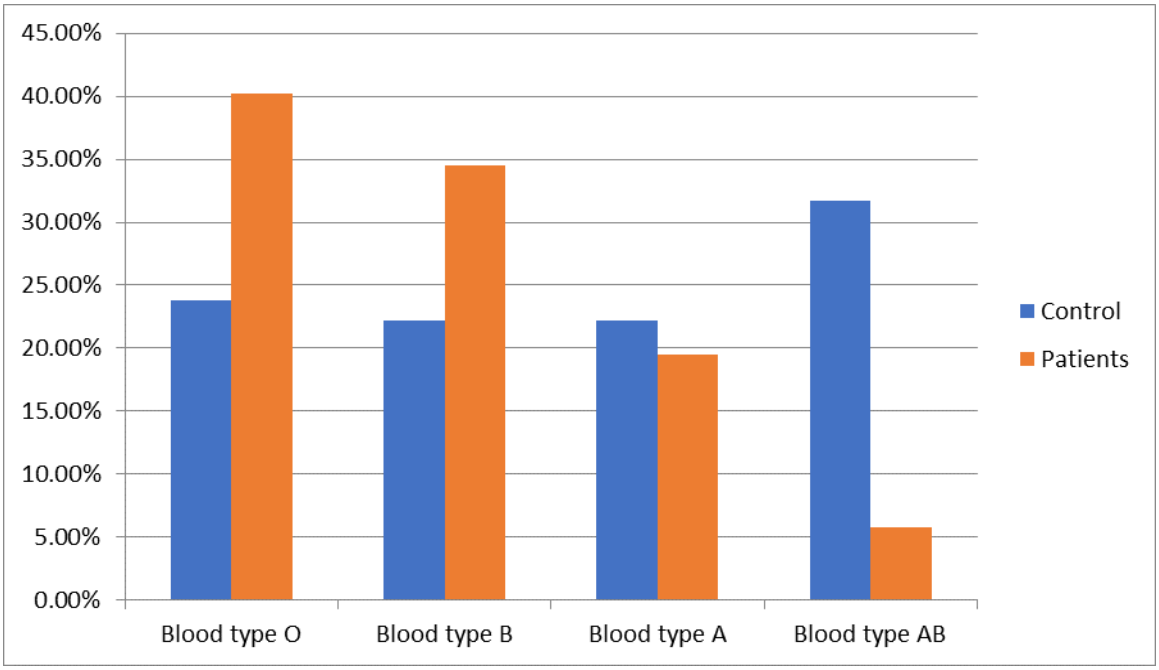


Figure 2. Distribution of ABO groups among patients and control.



Discussion

The ABO blood group antigens remain of prime importance in transfusion medicine since they are the most immunogenic of all the blood group antigens. Numerous associations have been made between particular ABO phenotypes and an increased susceptibility to certain diseases [10-11].

The *Helicobacter pylori* is one of the major health problem in the world, in this study the blood group O was 70 from 174 positively blood group this considered as a risk factor for *H pylori* infection , this study agree to the another study in Egyptian were blood group O positively associated with *H. pylori* [7].

It can be explained that this is because of the carbohydrate antigens that contributed to the susceptibility or resistance to infectious diseases [12]. Especially, the H antigen of blood group O expressed in the gastric mucous [13].

In this study, blood type A was not risk factor *H pylori* infection, but B blood group is a risk factor for *H. pylori* , this finding agrees with another study in Egyptians where blood type O was positive in *H. pylori*,[14] and these finding are also similar to study in Basrah University [15].

AB blood group in this study considered as a protective factor against *H. pylori* infection, this agree to the another study in Erbil City Iraq were AB group was 5 positive *H. pylori* from 48 sample [2]. A blood group in this study was 34 positive *H. pylori* from 62 sample, was similar to study in Kosovo were A group was 171 from 249 sample [14].

Conflict of interest : None.

Financial disclosure: None to declare.

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