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# Epidemiological Study of Helicobacter Pylori Infection in a Population in the Rabat-Sale-Zamour-Zaer Region

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## ABSTRACT

Infection with H. pylori is universal, likely to affect all populations, but especially encountered when socio-economic conditions are unfavorable. The prevalence of this infection is 70 to 90% in developing countries, while it represents only 20 to 30% in industrialized countries. To assess the prevalence of H. pylori infection in the Rabat-Sale-Zamour-Zaer region, we present a retrospective cohort made up of 3923 patients with gastric symptoms admitted to the LRAM from early 2016 to the end of 2018 for a diagnosis of H. pylori infection by the $^{13}$C-labeled urea breath test. The overall prevalence rate of H. pylori infection in this study is 35.89% distributed equally between the two sexes, but partially high among the youngest age group between 14 and 39 years (41.24%).


**Keywords:** H. pylori; Prevalence; Epidemiology; Urea test

## INTRODUCTION

Chronic bacterial H. pylori infection affects an average of 50% of the world's population. This high prevalence is very unevenly distributed in the world, in fact in non-developed countries which can reach 90% [1-3] while it is lower in industrialized countries [4,5]. For example in South America, Bangladesh, and Pakistan the prevalence is 80%, while it is 26% in Switzerland, 11% in Sweden and 20% to 50% in France [5]. The most affected populations in industrialized countries are people of low socio-economic status and those from developing countries. The prevalence in industrialized countries has been decreasing sharply for several decades, probably due to the increase in the standard of living, hygienic conditions and the heavy use of antibiotics [6]. In industrialized countries, the prevalence increases gradually with age. The infection rate is 5 to 10% in children and reaches 20 to 50% in adults. This gradual increase is due to a cohort effect. The infection is acquired in childhood, especially since the socio-economic level is low and persists throughout the life of the individual in the absence of effective treatment. There is very little acquisition in adulthood [7]. The prevalence for a given age group is therefore a reflection of the prevalence of infection in early childhood in the population of this age group. In adults, the infection rate is less than 1% per year. The incidence in children in industrialized countries is considered to be 1% per year compared to 3 to 10% in developing countries [4]. In Africa, the overall prevalence is between 70 and 98% of the population [1-3]. In Morocco, H. pylori infection concerns 70% of the population [6,7]. A retrospective cohort made up of 3619 cases, all presenting gastroduodenal warning signs [8], collected over a period of 5 years, found an overall prevalence around 67.4%. This prevalence has declined gradually since 1996. The numerous works published over the past ten years have demonstrated the pathogenic role of H. pylori for the gastro-duodenal mucosa, in particular its involvement in gastric and duodenal ulcer disease and in the majority of chronic gastritis [9].

H. pylori infection is often associated with cancer in humans. The most recent data indicate that this bacterium not only plays an initiating role but that it is also involved in the last stages of carcinogenesis [10]. Other recent studies have shown the link between H. pylori infection and certain pathologies such as iron deficiency anemia, bronchiectasis, type II diabetes and certain neurological diseases [11].

In this study, we wanted to assess the prevalence of H. pylori infection in the Rabat-Sale-Zamour-Zaer region by the 13C urea breath test (TRES) in patients with gastric symptoms and compare this prevalence according to different factors (Age, sex, etc.).

## MATERIALS AND METHODS

### Study location and period

This is a retrospective study carried out over a period of 3 years (January 2016-January 2019) at the Laboratory of Research and Medical Analysis of the Royal Gendarmerie in Rabat (LRAM).

### Population studies

The study concerned patients, adults of both sexes admitted to the LRAM.

**Inclusion criteria:** All patients over the age of 14, of both sexes, who had undergone a 13C urea breath test (TRES) without any medical treatment to eradicate H. pylori or were included in the study after stopping more than 4 weeks of antibiotic treatment.

**Exclusion criteria:** Patients excluded from the study are children aged less than 14 years.

### Methodology of the study

This epidemiological study is carried out by statistical analysis and interpretation of the results of the TRES analyzes carried out at LRAM. The TRES is rapid and based on the strong urease activity of H. pylori. After oral administration of $^{13}$C urea (stable carbon isotope), the $^{13}$CO2 enrichment of the exhaled gases indicates a urease activity signifying the presence of H. pylori. This non-invasive test is simple to perform (specificity > 98% / sensitivity > 95%). It also allows the diagnosis and evaluation of the eradication of H. pylori after treatment.

### Statistical methods

Statistical analyzes were performed to assess the following determinants of H. pylori infection; age, gender. For quantitative variables, means, standard deviations, medians and Interquartiles (IQR) were calculated. The proportions were established for the qualitative variables with their 95% Confidence Intervals (CI). To examine the relationship between two discrete variables, we calculated the Relative Risks (RR) and used Pearson's X2 test with the Yates correction and the Fischer's exact test for reduced numbers, for a significance level admitted at 5%.

## RESULTS

### Total population studies

During the study period, 5850 results were collected from January 1, 2016 to the end of December 2018 at LRAM. A total of 3923 (67.06%, 3923/5850) subjects met the inclusion criteria and were tested for H. pylori infection with TRES. 1927 subjects excluded from the study because their ages were less than 14 years or their results were not determinate or when the subjects were under medical treatment to

eradicate H. Pylori. Among these 1,419 men (36.17%) and 2,504 women (63.82%) of average age 48.5 ± 33.5 years (range 14-89 years), divided into age groups under 40 years 37% (1458/3923), 40-59 years 39.46% (1548/3923) and over 60 years 23.54% (923/3923) (Table 1).

### Demographic break down

**Global distribution of H. pylori infection:** The results obtained from this study lead to a significantly lower prevalence of H. pylori infection in our population than the figures found in previous studies [8]. It is 35.89% (34.08% in 2016, 32.55% in 2017 and 38.95 in 2018) (Figure 1 and Table 2).

**Gender distribution of H. pylori infection:** Our study series shows that H. pylori infection is positive in 37.06% of men and 35.34% of women with a non-significant statistical difference. 2 is around 1.08; χ. The calculated value of 2 = 3.84) at the 5% threshold. χ2 (χthis value is less than the theoretical. These figures allow us to accept the null hypothesis concerning the independence of the two characteristics. It is concluded that gender has no significant effect on the prevalence of H. pylori infection.

**Age distribution of H. pylori infection:** The prevalence of H. pylori infection varied significantly with age. 2 at 5%, allows us to reject the independence hypothesis and to conclude that age conditions the prevalence of H. pylori infection, which was high among the subjects of χ2 being higher than the theoretical χ the observed less than 40 years with 41.24% (601/1458) compared to subjects of 40-59 years 34.56% (535/1548) while it is only 31.05% (285/917) in subjects over the age of 59 (Figure 2 and Table 2).

**Distribution of H. pylori infection by sex by age groups:** The results obtained in this study show that there are as many men as women who are infected with H. Pylori in patients under 40 years 50.93%, however and from 40 years the frequency of H. Pylori infection becomes higher in men 54.10% (Figure 3 and Table 2).

**Table 1**: Demographic data of the study.

| Factor | Range | Size / Distribution |
|---|---|---|
| Sex | Men | 1419/3923 (36,17%) |
| | Women | 2504/3923 (63,82%) |
| Age | (14 à 19) years | 181/3923 (4,61%) |
| | (20 à 39) years | 1277/3923 (32,55%) |
| | (40 à 59) years | 1548/3923 (39,46%) |
| | (60 à 79) years | 835/3923 (21,28%) |
| | Ø 80 years | 82/3923 (2,10%) |
| Age and Sex | (14 à 39) years Men | 498/3923 (12,69%) |
| | (40 à 89) years Men | 893/3923 (22,76%) |
| | (14 à 39) years Women | 975/3923 (24,85%) |
| | (40 à 89) years Women | 1557/3923 (39,67%) |

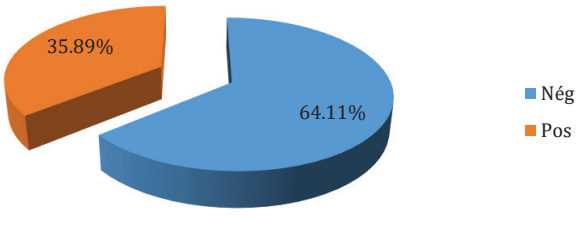


**Figure 1:** Overall prevalence of H. pylori infection.

**Table 2**: Distribution of H. pylori infection.

| Factor | Range | % H. pylori Pos | χ2 observed | χ2 calculated |
|---|---|---|---|---|
| Sex | Men | 37,06% | 1,08 | 3,84 |
| | Women | 35,34% | | |
| Age | (14 à 19) years | 41,22% | 2,49 | 9,489 |
| | (20 à 39) years | 41,26% | 17,39 | |
| | (40 à 59) years | 34,56% | 0,84 | |
| | (60 à 79) years | 27,41% | 22,79 | |
| | Ø 80 years | 34,69% | 0,04 | |
| Age and Sex | (14 à 39) years Men | 41,20% | - | |
| | (40 à 89) years Men | 35,41% | - | - |
| | (14 à 39) years Women | 41,27% | - | - |
| | (40 à 89) years Women | 29,80% | - | - |

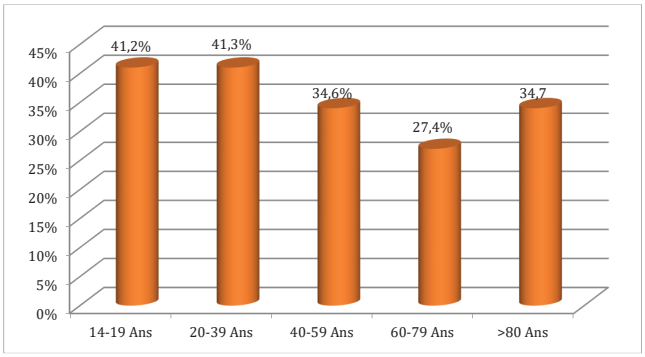


**Figure 2:** Age distribution of H. pylori infection.

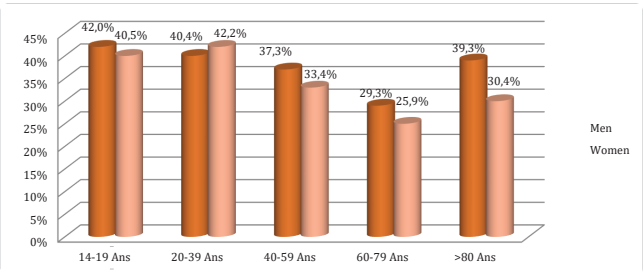


**Figure 3:** Distribution of H. pylori infection by sex by age group.

## DISCUSSION

The socio-economic status and determinants for H. pylori infection have been analyzed in several epidemiological studies, [12-14]. Recent studies confirm the association between H. pylori and the hygienic conditions linked to poverty in the urban environment on the one hand, and on the other hand, the increased prevalence of H. pylori infection among individuals living in community and overcrowding [15,16].

In our study, the prevalence of H. pylori infection is particularly high, in subjects under 40 and men without a significant link to sex being confirmed. The prevalence of H. pylori infection in our region is decreasing, age and hygienic conditions are determining factors for H. pylori infection [15]. 41% of young people aged 14 to 40 are infected with H. pylori, while from 40 years only 32% of patients are infected with this bacterium, 54% of which are men, this slight predominance of men can be explain by the consumption of tobacco and alcohol [17,18].

## CONCLUSION

The epidemiological study of H. pylori infection showed that 35% of the patients included in this study are infected with H. pylori, with a slight male prevalence. 41% of the population between 14 and 39 are affected by this pathology. This drop in the prevalence of H. pylori infection compared to previous studies is probably linked to the improvement of food and health hygiene conditions in our study region as well as to the development of socio-economic living standards of the population concerned. To prevent the progression and recurrence of this gastric pathology, patients are expected to be followed up after the diagnosis of the disease and during the course of treatment.

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