

Prevalence and Some Epidemiological Features of *Helicobacter pylori* Infection in Baghdad Medical City Hospitals

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Received: 10 September 2017

Accepted: 19 December 2017

Abstract

The present study was conducted during the period from 10th march 2017 until 30th June 2017. This study aimed to determine the prevalence of *Helicobacter pylori* infection in patients suffering from gastrointestinal disturbance. Two hundred and fifty blood and stool specimens were collected from patients attending Baghdad Teaching Hospital with the main clinical feature (abdominal pain, nausea and bloating) who had been examined and diagnosed by specialist physicians as suspected acute gastritis. Patients ages ranged from 15–65 years. Serum antibody and fecal antigen have been used to detect the occurrence of *H. pylori* infection in these patients. Our results showed that there were 250 cases [132 males (52.8%) and 118 females (47.2%)] suspected as acute gastritis cases. The overall infection rate was 39.2% (98 positive samples out of 250). The highest percentage rate of gastritis was in the age group (40–49 years) and significant differences have been found between the age groups ($P < 0.05$). In contrast, no significant differences have been observed between the two genders. Among the recorded clinical symptoms abdominal pain was the highest (38.4%), followed by loss of appetite (23.6%), nausea (14%), diarrhea (11.6%), bloating (10%) and vomiting (2.4%).

Key word: Prevalence, epidemiological features, *Helicobacter pylori* infection

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نسبة انتشار وبعض المظاهر الوبائية للإصابة ببكتريا البوابية المعدية في مستشفيات مدينة الطب ببغداد

قحطان عدنان و محمد شمخي جبر

كلية التقنيات الصحية والطبية - بغداد

الخلاصة

أجريت هذه الدراسة للفترة من 2017/3/10 ولغاية 2017/6/30 وقد هدفت الدراسة لتحديد مدى انتشار الإصابة ببكتريا البوابية *Helicobacter pylori* بين المرضى الذين يعانون من الاضطرابات المعوية. تم جمع مائتان وخمسون عينة دم وخروج من المرضى الذين يراجعون مستشفى بغداد التعليمي والذين لديهم العلامات السريرية الرئيسية (اضطرابات معوية، غثيان وانتفاخ) حيث تم فحصهم من قبل الأطباء الاختصاص وتم تشخيص أصابتهم بالتهاب المعدة الحاد. تراوحت أعمار المرضى بين (15-65) سنة وقد تم تشخيص الإصابة من خلال فحص الأضداد في الدم والمستضد البكتيري في الخروج. أظهرت النتائج ان (250) حالة شكلت (132) من الذكور بنسبة (52.8%) وإناث (118) بنسبة (47.2%). كان عدد العينات الموجبة (98) بنسبة (39.2%) وعدد العينات السالبة (152) بنسبة (60.8%). أعلى نسبة مئوية للإصابة بالتهاب المعدية الحاد كانت في الفئة العمرية (40-49) سنة حيث ان هناك فرق معنوي بين انتشار الإصابة وبين الفئات العمرية، ليس هنالك فرق معنوي بين انتشار الإصابة وبين جنس المرضى. الاضطرابات المعوية شكلت أعلى نسبة (38.4%) تبعت بفقدان الشهية (23.6%)، الغثيان (14%)، الإسهال (11.6%)، الانتفاخ (10%) والتقيء (2.4%).

الكلمات المفتاحية: نسبة الانتشار، المظاهر الوبائية، الإصابة ببكتريا البوابية المعدية.

Introduction

Helicobacter pylori is one of the most frequent gastrointestinal pathogenic agent in human which caused a disease called gastritis which is well-known all over the world and affect all age groups (1). It has been estimated that about 50% of the world population are infected by *H. pylori* (2). Prevalence of *H. pylori* infection in developing countries has noticeably higher than that in other countries. Moreover, the acquisition of *H. pylori* seems to be occur at higher rates in developing countries (70 – 90 %) of the population, while in the developed countries it was ranged between 25% and- 50 % (3).

It has been reported that *H. pylori* persists on the gastric mucosa of less than 20 % of persons of less than thirty years old but increases in prevalence 40-60 % of persons aged 60 years but,

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without clinical symptoms. Acute epidemics of gastritis suggest a common source for *H. pylori* (4). Gastritis is inflammation of stomach lining which takes place as a short or might be for a long period. It might be without clinical features but, when symptoms are present the most frequent is upper abdominal pain (5). Additional possible clinical features include nausea, vomiting, flatulence, loss of appetite and heartburn. While complications might include stomach ulcer, bleeding and tumor of stomach (6).

Helicobacter pylori affects the linings of stomach and duodenal by many mechanisms. Through that the ammonia produced to regulate pH might toxic to cell epithelium as are biochemical's produced by *H. pylori* such as proteases, vacuolating cytotoxin A (VacA) and thus lead to break down damage the epithelial cells, disrupt the tight junctions through causes programmed cell death and certain phospholipases. Cytotoxin associated gene CagA also could be the reason of inflammation and potentially tumor factor (7). This bacterium is a gram-negative that colonizes the gastric mucosa of its human host and it might increase the symptoms such as recurrent peptic ulcers and chronic gastritis. It has also been associated with gastric tumor (8).

One of the particular character of this bacterium is to have adequate amount of urease enzyme (6% of total proteins produced by *H. pylori*) that has strong pathogenicity. This enzyme destroys plasma urea released from the stomach wall to ammonium ion and this protects of *H. pylori* from the damage caused by stomach acidity via neutralization effects (9).

Gastritis is inflammation of the stomach lining which is believed to affect about half of people worldwide (10). Recently, after year 2013 there were about ninety million newly cases recorded. (11). As human gets older, the illness becomes more common (10). It along with a similar condition in the first part of the intestines known as duodenitis, killed 50,000 people during 2015 (12).

The aim of the present study was to find out the prevalence of *H. pylori* infection among patients that suffering from gastrointestinal disturbance.

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Materials and Methods

Two hundred and fifty subjects with the main clinical features (gastrointestinal disturbances, nausea, bloating and vomiting) have been examined and diagnosed by specialist physicians as suspected with acute gastritis. The basic demographic features such as age, gender, education level, water supply, food sources, socioeconomic status, smoking and clinical symptoms have been recorded. Blood samples (2 ml) were collected from suspected individuals. The blood specimens were examined by using immune chromatographic test (ICT) for the qualitative detection of *H. pylori* antibody as described by the manufacturer (13).

Test principle:

H. Pylori Ab Rapid test is a lateral flow chromatographic immunoassay based on the principle of the double antigen–sandwich technique. The test cassette consists of:

1) A burgundy colored conjugate pad containing *H. Pylori* antigens including Cag-A conjugated with colloid gold (*H. Pylori* conjugates) and rabbit IgG-gold conjugates. 2) A nitrocellulose membrane strip containing a test band (T band) and a control band (C band). The T band has pre-coated with non-conjugated *H. Pylori* antigens and the C band is pre-coated with goat anti-rabbit IgG.

Test procedure:

1. Blood specimens were collected into collection tube which contains no anticoagulants through vein puncture.
2. The blood specimen allowed to clot.
3. The serum was separated via centrifugation and then drawn into a new tube.
4. The specimen was tested at room temperature.
5. The pouch was opened at the notch and the test strip has removed. The strip was placed on a perfect, flat surface.
6. The plastic dropper was filled with the sample and vertically the dropper was holding, then dispensed one drop of specimen into the sample pad. Then one drop has added from sample diluents' immediately.

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7. Timer was set up and the results have been recorded during fifteen minutes and positive outcomes could be visible within one minute.

Stool specimens were examined by using of rapid immune chromatographic test (ICT) for the qualitative estimation of bacterial antigen in fresh stool samples as described by the manufacturer (14).

Principle of the test

The spectrum *H. pylori* antigen test device is a sandwich lateral flow chromatographic immunoassay. The test strip consists of:

1. A burgundy colored conjugate pad containing monoclonal anti- *Helicobacter pylori* Ab conjugated with colloid gold.
2. A nitrocellulose membrane strip contains a test band (T band) and control band (C band). The T band has been pre-coated with other monoclonal anti-bacterial Ab, and the C band has been pre-coated with goat anti-mouse IgG Ab.

Test procedure

1. Stool sample was collected in a dry, clean container.
2. Collection tube was opened and the stick applicator has removed.
3. Fecal specimen was randomly pierced in at least five different sites.
4. Applicator stick was replaced in the tube and tense securely.
5. Specimen was tested in room temperature.
6. The pouch was opened at the cut and the test strip removed and on a hygienic, perfect surface. The strip placed.
7. The specimen collection tube was mixed vigorously to ensure an efficient liquid suspension.
8. Collection tube hold upright and the tip twisted off then two drops of the solution were dispensed into the sample pad of the strip.
9. Timer was set up and the results were recorded after 15 minutes and positive outcomes were visible within one minute.

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Statistical analysis

Statistical analysis has been done by Statistical Package for Social Sciences (SPSS) version 16 for all analysis. Statistical significance has been considered when $P \leq 0.05$.

Results

Table (1) represents the distribution of acute gastritis according to gender. The results showed that 98 persons (39.2%) were positive specimens and from these 55(22.0%) were males and 43(17.2%) were females. There was no significant difference between the two genders regarding the distribution of *Helicobacter pylori* infection.

Table 1: Distribution of *Helicobacter pylori* infection according to gender.

Genders	<i>H. pylori</i> antibodies (Abs) and antigens (Ags)		Total
	Negative	Positive	
Female	75	43	118
	30.0%	17.2%	47.2%
Male	77	55	132
	30.8%	22.0%	52.8%
Total	152	98	250
Percentage %	60.8%	39.2%	100.0%

(P > 0.05) NS

The results showed that there was an association between *H. pylori* infection and age. There were 37(14.8%) cases that represent the highest percentage of acute gastritis in the age group (40-49 years) while the lowest percentage was recorded in the age group (≥ 60 years) as only 5 cases (2.0%) were recorded. There was a significant difference between the age groups regarding the distribution of *H. pylori* infection (Table 2).

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Table 2: Distribution of *Helicobacter pylori* infection according to Age

Age Groups	<i>H. pylori</i> antibodies (Abs) and antigens (Ags)		Total
	Negative	Positive	
< 20	14	11	25
	5.6%	4.4%	10.0%
(20 - 29)	32	18	50
	12.8%	7.2%	20.0%
(30 - 39)	32	17	49
	12.8%	6.8%	19.6%
(40 - 49)	30	37	67
	12.0%	14.8%	26.8%
(50 - 59)	22	10	32
	8.8%	4.0%	12.8%
≥ 60	22	5	27
	8.8%	2.0%	10.8%
Total	152	98	250
	60.8%	39.2%	100.0%

(P < 0.05) S

Table (3) demonstrated the clinical features that accompanied *H. pylori* infection and it can be seen that the abdominal pain represents the highest percent (38.4%), followed by loss of appetite (23.6%), nausea (14%), diarrhea (11.6%), bloating (10%) and vomiting (2.4%). There were significant differences (P<0.05) between the clinical symptoms.

Table 3: Clinical presentation of study patients with *H. pylori* infection

Signs & Symptoms	No.	%	<i>p.value</i>
Abdominal pain	96	38.4 %	(P < 0.05) S
Nausea	35	14 %	
Loss of appetite	59	23.6 %	
Bloating	25	10 %	
Diarrhea	29	11.6 %	
Vomiting	6	2.4 %	
Total	250	100 %	

Figures 1 and 2 showed the demographic characteristics of patients which included education levels, smoking, socioeconomic levels, water supply and food sources.

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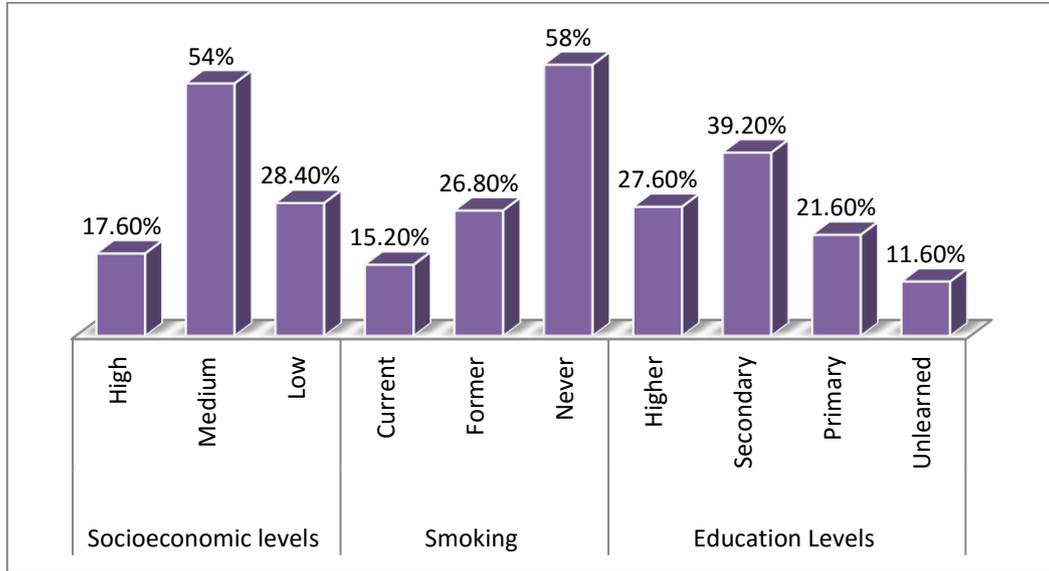


Figure 1: Demographic characteristics of patients.

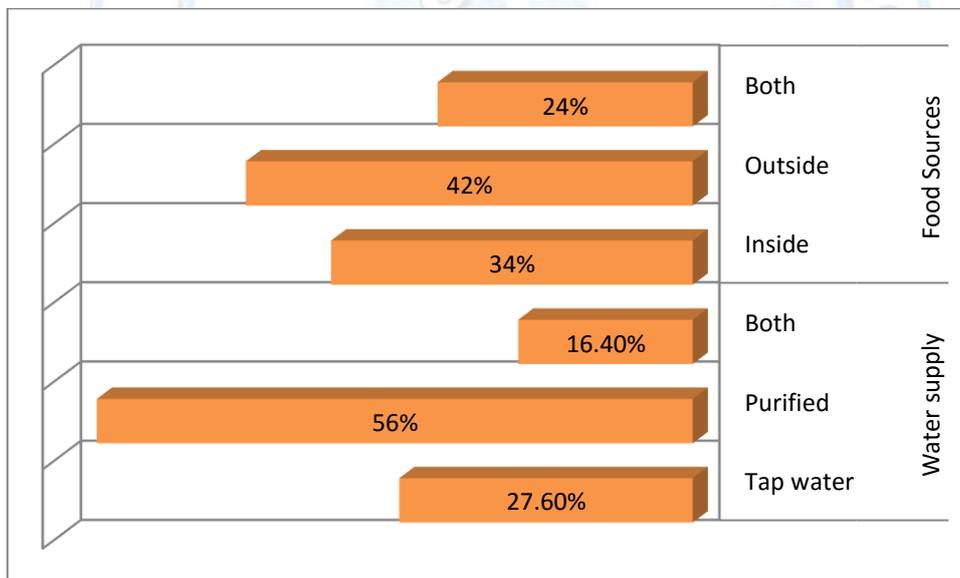


Figure 2: Demographic characteristics of patients

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Discussion

The results showed that the prevalence of infection among patients suffering from gastrointestinal disturbances was 39.2%, which was lower than in neighboring countries such as Jordan (82%) and Turkey (63%) (15, 16). This difference might be due to number of samples and life style (17). In the present study there were no significant differences between genders and distribution of *Helicobacter pylori* infection and this finding agrees with other studies that recorded no gender-association differences in the prevalence of *H. pylori* infection (18,19). In contrast, in one study males were found more prone to the infection with *H. pylori* than females (20). *Helicobacter pylori* infection is acquired after the first year of life and last for decades. It has been found that when the morbidity rate of bacterium is elevated, the mortality rate has decreased (21). Under the conditions of poor hygiene, crowded living conditions and absence of sanitation, the gastrointestinal microbes are easily transmitted (22). As an infectious agent *H. pylori* has been claimed to be acquired throughout childhood that stay in latency for long period and causing gastrointestinal problems in adults (1).

There was a significant difference ($P < 0.05$) between distributions of *H. pylori* infection and age and this may be due to the possible mode of transmission whereby spread infection was acquired from person to person by saliva or by fecal contamination of food or water.

The results of this study agrees with the findings of Haitham and others (23), who reported that the chances of acquisition of infection increase with age.

Inflammation of the stomach lining which is called gastritis might persist for short or long period. They might be asymptomatic but when symptoms were found, the most common was the gastrointestinal disturbance (5). Other probable clinical features were nausea, vomiting, loss of appetite and flatulence (6). The results of this study agree with the findings of Alsaimary and others (24), who reported that there were statistical differences between symptoms.

Concerning the possible risk factors (education levels, smoking, socioeconomic levels, water supply and food sources) were the first to be considered. Regarding the educational and socioeconomic levels, the outcomes of this study agree with the results of other studies conducted in the developing countries, which showed that the prevalence of *H. pylori* infection is higher in low socioeconomic groups (25,26). These results could be explained by the

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increased chances of transmission in this population due to improper hygiene and health care. In addition, the same is applicable for crowding (23).

Smoking, water supply and food sources were additional factors that play a significant role in the prevalence of *H. pylori* infection and this probably due to some of non-hygienic habits associated with these factors which might involve the transmission of bacteria through the saliva or by fecal contamination of food or water (22).

Conclusion

The highest percentage rate of *H. pylori* infection was in age group (40-49 years) and there was a significant difference between age groups ($P < 0.05$). In contrast, there was no significant difference between prevalence of infection and gender.

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