

## PERFIL SOCIODEMOGRÁFICO E PREVALÊNCIA DO *HELICOBACTER PYLORI* EM ADULTOS PORTUGUESES

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### RESUMO

**Introdução:** nas últimas décadas grande importância foi importada à bactéria *Helicobacter Pylori*. A infeção por *Helicobacter Pylori* constitui um problema de saúde pública, reconhecida como uma das infeções crónicas mais comuns estimando-se que cerca de metade da população mundial esteja infetada. Esta bactéria, localizada na mucosa gástrica, relaciona-se com algumas patologias: gastrites, carcinoma gástrico, úlcera péptica.

**Métodos:** realizámos um estudo transversal analítico com uma amostra comunitária de adultos dos concelhos de Viseu e Sátão. A amostra final ficou constituída por 166 adultos, com idades compreendidas entre os 19 e os 92 anos de idade (média de  $46,96 \pm 3,17$  anos) e a maioria do género feminino (56,6%). Os dados foram recolhidos através de um questionário auto-aplicado com questões referentes a aspetos sociodemográficos, agregado familiar e hábitos e estilos de vida diários. A infeção por *H. pylori* foi identificada com recurso ao teste respiratório da urease. O teste foi realizado pela manhã após pelo menos 6 horas de jejum. A análise estatística realizou-se com recurso ao programa estatístico SPSS 23.0. As prevalências expressas em proporções e comparadas pelo teste qui-quadrado, com um nível de significância de 0,05. As associações foram calculadas com recurso ao Odds ratio, com intervalos de confiança de 95% .

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Resultados: A prevalência de *Helicobacter Pylori* foi de 48,8%, (50,0% no sexo feminino e 47,2% no sexo masculino). Encontrámos percentagens maiores no sexo feminino, para idades  $\leq 50$  anos, estado civil casado, nível de escolaridade inferior ao 12º ano, para um maior número de irmãos e em pessoas que se encontravam no ativo, contudo as diferenças não foram estatisticamente significativas.

Conclusão: quase metade da amostra apresentava infeção por *Helicobacter Pylori*. Não encontramos associação entre o *Helicobacter Pylori* e o sexo; idade; estado civil; escolaridade, índice de massa corporal, situação profissional, número de elementos do agregado familiar e número de assoalhadas.

**Palavras Chave:** *Helicobacter Pylori*, prevalência, fatores de risco, adulto, epidemiologia

### ABSTRACT

#### **Sociodemographic profile and the prevalence of *Helicobacter pylori* in Portuguese adults**

Introduction: within the last decades, great importance has been given to the bacterium *Helicobacter Pylori*. The *Helicobacter pylori* infection is a public health problem and is recognized as one of the most common chronic infections, estimating that about half of the world's population is infected with it. This bacterium, located in the gastric mucosa, is related to some pathologies: gastritis, gastric carcinoma, peptic ulcer.

Methods: We carried out an observational cross-sectional study with a community sample of adults from the municipalities of Viseu and Satão. The final sample consisted of 166 adults, aged between 19 and 92 years (mean of  $46.96 \pm 3.17$  years), and the majority female (56.6%). Data were collected through a self-administered questionnaire with questions regarding sociodemographic aspects, the family household and daily habits and lifestyles. The *H. pylori* infection was identified using the urea breath test. The test was performed in the morning after at least 6 hours of fasting. Statistical analysis was performed using the statistical program SPSS 23.0. The prevalences were expressed in proportions and compared by the chi-square test with a level of significance of 0.05. Associations were calculated using the Odds Ratio (OR), with 95% confidence intervals (95% CI).

Results: The prevalence of *Helicobacter Pylori* was 48.8% (50.0% in females and 47.2% in males). We found higher percentages in the female gender, for ages  $\leq 50$  years, married, with an education level inferior to 12<sup>th</sup> grade, with a greater number of siblings, and for those who were employed. Nonetheless, the differences were not statistically significant.

Conclusion: Almost half of the sample was infected by the *Helicobacter pylori* bacteria. We found no association between the presence of *Helicobacter pylori* and gender; age; marital status; schooling, body mass index, professional situation, number of household members and the number of rooms.

**Keywords:** *Helicobacter pylori*, prevalence, risk factors, adult, epidemiology

### INTRODUCTION

The bacterium *Helicobacter pylori* (*H. pylori*) is considered one of the most common bacterial infections in humans worldwide. Its discovery more than 20 years ago altered the diagnosis and treatment of the gastroduodenal disease. It infects approximately 50% of the world's population, leading to chronic gastritis in at least 100% of the individuals infected. Also, a fraction of these individuals may also develop a gastric or duodenal ulcer, gastric adenocarcinoma or even lymphoma (Mucosa-Associated Lymphoid Tissue - MALT) (Marcus, Sachs, & Scitt, 2016). Currently, the possibility of it being considered a necessary cause for the occurrence of this outcome - gastric adenocarcinoma (Peleteiro, La Vecchia, & Lunet, 2012) - is being discussed. The present knowledge on the epidemiology and transmission of *H. pylori*, as well as the role of this infectious agent in the

pathogenesis of the upper gastrointestinal tract disease, has become fundamental (Suerbaum & Michetti, 2002).

The prevalence, although high, varies geographically - higher in developing countries and lower in the developed world - the majority of the developing countries have rates higher than 80% as opposed to the 20% to 40% of the developed countries (Hunt et al., 2010). In addition, within the same country the same variation can occur among urban populations with a high economic level and in rural populations (Hunt et al., 2010). Other factors that influence the incidence and prevalence of *H. pylori* infection are age, ethnicity and socioeconomic status - deprived socioeconomic environments increase the likelihood of infection since housing with large clusters and poor hygienic-sanitary conditions are common (Hunt et al., 2010; Santos et al., 2010). The transmission of *H. pylori* occurs mainly through the oral-to-oral or fecal-to-oral routes. There are many factors that intervene in the overall prevalence of infection, such as the lack of adequate sanitation, safe drinking water, basic hygiene, poor diets and overpopulation (Hunt et al., 2010). Intrafamilial transmission seems to be the main route for the acquisition of infection, mainly between mothers and children and between siblings, supporting the hypothesis that close contact is important for the transmission of the infection (Kivi & Tindberg, 2006).

In the city of Oporto, the estimates of the frequency of infection in the general population for different age groups, resulting from the studies EPIPorto (adults, 1999-2003), EPITeen (adolescents, 13 years old, 2003/2004) and Geração XXI (children, 4 years old, 2010-2011), were 73.9% in the age group 18-30 years and higher than 88% in the individuals over the age of 40 years (Lunet, 2011). Another study, carried out in Lisbon with a sample of 136 patients born in Portugal, revealed that 102 patients (75%) were positive for *H. pylori* (Oleastro et al., 2014). These patients, with upper gastrointestinal tract symptomatology, were submitted to high endoscopy and presented no history of anti-*H. Pylori* eradication therapy. Moreover, they attended the Gastroenterology Unit of the Hospital Cuf Descobertas or the Gastroenterology Centre of the Hospital Cuf Infante Santo, between October 2008 and May 2009. The distribution by gender indicated a ratio of 1:1 man:woman. Regarding age distribution, it was observed that 74.5% (76/102) of the patients were adults whose age ranged between 20 and 82, and that 25.5% (26/102) were between the ages of 3 and 18 years (Oleastro et al., 2014). In Nigeria (an underdeveloped country), an epidemiological study was carried out using the urease test and the histological analysis of gastric biopsies as diagnostic techniques, which concluded that 64% of the individuals were infected by the bacterium (Abiodun Christopher et al., 2010). On the other hand, another study carried out in Portugal (Algarve), also using the same type of diagnostic techniques, showed that 44.9% of the individuals were infected by *H. pylori* (Weyermann, Rothenbacher, & Brenner, 2009).

Thus, the objectives of this study were to determine the prevalence of *Helicobacter pylori* in a community sample of adults and to identify sociodemographic variables associated with the *Helicobacter pylori* infection in adults in the community of the district of Viseu.

## **PARTICIPANTS AND METHODS**

We carried out an analytical cross-sectional study with a sample of 166 adults from the centre part of Portugal. The majority of the sample was female (56.6%) with a mean age of  $46.96 \pm 3.17$  years (with a minimum age of 19 years and maximum of 92 years). The majority of the sample presented age  $\leq 50$  years (54.8%); was married or lived in a civil partnership (64.5%); had a baccalaureate or licentiate degree (35.2%) and was working (70.9%) (Table 1).

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*Table 1*  
*Sociodemographic characterization of the sample*

|  | Female |        | Male |        | Total |        |
|--|--------|--------|------|--------|-------|--------|
|  | n      | %      | n    | %      | n     | %      |
|  | (94)   | (56,6) | (72) | (43,4) | (166) | (100%) |
| <b>Age</b>   |        |        |      |        |       |        |
| ≤ 50 years old   | 52     | 55,3   | 39   | 54,2   | 91    | 54,8   |
| > 50 years old   | 42     | 44,7   | 33   | 45,8   | 75    | 45,2   |
| <b>Marital Status</b>  |        |        |      |        |       |        |
| Single   | 26     | 27,7   | 14   | 19,4   | 40    | 24,1   |
| Married / civil partnership                                  | 54     | 57,4   | 53   | 73,6   | 107   | 64,5   |
| Widowed/divorced   | 14     | 14,9   | 5    | 6,9    | 19    | 11,4   |
| <b>Schooling</b>   |        |        |      |        |       |        |
| < 4 <sup>th</sup> grade                                      | 11     | 11,8   | 15   | 20,8   | 26    | 15,8   |
| 1 <sup>st</sup> and 2 <sup>nd</sup> cycle of basic education | 30     | 32,3   | 14   | 19,4   | 44    | 26,7   |
| Secondary level  | 10     | 10,8   | 12   | 16,7   | 22    | 13,3   |
| Baccalaureate /Licentiate degree                             | 36     | 38,7   | 22   | 30,6   | 58    | 35,2   |
| Master's degree /PHD   | 6      | 6,5    | 9    | 12,5   | 15    | 9,1    |
| <b>Employment Status</b>                                     |        |        |      |        |       |        |
| Employed   | 53     | 68,8   | 52   | 73,2   | 105   | 70,9   |
| Unemployed   | 6      | 7,8    | 5    | 7,0    | 11    | 7,4    |
| Retired  | 18     | 23,4   | 14   | 19,7   | 32    | 21,6   |

Data were collected through a self-administered questionnaire, consisting of questions related to sociodemographic, household and lifestyle aspects. To evaluate the presence of H. pylori, we resorted to the 13C urea breath test.

Data were collected through a self-administered questionnaire with questions regarding sociodemographic aspects, the family household and daily habits and lifestyles. The H. pylori infection was identified using the urease breath test consisting of carbon dioxide exhalation in samples before and after ingesting non-radioactive carbon -13 labelled urea. The samples were then analysed and each result would be classified as positive or negative for H. pylori gastric infection.

Statistical analysis was performed using the statistical program SPSS 23.0. The prevalences were expressed in proportions and compared by the chi-square test, with the application of a significance level of 0.05. Associations were calculated using the Odds Ratio (OR), with 95% confidence intervals (95% CI).

This research was carried out in accordance with the Declaration of Helsinki and approved by the Ethics Committee of the Higher Education School of Health and the Studies Centre in Education, Technologies and Health of the Polytechnic Institute of Viseu (CI & DETS). The information collected by the questionnaires was provided voluntarily and confidentially, guaranteeing the anonymity of the information obtained.

**RESULTS**

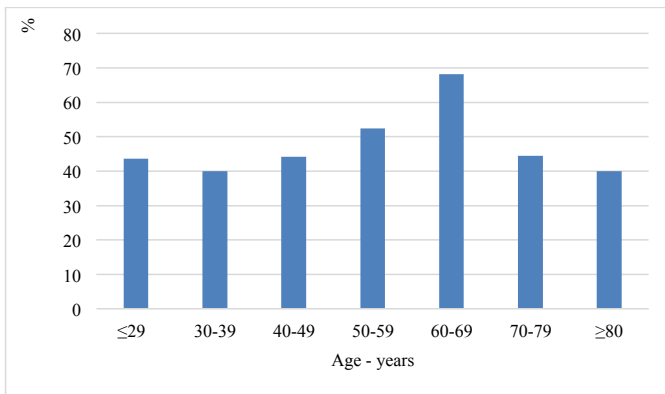
The prevalence of H. pylori infection was 48.8% (50.0% in females and 47.2% in males, p=0.72). As we can see from Table 2, the prevalence of HP was higher in women, but without any statistical significance (95%CI 0.484-1.654). Concerning age, the higher prevalences were found for ages between 50 and 69 years. Still, there were no statistically significant differences (Table 2 and Chart 1).

*Table 2*  
*Distribution and prevalence of infection by gender and age group*

|               | n  | %    | Hp <sup>+</sup><br>(n; %) | Hp <sup>-</sup><br>(n; %) | Prevalence<br>Hp | CI 95%      |
|---------------|----|------|---------------------------|---------------------------|------------------|-------------|
| <b>Gender</b> |    |      |                           |                           |                  |             |
| Male          | 72 | 43,4 | (34; 42,0)                | (38; 44,7)                | 47,2             | 0,484-1,654 |
| Female        | 94 | 56,6 | (47; 58,0)                | (47; 55,3)                | 50,0             |             |
| <b>Age</b>    |    |      |                           |                           |                  |             |
| ≤ 29          | 39 | 23,5 | 17 (21,0)                 | 22 (25,9)                 | 43,6             |             |
| 30-39         | 15 | 9,0  | 6 (7,4)                   | 9 (10,6)                  | 40,0             |             |
| 40-49         | 34 | 20,5 | 15 (18,5)                 | 19 (22,4)                 | 44,1             |             |
| 50-59         | 42 | 25,3 | 22 (27,2)                 | 20 (23,5)                 | 52,4             |             |
| 60-69         | 22 | 13,3 | 15 (18,5)                 | 7 (8,2)                   | 68,2             |             |
| 70-79         | 9  | 5,4  | 4 (4,9)                   | 5 (5,9)                   | 44,4             |             |
| ≥ 80          | 5  | 3,0  | 2 (2,5)                   | 3 (3,5)                   | 40,0             |             |

Legend: Hp - Helicobacter pylori; Hp<sup>+</sup> - Positive Helicobacter pylori; Hp<sup>-</sup> - Negative Helicobacter pylori

*Graph 1*  
*Distribution of HP infection by age group*



Observing Table 3, the prevalence of H. pylori and sociodemographic factors, it is found that higher prevalences for H. pylori infection were found in women (58.0%); Age ≤ 50 years (50.6%); Married (63.0%); with an education level ≤12th grade (60.5%), employed (75.3%) and in a household with a greater number of rooms (84.0%); Nevertheless, the differences found are not statistically significant. The prevalence of h. Pylori in the group with a number of siblings ≥ 2 (60.5%) and only with a number of ≤ 3 members was higher, without statistical differences (Table 3).

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*Table 3*  
*Percentage of Helicobacter pylori and sociodemographic variables*

|                                       | <b>H. pylori - Positive</b> |      | p    |
|---------------------------------------|-----------------------------|------|------|
|                                       | n                           | %    |      |
| <b>Gender</b>                         |                             |      |      |
| Male                                  | 34                          | 42,0 | 0,72 |
| Female                                | 47                          | 58,0 |      |
| <b>Age</b>                            |                             |      |      |
| ≤ 50 years old                        | 41                          | 50,6 | 0,29 |
| >50 years old                         | 40                          | 49,4 |      |
| <b>Marital Status</b>                 |                             |      |      |
| Married                               | 51                          | 63,0 | 0,69 |
| Single/divorced/widowed               | 30                          | 37,0 |      |
| <b>Education Level</b>                |                             |      |      |
| ≤ 12 <sup>th</sup> grade              | 49                          | 60,5 | 0,22 |
| >12 <sup>th</sup> grade               | 32                          | 39,5 |      |
| <b>BMI</b>                            |                             |      |      |
| Normal weight                         | 35                          | 43,3 | 0,99 |
| Overweight                            | 36                          | 44,4 |      |
| Obese                                 | 10                          | 12,3 |      |
| <b>Employment Status</b>              |                             |      |      |
| Employed                              | 55                          | 75,3 | 0,25 |
| Unemployed/Retired                    | 18                          | 24,7 |      |
| <b>People living in the household</b> |                             |      |      |
| ≤ 3 people                            | 51                          | 64,6 | 0,61 |
| > 3 people                            | 28                          | 35,4 |      |
| <b>Number of siblings</b>             |                             |      |      |
| ≤ 1 sibling                           | 32                          | 39,5 | 0,15 |
| ≥ 2 siblings                          | 49                          | 60,5 |      |
| <b>Average n° of rooms</b>            |                             |      |      |
| ≤ 3 rooms                             | 13                          | 16,0 | 0,57 |
| ≥ 4 rooms                             | 68                          | 84,0 |      |

**DISCUSSION**

In the present study, we determined the prevalence and investigated sociodemographic risk factors for the H. pylori infection. Scientific evidence has shown that more than half of the adult population is infected worldwide, with higher frequencies in countries with lower gross domestic product and in lower socioeconomic groups (Lunet, 2011). The calculated value concerning the prevalence of Hp infection - 48.8% - was considerably lower than that estimated for the general Portuguese population and closer to that of several developed Western European countries. Thus, the prevalence spectrum of Hp infection is very broad, varying with the level of development of the regions - most developing countries present rates higher than 80% as opposed to 20-40% of the developed countries (Santos et al., 2010). However, one of the limitations of this study - with a small and community-size sample - may have to interfere with the results, because most studies have been carried out on populations already affected. That is, on dyspeptic populations with a higher prevalence of infection than the general population, with an odds ratio of 2.3 (Santos et al., 2010). We found studies performed in Portugal and in the world with prevalences higher than the present study (Abiodun Christopher et al., 2010; Bastos et al., 2013; Oleastro et al., 2014). Nonetheless, we also found studies with lower prevalences (Weyermann, Rothenbacher, & Brenner, 2009). In China, a study with a sample of 5417 healthy individuals from the city of Yangzhong, aged 30-69 years

(mean 50.15 years) from 6 rural villages in the municipalities of Yangzhong, revealed a higher prevalence of *H. pylori* in women (64.47% vs. 61.74%  $p=0.026$ ), whereas the 30-39 year-old group presented a higher percentage of *H. pylori* (90.82%) with a significant reduction in prevalence with the increase of age (Zhu et al., 2014). The same study did not find any significant differences with other sociodemographic variables (gender, academic qualifications, marital status, income, number of household members and BMI). Another study conducted in Porto with a sample of institutionalized adults ( $n=2067$ ), showed a prevalence of *H. pylori* infection of 84.2% (95% CI 82.4 - 86.1), associated with age and the level of schooling (prevalence increases with age 18-30 years 72.6%,  $\geq 71$  years 88.1%;  $p<0.001$  and decreases with the level of schooling  $\leq 4$  years of schooling 100.0%;  $\geq 10$  years of schooling 72.6%;  $p <0.001$ ) (Bastos et al., 2013). In the present study, we did not find any statistically significant differences with sociodemographic variables probably due to the small sample size. When we look at graph 1, it is evident that there is an increase in the prevalence of HP over 40-49 years and a progressive decrease in the prevalence over 60-69 years. Other evidence shows a decline in prevalence in these age groups, namely the study conducted in the Algarve, which showed an evident progressive reduction of prevalence over 60 years and a higher prevalence between the age of 30 and 59 years (Santos et al., 2010). In China, the study carried out in the municipality of Yangzhong revealed higher prevalences in the age group of 30-39 years (Zhu et al., 2014). Other studies demonstrate clear evidence of the increased prevalence with age (Bastos et al., 2013; Moosazadeh, Lankarani, & Afshari, 2016; Sethi et al., 2013). That is, more attention has recently been paid to the relation of sociodemographic risk factors for *H. pylori* infection, such as gender, age and socioeconomic status, but the results have been controversial.

## CONCLUSION

In conclusion, the prevalence of the *H. pylori* infection was 48.8%. We did not find any significant differences with the sociodemographic variables. Knowledge regarding the *H. pylori* infection prevalence in each context as well as variability over time and age groups, are essential to estimate the potential impact of health promotion measures and the prevention and control of the infection.

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