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Original Research Article

Seroprevalence of *Helicobacter pylori* Antibodies in Diabetic Patients Type 2 in Kirkuk Province

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Abstract

The present study aimed to detect the seroprevalence of antibodies against *Helicobacter pylori* (*H. pylori*) bacteria and its relation to Diabetes type 2 in Kirkuk province.

The present study was conducted in Kirkuk city from 15 December 2012 to the 15 June 2013. The study included (391) diabetic patients whose aged between (22-81) years old. The control group included (288) non-diabetic individuals with no history of chronic diseases aged (21-81) years old. They were showed up at Primary Health Care Centers of Kirkuk First Health Care Sector and Kirkuk General Hospital. The diabetic patients and (control group) examined for detecting antibodies against to *Helicobacter pylori* by utilizing of rapid immunochromatographic cassette test.

In the current study there was (12.53%) of antibodies against *H. pylori* bacteria found in patients suffering from Diabetic Mellitus type 2 and (10.76%) of the antibodies were found in control group respectively. The present study was also revealed that the highest rate of diabetic patients, who suffering from hypertension.

The current study concluded there was no significant relation between patients suffering from Diabetic Mellitus type 2 and the bacterial infection caused by *H. pylori*. This study also revealed non-significant relation between cardiovascular diseases and *H. pylori* infection.

Key Words: DM type 2, seroprevalence, *H. pylori*.

الانتشار المصلي للأجسام المضادة لجرثومة الملوية البوابية في مرضى السكري نوع ٢ في مدينة كركوك

الخلاصة

الأهداف: تهدف هذه الدراسة لكشف عن نسبة الانتشار المصلي للأجسام المضادة لجرثومة الملوية البوابية وعلاقتها مع داء السكري-النوع الثاني في مدينة كركوك.

طرق العمل: لقد أجريت الدراسة الحالية في مدينة كركوك للفترة من ١٥ كانون الاول ٢٠١٢م ولغاية ١٥ حزيران ٢٠١٣ م. شملت الدراسة ٣٩١ مريضاً بالسكري وكانت أعمارهم من ٢٢ الى ٨١ سنة، وشملت مجموعة السيطرة ٢٨٨ شخصاً من غير المصابين بالسكري ولا يشكون من اية امراض مزمنة والذين كانت اعمارهم ٢١-٨١ سنة. كل المشمولين بالدراسة كانوا قد راجعوا قطاع الرعاية الصحية الاولية في كركوك ومستشفى كركوك العام. لقد اجريت فحوصات للتحري عن الاجسام المضادة لجرثومة الملوية البوابية باستخدام أشرطة اختبار المناعة الاستشرابية لكل المرضى المصابين بالسكري وكذلك مجموعة السيطرة.

النتائج: أظهرت الدراسة الحالية أن نسبة انتشار الاجسام المضادة لجرثومة الملوية البوابية في مرضى داء السكري كانت ١٢،٥٣% ١٠،٧% في مجموعة السيطرة الغير مصابين بداء السكري وكما أظهرت الدراسة أن النسبة الأعلى للمصابين بداء السكري سواء ممن كانوا من المصابين أو غير المصابين بعدوى الملوية البوابية كانوا يعانون من ارتفاع في ضغط الدم.

الاستنتاج: من هذه الدراسة نستنتج انه ليس هنالك علاقة بين جرثومة الملوية البوابية ومرض داء السكري نوع ٢ وكما كشفت هذه الدراسة عن عدم وجود علاقة قوية بين عدوى الملوية البوابية وأمراض داء القلبي الوعائي.

الكلمات المفتاحية: داء السكري.

Introduction

World widely one of the most common bacteria that can cause chronic bacterial infection is *Helicobacter pylori*; which can be found largely in developing countries and communities with low socioeconomic state [1].

It causes acute gastritis, duodenal and gastric ulcers and it is involve in peptic disease. It is not clear yet wither the infection caused by *Helicobacter pylori* can be found in diabetes patients or not [1, 2]. Some researchers have estimated the presence of *H. pylori* infection in patient with Diabetes Mellitus who have gastritis could have possible role in controlling of blood sugar level [3, 4].

90% of duodenal ulcers have been linked to *Helicobacter pylori* with nearly all gastric ulcers [5].

H. pylori infection causes the most predominant disease around the world. It is found in about 30%-50% of adult's stomachs in developed countries. More than 50% of those in developing countries [6].

Overall the seroprevalence of the infection in Northeast Asian countries, was as follows; 39% in Japan, 58% in China, 55% in Taiwan and in South Korea was 60%. The reported prevalence of antibodies to *H. pylori* infection in South-east Asian countries, was as follows; 57% Thailand, 36% Malaysia and 31% in Singapore [7].

One of the most prevalent metabolic disorder is Diabetes Mellitus which is defined as a chronic hyperglycemia. It may also causes potentially life-threatening acute hyperglycemic emergencies [8].

The aim of the current study was to evaluate the presence of antibodies formed against *H. pylori* and its relation to Diabetes Mellitus type 2 in Kirkuk province.

Materials and Methods: Presented study was conducted from Dec 2012 to May 2013 at Primary Health Care Centers of Kirkuk First Health Care Sector, and Kirkuk General Hospital/Kirkuk province.

Peripheral venous blood (10 ml) was withdrawn from (391) diabetic patient aged (22-81 years old) and (288) non-diabetes control group aged (22-81 years old) who showed up at Kirkuk General Hospital. Diabetes types (1 and 2) were detected based on the history of taking oral glucose reducer therapy agents or taking injections of insulin at the time of attendance. Diabetic patients who were older than 45 years old, and taking oral glucose reducers were considered to have type 2 diabetes. The diabetic patients and control group were unknown to have *Helicobacter pylori* infections during the time of blood withdrawal.

Serum was taken to detect the occurrence of antibodies to *Helicobacter pylori* by using of rapid immune-chromatography test (immune-chromatography, Plasmatec Co. UK) which was utilized based on the manufacturer's instructions. The assay started with a sample applied to the sample well followed by adding provided sample diluent immediately. Then the results were interpreted on the bases of forming of two colored bands in the test and control regions for seropositive samples and forming only one colored band on in the control region for seronegative ones. This was done for both patients and control group.

Results:

Frequency of antibodies to *H. pylori*.

The rate of anti-*H. pylori* antibodies in patients with Diabetes Mellitus was (12.53%) which was higher than that found among non-diabetic individuals (10.76%). The result was non-significant which can be seen in table 1.

Prevalence of anti-*H. pylori* antibodies in relation to sex and age

The highest rate (12.65%) of *Helicobacter pylori* antibodies was seen in female diabetes, but the result was non-significant again as shown, and regarding the age group, the highest rate (22.85%) of *H. pylori* antibodies was detected in (62-71) years old diabetic patients, and table (2) showed significant result.

Seroprevalence of anti-*Helicobacter pylori* antibodies based on the residency the prevalence rate (21.9%) of anti-*Helicobacter pylori* antibodies showed highest level in the rural areas, and the result was highly significant (Table 3).

Prevalence of anti-*H. pylori* antibodies in relation to cardiovascular diseases.

The highest rate (36.75 %) of *Helicobacter pylori* antibodies was found in diabetic patients who were suffering from hypertension, and table (4) showed non-significant result.

Table (1): Frequency of antibodies to *H. pylori* in patients and control group.

***H. pylori* antibodies**	**Diabetics**		**Control**	
	No.	**%**	**No.**	**%**
Positive	49	12.53	31	10.76
Negative	342	87.47	257	89.24
Total	391	100	288	100
$X^2 = 0.499$ P= 0.480		Not Significant(NS)		

Table (2): Prevalence of anti-*H. pylori* antibodies in relation to age of the diabetic patients.

Age groups (Years)	**Total No.**	***H. pylori* +ve**	
		No.	**%**
22-31	7	1	14.28
32-41	31	5	12.9
42-51	69	8	11.59
52-61	122	12	9.83
62-71	70	16	22.85
72-81	92	7	7.6
$X^2 = 9.426$ p= 0.007		$P \leq 0.01$	Significant(S)

Table (3): Residency distribution of seropositive *H. pylori* among diabetic patients.

Residency	**Total No.**	***H. pylori* +ve**	
		No.	**%**
Rural	145	34	21.9
Urban	246	15	6.09
$X^2 = 18.82$ p= 0.0001		P < 0.01	Highly Significant(HS)

Table (4): Relation of *H. pylori* infection with cardiovascular diseases.

Cardiovascular diseases	***H. pylori* positive (total 49)**		***H. pylori* negative (total 342)**	
	No.	**%**	**No.**	**%**
Hypertension	18	36.75	113	33.04
Angina	6	12.24	44	12.86
Heart attack	4	8.16	22	6.43
Stroke	16	32.65	113	33.04
$X^2 = 0.160$ p= 0.984		P > 0.05	Not Significant(NS)	

Discussion: *Helicobacter pylori* bacteria involves in diseases of the gastrointestinal tract [9]. Attention was attracted also by some extra-gastric diseases, including

Diabetes Mellitus, where the elevated anti-*H pylori* antibodies levels seen [10].

Our study showed the frequency of *H. pylori* which was 12.53% and 10.76% among patients and control group respectively. The result was non-significant for the frequency of *H. pylori* among diabetic patients and control group in which the probability was less 0.05. Based on the results we got we came to a conclusion that the association of *H. pylori* infection with Diabetes Mellitus type 2 is not significant in this population study group.

The result of the present study was confirmed by several studies worldwide, in Turkey, the prevalence of antibodies formed against *H. pylori* bacteria was 61.7% among diabetic patients and 58.5% among non-diabetic (control group) respectively [11]. In Nigeria, revealed that there was no significant relation between Diabetes Mellitus and *H. pylori* infection [12]. In Romania, a study revealed no connection between Diabetes Mellitus and *H. pylori* infection [13]. While in Athens, Greece, results didn't support any linkage between Diabetes Mellitus and *H. pylori* infection [14].

However, Al-Bayati and Yasir in Iraq showed a significant association of Diabetes Mellitus type 2 with *H. pylori* infection [15], and it was also true for other studies conducted in Iran, and United Arab Emirates [16, 17]. Several hypotheses confirmed the high presence of *H. pylori* infection among patients with Diabetes Mellitus type 2 may be associated to some reasons such as increased secretion of cytokines which may be related to the *H. pylori* gastric infections themselves, low motility of gastrointestinal and acid secretion, and the impairment of the immunity of the diabetic patients [18].

The differences of these results may be due to the fact that the present study performed by rapid immunochromato- graphy method which depends on the detection of antibodies formed against to *H. pylori* serologically and differ from other studies using histological studies or urease test in stool and stomach. Acute case of infection in patients before the IgG response has developed and gave false negative serological result, means that it may be positive result in biopsy method, also negative result may be due to patient not produce circulating antibody response which detectable only with complex type of antigen also depend on type of antigen used in test [19].

The current study showed no significant relation of presence of antibodies formed against to *H. pylori* infection with the sex of diabetic patients, this was agreed with Kim *et al* [20], with oluyemil *et al* [14], who showed no statically difference between males and females. The result were mismatched with Murtadha *et al* [21] who showed that (38.7%) of *H. pylori* infected patients were female and (61.3%) were male. AL-Obeidy *et al* [22] and Abdul-Gafour *et al* [23] who showed that (36%) females and (64%) males. Hassan [24] recorded a result of (34.09%) female vs. (65.90%) male. Deankanob *et al* [25] recorded that (60.9%) of the males and (50.0%) of the females were seropositive. The explanation for these variations may be imputed to the distribution male/female ratio of the total number of each and didn't reverse that male or female were more vulnerable to be infected with *H. pylori* bacteria.

Current study revealed highest seropositive rate of anti-*H. pylori* antibodies (22.85%) was among age group (62-71) years old with a significant relation. This finding of higher frequency of *H. pylori* infection among old diabetics could be explained by the fact that elderly diabetics had been diabetics for longer period than younger age diabetics, exposing them to higher risk of chronic diabetic related complications, particularly diabetic autonomic neuropathy which enhances the risk of developing diabetic gastric dysmotility and hence more frequent *H. pylori* infection, another important point to be considered in explanation of this finding is that the infection is essentially happened during childhood time, but changes in infection status with time are rare in adults [15]. The result was closely to Baqir *et al* [26] who detected highest rate of anti-*H. pylori* antibodies among patients aged more than

55 years old. Al-Bayati and Yasir [18] whose recorded highest rate of anti-*H. pylori* antibodies in age group (70-79) years old. Elzouki *et al* [27] who found that the prevalence of anti-*H. pylori* antibodies raised with age. The current study showed disagreement with Mohamed *et al* [28] who recorded the highest rate of anti-*H. pylori* antibodies was in age group (26-36) years old.

The present study showed that (21.9%) of patients with Diabetes Mellitus who were living at the rural areas were *H. pylori* seropositive and (6.09%) of diabetic patients who belonged to urban areas were seropositive for anti-*H. pylori* antibodies. The relation was high significant among them (Table 3). It was agreed with Awdalla *et al* [29] in which (54%) of *anti-H. pylori* antibodies were seropositive and they were from rural areas. This outcome was also true for those investigated by Cheng *et al* [30] in which the prevalence of anti-*H. pylori* antibodies occurred highly in rural regions. Seyda *et al* [31] and Aguemon *et al* [32] recorded similar results. The high occurrence of the infection in the rural areas may be due to unsafe field sanitation such as lack potable water, inappropriate disposing of sewage and garbage leading to accumulation of flies, poor personal hygiene such as consuming fruits and vegetables without washing it, and sharing personal items like towels. Sari *et al* [35] Who supported what mentioned above; when they said that the unsafe field sanitation may increase the probability of occurrence of the infection in families with low socioeconomic life styles. The study was disagreed with Hoang *et al* [33] who declared that urban people acquired the infection more frequently than rural people.

For the relation of anti-*H. pylori* antibodies in patients with cardiovascular diseases, high rate of the infection (36.75%) was detected in group who were suffered from hypertension and the lowest rate (8.16%) in heart attack group. In this case the result was non-significant as shown in (Table 4). Abdul-Gafour *et al* [23] found that the presence of anti-*H. pylori* antibodies was the highest in hypertension than controls. Probably the association of anti-*H. pylori* antibodies presence and hypertension could be due to the molecular mimicry between some peptides presented by endothelial cells and smooth muscle and antigens of *H. pylori* or the activation of pro-inflammatory cytokine cascade, in addition to the secretion of materials with vasoactive properties from the sites which infected primarily [34].

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