

# Seroepidemiology of *Helicobacter pylori* infection in an urban, upper class population in Chennai

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**Background:** In India, no true population-based seroepidemiological data on *Helicobacter pylori* infection are available. Serological studies have been done on hospital-based subjects chosen predominantly from lower socioeconomic strata. **Methods:** A population-based serological study was done in a randomly selected urban, upper class population (children under 12 excluded). Of 163 households, 126 participated (response rate 77%); the number of respondents was 406. Blood was collected from 354 persons (response rate 87%). A latex agglutination test was used for serology. Demographic data, socioeconomic indicators and history of treatment for acid-peptic disease (APD) were also collected. **Results:** The overall seroprevalence was 49.4% (95% confidence interval 44.1 - 54.8). Seroprevalence increased with age, ranging from 21.1% in the 12-20 years age group to 76.2% in the >70 years group ( $p=0.0003$ ), and with larger family size ( $p<0.05$ ); it was lower among those living in nuclear families ( $p<0.03$ ). No association was found with gender, treatment for APD, and number of generations living together. **Conclusions:** Though the overall seroprevalence of *H. pylori* in this urban, educated, upper class population is high, the age-specific prevalence is different from what has been reported earlier in India; the pattern resembles that of a developed country. [*Indian J Gastroenterol* 1999;18: 66-68]

**Key words:** Epidemiology, serology

A clear picture of the epidemiology of *Helicobacter pylori* infection in India is yet to emerge. It appears that the infection is widespread and more prevalent among persons in the lower socioeconomic stratum.<sup>1,2</sup> Exposure occurs early in life, with high prevalence even among the very young.<sup>3,4</sup> Serological studies have been done on patients attending hospitals,<sup>3,4</sup> but prevalence in this group may not reflect the true prevalence in the general population.<sup>5</sup> Also, the kits used for seroepidemiological studies are usually not validated before use in India.<sup>5</sup>

Epidemiological data in higher socioeconomic populations in India are not available.<sup>6</sup> We therefore did a seroepidemiological study on the prevalence of *H. pylori* infection in an urban, upper-class population in Chennai city.

## Methods

Anna Nagar, Chennai is a well planned residential locality, with 38 blocks (approximately 40,000 population). The blocks are relatively homogenous and the population is middle and upper class, and is highly educated.

### Study design

This was a cross-sectional prevalence study. One block was chosen by random sampling. In this block, all households were encouraged to participate. All members in each household (except children under 12 years) were requested to give a blood sample for serology. In addition, data were collected on demography, socioeconomic indicators, and history of treatment for acid-peptic disease (APD). Data on gross family income, highest education and occupation in the household, ownership of the house and a car, and type of house (individual house or flat) were used to assess the socioeconomic profile of the population.

The prevalence of infection in the target population was anticipated to be 40%. With a 5% alpha error and a desired precision of 5%, the required sample size was computed to be 369.

### Serological methods

*Pyloriset Dry* (Orion Diagnostica; Espoo, Finland) is a latex agglutination test which detects IgG, IgM and IgA antibodies to *H. pylori*. According to the manufacturer, its sensitivity is 97% and specificity 85% with culture and histopathology as gold standard.<sup>7</sup> The kit was validated using stored sera of 110 dyspeptic patients.

### Statistical analysis

Prevalence estimates and 95% confidence interval (CI) were obtained using Epi Info software (Version 6.04).<sup>8</sup> Association between infection and categorical variables was tested using  $\chi^2$  test.

## Results

### Response rate

Of 163 households in the block, 126 participated in the study (response rate 77%). The number of residents within the respondent households (excluding children < 12) was 406. Blood was collected from 354 individuals (response rate 87%).

### Baseline characteristics

The mean (SD) age of respondents ( $n=354$ ) and non-respondents ( $n=52$ ) within the participating households was

**Table 1: Age-specific seroprevalence of *H. pylori* (n=354)**

Age group (years)	Number positive/total (%)	95% CI
12 - 20	8/38 (21.1)	9.6-37.3
21 - 30	30/73 (41.1)	29.7-53.2
31 - 40	41/70 (58.6)	46.2-70.2
41 - 50	29/53 (54.7)	40.4-68.4
51 - 60	29/53 (54.7)	40.4-68.4
61 - 70	22/46 (47.8)	32.9-63.1
> 70	16/21 (76.2)	52.8-91.8
All	175/354 (49.4)	44.1-54.8

$\chi^2$  for trend = 12.93 (p=0.0003)

respondents had received such therapy. A majority (64%) of these had received H<sub>2</sub> blockers; five (10%) had received multiple drug therapy for *H. pylori* eradication.

The average family size was 3.9; 54 (13%) individuals lived in households with one generation, 206 (51%) with two generations, and 146 (36%) with three or more generations. One hundred and ninety three (48%) individuals lived in nuclear families, 89 (22%) in extended families and 124 (30%) in joint families. The socioeconomic profile of the population was that of an upper-class community: 376 (93%) individuals belonged to households that had at least one person who had studied up to a graduate degree or higher; 220 (54%) individuals belonged to households that had at least one professional; 397 (98%) individuals belonged to households that had at least one person who was a professional by occupation or involved in big business or some form of skilled work. Two hundred and forty one (59%) individuals lived in own houses and 256 (63%) individuals owned cars. A majority (89%) of the houses were independent houses. The average gross monthly family income was Rs. 17,660.

**Table 2: Association between seroprevalence and risk factors (n=354)**

Risk factor	Prevalence of infection (%)
Sex	
Male	53.2
Female	45.9
Family size*	
<5	45.4
>5	56.7
Type of family**	
Nuclear	42.7
Extended	60.5
Joint	52.3
Generations in family	
1	36.5
2	49.4
≥3	54.8
Past treatment for APD	
No	48.2
Yes	53.1

\*p<0.05; \*\*p<0.03

similar (42.4 [17.4] y and 43.1 [21.5] y, respectively). The male: female ratio was higher among non-respondents (1:1 vs 1:1.4). Whereas 50 (14%) respondents had received definitive therapy for APD, only one (2%) of the non-re-

#### Seroprevalence

Of 354 respondents, 175 were seropositive (overall seroprevalence 49.4%; 95% CI 44.1 - 54.8). Males (53.2%; 95% CI 45.4 - 60.9) and females (45.9%; 38.5 - 53.4) had similar seroprevalence.

Increasing age (Table 1) and larger family size (Table 2) were associated with higher prevalence. Seroprevalence was lower among those living in nuclear families. Prevalence was not related to history of treatment for APD, gender, and number of generations living together.

#### Discussion

*H. pylori* infection is generally believed to be an infection of the lower socioeconomic groups. This belief is supported by the fact that infection is more prevalent in developing countries.<sup>9,10</sup> The age-specific prevalence patterns of developing countries like Peru<sup>11</sup> and Thailand<sup>12</sup> reveal very high levels of *H. pylori* infection in the general population, and early onset of infection. Studies have shown that prevalence rates reach 80-90% by the age of 20 years in developing countries. A decrease in prevalence has been observed in countries which have undergone rapid socioeconomic development.<sup>13</sup>

Studies done in India so far have usually included only subjects from lower socioeconomic populations. One study has shown prevalence rates of IgG and IgA antibodies in 22%, 56% and 87%, and 48%, 58% and 83% of 0-4, 5-9 and 10-19 age groups, respectively.<sup>4</sup> Another study showed that 52% of Indians with dyspepsia and 44% of controls have active infection by the second decade of life.<sup>3</sup> These age-specific prevalence rates resemble those of developing countries. This has led researchers to conclude that exposure to *H. pylori* occurs early in life in India.<sup>1-4</sup> The main problem is absence of truly population-based studies involving different socioeconomic classes.

Our study reflects the epidemiology of *H. pylori* in a metropolitan, educated, upper class population where the living standards are good. In this group, the pattern resembled that of a developed country. Though the overall seroprevalence was high, the age-specific prevalence rates differed from those reported earlier, with the prevalence in the younger age groups being much lower. Interestingly, the prevalence in the 12 - 20 years age group in our study was only 22.1% and a trend of rising prevalence with increasing age was evident. Individuals belonging to larger families had a greater risk of infection.

To our knowledge, ours are the first seroepidemiological data on prevalence of *H. pylori* infection in an urban, upper-class population. The observation on low seroprevalence among children points to the possibility of using such children as negative controls for studies to validate different diagnostic and screening tests.

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