Prevalence of *Helicobacter Pylori* among rural school children of 5-12 year age Group

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Abstract

Background: *Helicobacter pylori* is a bacterium that is commonly found in the stomach and is usually contracted during childhood. It is more common in the developing countries than in developed countries. The prevalence of *H. pylori* infection is stated to be as high as 80% in the developing countries.

Objectives: The present study was planned to investigate the prevalence of *H. pylori* among school children with low socio-economic status of the rural areas of Jagalur, Davangere.

Materials & Methods: A cross-sectional study was conducted among 5-12 year old rural school children. A total of 484 children participated in the study. *H. pylori* was diagnosed by means of [13]Carbon-Urea Breath Test (^{13}C-UBT).

Results: The prevalence of *H. pylori* infection was 13.2%.

Conclusion: The prevalence of *H. pylori* infection is inversely related to socio-economic and developmental status. Those living in developing countries or crowded, unsanitary conditions are most likely to contract the bacterium, which is passed from person to person.

Key words: *Helicobacter pylori*, Urea Breath Test

Introduction

The vast majority of people infected with *H. pylori* infection have no symptoms and will never develop problems. *H. pylori* is probably spread by consuming food or water contaminated with faecal matter. *H. pylori* causes changes to the stomach and duodenum. The bacteria invade the protective tissue that lines the stomach. This leads to the release of certain enzymes and toxins. These may directly or indirectly injure cells of the stomach or duodenum, causing chronic inflammation in their walls[1].

Factors predisposing to *H. pylori* infection in children were low socioeconomic status[2,3]. *H. pylori* infection is greater among those living in crowded dwellings[1]. McCallion *et al.* showed that the association between social class and *H. pylori* becomes insignificant after adjustment for household density and bed-sharing between a child and an adult. This finding suggests that with regard to the acquisition of *H. pylori* infection, social class was acting as a proxy measure for conditions and practices within the household that increase the transmission of the organism from infected to uninfected subjects[4]. Improvements in the standards of living have resulted in a marked reduction in *H. pylori* transmission[5].

In developing countries, most children are infected with *H. pylori* before age 10.

As many as half of the world's population is infected with *H. pylori*, but most people will never experience any symptoms. The infection penetrate in childhood and continues lifelong. During its course, the disease can have several manifestations including acute gastritis, chronic atrophic gastritis, intestinal metaplasia, dysplasia growth failure, malnutrition and finally cancer[6,7].

The aim of the study was to evaluate the prevalence of *H. pylori* infection among 5-12 year age group rural school children who belong to low socio-economic status.

Materials And Methods

Ethical clearance: Ethical clearance was obtained from the Bharathiar University, R & D,Coimbatore. Informed written consent was taken from all students and their guardians for interview and sample collection.

Type of study: A school based cross sectional study, deals with the investigation of prevalence of *H. pylori* infection in children between the ages of 5-12 years.

Study area: Three schools from three different villages of Jagalur taluk, Davangere district, Karnataka were selected.

Sample size: A school based cross sectional study was conducted through a pretested, semi structured interview schedule in rural areas of Davangere. A total of

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484 samples between the age group of 5-12 years participated in the study.

Inclusion and exclusion criteria: The rural school cater to low socio-economic group of population. Children with an obvious cause of blood loss, such as active or recent gastro intestinal hemorrhage, epistaxis were excluded. Other exclusion criteria were the presence of chronic diseases, hematologic diseases, motor mental retardation, celiac disease, recent antibiotic or antacid use and malabsorption syndromes. The age of children was ascertained by questioning them and later confirmed from school registers in case of any discrepancy between the two, the date in the school register was taken as a accurate. Age in completed years was taken for analysis.

Urea breath test (UBT): The 13C-UBT was performed as described by Ohare *et al*. after at least a 2 hour fast, 100 mg 13C- urea was administered with 100 ml of water. Breath samples were collected before and 20 minutes after ingestion. The ratios of 13C- to 12C in the baseline sample and the sample obtained after 20 minutes were determined by a mass spectrometer (ABCA – G; Europe Scientific of the baseline, Crewe, UK). An excess value of 2.5δ (subtraction of the baseline value from that of the 20 minute sample) was considered positive for the infection.

Because fasting for at least 6 hours was required the 13C-UBT was performed in the morning of the day following the interview.

Results :

Demographic characteristics : Children were categorized into four groups based on the age group. 112 (23.1) children from 5-6y, 121 (25.0) from 7-8y, 125 (25.8) from 9-10y and 126 (26.1) from 11-12y children. Participation of boys was 48.8% (236) and that of girls were 51.2% (248).

Out of 484 children studied, 64 (13.2) was found positive for *H. pylori* infection (Fig 1). Among these 19 (17.0) was positive in 5-6y age group, 16 (13.0) in 7-8y, 17 (14.0) in 9-10y and 12 (10.0) in11-12y age group was found positive for *H. pylori* infection. There was no significant difference of *H. pylori* positivity among different age groups (Table 1).

Discussion

The stomach is protected from its own gastric juice by a thick layer of mucus that covers the stomach lining. *H. pylori* take advantage of this protection by living in the mucus lining.

According to the U.S. Centers for Disease Control and Prevention (CDC), more than half of the world's population is infected with *H. pylori*, which is acquired

almost always within the first five years of life[8], making it the most widespread infection in the world[9]. Actual infection rates vary from nation to nation; the developing countries has much higher infection rates (90%) than the developed countries (1.2% - 12%)[1,2,10,11].

Studies point towards a relation between the low socio-economic status and the high rate of *H. pylori* infection[12]. Herberth *et al* reported a prevalence of 6.5% among school children in Germany[13]. Improving the living conditions lowers the rate of infection. The decrease in the rate of infection of *H. pylori* in Southern China from 1993 to 2003 was attributed to an improvement in the socio-economic conditions[14]. In the middle east countries like Turkey, the prevalence was 44% in children and in other studies, the prevalence was upto 89%[15,16]. Prevalence of *H. pylori* infection appears to be higher in Africa, Mexico, South America and Central America, which reaches 70% - 90% of the population, most likely due to socio-economic factor[17]. The lower rate of infection in the west (Western Europe, North America, Australia) is largely attributed to higher standards and widespread use of antibiotics[18].

The prevalence of *H. pylori* was 13.2% in the present study. Several studies have shown that *H. pylori* infection in childhood is associated with growth faltering[19,20,21,22]. However, these studies are confounded by the coexistence of variables such as poor socioeconomic status, which may contribute to both the development of malnutrition and the early *H. pylori* colonization. Therefore, *H. pylori* and growth faltering may be mere associations rather than cause and effect.

Conclusion

There is a conspicuous paucity of similar reports in populations with high prevalence of *H. pylori*. We speculate that strains of *H. pylori* and its colonizing behavoiur, host factors and environmental factors may be involved in the development of infection. Recently it has been suggested that *H. pylori* infection may affect metabolism of iron in healthy humans.
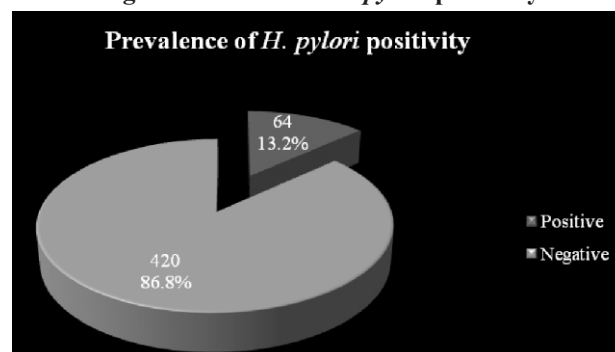
Fig 1: Prevalence of *H. pylori* positivity

Table 1: Prevalence of H. pylori infection among 5-12y children

Age	*H. pylori* positivity n (%)
5-6y	19 (17.0)
7-8y	16 (13.0)
9-10y	17 (14.0)
11-12y	12 (10.0)
Total	**64 (13.2)**

$X^2=1.6$, P=0.65 NS 3 d.f

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