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ORIGINAL ARTICLE

Changing prevalence of *Helicobacter pylori* in south of Iran

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ABSTRACT

Background: The prevalence of *Helicobacter pylori* has declined rapidly in Asia. This has been shown in both seroprevalence-based and endoscopy-based studies. The present study was conducted to determine the prevalence of gastric infection caused by *H. pylori* in an Iranian population residing in south of Iran.

Patients and methods: A total of 522 patients (266 females and 256 males with the mean age of 44.3±13.0, range 18-83 years) underwent endoscopy in Shiraz, southern Iran. The diagnosis of *H. pylori* infection was established by rapid urease test, culture and gram staining and the gastric disease was confirmed by an expert pathologist.

Results: From ulcerative (n=296) and non-ulcerative (n=226) patients, 156 (52.7%) and 94 (41.6%) *H. pylori* strains were isolated by culture, respectively. The prevalence of *H. pylori* infection was significantly higher in patients aged 21-30 and >50 years (66.66% and 62.12%, respectively). However, *H. pylori* was not detected in 22 patients aged <20 years.

Conclusion: The present study revealed a significant decline in the prevalence of *H. pylori* infection in the studied population. It seems that in parallel with better therapeutic approaches and elimination of bacteria, an improvement in the personal hygiene and living conditions of the Iranian population contribute to lower prevalence of *H. pylori*.

Keywords: *Helicobacter pylori, Iran, Gastric disorders, Prevalence*.
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INTRODUCTION

Helicobacter pylori is a microaerophilic spiral-shaped, gram-negative bacillus which was discovered more than two decades ago by Warren and Marshall (1). *H. pylori* organisms colonize approximately half of the world's human population (2). It is considered to play a major role in the pathogenesis of several gastroduodenal diseases, including gastric ulcer, duodenal ulcer, gastric mucosa-associated lymphoid tissue (MALT) lymphoma, and distal gastric cancer. Previous seroepidemiologic studies indicated that about 50% of adults in developed countries and nearly 90% of adults in developing countries were positive for serum antibodies against *H. pylori* (3, 4). There are reports describing a significant difference in the prevalence of *H. pylori* infection, between and within countries due to variation in geographical locations and ethnicity of each population (5,6). High rates of *H. pylori* infection have been significantly associated with low socioeconomic status and poor living conditions during childhood (7). It has been demonstrated that

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prevalence of *H. pylori* infection in developing countries with low socioeconomic and poor management of drinking water is much higher (>80%) than that in developed countries (<40%) (8,9).

The prevalence of *H. pylori* has declined rapidly in Asia. This has been shown in both seroprevalence-based and endoscopy-based studies (10). However, there have been few conclusive studies from Asia on this subject. Studies from northern and southern regions of Iran demonstrated high rate of *H. pylori* infection (>85%) with the frequent rate of development of duodenal ulcer (11) and gastric cancer (12).

Based on these data this study was aimed to determine the prevalence of *H. pylori* infection among a population in Shiraz, south of Iran, in order to evaluate the socioeconomic status in this population.

PATIENTS and METHODS

In this study 522 patients (266 females and 256 males with the mean age of 44.3±13.0, range 18-83 years), attending the endoscopy section of Motahhary Clinic of Shiraz University of Medical Sciences during the period of October 2005 to March 2007, were enrolled. The following exclusion criteria were applied at baseline: previous eradication of *H. pylori*, use of antibiotics or proton pomp inhibitors (PPIs) within the last 2 weeks prior to endoscopy, and previous gastric surgery. The diagnoses of *H. pylori* infection and the confirmation of gastric disease were established by an expert pathologist.

Antral biopsies taken from each patient were transferred to the lab in an appropriate transfer media (Brain heart infusion broth supplemented with 20% glucose) for *H. pylori* isolation and identification.

Identification of H. pylori infection: Biopsy samples from patients were gently homogenized and cultured on rapid urease test media and brucella agar base (Merck, Germany) supplemented with 10% lysed horse blood and antibiotics of amphotericin B (2µg/L), trimethoprim (5µg/L) and nalidixic acid (10µg/L). The cultures were kept in a microaerophilic atmosphere (6% O2, 7.1% Co2, 7.1% H2, 79.8% N2) provided by Anoxomate (Mark II, Mart Microbiology BV, Netherlands) at 37°C for 5-10 days. Then the isolates were confirmed as *H. pylori* by positive oxides, catalase and rapid urease tests. The samples were also evaluated for the presence of *H. pylori* by gram staining and rapid urease tests. If the two tests were positive simultaneously, the sample was considered *H. pylori* positive.

Statistical analysis of data was achieved by χ^2 test using SPSS software (version 13.0, SPSS Inc., Chicago, USA) and p-value less than 0.05 was considered significant.

RESULTS

Based on endoscopic and pathologic findings patients were assigned in 2 groups: ulcerative (n=296) and non-ulcerative (n=226). Totally, 156 (52.7%) ulcerative and 94 (41.6%) non-ulcerative patients were positive for *H. pylori* ($p<0.05$).

The prevalence of *H. pylori* infection in females and males was 48.9% (130 of 266) and 46.9% (120 of 256), respectively, however, when gender was considered the difference did not reach a statistically significant level (p=0.175).

Table 1. Prevalence of *Helicobacter pylori* infection according to the patients' age

H. pylori infection	**Age groups (years)**					
	<20	21-30	31-40	41-50	>50	Total
Positive (%)	0 (0)	96 (66.7)	36 (35.3)	36 (29.5)	82 (62.1)	250 (47.9)
Negative (%)	22 (100.0)	48 (33.3)	66 (64.7)	86 (70.5)	50 (37.8)	272 (52.1)
p-value		0.012	0.231	0.433	0.032	

We also categorized patients to 5 subgroups according to their age. The prevalence of *H. pylori* infection was significantly higher in patients aged

21-30 and >50 years when compared to patients aged 31-40 and 41-50 years (table 1). Surprisingly, no *H. pylori* strain was detected in 22 patients aged less than 20 years.

DISCUSSION

Several studies as with studies from the developed world have shown conclusively that *H. pylori* prevalence has now started to decline in Asia (10). Early studies from China, for example, have shown prevalence rates in excess of 80% (13-15). However, Chen et al (16) demonstrated a decreasing seroprevalence of *H. pylori* infection in 1993–2003 in Guangzhou, southern China (from 62.5% to 47%). Fujisawa et al (17) also demonstrated that *H. pylori* seroprevalence declined steadily from 72.7% in 1974, to 54.6% in 1984 and 39.3% in 1994 in Tokyo. In South Korea (18) the seropositivity for *H. pylori* in 1998 was 66.9% whereas it was 59.6% in 2005. In the present study we observed a decline in the prevalence of *H. pylori* infection in the patients undergoing endoscopy in a population in Shiraz, south of Iran. As it was expected, the prevalence was significantly higher in the ulcerative patients when compared with non-ulcerative ones (52.7% vs. 42%), nevertheless the total prevalence of infection (47. 9%) was significantly less than that previously described. In a previous study of the seroprevalence of *H. pylori* infection in Shiraz, it was shown that more than 85% of Iranian adults carry IgG against *H. pylori* (11). In another study from Ardebil (a city in north of Iran) the *H. pylori* infection was confirmed in 89.2% of the biopsies by rapid urease test (12).

We observed a significant association between age and *H. pylori* infection prevalence, with the highest infection rate in the age groups of 21-30 and >50 (66.7% and 62.1%, respectively) which decreased to 35.3% and 29.5% in 31-40 and 41-50 years, respectively. No *H. pylori* infection was detected in 22 patients aged <20 years. This finding was in agreement with Nouraie et al study in which *H. pylori* was found in 79.2% and 74.7% of 46-55 and over 56 years individuals, respectively (19). In 2005, Alborzi et al reported prevalence rates of 82%, 98%, 88%, 89%, and 57% in subjects aged 9 months, 2, 6, 10, and 15 years, respectively, based on antigen immunoassay of stool samples in Shiraz (20). Their data showed no significant differences between the prevalence of *H. pylori* infection in the first 4 age groups (NS), but there was a significant decrease in 15-year-old group ($p<0.05$). They concluded that after *H. pylori* colonization in infancy it takes an extended period to be eradicated by the immune system.

In this regard, the EUROGAST study group described the status of *H. pylori* infection among asymptomatic individuals in two age groups (25–34 and 55–64 years) from Europe, North America, North Africa, and Japan. The prevalence of infection was higher in older age group (62.4%) than in the younger age group (34.9%) (2). This significant consistency has also been confirmed in lower age groups, for example, 44.4% (15–19 years) to 70% (20–30 years) in individuals selected from rural and urban areas of Shanghai (21) and 38% (0–2 years) to 71% (7–10 years) in Cameroon children (22). Furthermore, decline in *H. pylori* prevalence observed in all age groups except in those over 70-years old in a study in South Korea (18).

In a cross-sectional survey (23) of 1060 dyspeptic patients undergoing endoscopy in 1994 and 1995 the overall prevalence of *H. pylori* was recorded at 49% in Kuala Lumpur, Malaysia. The prevalence of *H. pylori* among the different races was: Malay 16.4%, Chinese 48.5% and Indian 61.5%. A similar study (24) conducted in 2002 and 2003 at the same center showed an overall *H. pylori* prevalence of 22%. What was interesting and important was that the prevalence of *H. pylori* among the different ethnic groups had uniformly declined: Malay to 12.1%, Chinese to 21.7% and Indian to 30.7%.

Interestingly, a similar study conducted in Shanghai, China comparing the seroprevalence of *H. pylori* in 1990 and 2001 among healthy subjects undergoing routine health checks showed a significant increase, from 40.5% to 58.3%, respectively. However, this was mainly due to the influx of rural immigrants seeking jobs in Shanghai and hence, may not reflect the true seroprevalence in that time period (25).

We found no association between gender and *H. pylori* positivity. Although, similar results reported from other countries (26,27), our results were inconsistent with other findings (28-32).

In conclusion, the present study reveals a significant decline in the prevalence of *H. pylori* infection in the studied population. It seems that in parallel with better therapeutic approaches and elimination of bacteria, an improvement in the personal hygiene and living conditions of the Iranian population contribute to lower prevalence of *H. pylori*.

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