The prevalence of *Helicobacter pylori* infection in Baqubah city

Nadia Hameed Jameel (BSC)[1]**, Anfal Shakir Motib**(PhD)[2] **and Ahmed Methab Athab**(PhD)[3]

Abstract

Background: *Helicobacter pylori* are the most common cause's peptic ulcer disease, and it is transmitted by oral-oral, fecal-oral and gastric oral. The prevalence of this bacteria depends on age, sex, smoking or non-smoking and also chronic disease such as diabetes.

Objective: To determine the infection of *H. pylori* in Baqubah city and its associated with age and gender of patients.

Patients and Methods: *H. pylori* diagnosed by used rapid urease test and histopathology test. From 200 studied groups, 127 (63.5%) males and 73 (36.5%) females ages ranged from (10 to ≥ 60) years were collected from Baqubah teaching hospitals, during the period from September 2018 till January 2019. From 200 studied groups 110 considered patients after initial diagnosis by endoscopic unit (presence symptoms) and 90 considered control group (absence symptoms). Two types of samples were collected from each studied groups including gastric biopsy specimens for rapid urease test and histopathology test to detect *H. pylori* infection.

Results: The result of this study shows that H. pylori infection was detected by rapid urease test which appears positive results in 86 patients (78.2 %), and the positive results of histopathology test were 10 (9.0%). The incidence of H. pylori infection in male more than in female as the percentage (70.00%) and (30.00%), respectively. Minimum age was 10 years and maximum was ≥ 60. The highest age specific frequency in studied groups is in the age group (40-49) & (50-59) years old.

Conclusion: The prevalence rate of gastric ulcer caused by *H. pylori* in Baqubah city was high and it is detected by rapid urease test which showed more accurate than histopathological test. In addition, the results showed that the rate of incidence in males more than in females, and in (40-49)&(50-59) more than other ages.

Keywords: *H. pylori*, Gastric ulcer, Rapid urease test, histopathology.

[1,2,3]College of Medicine -Diyala University- Diyala- Iraq

Introduction

Helicobacter pylori are a gram- negative bacterium and spiral-shaped that colonizes the human stomach mucoid lining [1]. It is characterized by polymorphism phenomenon

it may appear in the form of coccoid and bacillary form, it is the main cause of stomach and duodenal ulcers, these disease have become common in recent times due to the spread this type of bacteria, it is highly pathogenic, affect more than half of the world population [2][3]. The incidence of these bacteria is due to the virulence genes that are carried by particular genetic patterns of this bacteria it is the most important virulence genes accompanying stomach and bowel disease is cytotoxin associated protein (cag A) [4][5].

To avoid the harsh condition in the gastric lumen, this bacteria have developed an antibiotic-resistant to the stomach acid of the microbial through colonization in a very narrow place of gastric lactation and secretion of the urease which analyses urea located in the medium to ammonia which have the effect of the acidic acid around in the stomach lining which enables them to stay in the human stomach lifelong if not treated with antibiotics [6]. Therefore, this bacterium causes many diseases such as chronic gastritis, gastric ulcers, duodenal ulcers, Gastric cancer and Mucosa-associated lymphoid-tissue lymphoma [7]. The transmission of *H. pylori* may occur via oral-oral, fecal-oral, gastric-oral or iatrogenic routes [8]. The prevalence of *H. pylori* infection varies widely by age, sex, race, ethnicity [9]. Several of studies have shown the highest rates of infection are associated with low socioeconomic status, family size, crowding, low level of education, poor sanitation, and un cleanly water supplies

[10][11]. Repeat of the epidemiology and mode of transmission *H. pylori* is important to prevent spread of this bacteria and may be usable in identify high-risk populations especially in areas that are high rates of infection [12].

Diagnosis *H. pylori* infection can be made by using several invasive or non-invasive techniques. Invasive diagnostic assays include rapid urease test and histological examination [13]. Accurate diagnosis of H. pylori is very important in both clinical practice and research purposes. The methods yield a high specificity that would be necessary in order to avoid giving unnecessary eradication treatment to non-infected patients [14]. Therefore, it is important to know the prevalence rate of this bacterium and try to eliminate the factors that increase the risk of spread *H. pylori* infection.

Patients and Methods
Biopsy Samples

In this study, it was collected 200 biopsy patients (127 males and 73 females) aged from (10- ≥ 60) years were collected from Baqubah teaching hospitals. The patients were suffering from dyspepsia and advised by the doctors to have clinical indications for endoscopy in the gastrointestinal clinic of the hospitals. All the patients with dyspepsia undergoing endoscopy were asked to fill the inclusion questioner of the gender and age of the patients. Biopsies of gastric tissue were collected from the corpus or the antrum or corpus and antrum of the patient's stomach. The taken biopsies were classified according

to the performed test. The biopsy used for histopathology examination was transported to the histopathology laboratory with 10% buffered formalin for at least 24 h. The biopsy used the rapid urease test (RUT) was tested immediately at the department of gastroenterology and the result examined within 1 h.

Rapid urease test

The tissue biopsies taken from patients were placed in test tubes containing 5 ml of urea broth incubated in temperature 37℃ for 24 h, when the color convert from yellow to pink indicates a positive test and contains tissue biopsies on the bacteria *H. pylori* [15].

Histopathologic Examination

This test was performed by the laboratory techniques in the hospital and read by the doctor following the standard procedure [16]. The gastric biopsies were fixed in (10%) buffered formalin for at least (24 h) and then embedded in paraffin. In each case, two sections of the tissues were cut at 0.3 microns, de-paraffinized and hydrated in descending grades of alcohol, cut in sequential 4-μm sections. One section was stained with routine haematoxylin and eosin stain. The second section was stained with a modified Giemsa stain to demonstrate the presence of *H. pylori*. The *H. pylori* were identified as curved rods on the luminal surface of the gastric epithelial cells.

Statistical analysis

ANOVA analysis of variance was used to describe and least significant differences (* $p<0.05$, ** $p<0.01$, *** $p<0.001$ and **** $p<0.0001$).

Results

From 200 studied groups, the positive result of RUT from 110 patients was (86) (78.2%), while 90 (100.0 %) negative for (RUT) among control groups, and the statistical analysis was high significant (p value 0.001). The positive result appears as pink color indicating the presence of *H. pylori* in the patient as shown in Figure (1).
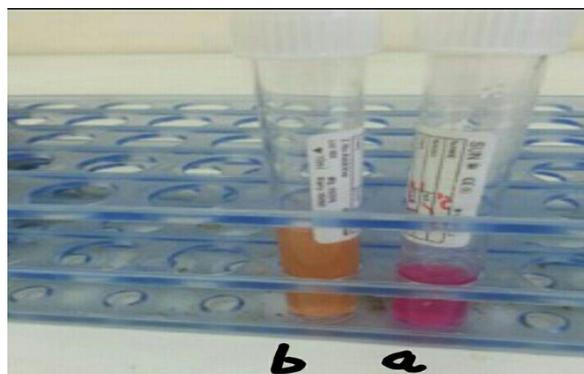

Figure (1): Rapid urease test result. (a) Positive sample for RUT
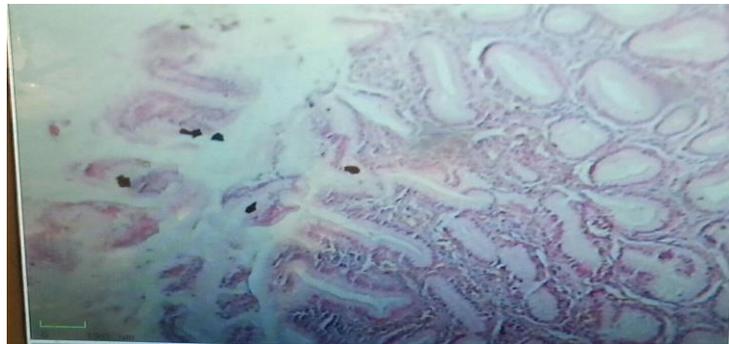(b) Negative sample for rapid urease test

In the present study, the positive result of the histopathology test from 110 patients was 10(9.0%) and the percentage of the negative results was 100 (91.0%), show Table (1).changing histopathology in Figure (2). The statistical analysis was a significant difference (p 0.001).

Table (1): Histopathology test results with patients groups

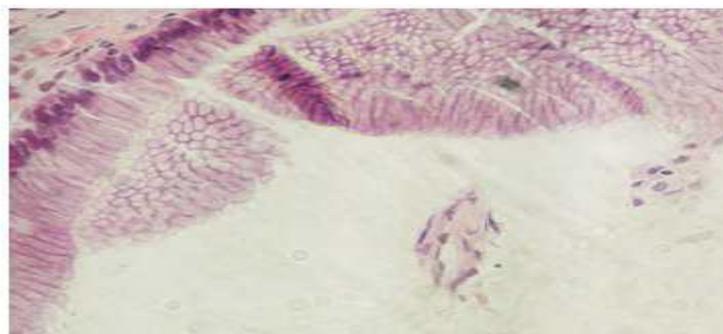| Histology test	Patients	Statistics
Positive	10 (9.00%) from 110 samples	0.001***
Negative	100 (91.0%) from 110 samples	

A

B

Figure (2): The results of the histopathology test. A(A positive result, and B) Negative result

In this study, it was showed that a high percentage for diagnosis of the infection with *H. pylori* among patients in biopsy is rapid urease test which percentage (78.18%), and histology was (9.0%) shown the Table (2).

Table (2): Comparative positivity of tests specific for *H. pylori* of patients

Positivity of tests	NO. Of Patients (%)
Rapid Ureases Test	86(78.18%)
Histology test	10(9.0%)

The results of the current study showed that the incidence of *H. pylori* infection in males more than in females as the rate of infection (70.00%) and (30.00%), respectively. A significant difference was observed when comparing sex to *H. pylori* infection (P<0.03). Shown in Table (3).

Table (3): The frequency of *H. pylori* infection among studied groups according to sex

		groups		Total	Statistics
		controls	patients		
Gender	Male	50(55.6%)	77(70.0%)	127(63.5%)	P value=0.03* RR=0.71 OR=0.53
	Female	40(44.4%)	33(30.0%)	73(36.5%)	

The result of our current study showed that age group(40-49)&(50-59) was the most age group of people with bacteria *H. pylori* as the percentage (29.10%), followed by age group ($\geq$ 60) limit (22.70%) and the age group (30-39)limit (10.00%) and (20-29) limit (6.40%) and the age group(10-19) limit (2.70%), statistically significant was (p 0.02) that are shown in Table (4).

Table (4): The frequency of *H. pylori* infection among studied groups according to age groups

		groups		Total	Statistics
		controls	patients		
Age groups	10-19	7(7.8%)	3(2.7%)	10(5.0%)	0.001***
	20-29	19(21.1%)	7(6.4%)	26(13.0%)	
	30-39	20(22.2%)	11(10.0%)	31(15.5%)	
	40-49	10(11.1)	32(29.1%)	42(21.0%)	
	50-59	12(13.3%)	32(29.1%)	44(22.0%)	
	$\geq$60	22(24.4%)	25(22.7%)	47(23.5%)	

Discussion

Helicobacter pylori colonize in the stomach and survive in acidic pH conditions of the lumen and burrow into the mucus to reach the stomach's epithelial cell layer [17]. The survival of H. pylori in the acidic stomach depends on the urease enzyme by neutralizing gastric acidity and damage gastric mucosa by produce toxins such as Cag A and Vac A [18][19]. There are many factors used by H. pylori for colonization in the host tissues including, high-salt diet, smoking habit, and low iron levels [20].

In the present study, *H. pylori* diagnosed by rapid urease test. The positive results of *H.*

pylori incidence were 86 (43.0%) while the negative results were 114 (57.0%). The result of our study was agreed with the study that found (58%) patients positive for RUT [21], and 42% positive results of RUT [11] However, the study in Basrah showed that there is a variation in detection of *H. pylori* by RUT including 74% [22], and disagree with [23].The reason is due to the error taking the sample, the size of the small sample and the low density of *H. pylori* bacteria all this can give wrong negative results, the wrong positive results can occur because of the presence of another microorganism that can release the urease enzyme, prolonging the incubation period for more than 24 hours gives a false positive result [24]. It was reported that the urease test was useful as a preliminary screening test and important in indicating the presence of *H. pylori* [25].

In the present study, *H. pylori* have been diagnosed with gastric biopsy by histopathology test as was shown in Table 1. The results of this study agree with [26] which determine the percentage was 14%. Also, it was found that 12% of those with H. pylori infection have histopathological changes [27]. It was shown that the density of H. pylori varies in different locations and it can take the sample from the wrong location and thus lead to a negative wrong result, these causes less sensitivity. Moreover, the use of antibiotics also affects the sensitivity of the test by its effect on the density of the bacteria present [28]. It was shown that the specificity of this test is influenced by the skill of the person working in this field and its ability to determine the form of bacteria or associated changes [27].

Clarify the distribution of patients with *H. pylori* infection according to gender, the higher infections were among males than females, in the males the rate of infection (70.00%) but in females (30.00%) this result agree with [29][30]. It was reported that according to other studies, the increase rate of infection in males is due to the daily effort of males compared to female, and other factors such as smoking and alcohol, the low infection in females compared to males may be due to antibiotics taken by females over the course of life (during pregnancy, after birth, in cases of abortion and infections during urinary genital) these antibiotics inhibit *H. pylori* growth which is the leading cause of gastrointestinal diseases [31].

The highest detection rate of *H. pylori* infection recorded in the age group (40-49) and (50-59) was (29.10%), while the lowest detection rates recorded in the age group (10-19) were (2.70%). The result of the study is consistent with [32] which found that the age group most susceptible to *H. pylori* infection is the group (40-59) , also agree with [33]. However, it was showed different results with [26], which found that the age group (11-20) is the most susceptible to infection. The result of our current study similar to the study of [34] which showed that the weakness in the immune system among older individuals may be related to the increase of prevalence in this stage group.

Conclusions

The results of this study showed a high incidence of *H. pylori* infection among patients suffering from peptic ulcer disease in Baqubah city. In addition, it appeared that the rate of H. pylori infection in male more than in female and in ages (40-49) & (50-59) more than in other ages.

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