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Helicobacter pylori infection and associated factors

Infecção por Helicobacter pylori e fatores associados

Infección por Helicobacter pylori y factores asociados

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Knowledge on the interaction between *Helicobacter pylori* infection and the development of gastric diseases leads to the investigation of its prevalence in different geographic areas. Considering the oral-oral or fecal-oral transmission routes, an *H. pylori* infection can be associated with lack of adequate sanitation, poor hygiene, low socioeconomic status and family agglomeration.[1] In this sense, the purpose of this study was to determine the frequency and potential risk factors of *H. pylori* infection among patients with dyspeptic symptoms in the extreme south of Brazil.

We analyzed gastric biopsy specimens obtained from 227 patients undergoing endoscopy at Hospital Dr. Miguel Riet Corrêa Jr., in Rio Grande and at Hospital São Francisco de Paula, in Pelotas. This study was approved by the Research Ethics Committee of FURG (number 36/2011). An informed consent was obtained from all patients and a questionnaire was applied for to evaluate the potential risk factors of *H. pylori* infection. *H. pylori* infection was determined by histology or *in-house* urease test and confirmed by polymerase chain reaction, as described by Vianna et al (2016).[2] The chi-square test was used for categorical data analysis. *P*-values <0.05 were considered statistically significant. Statistical tests were carried out with the application software Stata version 13.0.

Among the 227 patients included in this study, *H. pylori* was present in 66.5% (151), which is in accordance with the frequencies reported in the last years in Brazil and other developing countries. Since this frequency varies worldwide, mainly due to the socioeconomic level of the population, in developed countries, these rates are lower (~30%). This can attributed to the fact that in these places, the population has access to better sanitation and hygiene conditions, as well as guidance for prevention and treatment of diseases.[3,4]

Regarding demographic factors (Table 1), of the 227 patients analyzed, no significant difference was detected between gender and *H. pylori* infection (p=0.37). On the other hand, a statistically significant relation was observed between the presence of *H. pylori* infection and patient age (p=0.04), the average was 53.4±13.9 years old with a range of 20–88 years. Figure 1 shows *H. pylori* infection according to different age groups. The frequency of *H. pylori* infection increased with age until the age range of 40–59 years, whereas soon after the frequency decreased. This may be associated with a birth cohort effect (i.e. a change in the rate of infection during childhood). Once *H. pylori* infection is acquired during childhood, and left unidentified and untreated, it can remain for the entire life, leading to the development of gastric disorders.[5]

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Table 1. Factors for Helicobacter pylori infection available in the study.

Study factors	*H. pylori* positive patients (n = 151) % (N)	*H. pylori* negative patients (n = 76) % (Number)	p - value
Marital status			
Unmarried	22.5% (34)	18.4% (14)	0.38
Married	54.3% (82)	50.0% (38)	
Divorced/Widower	23.2% (35)	31.6% (24)	
Smoking			0.11
No	74.8% (113)	84.2% (64)	
Yes	25.2% (38)	15.8% (12)	
Alcohol consumption			0.83
No	80.1% (121)	78.9% (60)	
Yes	19.9% (30)	21.1% (16)	
N° of persons per household			0.04
1 – 3	59.6% (90)	73.7% (56)	
4 or more	40.4% (61)	26.3% (20)	
Source of water for drinking			
Public tap	72.8% (110)	61.8% (47)	0.17
Bottled	19.2% (29)	23.7% (18)	
Well	8.0% (12)	14.5% (11)	
Toilet			
Flush toilet	96.7% (146)	100.0% (76)	0.28
Pit toilet	2.0% (3)	0% (0)	
No toilet	1.3% (2)	0% (0)	
Years of school			
0-4	39.7% (60)	36.8% (28)	0.83
5-8	32.5% (49)	31.6% (24)	
9 or more	27.8% (42)	31.6% (24)	
Monthly family income (US$)			
0 – 500	53.6% (81)	51.3% (39)	0.51
501 – 1000	32.5% (49)	29.0% (22)	
1001 or more	13.9% (21)	19.7% (15)	

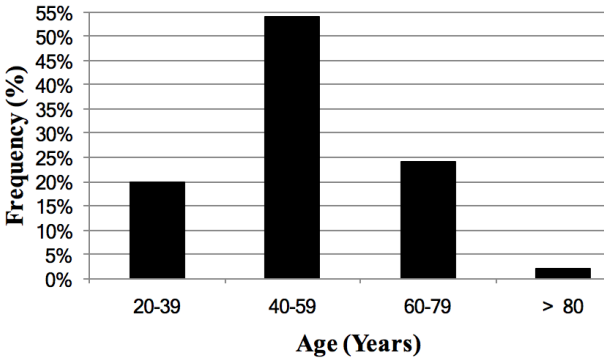

Figure 1. Frequency of Helicobacter pylori infection according to age.

The decrease in frequency of *H. pylori* observed from the age group of 60-79 years can be explained by a decreased number of microorganisms as a consequence of gastric mucosa atrophy or of the cumulative use of antibiotics. This atrophy leads to a pH increase in the stomach, an event which can create an unfavorable environment for *H. pylori* survival.[6]

By analyzing the questionnaires applied to the patients, we observed a statistically significant relation between the number of persons per household and the presence of *H. pylori* (p=0.04) (Table 1). This finding may indicate the occurrence of *H. pylori* transmission between individuals who live in the same household, due to more opportunities of personal contact, which assists in maintaining a high *H. pylori* prevalence. Thus, the eradication treatment in patients and family members with *H. pylori* infection can result in a decrease in the number of recurrences.[7]

As show in table 2, a statistically significant association was found between the histological and endoscopic diagnoses as well as the *H. pylori* infection ($p<0.05$). According to histological reports, none of the patients infected with *H. pylori* presented gastric mucosa without an inflammatory infiltrate; and chronic pangastritis was identified in 77.0% of *H. pylori* positive patients. Based on endoscopic reports, enanthematous gastritis and peptic ulcer were the most frequent diagnoses in patients infected with the bacterium, appearing in 78.3% and 75.5% of

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Table 2. Association between endoscopic and histological diagnoses and Helicobacter pylori infection.

Histological Diagnosis	*H. pylori* positive patients (n = 151) % (N)	*H. pylori* negative patients (n = 76) % (Number)	p - value
Gastric mucosa without an inflammatory infiltrate (n = 20)	0% (0)	100.0% (20)	<0.001
Chronic gastritis (n = 42)	57.1% (24)	42.9% (18)	
Chronic pangastritis (n = 165)	77.0% (127)	23.0% (38)	
Endoscopic Diagnosis			
Normal gastric mucosa (n = 38)	60.5% (23)	39.5% (15)	0.01
Enanthematous gastritis (n = 69)	78.3% (54)	21.7% (15)	
Erosive gastritis (n = 62)	51.6% (32)	48.4% (30)	
Peptic ulcer (n = 49)	75.5% (37)	24.5% (12)	
Gastric cancer (n = 9)	55.6% (5)	44.4% (4)	

patients, respectively. The high frequency of peptic ulcer related to *H. pylori* identified in this study suggests a low influence of acetylsalicylic acid, non-steroid anti-inflammatories and alcohol on the peptic ulcer development of these patients.[8] Furthermore, 55.6% of the patients with gastric cancer were diagnosed with *H. pylori*. As gastric cancer is a multifactorial disease, environmental factors and host-related variables can be involved in the development of the gastric cancer detected in the patients of this survey.[9] However, it is important to note that during atrophic gastritis, intestinal metaplasia and dysplasia, which are disorders that precede the development of gastric cancer, there is a significant decrease in the *H. pylori* colonization of the gastric mucosa, which could have led to false negative results in the patients with gastric cancer.[10]

To conclude, this study showed a frequency of *H. pylori* infection of 66.5%, and suggested that household crowding facilitates person-to-person transmission of *H. pylori* within families, being considered a risk factor for infection. In addition, we observed an increase in the frequency of *H. pylori* infection according to age, suggesting a cohort phenomenon, in other words, the acquisition of this bacterium may have occurred predominantly during childhood, when the sanitary conditions in the place where they lived were deficient, and not during adulthood. Finally, once acquired and untreated, the persistent *H. pylori* infection might have led to the development of gastritis, peptic ulcer or gastric cancer.

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REFERENCES

1. Goh KL, Chan WK, Shiota S, et al. Epidemiology of Helicobacter pylori Infection and Public Health Implications. Helicobacter 2011;16(1):1–9. doi: 10.1111/j.1523-5378.2011.00874.x
2. Vianna JS, Ramis IB, Halicki PCB, et al. Detection of Helicobacter pylori CagA EPIYA in gastric biopsy specimens and its relation to gastric diseases. Diagnostic Microbiology and Infectious Disease 2016;83(2):89-92. doi: 10.1016/j.diagmicrobio.2015.05.017
3. Vinagre IDF, Queiroz AL, Silva Júnior MR, et al. Helicobacter pylori infection in patients with different gastrointestinal diseases from northern Brazil. Arq Gastroenterol 2015;52(4):266-271. doi: 10.1590/S0004-28032015000400004
4. Hooi JKY, Lai WY, Ng WK, et al. Underwood. Global Prevalence of Helicobacter pylori Infection: Systematic Review and Meta-Analysis. Gastroenterology 2017;153(2):420–429. doi: 10.1053/j.gastro.2017.04.022
5. Zou D, He J, Ma X, et al. Helicobacter pylori infection and gastritis: the Systematic Investigation of gastrointestinal diseases in China (SILC). J Gastroenterol Hepatol 2010;26(5): 908–15. doi: 10.1111/j.1440-1746.2010.06608.x
6. Carrilho C, Modcoicar P, Cunha L, et al. Prevalence of Helicobacter pylori infection, chronic gastritis, and intestinal metaplasia in Mozambican dyspeptic patients. Virchows Arch 2009;454(2):153-60. doi: 10.1007/s00428-008-0713-7
7. Yalçin M, Yalçin A, Bengi G, et al. Helicobacter pylori Infection among Patients with Dyspepsia and Intrafamilial Transmission. Euroasian Journal of Hepato-Gastroenterology 2016;6(2):93-96. doi: 10.5005/jp-journals-10018-1177
8. Chen TS, Luo JC, Chang FY. Prevalence of Helicobacter pylori infection in duodenal ulcer and gastro-duodenal ulcer diseases in Taiwan. J Gastroenterol Hepatol 2010;25(5):919-22. doi: 10.1111/j.1440-1746.2009.06139.x
9. Krejs GJ. Gastric Cancer: Epidemiology and Risk Factors. Dig Dis 2010;28(4-5):600-3. doi: 10.1159/000320277
10. Axon ATR. Relationship between Helicobacter pylori gastritis, gastric cancer and gastric acid secretion. Adv Med Sci 2007; 52:55-60. Disponível em: https://www.ncbi.nlm.nih.gov/pubmed/18217390

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