

Helicobacter pylori Infection among Children with Recurrent Abdominal Pain

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Abstract

Background: *Helicobacter pylori* is one of the most common chronic bacterial infections worldwide and it is more prevalent in developing countries. Its association with recurrent abdominal pain (RAP) in children is still controversial. **Objectives:** The aim of this study was to determine the prevalence of *H. pylori* infection and evaluate its association with RAP and response to proper eradication therapy. **Materials and Methods:** A cross-sectional study involved 185 children aged <18 years who attended the outpatient department in Rapareen Teaching Hospital presented with a history of RAP. Only 150 children fulfilled the criteria to be included in the study and later they were divided into two groups according to the presence of *H. pylori* infection or not. **Results:** The prevalence of infection among healthy children was 11 (11%), whereas among 150 children with RAP included in the study, the prevalence of positive *H. pylori* was 36 (24%) and was statistically significant. Family history of *H. pylori* infection was significantly higher in 24 (16%) children among those who tested positive and treatment shown to have great impact on clinical and laboratory results in 17 (77.3%) and 13 (72.2%) children, respectively, during follow-up compared to those who did not receive therapy. **Conclusions:** The prevalence of *H. pylori* infection is significantly higher among children with RAP and children who have excellent response to proper eradication therapy proved by high rate of negative stool test for *H. pylori* after treatment.

Keywords: Abdominal pain, children, *Helicobacter pylori*

INTRODUCTION

Recurrent abdominal pain (RAP) in children is defined as at least three discrete episodes of abdominal pain of sufficient severity to interrupt normal daily activities or performance occurring over a period of 3 months.^[1] RAP occurs in 10%–15% of school-age children and often interferes with school attendance and performance, peer relationships, participation in organizations and sports, and personal and family activities.^[2] Many studies evaluate its relation to certain conditions and precipitating factors, and *Helicobacter pylori* infection is suggested to be related with no strong level of evidence.^[3]

H. pylori is one of the most common chronic bacterial infections worldwide, which infects at least 50% of world's human population. There is evidence that acquisition of *H. pylori* occurs mainly in early childhood. The infection is more prevalent in developing countries, and it is associated with poverty and social deprivation and main risk factors include overcrowded households, poor sanitation, and poor water supply.^[1]

The relative risk of gastric carcinoma is 2.3–8.7 times greater in infected adults as compared to uninfected subjects. *H. pylori* is classified by the World Health Organization as a Group I carcinogen.^[4]

Diagnostic tests for the detection of *H. pylori* are of two major categories: invasive tests require upper gastrointestinal endoscopy and noninvasive methods such as (ELISA, immunochromatography, and latex agglutination tests) saliva antibody test, urine antibody test, *H. pylori* stool antigen test, urea breath test, and finally culture of multiple biopsy specimens from the gastric mucosa are considered the most accurate method.^[5] Serologic assays using validated immunoglobulin G antibody detection may be helpful for

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screening children for the presence of *H. pylori*; they do not help predict active infection or assess the success of antimicrobial eradication therapy.^[4]

If *H. pylori* is identified, even in a child with no symptoms, eradication therapy should be offered as a combination therapy of antibiotics and proton-pump inhibitor (PPI).^[4] Eradication rates in children range from 68% to 92% when the double or triple therapy is used for 4–6 weeks. The ulcer healing rate ranges from 91% to 100%. Triple therapy yields a higher cure rate than double therapy.^[4]

Most studies focusing on *H. pylori* infection focused on adults. Only a few studies on children are available.^[6] Unfortunately, none of the pediatric studies examined the relationship between *H. pylori* infection, feeding practices, and child nutritional status. Similarly, there has been no report on the association between *H. pylori* infection and RAP among healthy children.

Therefore, this study aimed to determine the current prevalence and also aimed to evaluate if the infection was associated with RAPs and response to proper therapy.^[7]

MATERIALS AND METHODS

Study design and patients

A cross-sectional study involved 185 children aged <18 years who attended the outpatient department in Rapareen Teaching Hospital, Erbil, Iraq, presenting with a history of RAP during a period of 3 months from 1st of January till end of March. After a detailed history and thorough examination, then under some investigations to exclude organic causes including urinalysis, stool analysis, ultrasound and others. Thirty-five patients were excluded from the study due to incomplete data or confirmed organic cause, whereas the remaining 150 patients were tested for stool to determine the presence of *H. pylori* (enzyme immunoassay to detect *H. pylori* antigen in stool specimen). Accordingly, patients were divided into two groups: with positive infection (Group 1) and with negative infection (Group 2). Any child with previous history of underlying chronic illness, proved organic cause for abdominal pain, and those patients who received recent medications affecting stool *H. pylori* testing validity were excluded from the study.

For those patients with positive *H. pylori*, treatment prescribed as triple therapy (amoxicillin 50 mg/kg/day and clarithromycin 15 mg/kg/day for 14 days plus omeprazole 1 mg/kg/day for 1 month)^[4] and fecal antigen testing were done at least 4 weeks after the completion of antibiotic therapy and after PPI therapy has been withheld for 1–2 weeks to evaluate the response to therapy.^[4,8] Among those patients who tested positive for *H. pylori*, 17 out of 36 patients who omit or neglect receiving treatment were compared to those treated for the aim of the study. One hundred healthy children with no history of chronic or acute significant illness were included in the study as the control group.

Ethical consideration

The study was conducted in accordance with the ethical principles that have their origin in the Declaration of Helsinki. The study protocol was approved by the Ethical Committee of Kurdistan Board for Medical Specialties. Written informed consent was obtained from the parents before enrollment of their children in the study.

Statistical analysis

Statistical analysis was carried out using SPSS version 21 (SPSS, IBM Company, Chicago, USA). Chi-square was used to calculate the Pearson's Chi-square and independent *t*-test comparing the means of the two groups. Fisher's exact test was used for small-sized samples in the case of a 2 × 2 contingency table when Chi-square test is not suitable. *P* ≤ 0.05 was considered statistically significant.

RESULTS

Out of 100 healthy children, 11 (11%) of them had positive evidence of *H. pylori* infection documented in their stool samples, whereas among 150 children with abdominal pain who were included in the study, the prevalence of positive *H. pylori* was 36 (24%) and it was statistically significant when compared to the tested control group [Table 1].

Most of infected children had the mean age of 8.027 (±2.585) and predominantly were males. Family history of *H. pylori* infection was highly significant associated with patients tested positive and this was the result among those with RAP when not associated with household size and positive history of peptic ulcer disease among first-degree relatives [Table 2].

Epigastric pain was the main site of abdominal pain in both the groups with abdominal pain (66.7% in *H. pylori* positive

Table 1: Certain characteristics of the studied sample groups

Variables	Cases (n=150), n (%)	Control (n=100), n (%)	P
Age	7.82±2.669	7.72±2.690	0.77
Gender			
Female	78 (52)	49 (49)	0.64
Male	72 (48)	51 (51)	
Family history of HP			
Yes	24 (16)	7 (7)	0.034
No	126 (84)	93 (93)	
Family history of peptic ulcer			
Yes	44 (29.3)	17 (17)	0.26
No	106 (70.7)	83 (83)	
Household size			
<4	88 (58.7)	65 (65)	0.314
≥4	62 (41.3)	35 (35)	
Stool for HP			
Positive	36 (24)	11 (11)	0.01*
Negative	114 (76)	89 (89)	

*Significant *P* value. HP: *Helicobacter pylori*

and 51.8% tested negative) with no significant differences as described in Figure 1.

Proper eradication therapy had significant outcome with more than 70% clinical and laboratory response as revealed in Table 3.

DISCUSSION

Abdominal pain is a common complaint in pediatric outpatient clinic and most of them have no organic cause; many studies involved whether *H. pylori* could be a cause especially in prevalent developing countries. This study involved 150 children with abdominal pain and another 100 healthy children with no complaint, and then the data were taken and analyzed. The prevalence among the control group (11%) is the same of a study conducted by Al-Mashhadany^[9] among children, but less than that reported by Yahya^[10] and other studies that included seropositivity by Senbanjo *et al.*^[7] and Nooruldeen.^[11] The latter study^[11] concluded a higher rate of infection reaching up to 78.2% among studied samples who have abdominal pain. These controversial results can be justified by regional variation, different sample sizes, and method of screening tests used, as reports from developing countries with large sample sizes have higher prevalence rates.^[12]

Table 2: Comparison of certain variables among cases group tested for *Helicobacter pylori*

Variables	Positive (n=36)	Negative (n=114)	P
Age	8.027±2.585	7.758±2.703	0.6
Gender			
Female	14 (38.9)	64 (56.1)	0.71
Male	22 (61.1)	50 (43.9)	
Family history of HP			
Yes	16 (44.4)	8 (7)	<0.001*
No	20 (55.6)	106 (93)	
Family history of PUD			
Yes	14 (38.9)	30 (26.3)	0.149
No	22 (61.1)	84 (73.7)	
Household size			
<4	20 (55.6)	68 (59.6)	0.66
≥4	16 (44.4)	46 (40.4)	

*Highly significant P value. HP: *Helicobacter pylori*, PUD: Peptic ulcer disease

Table 3: Laboratory and clinical response of treated patients compared to those who did not receive treatment

Response	Received treatment (n=19)	Did not receive (n=17)	P
Stool HP after Rx			
Positive	2 (14.3)	12 (85.7)	<0.001*
Negative	17 (77.3)	5 (22.7)	
Clinical response			
Yes	13 (72.2)	5 (27.8)	0.019
No	6 (33.3)	12 (66.7)	

*Highly significant P value. HP: *Helicobacter pylori*, Rx: Treatment

In this study; the prevalence rate increased to 24% in those with RAP with significant association that unfortunately not supported by updated guidelines but declare high frequencies of infection among such children.^[13]

A study conducted by Senbanjo *et al.*^[7] involved school-aged children with RAP screened using UBT (urea breath test); out of the 55 students with chronic RAP, 40 (73%) were positive for *H. pylori*. Furthermore, 62.9% and 82.1% were positive among the intermediate and secondary school students with RAP, respectively. The overall and specific odds ratios of RAP were 12.35 (95% confidence interval [CI]: 6.30–24.22) and 10.40 (95% CI: 1.75–11.73) for the intermediate school students and 22.69 (95% CI: 7.99–64.44) for the secondary school students.^[7] Another study reported by Alimohammadi *et al.*^[13] who revealed that children with RAP had a higher *H. pylori* infection rate than the control group (58.6% vs. 44.8%) (odds ratio [OR] = 1.744; 95% CI: 1.095–2.776) but with no significant difference.

The mean age of 8.027 (±2.585) represented infected persons and did not reflect the real mean as most of patients selected have near age of (7.82 ± 2.669); previous studies in Iraq revealed that it is prevalent even among children below 5 years.^[9,10] The rate of infection in the pediatric age groups increased with advancing age as chance of acquiring it raised and they could even have manifestations that mandate testing.^[7,9,11,14]

Gender did not prove to be a risk for acquiring the microorganism as most pediatric reports available in developing and developed countries did not show significant impact despite some showed slight male predominance,^[7,9,10] whereas positive history of peptic ulcer disease in other siblings or parents is not declared to be associated with the infection.

Family size had not affected the results of our study; this is incompatible with most studies that showed that crowding has a major role in spreading infection even in developed countries.^[10,15] This could be explained by the fact that the samples in this study involved only those with abdominal pain.

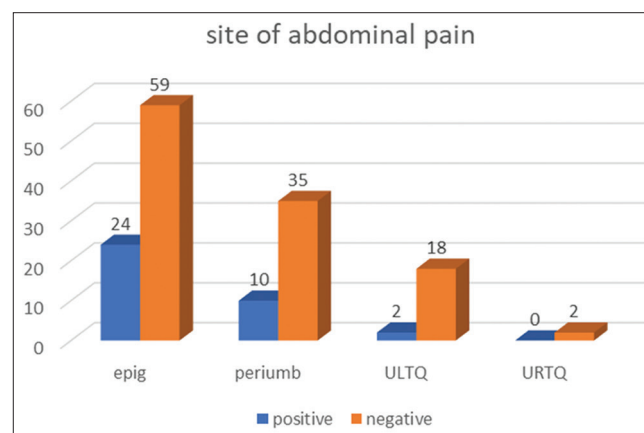


Figure 1: Main site of pain among cases group (Fisher's exact test = 0.298). Epig: Epigastric, Periumb: Periumbilical, ULTQ: Upper left quadrant, URTQ: Upper right quadrant

Family history of infected persons has high significant role in children getting infection ($P < 0.001$). A study that involved 150 children in Nigeria revealed no significant association screened by serology.^[7]

Most of the infected patients complained from epigastric pain as the main site followed by periumbilical and these results were the same as in not infected persons; this may suggest an associated gastritis or even erosive or ulcerative lesions; unfortunately, endoscopy and biopsy sampling were not included in our study. Gastritis is the most common disorder confined to symptomatic affected children as revealed in many studies.^[1,16] This cannot be a standard result as infected school-aged children with RAP complained from sites away from epigastric region or even ill-defined discomfort in many previous researches.^[13] Previous articles among infected adults revealed epigastric pain as the main complaint rather than other sites or even dull or generalized pain.^[17]

High rate of recovery from infection in stool sample was highly significant after proper eradication therapy reaching up to 77.3% with clinical improvement of 72.2% necessitating treatment to be indicated for symptomatic and expel infectivity. Most studies recommended therapy with a response rate of more than 80%.^[12,18,19]

CONCLUSIONS

The prevalence of *H. pylori* infection was higher among those with RAP and positive family history associated strongly with the infection among the studied group. Excellent response to proper eradication therapy proved by high rate of negative stool for *H. pylori* after treatment.

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Conflicts of interest

There are no conflicts of interest

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