Study of epidemiological *Helicobacter pylori* infection among Iraqi patients

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Abstract:

Background:

Helicobacter pylori (H. pylori) continues to be a highly prevalent chronic infection on a global scale. Despite an apparent rise in prevalence across numerous countries globally, *H.pylori* continues to be a significant determinant in the etiology of peptic ulcer disease, gastric cancer, and dyspeptic symptoms.

Objectives: To determine the prevalence of *H.pylori* infection in Baghdad province, Iraq.

Patients and methods: This prevalence study was conducted in Baghdad province from March 2019 to March 2023. 240 participants were divided into 120 males and 120 females, all participants suffered from a disorder in the gastrointestinal tract. The presence of *H.pylori* was identified using the Urea breath test method, a standard procedure employed to diagnose *H.pylori* or validate the elimination of the pathogen from patients following *H.pylori* treatment.

Results:

The research findings indicate that the prevalence of *H.pylori* infection differs between genders, with females having a higher incidence rate (29.2%) than males (22.5%). The study shows the level of education does not decrease the percentage of infection and the percentage of infected persons in non-literate was (11.6 %), the secondary level was (14.1 %) and in academic level person (22.9 %). The study shows the age effect on the percentage of infection, in patients aged less than 20 years old the percentage was (7.9 %), in patients between 21 – and 40 years old the percentage was (30.4 %) which is considered a high percentage, and in age more than 40 years old the percentage decreased to (11.6 %).

Conclusion:

In conclusion, the study *H.pylori* infection is influenced by gender, with a greater frequency of infection seen in females. The level of education did not decrease the percentage of infection. The percentage of infection affected by age and the higher percentage the age between (21–and 40) was considered a higher age for infection.

Keywords: *Campylobacter pylori*, Chronic gastritis, C14, *Helicobacter pylori*, Urea breath tests

1-Introduction:

Helicobacter pylori is a small bacterium. The term "*Campylobacter pylori*" was coined by Warren and Marshall in 1983 to describe a kind of bacterium that is Gram-negative, flagellated, highly migratory, and has a spiral form. (1, 2,3, 4). It remains the most comments pathogenic bacteria that infect the human body and is considered a co-factor in the development of upper gastrointestinal problems including peptic ulcer, Chronic gastritis, duodenal ulcer, and gastric malignancy such as gastric adenocarcinoma or mucosa-associated lymphoid tissue lymphoma. (3, 5,6,7). However, more than 70

% of infected people are asymptomatic, whereas 30 % of infected people are symptomatic (1).*H.pylori* can be transmitted in two methods, including faecal–oral and oral–oral routes (8). Throughout the world, the prevalence of *H.pylori* infection varies and is mainly associated with socioeconomic conditions and age (9)

Several methods are available to detect *H.pylori* (11). *H.pylori* can be diagnosed directly by biopsy tissue specimens obtained by endoscopy (11,12).Giemsa staining techniques may also be used to stain the bacteria present in the excised tissue (9,13,14). *H.pylori* can also be indirectly diagnosed in the tissue specimen's biopsy by testing its urease enzyme activity in a method called rapid urease test. This enzyme secreted by organisms can convert urea in the testing medium into ammonia and carbon dioxide. The presence of ammonia leads to elevated pH, which can be observed in growth medium (13).Alternatively, the presence of *H.pylori* may be identified in infected patients' blood samples using immunological techniques, primarily by Enzyme-linked immunosorbent assay (ELISA) or fast test, by detecting particular antibodies (IgG or IgA) targeting *H.pylori*(15). The disadvantage of the immunological method appears when these antibodies persist more than months or years after infection and give a false positive result (16). An important method used to detect *H.pylori* is Pylori specific antigen in stool samples (17-20)This method is also very suitable for monitoring the therapeutic response and gives a good idea to physicians about *H.pylori* eradication (21).

2-Methodology:

2-1-Principle:

Urea breath tests (UBT) are used for the detection of ongoing H. pylori infection. This test relies on the knowledge that *H.pylori* produces a large amount of active urease, an enzyme that can convert urea into ammonium and carbon dioxide (CO_2). When a patient is infected with *H.pylori*, there is a significant presence of a highly active urease enzyme in the stomach. The individual consumes a C14-labeled urea pill. The urease enzyme, synthesized by bacteria, facilitates the breakdown of urea inside the capsule. This process occurs within the mucus layer where *H.pylori* is located. The resulting labelled CO_2 then permeates into the epithelial cells and then enters the circulation, before being expelled by breathed air. The exhaled breath may be analyzed to assess the concentration of labelled CO_2, which is directly correlated to the activity of urease. This activity serves as an indicator of the presence or absence of *H.pylori* infection. Subsequently, the quantities of isotopic CO_2 are assessed using different methods, and the percentage is denoted as endogenous CO_2 generation. This test has a notable sensitivity and specificity, ranging from 95 to 97%. However, it has been shown that its reliability diminishes for patients who have had stomach surgery or those who are using proton pump inhibitors (PPI) or ranitidine (22 – 24).

2-2-Method:

A total of 240 individuals, consisting of 120 males and 120 females, participated in the research. They underwent specific preparation for the Urea Breath Test, which included fasting for a minimum of 4 hours and ingesting a capsule containing C14 urea dissolved in 20 mL of water. After taking a deep breath, holding it for about 10 seconds, and blowing it into a balloon until it becomes firm, breath is collected within 20 minutes after taking the medication by using a CO_2 absorption method. The level of radioactivity in the sample is quantified using a specialized instrument counter, and the outcome is reported as the number of counts per minute (25-27).

3-Result and discussion

Table (1) Relationship of gender with infection

Gender	Number of infected (%)	Number of non-Infected (%)
Male	54 (22.5 %)	66 (27.5 %)
Female	70 (29.2 %)	50 (20.8 %)
Total	124	116

Table (2) Relationship of Literate with Infection

Education	Number of infected (%)	Number of non-Infected (%)
Not literate	28 (11.6 %)	16 (6.6 %)
Secondary	34 (14.1%)	46 (19.1 %)
Academy	55 (22.9 %)	61 (25.4 %)
Total	117	123

Table (3) Relationship of age with infection

Age in years	Number of infected (%)	Number of non-Infected (%)
< 20	19 (7.9%)	28 (11.6%)
21 – 40	73(30.4%)	49 (20.4%)
> 41	28 (11.6 %)	43 (17.9 %)
Total	120	120

In Table (1) the study shows *H.pylori* infection is affected by gender and the prevalence of infection in females (29.2 %) is higher than in males (22.5 %).

In Table (2) the study shows the level of education did not decrease the percentage of infection and the percentage of infected persons in non-literate was (11.6%), the secondary level was (14.1%) and in academic level person (22.9%).

In Table (3) the study shows the age effect on the percentage of infection, in patients aged less than (20) years old the percentage was (7.9%), in patients between (21–40) years old the percentage was (30.4%) considered a high percent and in age, more than (40) years old the percentage decreased to (11.6 %).

The findings of this study align with the research done by Khoder et al.,(2019), which discovered a notable correlation between *H. pylori* infection and factors such as gender, age, career, household overcrowding, source of drinking water, and gastrointestinal features of the participants.

4-Conclusions

The ongoing work has shown that *H.pylori* infection is influenced by gender, with a greater frequency of infection seen in females. The level of education did not decrease the percentage of infection. The percentage of infection affected by age and the higher percentage the age between (21–and 40) was considered a higher age for infection. Additional research is necessary to ascertain the causes of the spreading of this bacteria and study antibiotic resistance.

5-Authors' Declaration

-Conflicts of Interest: None.

- We affirm that all the Figures and Tables in the text are our work. In addition, any external figures and pictures used in the text have been obtained with the requisite permission for re-publication, which is provided with the manuscript.

-Ethical Approval: The proposal received approval from the local ethics committee at the University of Middle Technical University.

6-Authors' Contribution Statement

Mohammed Ali Mohammed Al-Badri contributed to the design and implementation of the research, the analysis of the results, and the writing of the manuscript.

7-Acknowledgement

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