Turk J Gastroenterol 2004; 15 (3): 156-158

*Changes in the seroepidemiological pattern of *Helicobacter pylori* infection over the last 10 years in Turkey

Türkiye'de son 10 yılda *Helicaobacter pylori* sero-epidemiyolojisinde meydana gelen değişiklikler

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Background/aims: *This study was undertaken to evaluate changes in the seroepidemiological pattern of Helicobacter pylori in a group of Turkish children over a span of 10 years.* ***Methods:*** *A total of 403 (219+184) serum samples were obtained from a primary school located in the urban part of Ankara in 1990 and 2000. All of the samples were from healthy students aged 7-14 (in 1990, n= 219, 109 females; and in 2000, n= 184, 90 females).* ***Results:*** *All serum samples were assayed for Helicobacter pylori IgG by means of enzyme-linked immunosorbent assay. The overall prevalence of Helicobacter pylori antibodies was 78.5% in 1990 and 66.3% in 2000. The prevalence of Helicobacter pylori was found to be decreasing over a time span of 10 years (p<0.01). While the most susceptible age group to Helicobacter pylori in 1990 was 10 years (89.5%), in 2000 the susceptible age group was 8 years (85.0%).* ***Conclusions:*** *Our data suggest that the seroprevalence of Helicobacter pylori infection seems to have decreased during the last 10 years in Turkey. This change may be attributable to the changes in environmental condition and socioeconornic development that have taken place in the country.*

Key words: *Helicobacter pylori,* serology, seroprevalence, Turkey

Amaç: Bu çalışmanın amacı, Türk çocuklarında 10 yıllık bir zaman dilimi içerisinde, Helicobacter pylori infeksiyonunda oluşan seroepidemiyolojik değişiklikleri belirlemektir. ***Yöntem:*** *Ankara'nın kenar mahallelerinde bulunan bir ilkokuldaki sağlıklı öğrencilerden 1990 (219 adet) ve 2000 (184 adet) yıllarında Helicobacter pylori serolojisi araştırılmak üzere toplan 403 serum örneği toplanmıştır.* ***Bulgular:*** *Toplanan serum örneklerinde ELISA yöntemi ile Helicobacter pylori Ig G antikorları araştırılmıştır. Tüö grup genel olarak değerlendirildiğinde Helicobacter pylori antikoru sıklığı 1990 yılında % 78.5 iken, 2000 yılında % 66.3 olarak bulunmuştur. 10 yıllık bir dönem içerisinde helicobacter pylori prevelansı düşüş göstermektedir (p<0.01). 1990 yılında Helicobacter pylori infeksiy onuna en duyarlı yaş grubu 10 yaş iken (89.5%), 2000 yılında en duyarlı yaş grubu 8 yaş grubudur. Sonuç: Bulgularımız, 1990-2000 yılları arasında Helicobacter pylori seroprevalansının düşmekte olduğunu göstermektedir. Bu değişiklikler çevresel faktörlerdeki düzelmeyle ve Türkiye'nin sosyoekonomik durumundaki iyileşmeye bağlı olabilir.*

Anahtar kelimeler: *Helicobacter pylori,* seroloji, seroprevalans, Türkiye

INTRODUCTION

Helicobacter pylori (H. pylori) has been established as the causative agent in type B gastritis and peptic ulcer disease, and is also associated with gastric carcinoma and primary gastric B cell lymphoma (1-5). The diagnostic accuracy of serological detection of antibodies to *H. pylori* has been well established (6, 7). Serology is less expensive and is quicker and easier to perform than endoscopy-based procedures. It is non-invasive and does not involve exposure to radioisotopes. These properties of serology make it a suitable tool for epidemiological investigations.

H. pylori infection is more frequent and acquired

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Manuscript received: 25.02.2003 **Accepted:** 20.07.2004

*This study was presented at the 11th European Conference of Clinical Microbiology and Infectious Diseases in Istanbul, on April 1-4, 2001

at an earlier age in developing countries compared to industrialized nations (8). Once acquired, infection persists and may or may not produce gastroduodenal disease. In developed countries, evidence of infection in children is unusual but becomes more common during adulthood. Serologic evidence of *H. pylori* is rarely found before age 10 but increases to 10% in those between 18-30 years of age and to 50% in those older than age 60 (8). The epidemiology of *H. pylori* infection is different in developing nations, where the majority of children are infected before the age of 10 and adult prevalence peaks at more than 80% before age 50 (8,9).

Although scarce data is available regarding *H. pylori* prevalence from Turkish populations living outside Turkey (10,11), no long-term data exists related with the seroprevalence of *H. pylori* infection in Turkey. Therefore, the aim of this study was to investigate the seroprevalence of *H. pylori* infection over the last 10 years in different age groups in patients with no gastrointestinal complaints, and to detect the relationship with age in a developing nation.

MATERIALS AND METHODS

Four hundred and three sera samples were obtained from healthy students aged 7-14 years from a primary school located in the urban area of Ankara in 1990 and 2000. Of these samples, 219 (age range: 7-14; 109 female and 110 male) were collected in 1990 and 184 (age range: 7-14; 90 female, 94 male) in 2000. We investigated the prevalence of *H. pylori* for all age groups separately. The samples were stored at -20^{Q}C until assay. Sera were tested for the presence of Anti-i/. *pylori* IgG antibodies by means of enzyme-linked immunosorbent assay (IBL, Hamburg, Germany) according to manufacturer's instructions. Double wells of negative and positive reference sera were also included. The optical densities were read at 450 nm with a spectrophotometer. Samples were considered positive for *H. pylori* infection when antibody levels were >20 U/ml and negative when they were <12.5 U/ml. Specimens exhibiting OD values between the limits (cut off ±10) were considered as equivocal and re-tested.

The statistical significance of seropositivity was examined by means of the chi-square test and Fisher's exact test. Statistical calculations were performed using the SPSS 9.0 version for Windows. A value of $p<0.05$ was considered statistically significant. Odds ratios (OR) and 95% confidence interval (CI) were calculated for 1990 to 2000 (12).

RESULTS

The overall seroprevalence ratios of *H. pylori* antibody were 78.5% in 1990 and 66.3% in 2000 ($p<0.01$). In comparison with the *H. pylori* infection rate in 1990, the 2000 infection rate of *H. pylori* decreased significantly ($p<0.01$). In 2000, the peak seroprevalence of *H. pylori* infection was at age 8 (85%), and then decreased to 60.9% at age 9, followed by a gradual increase towards ages 12-14. In 1990 and 2000, subjects were evaluated according to specific age groups and irrespective of age groups by means of Odd's ratio and confidence intervals due to *Helicobacter pylori* seroprevalance (Table 1). illustrates overall and age-group specific *Helicobacter pylori* seroprevalance in 1990 and 2000 years. In 7, 8 and 9-year age group, Odd's ratio was 1.5, this means that in 1990 *Helicobacter pylori* seroprevalance was 1.5 times higher compared to year 2000. However, this ratio did not reach to statistical significance. On the other hand, in 10, 11 and 14-year age group, Odd's ratio was 2.5, therefore, in 1990 *Helicobacter pylori* seroprevalance was 2.5 times higher compared to year 2000. This change was statistically significant ($p<0.05$), (Figure 1). Irrespective of age groups, Odd's ratio was found to be 1.86 and this shows that in 1990 *Helicobacter pylori* seroprevalance was 1.86 times higher compared to year 2000. This difference was statistically significant ($p< 0.05$).

Table 1. Overall and age-specific seroprevalence of *h. pylori* in 1990 and 2000

Years	1990				2000				P	Odds	95% CI
Age groups	Positive		Negative		Positive		Negative			Ratio	
	N	%	N	%	N	%	N	%			
7,8, 9	80	73.4	29	26.6	42	64.6	23	35.4	>0.05	1.511	0.779-2.930
10,11,14	92	83.6	18	16.4	80	67.2	39	32.8	<0.01	2.491	1.322-4.695
Total	172	78.5	47	21.5	122	66.3	62	33.7	<0.01	1.860	1.192 - 2.900

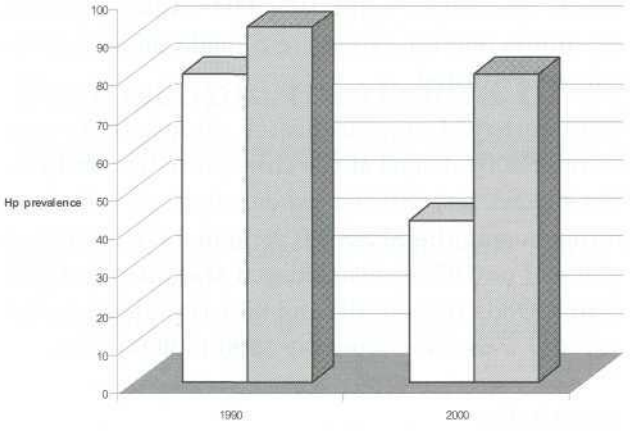

Figure 1. *Helicobacter pylori* seroprevalence in two selected age groups. White bars show 7, 8 and 9 years of age groups in 1990 and 2000 (p=ns); dotted bars illustrate 10, 11 and 14 years of age groups in 1990 and 2000 ($p<0.05$)

DISCUSSION

The results of our study indicate that the overall prevalence of *H. pylori* infection has decreased during the last 10 years in Turkey. The risk of acquiring *H. pylori* infection is related to socioeconomic status and living conditions early in life. Factors such as density of housing, overcrowding, number of siblings, sharing a bed, and lack of running water have all been linked to a higher acquisition rate of *H. pylori* infection (13). Within a particular country, a decline in prevalence of *H. pylori* appears to parallel economic improvement. The high prevalence and early acquisition of *H. pylori* infection in 1990 may be related in part to socioeconomic status and traditional living conditions in Turkey. However, given the improvement in living conditions and sanitation in 2000, the prevalence of *H. pylori* decreased. In Japan, 70-80% of adults born before 1950, 45% of those born between 1950 and 1960, and 25% of those born between 1960 and 1970 were reported as infected (14). This rapid decline in infection has been attributed to Japan's post-war economic progress and improvement in sanitation. Goodman et al. conducted a study in Colombian children and found that the prevalence of infection increased from 53% in two-year-old children to 87% in nine-year-old children (15). In another report from France, the prevalence *of H. pylori* was found to be 5% in the 4-6 years of age group and 15% in the *6-8* years of age group (13).

In conclusion, our study pointed out that most of the subjects in Turkey acquired infection before the teenage period. The prevalence of *H. pylori* infection in Turkish children has decreased over the last 10 years, presumably due to the improvement in living and sanitation conditions during that time.

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