



## Prevalence of *Helicobacter pylori* infected in the Kirkuk native population and associated with serum ferritin and Iron levels/Iraq

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#### Introduction

*Helicobacter pylori* are urease producing organisms gram-negative that are found throughout the world and produce chronic gastritis, it may also predispose patients to develop duodenal ulcers, gastric lymphoma or carcinoma [1,2]. Current evidences suggest that *Helicobacter pylori* is associated with iron deficiency. Many studies have found an association bacteria and low body iron stores and iron deficiency anemia and a reduced response to iron supplementation[3,4]. Iron deficiency, defined as decreased total body iron content, is among the most common nutritional deficiencies in the world. Iron deficiency results in impairments in immune, cognitive, and reproductive functions as well as decreased work performance[5]. Iron deficiency develops through three phases: 1-iron depletion, 2-iron-deficient erythropoiesis, and 3-iron-deficiency anemia (IDA)[1]., clinical and epidemiologic studies suggest that infection with bacterial is associated with iron deficiency and IDA[6]. Barabino hypothesized that gastritis levels of neutrophil-derived lactoferrin, the infection would result in the rise increased iron losses related to bacterial turnover[7]. A study in Alaska showed that anemia responded to oral iron replacement but recurred when iron therapy was discontinued suggesting that mild chronic bleeding was involved[8]. The pathogenesis is multifactorial, including combinations of reduced iron absorption

### ABSTRACT

An association of *Helicobacter pylori* and iron deficiency (ID) was conducted in Kirkuk city on 176 patients attending private laboratories in Kirkuk for the period from 1/8/2016 to 1/4/2017, blood sampling and a data collection survey were performed in 176 patients suffering from digestive problems and disorder ,120 of them with *H.pylori*, serum ferritin and iron were measured by ELISA and direct enzymatic method techniques respectively. the result showed that 67 (55.83%) of the patients have serum ferritin concentrations below the normal range indicating iron deficiency, 69 (57.5%) of the patients have iron concentrations below the normal range indicating iron deficiency.

related to decreased acid secretion, increased iron loss from microbleeding, and utilization by bacteria. The purpose of this study is to investigate the infection with *Helicobacter pylori* gastritis association with iron-deficiency (ID) in some Kirkuk patients.

#### Materials and methods

The patients were referred to private laboratories in Kirkuk city in period from 1/8/2016 to 30/4/2017 *H.pylori* infection was diagnosed serologically by using anti-*H. Pylori* IgG, antibodies Elisa kit (CALBIOTECH IgG.USA). Totally 176 patients 120 were seropositive *H. pylori*-IgG and 56 anti-*H. pylori*-IgG seronegative. Some factors such as age, sex, smoking , drug treatment and Chronic diseases (gastric lymphoma ,duodenal ulcers or carcinoma )were recorded for all of the patients

#### Sample Collections

from the subjects 5 ml venous blood was obtained. All samples were dispensed into dry glass test tubes for clotting and retraction to take place. Sera was obtained after samples were centrifuged at 2000 g for ten minutes and stored at -20°C until assayed for laboratory investigations.

Ferritin was detected by ELISA., this assay system utilizes one rabbit anti-ferritin antibody for solid phase immobilization and a mouse monoclonal anti-ferritin antibody in the antibody-enzyme (horseradish peroxidase) conjugate solution. The normal range of

ferritin as recommended by BioCheck is 20-250ng/ml for male and 10- 120ng/ml for female, serum iron concentration was investigated by direct enzymatic method., after dissociation of iron- transferring bound in acid medium, ascorbic acid reduces Fe+3 iron into Fe+2 iron. The absorbance measured at 600 nm is directly proportional to the amount of iron in the specimen. The normal rang of iron as recommended by BIOLABO is 11.6-31.1 μmol/L for male and 9.0-30.4 μmol/L for female.

**Statistical Analysis**

All values were expressed as mean ± SD. Statistical analyses were done using the Student’s t-test to assess differences among patients. The level of significance was set at P <0.05.

**Results**

A total of 120 patients (79 women and 41 men) with infected *H.pylori* were enrolled in this study. Mean ±SD age of the 79 female/male patients was 44.2±14.4/45.4±14.9 years, range 15-74/18- 73 years,

respectively. Table 1 shows the lifestyle and clinical characteristics of subjects (women and men).

**Table 1. A number of patients infected by *Helicobacter pylori* bacteria according to age group (year), smoking and presence of chronic disease**

Varaibl	Men (n=41)	Women (n=79)
Age (18-75)	(18-75)	(15-74)
Mean ±SD	43.4±14.2	44.2±14.4
Range		
Smoking%	32 (78.04)	11 (13.92)
Chronic diseases %	15 (36.58)	37 (46.83)

Of the 120 *H.pylori* patients (67) 55.83%, showed low concentration of ferritin, (69) 57.5% showed low concentration of iron. In general median serum ferritin and iron levels were significantly lower than the normal ranges in *H.pylori* infected patients than in anti- *H.pylori*-IgG seronegative as it showed in table 2,3.

**Table 2 .shows serum concentration of ferritin (ng/ml) according to prevalence of *H. pylori* under study**

Serum ferritin conc (ng/ml)	H.Pylori (+ve) %	H.pylori (-ve) %	Total %
Low ferritin conc.	67 (55.83)	11 (19.64)	78 (44.31)
Normal ferritin conc.	53 (44.16)	45 (80.35)	(55.68) 98
Total	120 (100)	56 (100)	176 (100)
Chi-Square=**20.265		P value=0.0006	

There was no significant difference in median concentrations of both iron and ferritin between women and men.

**Table 3. presents serum concentration of iron (μmol/L) according to prevalence of *H. pylori* under study**

Serum Iron conc.	H.Pylori (+ve) %	H.pylori (-ve) %	Total %
Low Iron conc.	69 (57.5)	12 (21.42)	81 (46.02)
Normal Iron conc.	51 (42.5)	44 (78.57)	95 (53.97)
Total	120 (100)	56 (100)	176 (100)
Chi-Square =**19.999		P value=0.0005	

**Discussion**

iron deficiency and IDA are conditions with important health consequences regarding reproduction, work performance, immunity and possibly cognitive development; it is a simple result of an imbalance between absorption and iron loss. It is unclear why some patients with *H. pylori* infection develop IDA. Postulates include decreased iron absorption secondary to atrophic gastritis, reduced gastric acid production, decreased ascorbic acid concentration in stomach, and uptake of iron by bacteria. [6,9] as *Helicobacter pylori* sociated gastritis has emerged as a cause of IDA that is unresponsive to iron therapy.[3,10] Laboratory Investigations: Ferritin is a very good marker for iron deficiency but iron is measured too as another indicator for iron deficiency due to ferritin which is an acute phase protein, it can be elevated in inflammation conditions that a normal serum ferritin may not always exclude iron deficiency in this results the proposal that *Helicobacter.pylori* infection is associated with ID, this proposal is achieved by many studies with different explanation of the mechanisms *abaout Helicobacter. pylori* affect

iron absorbance. Baysoy, *et al.* have investigated *Helicobacter. pylori* related-changes in gastric physiology and histology. They have reported that *H.pylori* infection is associated with low serum iron levels and with a decrease in gastric juice ascorbic acid concentration.[10] Capurso, *et al.* has suggested that *H.pylori* infection may be the cause of atrophic gastritis leading to achorhydria and gastric hypoacidity.[11] A study in Alaska including 2080 adult patients, where there is a high prevalence of *H.pylori*, have suggested a significant correlation between *H.pylori*-IgG positivity and low serum ferritin levels. [12] They have suggested that ulceration causes bleeding which leads to IDA and this result was confirmed in this study. The blood loss in chronic gastritis, and bleeding from duodenal or gastric ulcers related to *H pylori* infection, which plays an important role in the development of iron deficiency in adults. In response to. *Helicobacter. pylori* chronic gastric inflammation, the epithelial cells in the mucosa are damaged, leading to detachment and apoptosis. In the absence of bleeding lesions, the possible mechanisms by which.

*Helicobacter pylori* is involved in the development of IDA remain not understading. studies suggest that the growth and proliferation of. *Helicobacter pylori* requires iron from the host and that some *Helicobacter. pylori* strains have an ability to interfere with iron metabolism by binding iron to their outer membrane proteins[13].

Moreover, Boggs reviewed that eradication of *Helicobacter. pylori* with a triple therapy consisting of clarithromycine, amoxicillin and lansoprazole for

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14 days leads to serum ferritin levels elevation significantly in both ID and IDA groups without iron supplements indicating that complete recovery of ID and IDA can were achieved with the treatment of. *pylori* infection.[14] We believe that *Helicobacter pylori* infection might have a role to play in causing IDA. Hence *Helicobacter. pylori* infection has to be looked for in cases of IDA in *Helicobacter pylori*, Throughout investigation, recurrent iron deficiency anemia, is very common in our city.

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## الإصابة بالولبيات البوابية المصاحبة لنقص الحديد لدى المرضى في مدينة كركوك

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### الملخص

ثمة علاقة بين الإصابة بالولبيات البوابية ونقص الحديد. في هذه الدراسة تم الحصول على نماذج دم من 176 مريضاً من المراجعين للمختبرات الخاصة في مدينة كركوك يعانون من سوء الهضم واضطرابات معدية ومعوية للفترة من 1/ 8/ 2016 ولغاية 1/ 4/ 2017 تبين إصابة 120 مريضاً ببكتريا اللولبيات البوابية، وعند قياس تراكيز الحديد والفيريتين في مصل الدم لجميع المرضى تبين ان 67 (55.83%) مريضاً كان مستوى الفيريتين منخفض عن المستوى الطبيعي و69 (57.5%) مريضاً نسبة الحديد منخفضة عن المستوى الطبيعي مما يؤكد اصابتهم بمرض فقر الدم الناجم عن نقص الحديد، وجدت فروقات معنوية في الإصابة بين الذكور والاناث إذ بلغت 41 (34.3%) و 79 (65.83%) على التوالي.