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Research article

# Feco-prevalence of *Helicobacter Pylori* among symptomatic patients in Al-Marj city

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**ABSTRACT**

*Helicobacter pylori* is a bacterium that causes infections in a significant portion of the global population. This study aimed to determine the prevalence of *H. pylori* infection among dyspeptic patients and to investigate its association with age and sex in Al Marj City, Libya. A cross-sectional descriptive study was conducted at Tabebouk Laboratory from January 1, 2023, to December 31, 2024, involving 495 participants. Stool samples were analysed using a fluorescence immunoassay-based technique to detect *H. pylori* antigens. The overall prevalence of *H. pylori* infection was 50.3%, with males showing a higher infection rate (54.22%) than females (45.78%). The highest prevalence was observed in young adults aged 20-45 years (49.40%), followed by middle-aged and elderly individuals (≥46 years; 36.95%). Children and teenagers had significantly lower infection rates (6.83% each). No significant sex differences were found among children and teenagers. In conclusion, *H. pylori* infection rates were higher in males and most prevalent among young adults aged 20–45 years. These findings highlight the need for targeted public health strategies, especially in adult populations, to improve early detection and management of *H. pylori*-related gastrointestinal conditions.

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## 1. Introduction

*Helicobacter pylori* is classified as a Gram-negative, helical, microaerophilic microorganism that is a member of the *Helicobacteraceae* family. It predominantly targets the gastric mucosa, inhabiting the protective mucus layer that envelops the gastric epithelial cells. Although few bacteria interact directly with epithelial cells, *H. pylori* is recognized as a major pathogen associated with various gastroduodenal diseases, including ulcer dyspepsia, upper gastrointestinal haemorrhage, and gastric tumors such as mucosa-associated lymphoid tissue (MALT) lymphoma. It is additionally categorized as a Group 1 carcinogen by the International Agency for Research on Cancer, signifying a robust correlation with the etiology of gastric cancer [1].

The exact mode of *H. pylori* infection transmission is not fully understood, but it is believed to occur primarily through direct contact between individuals (oral-oral or fecal-oral), as well as through contaminated food and water sources [2]. Notably, *H. pylori* infection tends to cluster within families. Previous studies have demonstrated that children whose parents infected with *H. pylori* exhibit a markedly elevated incidence of infection, particularly when both parental figures test positive [3-5]. This observed familial aggregation implies a plausible mechanism for direct transmission between individuals or shared exposure to a common source within domestic environments. One investigation revealed that 68% of partners of infected individuals also harbored the infection, in stark contrast to only 9% of partners of uninfected individuals [6]. This evidence highlights the importance of family-based management strategies for controlling *H. pylori* infections [7].

Diagnosis of *H. pylori* infection employs various methods, including urea breath tests, blood tests, stool tests, and endoscopic examinations [8]. The stool antigen test (SAT) is the commonly used non-invasive technique for identifying *H. pylori* in stool samples. The prevalence of *H. pylori* infection can vary widely depending on the diagnostic techniques employed. For instance, studies report a prevalence range of 47.8% to 70.4% in Iraqi patients based on the diagnostic method used [9]. In patients with MALT lymphoma, reported prevalence rates vary from 79% to 85%, depending on whether multiple diagnostic methods were utilized [10].

The prevalence of *H. pylori* infection varies significantly across different populations and is influenced by several factors, including age, socioeconomic status, and sanitation conditions [11]. An estimated that approximately 4.4 billion people are infected [12]. In developing countries, over 80% of middle-aged individuals are affected, with rates exceeding 50% in regions with poor sanitation, such as parts of Africa and Asia [13].

In Africa, the prevalence averages around 90%, with specific rates in Nigeria 93.6% [14], Ghana 75.4% [15], and Egypt 90% [16]. In Asia, the seroprevalence rate is 44.2% in China, 37.6%-43.2% in Japan, and 51.0% in South Korea [17]. While in Libya, various reports reveal disparate prevalence rates, including 17.2% in Tripoli, 74% in Bani Waleed, and notably concerning rates of 83% in Sirte among patients exhibiting symptoms [18, 19].

This study aimed to assess the prevalence of *H. pylori* infection among dyspeptic patients in Al Marj City, Libya, and to investigate the relationship between age, sex, and infection rates. Understanding these variables is essential for developing effective public health interventions and improving diagnostic strategies.

## 2. Methodology

A cross-sectional descriptive study was undertaken to evaluate the prevalence of *H. pylori* infection and its association with demographic factors. The investigation took place at Tabebouk Laboratory in Al-Marj City, focusing on individuals presenting with dyspepsia from January 1, 2023, to December 31, 2024

Of the 508 initially examined patients, 13 were excluded due to incomplete information,

resulting in a final sample size of 495 participants. Participants were systematically recruited and analysed to ensure the representativeness of the population.

Stool samples were collected from all participants using a standardized protocol and were subsequently analysed for *H. pylori* antigens utilizing a fluorescence immunoassay-based technique. *H. pylori* stool antigen levels were quantified using the Chroma™ fluorescence immunoassay system and an i-CHROMA reader, following the manufacturer's instructions.

The assay provided quantitative measurements of stool antigen. Results were interpreted based on a reference value: concentrations below 1 ng/ml were classified as negative, while values equal to or exceeding this threshold indicated a positive result.

Demographic factors (age and sex) and diagnostic outcomes were recorded. Participants were stratified into age groups: children (1–12 years), adolescents (13–19 years), young adults (20–45 years), and middle-aged or elderly individuals (≥46 years). Data were analysed by SPSS software version 21. The chi-square statistical test was implemented to examine the relationship between demographic factors and the prevalence of *H. pylori*, with statistical significance determined at $P < 0.05$.

### 3. Results

Out of the 495 patients, 249 positive cases were identified, as shown in Table 1. Among these, the overall incidence of infected males was 135 out of 249 (54.22%), while the infection rate for females was 114 (45.78%), as presented in Table 2.

The distribution of *H. pylori* positive cases across age groups showed the highest prevalence among young adults (20–45 years), accounting for 49.40% of the total positive cases. This was followed by middle-aged and elderly individuals (≥46 years) at 36.95%. Both children (1–12 years) and teenagers (13–19 years) had the lowest prevalence, each comprising 6.83% of the positive cases. These findings suggest that *H. pylori* infection is significantly more common in adults, particularly those in early to middle adulthood as shown in Table 3

**Table 1:** Prevalence of *H. pylori* infections among the patients

| Results | Frequency (No) | Percentage (%) |
|---|---|---|
| Negative | 246 | 49.7% |
| Positive | 249 | 50.3% |
| Total | 495 | 100% |

**Table 2:** Prevalence of *H. pylori* infection per sex

| Sex | Results (Positive) | |
|---|---|---|
| | Frequency (No) | Percentage (%) |
| Male | 135 | 54.22% |
| Female | 114 | 45.78% |
| Total | 249 | 100.00% |

The age and sex distribution of participants shows variation across groups. Among males, the highest representation was in the 20–45 years and >46 years age groups, with 55 % each. For females, the largest group was 13–19 years, comprising 64 %, followed by the >46 years group with 43 %. In the 1–12 years group, there were slightly more males 53% than females 47%. Overall, males were more prevalent in the adult age groups, while females were more represented among teenagers as shown in Figure 1.

## 5. Discussion

This study investigated the prevalence of *H. pylori* infection among 495 patients, revealing an overall infection rate of 50.3%. This prevalence aligns with findings from other studies in similar settings, although regional variations are notable due to differences in diagnostic methods, socioeconomic factors, and environmental conditions [11].

Sex differences were significant, with males (54.22%) exhibiting a higher prevalence than females (45.78%).

**Table 3** Distribution of *H. pylori* Infection Across Age Groups

| Age Groups (Year) | Results (Positive) | |
|---|---|---|
| | Frequency (No) | Percentage (%) |
| Children 1 – 12 | 17 | 6.83% |
| Teenagers 13 – 19 | 17 | 6.83% |
| Young adult 20 – 45 | 123 | 49.40% |
| Middle age + elderly 46 ≥ | 92 | 36.95% |
| Total | 249 | 100% |

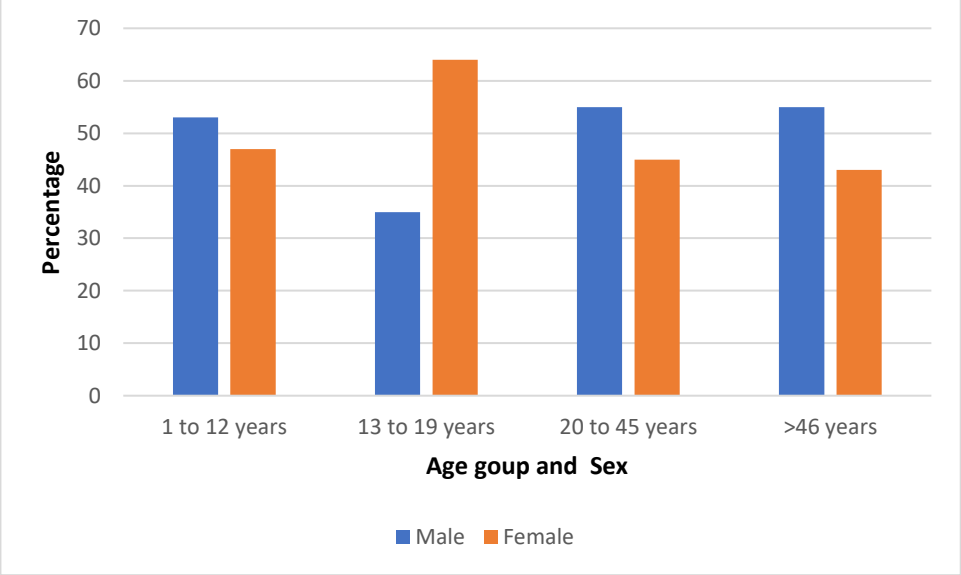


**Figure 1**: Relationship between *H. pylori* Infection and Demographic Factors (Age and Sex)

Similar trends have been reported in other studies, suggesting that lifestyle factors, such as smoking and alcohol consumption—more common among men—could elevate the risk of infection. Biological factors, including hormonal influences on the immune response, may also play a role [20].

Age-specific trends indicated that young adults (20–45 years) had the highest infection rate (49.40%), followed by middle-aged and elderly individuals (≥46 years; 36.95%). Children and teenagers showed a significantly lower prevalence (6.83% each). These findings support evidence suggesting that *H. pylori* acquisition often occurs in childhood but may remain latent or asymptomatic until later in life [21]. The lower prevalence among older adults compared to young adults could reflect cohort effects, including improved hygiene standards or healthcare access over time.

The diagnostic test employed in this study was critical in determining the observed prevalence. Although the specific test type was not detailed

in the results, different diagnostic methods vary in sensitivity and specificity, which can significantly influence prevalence estimates. For instance, serological tests, while convenient, may overestimate prevalence as they detect both past and current infections. In contrast, urea breath tests and SAT provide more accurate measures of active infections but may require advanced infrastructure and incur higher costs [22].

Given the reported prevalence, it is essential to evaluate whether the diagnostic method used is optimally suited for detecting active infections. Misclassification due to test limitations could lead to either underestimation or overestimation of the true infection burden.

## 4. Conclusions

This study shows a high prevalence of *H. pylori* infection among dyspeptic patients in Al Marj City, Libya, especially among young adults aged 20–45 years. The findings underscore the importance of implementing targeted public health strategies to address this infection in high-risk age groups. Moreover, the observed age-related and sex-related patterns emphasize the need for continued surveillance to guide prevention and treatment efforts effectively.

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## Conflict of Interest

The authors report no conflicts of interest.

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