Helicobacter pylori infection in children undergoing upper endoscopy in Jamaica

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Citation

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Abstract

H. pylori infection is usually acquired in childhood in developing countries but the prevalence differs among socioeconomic status of the family during childhood. This study determined the prevalence of H. pylori infection in children undergoing upper endoscopy in Jamaica. There were 24 patients including 13(56%) males and 11(46%) females with a mean age of 8.2 years. They were evenly distributed between middle to upper socio-economic classes. Abdominal pain was the most common presenting symptom. Other symptoms included nausea, vomiting and reflux, 17% had all symptoms. Four (17%) patients had a positive CLO test and all also had H. pylori gastritis on histology. The majority of Jamaican children in the middle to upper socio-economic groups with upper gastro-intestinal complaints are negative for H. pylori. The present low prevalence may indicate that the prevalence in the Jamaican population is decreasing.

INTRODUCTION

Helicobacter pylori infection is one of the most prevalent infectious diseases, affecting greater than 50% of the world's population. Prevalence varies greatly between developing and developed countries being higher in the former (1,2,3). In the Colombian Andes, 69% of 2-9 year children had H. pylori infection (4). In Shanghai, China, 41% of children were H. pylori seropositive (5). In the USA, 17% of children, 6 - 9 years and 26% of 10 -14 year olds were infected (6).

In Jamaica, a previous endoscopic study found a prevalence of 55% H. pylori infection in adults (7). Another study in a suburban community found 70% of individuals were infected, with 27% of children less than 5 years of age being seropositive (8). This is similar to the 70% seroprevalence in blood donors reported in Barbados (9).

The route of transmission is thought to be mainly fecal-oral, but oral-oral and gastric-oral transmission may also occur. Children born within four years of an older sibling were four times more likely to be infected with H. pylori (10). Birth order, birth spacing and infectious status of siblings, influenced the odds of acquiring H. pylori, independently of the number of children in the home. Transmission seems to be among siblings who are closer in age and most frequently from older to younger siblings (10). Other factors associated with increased transmission include low socio-economic status, over crowding, sharing of bed and poor hygiene (6).

In developing countries, infection seems to occur primarily in the paediatric age group with most occurring before age 5-10 years (11). If untreated, infection is life-long with most individuals being asymptomatic. Amongst infected persons, there is a 15% risk of developing peptic ulcer disease, 0.01% of developing gastric carcinoma and 0.001% for gastric lymphoma (12).

Although infection with H. pylori is prevalent in childhood there is a paucity of paediatric studies within the Caribbean region. This study determined the prevalence of H. pylori infection in children undergoing upper endoscopy at the University Hospital, Jamaica.

PATIENTS AND METHODS

All patients aged 0-18 years referred for upper gastrointestinal endoscopy to the University Hospital of the West Indies (UHWI) between January and December 2006 were eligible for the study.

Patients were assessed by a consultant gastroenterologist, and if endoscopy was deemed necessary, were invited to participate in the study. Informed consent was obtained from a parent or guardian for endoscopy as well as for participation in the study. The consent for having endoscopy was obtained by the endoscopist, however, consent for participation in the study was obtained by a separate

physician who also completed the questionnaire. Exclusion criteria were; a)previous diagnosis of H. pylori infection, b)use of acid suppressants and/or antibiotic within the preceeding 3 weeks, c) moderate to severe cardiopulmonary disease.

Endoscopy was performed by a single consultant gastroenterologist using a thin flexible endoscope. Local anaesthetic was administered and conscious sedation was given to all patients. Evaluation of the oesophagus, stomach and proximal duodenum was performed and any abnormalities noted. Four pinch biopsy specimens were taken, two each from the antral and body mucosa of the stomach. The antral specimens were taken within two to three centimeters of the pylorus. Two specimens, one from

the antrum and one from the body, were immediately tested for H. pylori using the rapid urease test (CLO Test), whilst the remaining two specimens were submitted for histological evaluation.

The rapid urease test (CLO Test, Trimed Laboratories, Draper,Utah) was performed on specimens collected from all patients. The results were read by a gastroenterology nurse blinded to the patients diagnosis or endoscopic findings and confirmed by a gastroenterology resident or consultant.

All histological specimens were routinely stained with hematoxylin & eosin stain (H/E). Cresyl violet staining was also done to improve visibility of the organism if these were not evident on H/E staining in the presence of inflammation. Histological evaluation was performed by a single histopathologist who was blinded to the H. pylori status of the patient.

At the time of endoscopy, five milliliters of venous blood was drawn for H. pylori antibody testing. Serum samples were stored at –20 C until analysed for IgG antibodies by enzyme linked immunoabsorbent assay (ELISA) using commercially prepared reagent kits.

Endoscopic findings were discussed with the patient and parents and further management recommended by the consultant gastroenterologist. On subsequent follow-up, the result of the H. pylori test was discussed and treatment initiated for H. pylori as appropriate.

Approval for the study was obtained by the Ethics committee of the UWI/UHWI. Data analysis was done using the Statistical Package for the Social Sciences (SPSS). Calculation of socio-economic status (SES) score was performed by the following parameters; parental occupation, possessions, toilet facilities, water supply and travel.

Calculation of crowding index was performed using the following parameters: total number of rooms divided by total number of household members

RESULTS

Twenty four (24) patients were enrolled in the study. Thirteen (56%) were males and 11 (46%) were females. The age ranged from 3-13 years with a mean age of 8.2 years ± 2.6 years. There was no significant difference between the mean age of males (7.9 years ±3 years) and females (8.7 years ± 2.2 years) ($p = 0.4$).

Most patients (63%) resided in the Kingston and St Andrew metropolitan area. Twenty patients (83%) had water piped inside the house. Nineteen (79%) patients had toilet facilities located inside the house. The households had between 2-7 members. The mean number of rooms was 5 ± 2 (range 1-11). The maximum crowding index was 3. Of the 24 patients, 7 (29%) parents were unemployed inclusive of 1 housewife. The remaining 17 parents held jobs ranging from higher professional to unskilled laborer. No child was from a low socio-economic group. They were evenly distributed between middle to upper socio-economic classes.

Abdominal pain was the most common presenting symptom. Other symptoms included nausea, vomiting and reflux. Of the 24 patients, 4 (17%) had all symptoms.

All patients had CLO Test and histology done and 7(29%) patients had serologic testing for H. pylori. Four(17%) patients had a positive CLO test. All of these patients also had H. pylori gastritis on histology. There was no patient who had H. pylori gastritis on histology with a negative CLO Test. Three patients with negative CLO Test, however had abnormal histology including reactive gastropathy, parietal cell hypertrophy and non-specific gastritis. Of the 4 patients with H. pylori gastritis, there was no gender difference. The mean age was 6.8 years ± 2.2 years. All positive patients had no more than 2 persons sharing their beds. They all had toilet facilities connected to a sewer system and 75% had piped water inside the house.

DISCUSSION

The prevalence of H. pylori infection of 17% in this study is much lower than the 27% prevalence in children 5-10 years or younger previously reported in a community based study in Jamaica (8) and in other developing countries (3,4,5). The

present endoscopy based study would have been expected to show a higher incidence than that seen in the community as H pylori infection was reported to be significantly higher in children referred to gastroenterologists than asymptomatic patients (13). In an endoscopy study done at this institution in adult patients, 55% of patients were positive for H. pylori (7). The difference seen in this study might be showing a cohort effect. H. pylori infection is primarily a childhood acquired disease and the prevalence at the age of 20 years approximates the prevalence of that birth cohort throughout life (14). Children acquire, loose and reacquire H. pylori infection and the prevalence may decrease during childhood (2). As the standard of living and sanitation improve from generation to generation the incidence should similarly decrease (15). In the Netherlands, H. pylori prevalence declined from 21% to 10% over a 15 year period (16). In the United Kingdom, the odds of being seropositive decreased by 26% per decade (17). Another possible explanation for the low prevalence of H. pylori in this study may be related to the increasing use of antimicrobials in the paediatric age group.

Helicobacter pylori infection tend to occur in individuals of lower socioeconomic standing and the major marker for risk of infection is the socioeconomic status of the family during childhood, regardless of the present social class(14, 18). In this study, all patients were in the middle to upper socio-economic groups. This is in contrast to previously reported studies which uniformly revealed higher prevalence of H. pylori infection amongst low socio-economic groups (3,4). In Northeastern Brazil, 55% of children of low socioeconomic status were H. pylori positive compared to 16% of high social status (19). Therefore, the low infection prevalence observed in the present study might be partly due to the fact that most of the patients were from middle and higher income families, and the paediatric population from lower socioeconomic groups may have been under-represented. In addition, referring practices may account for the disparity. Since the UHWI is the only hospital offering paediatric endoscopy, only the most severe cases may have been referred. Also, parents in the middle to upper socio-economic groups give more credence to symptoms of abdominal pain, and so are more inclined to seek medical care early, as opposed to those in the lower socio-economic group who may give home remedies or over-the counter drugs instead of seeking medical attention. Parents in lower socio-economic groups also might not access specialist medical care for their children, even if they had been referred, because of financial constraints.

Children from households with four or more household members had a higher seropositivity rate for H. pylori (13). H. pylori infection clusters in families but it is unknown if transmission is more often due to sharing a common exposure source or occurs between individuals (11). In the present study, 50% of the patients who were positive for H. pylori infection had 4 or more household members. However, amongst the negative patients, 85% had 4 or more household members

A similarly lower than expected prevalence (34%) of H. pylori infection was obtained in Belo Horizonte, Brazil(3). It was proposed that although the population was of a low socio-economic level, the families were not living in conditions of absolute poverty. They had fixed dwellings and 94% received treated municipal water (3). Similarly, in Jamaica, the majority of the study population (92%) received municipal water supply which is of good quality. There is epidemiologic evidence of waterborne transmission of infection (20,21) Also, there is an association between H. pylori infection and source of water (22). However, in countries where water treatment is advanced this association is not found (14). In Peru, children whose homes had external water sources were three times more likely to be infected than those who had internal plumbing (20)

The main limitation in this study is the small number of patients studied. Several potential patients were on anti-microbial drugs or proton pump inhibitors which rendered them ineligible for participation in the study.

In conclusion, in this study, the majority of Jamaican children in the middle to upper socio-economic groups with upper gastro-intestinal complaints are negative for H. pylori. The low prevalence may indicate that the prevalence in the Jamaican population is decreasing. Further studies are required to determine the status of symptomatic children from low socioeconomic strata.

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