



Helicobacter Pylori Infection at the Regional Hospital of Agadir: First Evaluation of Prevalence in Endoscopy

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Abstract

Introduction: Helicobacter pylori (HP) is a Gram-negative bacterium that colonizes the gastric mucosa and is implicated in various gastrointestinal pathologies. Globally, the prevalence of HP infection is approximately 50%. This study aimed to evaluate the prevalence of HP infection among patients undergoing esophagogastroduodenoscopy (EGD) at the Regional Hospital Center of Agadir and to analyze its clinical, endoscopic, and histopathological associations. **Materials and Methods:** This retrospective cross-sectional study was conducted over 76 months (January 2016 - May 2022). The cohort consisted of 407 patients presenting with upper gastrointestinal symptoms who underwent EGD with biopsies for histological assessment of HP infection. Data included demographic characteristics, clinical presentations, endoscopic findings, and histopathological results. **Results:** The prevalence of Helicobacter pylori (HP) infection in the study population was 91.5% (n = 372), with no significant differences observed based on age (mean: 47.8 ± 16 years) or sex (p = 1). Clinically, epigastric pain was the most common indication for esophagogastroduodenoscopy (EGD) in HP-positive patients (43.8%). Endoscopic findings revealed that erythematous pangastritis was the predominant lesion, occurring in 38.4% of HP-positive patients, with a statistically significant association between HP infection and macroscopic endoscopic lesions (p < 0.001). Histopathological examination confirmed chronic gastritis in all cases, with active gastritis present in 93%. The bacterial load was categorized as low in 10.8% of cases, moderate in 35.4%, and high in 53.5%, with a significant correlation between bacterial load and HP infection (p < 0.001). Although precancerous lesions, including intestinal metaplasia (7.1%) and dysplasia (1.2%), were identified, they were not significantly associated with HP infection. **Conclusion:**

This study highlights the high prevalence of HP infection in the Agadir region. While neither age nor sex influenced infection rates, HP was strongly associated with the presence and activity of inflammatory gastric lesions.

Subject Areas

Gastroenterology

Keywords

Helicobacter Pylori, Prevalence, Endoscopy, Gastritis

1. Introduction

Helicobacter pylori (HP) is a Gram-negative bacterium that colonizes the gastric mucosa, and its urease enzyme allows it to thrive in the acidic environment of the stomach. It was first identified in 1982 by J. Robin Warren and Barry J. Marshall [1].

HP infection represents a major public health issue, with a global prevalence of around 50%, and rates exceeding 80% in Africa and other developing regions [1]. It is associated with a range of gastro-duodenal conditions, including gastritis, peptic ulcer disease, mucosa-associated lymphoid tissue (MALT) lymphoma, and gastric adenocarcinoma.

Contamination is essentially intra-familial, occurring early in childhood, and can be transmitted via the oral-oral, fecal-oral, and gastro-oral routes, since this bacterium is present in saliva, feces, and vomit. It can also be ingested in food and water (e.g., contaminated raw vegetables, and raw milk). Iatrogenic transmission through the use of poorly disinfected endoscopes is a potential mode of transmission.

Preventive measures must be implemented to reduce the prevalence of this infection. These include practicing good hygiene (e.g., handwashing and consuming clean food) and ensuring access to safe drinking water. Raising awareness, improving living conditions, and conducting targeted screening are also essential [2].

The aim of this study was to assess the prevalence of HP in patients undergoing endoscopy, examine their clinical and endoscopic profiles, and identify the primary gastric pathologies associated with this infection.

2. Materials and Methods

This was a retrospective cross-sectional study conducted over a period of 76 months, from January 2016 to May 2022. We included patients presenting with upper gastrointestinal symptoms who underwent esophagogastroduodenoscopy (EGD) with gastric biopsies for Helicobacter pylori (HP) testing at the Regional Hospital Center of Agadir.

Data collected included demographic information (age and sex), clinical presentations, endoscopic findings, and histopathological results. The histological

examination focused on confirming HP infection, identifying the types of histological lesions, and assessing the severity and activity of gastric inflammatory changes.

A standardized data sheet was used to collect demographic (age and sex), clinical, endoscopic, and histological information from patients' files archived in the gastroenterology and pathology departments of the Regional Hospital Center of Agadir.

For each patient included, five biopsies were taken: two antral, one from the angulus, and two fundic, in accordance with the Sydney recommendations for the detection of *Helicobacter pylori* (HP) infection. Additionally, targeted biopsies were taken in cases of endoscopic gastric mucosal abnormalities. Biopsy specimens were fixed in formalin and sent to the pathology laboratory for histological analysis. HP infection was detected using Giemsa staining. The severity, activity, atrophy, and metaplasia of gastritis were graded according to the Sydney System as absent, minimal, moderate, or severe.

Patients were divided into two groups: Group 1 consisted of HP-positive patients (+), and Group 2 consisted of HP-negative patients (-).

Statistical analysis was performed using Jamovi software. Qualitative variables were described as percentages, while quantitative variables were presented as means and standard deviations. The chi-square test was used to compare frequencies, with statistical significance set at $p < 0.05$.

3. Results

A total of 407 patients were included in the study, all of whom underwent EGD with biopsies for histological assessment of *Helicobacter pylori* (HP). HP infection was detected in 91.5% of cases (Group 1: HP-positive (+), $n = 372$) compared to 8.6% (Group 2: HP-negative (-), $n = 35$), resulting in an overall prevalence of 91.5%.

The male-to-female ratio was 0.9 in both the HP-positive and HP-negative groups, with no statistically significant difference ($p = 1$). The mean age was 47.8 ± 16 years in the HP-positive group and 49.6 ± 15.4 years in the HP-negative group, a difference that was not statistically significant ($p > 0.05$).

EGD Indications: In the HP-positive group, indications included epigastric pain (43.8%, $n = 163$), upper gastrointestinal bleeding (18.8%, $n = 70$), and anemia (14%, $n = 53$). In the HP-negative group, anemia was the most common indication (34%), followed by epigastric pain (25.7%) and upper gastrointestinal bleeding (23%), as shown in **Table 1**. There was no statistically significant correlation between EGD indications and HP prevalence.

Endoscopic Findings: Among HP-positive patients, erythematous pangastritis was the predominant lesion (38.4%, $n = 143$), followed by erythematous antritis (17.4%, $n = 65$). In the HP-negative group, erythematous antritis and fundic atrophy were the most common findings (17%, $n = 6$ each) (**Table 1**). HP infection was significantly correlated with the presence of macroscopic endoscopic lesions ($p < 0.001$).

Histopathological Results: Chronic gastritis was observed in all patients. The bacterial load was categorized as HP+ (low) in 10.8% (n = 41), HP++ (moderate) in 35.4% (n = 135), and HP+++ (high) in 53.5% (n = 204). Active gastritis was present in 93% of cases (n = 380), as shown in **Table 2**. The severity of gastritis was minimal in 11% (n = 42), moderate in 85.5% (n = 325), and severe in 3.5% (n = 13).

HP infection was statistically correlated with both the activity of gastritis (p = 0.003) and bacterial load (p < 0.001). Chronic gastritis was classified as atrophic in 24.2% (n = 92) and non-atrophic in 75.8% (n = 288). Intestinal metaplasia was identified in 7.1% (n = 27), and dysplasia in 1.2% (n = 5) (**Table 2**). Atrophic gastritis and precancerous lesions were not statistically associated with HP infection.

Table 1. Clinical, epidemiological, and endoscopic data of patients.

	HP+ Group n (%)	HP- Group n (%)	P
Total	372 (91.5%)	35 (8.6%)	
Sex ratio	0.9	0.9	<0.5
Mean age	47.8	49.6	<0.5
EGD Indications:			
Epigastric pain	163 (43.8%)	9 (25.7%)	
UGI bleeding	70(18.8%)	8 (23%)	<0.001
Anemia	53 (14%)	12 (34%)	
Vomiting	34 (9%)	2 (5.7%)	
dyspepsia	16 (4.3%)	1 (3%)	
EGD Finding:			
-Erythematous pangastritis	143 (38.4%)	5 (14.3%)	
-Erythematous antritis	65 (17.4%)	6 (17%)	
-Fundic atrophy	12 (3.2%)	6 (17%)	<0.001
-Peptic ulcer disease	31 (8.3%)	4 (11.4%)	
-Bulbar stenosis	8 (3%)	1 (2.2%)	
-Gastric tumor	7 (2%)	5 (14.3%)	

Table 2. Histopathological findings of gastric biopsies.

	n	%
Bacterial load:		
+ (low)	41	10.8%
++ (moderate)	135	35.4%
+++ (high)	204	53.5%
Activity of gastritis:		
-Minimal	42	11%
-Moderate	325	85.5%
-Severe	13	3.5%
Atrophic gastritis	92	24.2%
Precancerous lesions:		
-Intestinal metaplasia	27	7.1%
-Dysplasia	5	1.2%

4. Discussion

In Morocco, studies on the epidemiology of *Helicobacter pylori* (HP) infection and its associated gastric pathologies remain limited. The prevalence of HP infection ranges from 70% to 90% in developing countries, compared to 20% to 40% in industrialized nations [3]-[5]. In our study, the prevalence was notably high at 91.5%. This figure is within the range reported by several African studies, which vary from 56.4% to 91.3%, and is higher than European data, where prevalence does not exceed 45% [6] [7]. Our findings are consistent with the World Health Organization (WHO) estimates of over 80% prevalence in Africa [8]. However, they exceed the prevalence rates reported in other Moroccan studies [2] [9], as well as in research from Algeria and Cameroon, where prevalence ranges from 60% to 70% [10] [11]. In contrast, studies conducted in Gabon, Nigeria, and Tunisia report lower prevalence rates of 30% to 40% [1] [12] [13]. These variations suggest that HP prevalence in Africa is not homogeneous, with considerable differences even within the same country. Additionally, methodological biases across studies may contribute to these discrepancies [1].

Some studies [2] [11] [14] [15] have demonstrated that HP infection affects both sexes equally [15], which aligns with our findings, where gender had no significant impact on HP prevalence ($p > 0.05$). However, other studies, such as that of Itoudi *et al.*, noted a female predominance, though without statistical significance ($p = 0.07$) [1]. Sokpon *et al.*, on the other hand, reported a statistically higher prevalence among women (66.5%, $p = 0.03$) [9].

In our study, the mean age was 47.8 ± 16 years in the HP-positive group versus 49.6 ± 15.4 years in the HP-negative group, with no statistically significant difference ($p > 0.05$). This result mirrors findings from Ivorian [6] and Palestinian authors [15]. In contrast, other Moroccan studies [2] [9] [14] have reported a significant association between HP infection and age, as did studies from Cameroon and Gabon [1] [11].

HP infection in our cohort was statistically associated with endoscopic lesions ($p < 0.001$). This finding corroborates reports by Sokpon *et al.* and Itoudi *et al.* [1] [9], and supports the pioneering work of J. Robin Warren and Barry J. Marshall, who first established the relationship between gastroduodenal lesions and the presence of HP [8].

Our study also demonstrated a significant correlation between HP infection and gastritis activity ($p = 0.003$), as well as bacterial load ($p < 0.001$). Similar findings were reported in Moroccan studies by Sokpon *et al.* and a Gabonese study by Itoudi *et al.* [1] [9].

Several studies, including those by Essadik *et al.*, Sokpon *et al.*, Itoudi *et al.*, and Shigeto *et al.* [1] [2] [9] [16], have established a statistical association between HP infection and both gastric atrophy and intestinal metaplasia, resulting from the inflammatory and immunological response induced by the bacterium [8]. HP infection is most often linked to chronic atrophic gastritis, with a prevalence of 91.8%. In contrast, our study did not find a significant association between HP

infection and precancerous lesions. This could be explained by the small sample size in our study, which may be insufficient to detect such a significant association, even if it exists. In addition, differences in the diagnostic criteria used to identify precancerous lesions could explain the variation in results. On the other hand, confounding factors uncontrolled in our study, such as age, patient history, or drug treatments, could have influenced the results.

Finally, it is important to note that the relationship between HP and precancerous lesions could be influenced by geographical, cultural, or environmental factors (such as dietary habits, access to healthcare, and socioeconomic conditions). These contextual differences, together with methodological aspects, therefore explain the discrepancies observed between our study and the data in the literature.

It is now well established that HP is a primary causative agent of gastric cancer [17]. Studies by Haruma *et al.* demonstrated a higher prevalence of HP infection in populations with gastric cancer compared to control populations [18]. This causal link prompted the International Agency for Research on Cancer to classify HP as a definitive carcinogen [19]. Nevertheless, the proportion of infected individuals who develop gastric cancer remains minimal relative to the overall infected population [18].

HP infection represents a real public health problem, as it can lead to precancerous lesions, requiring systematic screening of at-risk populations, particularly those with gastrointestinal symptoms or a family history of gastric cancer, to prevent these complications. Although our study found no statistical association between HP and precancerous lesions, the high prevalence of this bacterium in certain regions justifies increased endoscopic follow-up of patients with precancerous lesions.

In addition, primary prevention strategies such as hygiene education programs, awareness campaigns, and improved access to care are essential to reduce the prevalence of this infection. Larger-scale studies, including multicenter studies, would be relevant to more accurately assess the relationship between *H. pylori* and precancerous lesions, taking into account geographical and socioeconomic factors. Such studies could explore the impact of local variables on the incidence of *H. pylori*-related complications.

5. Conclusion

In our study, the prevalence of HP infection was 91.5%. Neither age nor gender had a significant effect on this prevalence. However, inflammatory gastric and/or duodenal lesions were statistically associated with the presence of HP.

Conflicts of Interest

The authors declare no conflicts of interest.

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