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Epidemiological Pattern of Active Helicobacter pylori Infection Among Symptomatic Patients in Wasit Province, Iraq: A Cross-Sectional Study

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ABSTRACT

Objective: *This cross-sectional study sought to determine the demographic distribution and prevalence of active H. pylori infection in symptomatic cases in Wasit Province, Iraq.* ***Method:*** *A cross-sectional study of 140 patients with symptoms visiting Al-Zahraa Teaching Hospital, Wasit Province, Iraq, was carried out. The H. pylori Stool Antigen Test was used to analyse stool samples. The participants were divided into genders and age groups, and associations between demographic variables and infection were tested with the Chi-square test.* ***Results:*** *A total of 140 patients were examined, 48 of which were positive for H. pylori, with an overall prevalence of 34.29%. There was a slight male-to-female predominance (35.42% vs. 31.82%). The highest prevalence was seen in patients <15 years of age (38.89%), followed by those 15–45 years of age (33.33%) and those >45 years (30.00%) when analysed by age groups. There was no difference between infection status and gender ($\chi^2 = 0.17$, $df = 1$, $p = 0.68$) or age groups ($\chi^2 = 0.53$, $df = 2$, $p = 0.77$).* ***Novelty:*** *This study provides epidemiological evidence on the demographic distribution and prevalence of active Helicobacter pylori infection among symptomatic patients in Wasit Province, Iraq, using a non-invasive stool antigen test.*

INTRODUCTION

The bacteria known as H. pylori is mainly linked to the human stomach's inner lining and thrives in low oxygen settings. In fact, it's one of the most prevalent long-term bacterial infections that affect people worldwide. Depending on the degree of economic growth, hygiene, environment, and health care, infection rates vary greatly between regions [1,2].

H. pylori can cause major digestive issues such chronic gastritis, peptic ulcers, gastric cancer, and MALT (mucosa-associated lymphoid tissue) lymphoma, while many people are never afflicted. Serious gastrointestinal issues including chronic gastritis and even gastric cancer can be brought on by H. pylori [3, 4].

The fecal-oral, oral-oral, and gastro-oral routes are thought to be the main ways that H. pylori spreads. The first few years of life may be viewed as a very critical period to contract infections. The living conditions of people living in confined areas, bad sanitation and dirty water were cited as conditions that can contribute to bacteria spread. The importance of understanding how infections spread within a community is emphasized in references [5,6] to enhance the understanding of prevention measures and optimize treatment.

It is very important to know if a person has an H. pylori infection at the moment to ensure that the eradication treatment is effective and that the person will not have any

further gastrointestinal problems from the infection. There are multiple methods to identify H. pylori infections, but the non-invasive approaches tend to be favored since they're generally seen as more trustworthy. [7,8].

Testing for H. pylori is crucial. The H. Pylori Stool Antigen Test (HpSA) is one of the most accurate methods for identifying current infections because, unlike serology tests, it looks for antigens in the stool rather than past infections. [9, 10].

In recent years, H. pylori has been found to vary in different studies regarding age, sex, geographic location. Some elderly people have a higher frequency of H. pylori due to a longer period of exposure to the bacteria, while some younger generation has a higher frequency. [11,13]. The correlation between sex and infection is discordant [14-16].

H. pylori is an international problem and has gained much attention but studies of the prevalence of infection in the Wasit Province of Iraq have been limited. A demographic study will give some useful insight into the geographical distribution of the disease. Therefore, the current cross-sectional study was carried out to estimate the prevalence of H. pylori infection by gender and age categories and to determine the prevalence of H. pylori infection among symptomatic patients in Wasit province, Iraq, using a stool antigen test.

MATERIALS AND METHODS

1. Study Design, Sample Collection, and Patient Characteristics

The study was conducted as a cross-sectional study in Al-Zahraa Teaching Hospital, Wasit Province, Iraq from December 2024 to February 2025 among the symptomatic patients who visited the hospital. The study included 140 consecutive individuals who had upper gastrointestinal symptoms, including dyspepsia, that might indicate an H. pylori infection.

To check for an active infection, each participant gave a stool sample for a non-invasive H. pylori stool antigen test. A standardized data collecting form with demographic information like age and gender was used to collect the data.

The epidemiological analysis was performed on a group of participants divided into three age groups:

- **Children & adolescents:** <15 years
- **Young and middle-aged adults:** 15–45 years
- **Older adults:** >45 years

To determine the prevalence of active H. pylori infection and assess the demographic distribution, all positive and negative cases were included.

2. Detection of *H. pylori* Infection by Stool Antigen Test

The NADAL® H. pylori Ag Test, a commercial quick immunochromatographic rapid test for the qualitative identification of H. pylori antigen in human stool specimens (Nal von Minden GmbH, Moers, Germany), was used to diagnose an active H. pylori infection. The manufacturer's instructions were followed when conducting the test.

Because the test is selective for the H. pylori antigen rather than the antibody, it may be utilized to identify active infection and is therefore helpful in epidemiological studies and clinical diagnosis [26].

2.1. Test Procedure

The stool samples were collected in sterile containers and tested for H. pylori with the NADAL® H. pylori Ag Test (Nal von Minden GmbH, Germany) as per the manufacturer's guidelines using fresh stool samples. Stool samples were placed in the extraction buffer, then into the test cassette and results were read off visually within 5-10 minutes.

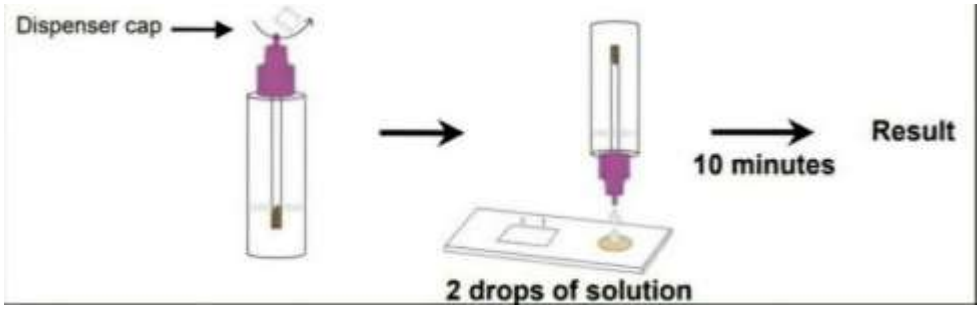

Figure 2.1. The stool collection device and sample inoculation procedure.

2.2. Interpretation of Results

Test Results Interpretation:

- **Positive result**: Two colour lines formed, including the control line and the test line, suggesting that there is an H. pylori antigen present.
- **Negative result:** Formation of the control line alone; this means that the H. pylori antigen is not present.
- **Invalid result:** Control line was not found, this means that the test may have been unreliable and needs to be repeated.

2.3. Analyse statistiques

For statistical analysis, IBM SPSS Statistics version 26.0 was utilized. Descriptive statistics were used to summarize the distribution of infection and demographic features. Frequencies and percentages are used to display data.

For both the entire population and the various demographic groupings, the prevalence of active H. pylori infection was calculated. An connection between an infection status and categorical characteristics such as age groups and gender was examined using the Pearson Chi-square ($\chi 2$) test. A p-value of less than 0.05 was considered statistically significant.

2.4. Ethical Considerations

The Declaration of Helsinki's guidelines were followed when conducting the study. Prior to data collection, the project was authorized by the ethical committees of the relevant institutions.

The information of all participants was anonymised and kept confidential when handling and analysing the data. All collected data and biological samples were solely used for research purposes and privacy was kept throughout the study period.

RESULTS AND DISCUSSION

1. Prevalence of *H. pylori* Infection According to Gender

A cross-sectional research was used to include 140 people with symptoms. Out of the 100 participants in the research, 48 tested positive for active H. pylori infection, 92 tested negative, and the total prevalence was 34.29%.

Distributions by gender indicated that the prevalence of H. pylori infection was somewhat greater in women than in men (35.42% versus 31.82%). 34 out of 96 girls and 14 out of 44 males were tested. On the other hand, the difference is not statistically significant ($\chi^2 = 0.17$, df = 1, p = 0.68).

Table 1. Distribution of *H. pylori* Infection According to Gender.

Gender	Positive (+ve), n	Negative (-ve), n	Total Cases,	Infection Prevalence Within Gender (%)
Female	**34**	**62**	**96**	**35.42**
Male	**14**	**30**	**44**	**31.82**
Total	**48**	**92**	**140**	**34.29**

Chi-square test: $\chi^2 = 0.17$, df = 1, p = 0.68

2. Age-Stratified Distribution of *H. pylori* Infection

The research participants were separated into three age groups for epidemiological analysis: children and adolescents (less than 15 years), young and middle-aged adults (15–45 years), and elderly people (more than 45 years).

H. pylori activity was greatest among children and adolescents (less than 15 years old) (14/36) (38.89%). Young and middle-aged people had the highest incidence rate (33.33%, 28/84), whereas elderly persons had the lowest (30.00%, 6/20).

The relationship between age groups and H. pylori infection status was evaluated using the chi-square test. The infection status did not differ significantly between age groups ($\chi^2 = 0.53$, df = 2, p = 0.77).

Table 2. Age-Stratified Distribution of *H. pylori* Infection.

Age Category	Age Range	Positive (+ve), n	Negative (-ve), n	Total Cases, n	Infection Prevalence Within Age Group (%)
Children and adolescents	**<15 years**	14	22	36	38.89
Young and middle-aged adults	15–45 years	28	**56**	**84**	33.33
Older adults	>45 years	6	**14**	**20**	30.00
Total	—	**48**	**92**	**140**	**34.29**

Chi-square test: $\chi^2 = 0.53$, df = 2, p = 0.77

3. Demographic Distribution Among *H. pylori*-Positive Cases

Demographic data of the 48 cases positive for H. pylori was analyzed further. The majority of positive cases were female (34 cases, 70.83%) while the males were 14 cases (29.17%). As far as age distribution of infected people are concerned, the age group 15-45 years had the maximum number of positive cases, comprising 28 (58.33%) of all positive infections. There were 14 positive cases in children/teenagers (29.17%) and 6 cases in older adults (>45 years).

Table 3. Demographic Distribution Among *H. pylori*-Positive Cases.

Age Category	Category	Positive (+ve), n	Percentage Among Positive Cases (%)
Age	**<15 years**	**14**	**29.17**
Age	**15–45 years**	**28**	**58.33**
Age	**>45 years**	**6**	**12.50**
Total	**48**	**48**	**100.00**

Discussion

In the field of gastroenterology, H. pylori continues to be a major issue. Using a stool antigen test, this study was conducted at a hospital to ascertain the incidence of active infection in symptomatic individuals in Wasit, Iraq. The overall incidence percentage was 34.29% (48/140).

The prevalence found in this study was similar to that determined from other studies carried out in various populations of Iraq with some variations in the level of infection recorded in different provinces. This may be attributed to geographical, socio-economic, sanitary and environmental differences or population specific differences or differences in the methodology used for making the diagnosis. [22,23]. The present results contribute to the knowledge of epidemiological burden of H. pylori infection in Wasit Province, as data is limited in the area.

The NADAL® H. pylori Ag Test (Germany) detected H. pylori antigens in stool samples, confirming the existence of an active infection. Compared to serological testing, which identifies prior exposure to the bacteria, stool testing for the presence of H. pylori antigens is a legitimate non-invasive way to diagnosis current infection and is simpler to do [8–10,26].

Regarding gender distribution, females showed a slight advantage over males (35.42% vs 31.82%) but no statistical difference was found between the amounts of males and females. This result has been reported in other studies like ours, and indicates that gender may probably be not an important variable in H. pylori infection. Environmental and economic conditions might be more important in the infection [16,17].

The analysis based on age indicated that the highest prevalence was among the participants younger than 15 years (38.89%) followed by the age group 15-45 years (33.33%) and the elderly (30.00%). The differences were not statistically significant ($\chi 2$ = 0.53, df = 2, p = 0.77), but difference in prevalence rates between younger and older groups may be due to early life acquisition or household transmission, both of which have been shown to be a route of transmission for H pylori, particularly in developing parts of the world [18–20].

The lack of correlation between demographic variables and infection status suggests that multiple factors such as hygiene habits, household crowding, food consumption and socio-economic status are important in H. pylori transmission [5,6,21]. More research in the population with detailed assessment of risk factors in H. pylori infection is required in Wasit Province.

This study has several limitations, including participation of patients from only one health facility and failure to assess other risk factors, including diet, family history and socioeconomic status. However, the results obtained from this study will definitely contribute toward the knowledge of the prevalence of H. pylori infection. Finally, the H.

pylori was detected in 34.29% of symptomatic people in Wasit Province. Gender and age group differences were seen, but not statistically associated.

CONCLUSION

Fundamental Finding: Stool antigen testing identified an overall Helicobacter pylori incidence of 34.29% among symptomatic patients in Wasit, Iraq. Although the infection was more frequently observed in women and younger age groups, no statistically significant associations were found between H. pylori infection and the examined demographic characteristics. **Implication:** The findings highlight the need for continued surveillance and effective management of active H. pylori infection to support gastrointestinal health and improve disease control strategies in the Wasit region. **Limitation:** This study was conducted among symptomatic patients in a single province, and the demographic analysis did not identify significant associations, limiting the broader understanding of factors influencing H. pylori infection. **Future Research:** Future research should conduct multicenter studies with larger sample sizes and comprehensive analyses of potential risk factors to better understand the epidemiology of H. pylori infection in Iraq.

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