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# Prevalence of *Helicobacter pylori* infection in Fortaleza, Northeastern Brazil

## Prevalência da infecção pelo *Helicobacter pylori* em Fortaleza, Ceará

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### Keywords

*Helicobacter* infections, epidemiology. *Helicobacter pylori*. Poverty. Urban population. Prevalence. Brazil.

### Descritores

Infecções por *Helicobacter*, epidemiologia. *Helicobacter pylori*. Pobreza. População urbana. Prevalência. Brasil.

### Abstract

The prevalence of *Helicobacter pylori* infection was assessed in a randomly selected sample of individuals from low-income community in Fortaleza, Northeastern Brazil. Overall, 384 out of 610 participants (62.9%) were *H. pylori* positive. A 47.5% infection rate was found in subjects aged six months to 10 years old, increased to 73.3% in subjects aged 11-20 years and then continued to increase with age reaching up to 87% in those over 60 years old. After this age group, the prevalence decreased slightly. The prevalence of infection increased significantly with age ( $p<0.0001$ ).

### Resumo

A prevalência da infecção pelo *Helicobacter pylori* foi avaliada em amostra randomizada de indivíduos de uma comunidade urbana de baixa renda em Fortaleza, Estado do Ceará. O *H. pylori* foi detectado em 384 (62.9%) dos 610 participantes. A taxa de infecção foi de 47.5% em indivíduos com seis meses a 10 anos de idade, aumentou para 73.3% entre indivíduos com 11 a 20 anos, e continuou a aumentar com a idade, atingindo 87% naqueles com aproximadamente 60 anos. Após essa idade, a prevalência diminuiu discretamente. A prevalência da infecção aumentou significativamente com a idade ( $p<0.0001$ ).

## INTRODUCTION

*Helicobacter pylori* infection is found worldwide and is a public health concern in many countries. It is causally linked with a diverse spectrum of gastrointestinal clinical disorders including gastritis, peptic ulcer disease, and gastric MALT lymphoma and it represents one of the most significant risk factors for gastric cancer.<sup>3</sup>

Previous epidemiological studies on *H. pylori* have shown high prevalence of the infection in Brazil similarly to other developing countries.<sup>4</sup> Since Brazil is a

country of continental dimensions, regional differences are likely to occur. No published reports on the epidemiology of *H. pylori* infection in randomized population in Northeastern Brazil were found. Also it has been emphasized that gastric carcinoma is the most common internal malignancy in men\* in the state of Ceará, Northeastern Brazil.

As *H. pylori* infection is considered a risk factor for gastric cancer, it seems very important to study *H. pylori* in this region. Therefore, the aim of the present study was to assess the prevalence of *H. pylori* infection in individuals according to their age and gender.

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\*Ministério da Saúde. Câncer no Brasil: dados dos registros de base populacional 2. Brasília (DF): 1995.  
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**Table** - Prevalence of *Helicobacter pylori* infection by age in Northeastern Brazil. 2000-2001.

Age	N	Positive <i>H. pylori</i> N (%)	95% CI
6 months-10 years old	305	145 (47.5)	48.8-53.3
11-20 years old	120	88 (73.3)	64.5-81.0
21-30 years old	66	51 (77.3)	65.3-86.7
31-40 years old	73	60 (82.2)	71.5-90.2
41-50 years old	17	14 (82.4)	56.6-96.2
51-60 years old	16	15 (93.8)	69.8-99.8
>60 years old	13	11 (84.6)	54.6-98.1

CI: Confidence Interval

## METHODS

A cross-sectional randomized study in a selected population of individuals, according to their age and gender, was carried out between March 2000 and April 2001 in an urban low-income community of Fortaleza, Northeastern Brazil. Houses in the community had been previously numbered and households to be surveyed were chosen by means of a table of random numbers. The sample size was based on a 80% prevalence rate and 5% sample error, resulting in 250 individuals. Seven-hundred subjects were interviewed, of which 610 had their breath collected for analysis. The questionnaire comprised information about age, gender, family income, number of people in the household and type of water consumed.

*H. pylori* status was assessed using  $^{13}\text{C}$ -urea breath test ( $^{13}\text{C}$  -UBT) in individuals under the age of 14 years old and using ELISA for those above this age. Both tests were previously validated for the Brazilian population.

Statistical analysis was conducted by the Chi-square test to determine the association between *H. pylori* infection and age and gender. Differences were considered significant when  $p < 0.05$ .

The study was approved by the Clinical Research Committee of the *Universidade Federal do Ceará*. An informed consent was obtained from each subject or parents of those who were younger than 14 years of age.

## RESULTS

The questionnaire data showed that 99% of the families had an average annual income of R\$3,600 (around US\$1,450). Ninety per cent of the houses were brick-built, 71.1% had more than two rooms. There were no sewage systems in the area, but most dwellings had water supply; in spite of that, 82% of the population got water from local wells and water sources. In 53.3% (84/152) of the residences there lived four to six people; in 25.6% (39/152), one to three, and in 19.1% (29/152), more than seven.

Six-hundred and ten individuals were included in the study, 358 females and 252 males, with ages ranging from six months to 80 years old. Among them, 30.3% (185/610) were between 21 to 80 years old (44 males, 141 females) and 69.7% (425/610) six months to 20 years old (mean age seven years, 208 males, 217 females).

Overall, 384 of 610 participants (62.9%) were *H. pylori* positive with no significant difference between the genders ( $p = 0.42$ ). Infection rate was of 47.5% in subjects aged six months to 10 years, increased to 73.3% in subjects aged 11-20 years, and continued to increase with age reaching up to 87% in those over 60 years old. After this age the prevalence slightly decreased (Table). As a whole, the prevalence of infection significantly increased with age ( $p < 0.0001$ ). However, when subjects were stratified by the age below (233/425, 54.6%) and above (151/185, 81.6%) 14 years old, increasing rates were seen in younger groups ( $p < 0.0001$ ) but not in older ones ( $p = 0.42$ ).

## DISCUSSION

This study showed *H. pylori* high infection rates among adults, children and teenagers living in the studied urban community. Among adults, the prevalence was similar to that reported in the rural area of Mato Grosso do Sul, Midwest Brazil, among those with similar socio-economic condition.<sup>4</sup> However, the prevalence of infection among children is higher than that observed in a study of low-income children from Southeast Brazil.<sup>2</sup> This could be explained by quality of drinking water, where it is considered of good quality for human consumption by the local authorities (without fecal coliforms).

The prevalence of *H. pylori* infection increased with age, but a slight decrease in prevalence in the oldest age group, is probably due to decreasing specific immune response among older individuals and/or to decreased number of microorganisms as a result of gastric atrophy. There was no significant difference in the overall prevalence of *H. pylori* infection between males and female.

In the study community, the likelihood of being infected by *H. pylori* seems quite high in children up to 10 years of age, for whom the estimated infection rate is around 4.75% a year. Between that age and up to 20, infection rate drops to 2.6% a year; after the age of 20, it decreases steadily and by 60 years of age it reaches 0.1% a year. These results are consistent with Mitchell et al.<sup>1</sup> hypothesis that *H. pylori* infection in developing countries occurs mostly during

childhood and that during adulthood the chance of getting infected is low but constant.

In conclusion, the study shows *H. pylori* infection is highly prevalent in this urban community in Northeastern Brazil, characterized by poor living conditions. Prospective cohort studies are needed to clearly define aspects of the epidemiology of *H. pylori* infection.

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