FREQUENCY OF HELICOBACTER PYLORI (HP) INFECTION IN CHILDREN WITH RECURRENT ABDOMINAL PAIN (RAP)

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ABSTRACT

Objective: To study the frequency of *Helicobacter Pylori* (HP) infection among children with recurrent abdominal pain (RAP)
Study Design: Cross-sectional comparative study.
Place and Duration of Study: Military Hospital (MH), Rawalpindi from December 2011 to February 2012.
Patients and Methods: One hundred children of either gender aged 2 to 12 years presenting with RAP were tested for HP at Paediatric OPD MH, Rawalpindi who consented to participate in the study. Those children who tested positive for *Helicobacter Pylori* Stool Antigen Test (HPSAT) were labeled as those having Hp infection. The stool assay was performed using the HpSAT kit and the socio-demographic and clinical profiles of children were associated.
Results: Out of 100 children included in the study HpSAT was positive in 38% children. Frequency of Hp infection was significantly associated with source of drinking water (p = 0.014), socioeconomic status (p = 0.001) and positive family history of dyspepsia (p= 0.023). While age and gender have no significant association with HP infection.
Conclusion: Hp infection is very common in children presenting with RAP in our Paediatric OPD. Children with family history of dyspepsia, from low socioeconomic class and those drinking filtered water are at greater risk for HP infection. It is recommended that children from other populations in our country should also be tested in their medical health facilities in order to have a wider analysis of this problem in our setup.

Keywords: *Helicobacter Pylori*, Recurrent Abdominal Pain, *Helicobacter Pylori* Stool Antigen Test.

INTRODUCTION

Recurrent abdominal pain (RAP) is a major health issue in paediatric age group and is often associated with functional impairment in children and adolescents. In concurrence with recurrent headaches, abdominal pain is the most common pain syndrome in children[1]. In some children, RAP is severe enough to cause repeated visits to paediatricians, affecting school activities, studies, and inability to take part in sports and other extracurricular activities[2]. Affected children and their parents may suffer from anxiety and stress[3]. RAP has two distinct patterns of frequency. The first peak occurs between 5 and 7 years of age, with equal frequency in boys and girls and in 5% to 8% of children and the second peak, with prevalence approaching 25% occurs between 8 and 12 years of age and is far more common in girls[4].

Helicobacter Pylori (HP) are gram-negative bacilli and are held accountable for a number of infections found in humans globally[5]. They are highly motile because of multiple unipolar flagella[6]. They are microaerophilic, potent producers of the enzyme urease and inhabit the mucus adjacent to the gastric mucosa[7]. This bacterium was cultured for the first time 30 years ago[8]. In general, the prevalence is high in developing countries and the infection is acquired at a young age. The incidence is >3% of the population each year in developing countries compared with 0.5% in developed countries[9]. Rosenberg explained the overall exposure rate of HP in children to be 33%[10]. HP infection has strongly been associated with gastritis and peptic ulcer disease in our country and has increased prevalence (28.3%) in lower socioeconomic status. Hafeez et al studied 75% of the children with RAP who tested positive for HP[12]. Spontaneous eradication is unusual and it can persist indefinitely causing severe pathology if untreated[13].

The present study aims to determine the frequency of HP infection using HPSAT among children presenting with RAP as it is a common presenting symptom in paediatric

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population and HP is quite prevalent in our country[11,12]. Also, very little research has been done in our country on association between RAP and HP in pediatric population. Also treating the child with H.Pylori eradication therapy in time will help prevent the risk of gastric carcinoma and MALT later in adult life.

PATIENTS AND METHODS

This cross-sectional comparative study was carried out at Paediatric Department of MH, Rawalpindi, which is a 300 bed capacity Tertiary Care Army Hospital, from December 2011 to February 2012. The study population consisted of children of army personnel reporting to Military Hospital (MH) Rawalpindi for medical treatment or those referred from primary or secondary care hospitals for evaluation of RAP. Children of either gender between age of 2 and 12 yrs suffering from RAP were included in the study. Patients with concurrent diseases (pneumonia, viral infection, asthma), with diarrhea, those taking proton pump inhibitors and/or antibiotics less than 4 weeks at the time of examination were excluded from the study. Children under 2 years of age were also excluded from the study as they cannot explain their symptoms properly.

RAP was defined as abdominal pain which waxed and waned, occured with three episodes within a three-month period of time and was severe enough to affect a child's activities[14].

The study was approved by the MH Research and Ethics Committee. Written informed consent was obtained from the parents of all the participants. Demographic data were obtained from children's parents including: socioeconomic status and their children's drinking water source.

All the patients underwent physical examination and investigations to look for any other cause of RAP. The children with RAP underwent full battery of investigations including complete blood picture, urine routine examination, stool routine examination, stool culture and sensitivity, liver function tests, renal function tests, abdominal and pelvic ultrasonograms to rule out other common causes of RAP like Hepatitis, urinary tract infection, parasitic infections, urinary calculi, inflammatory bowel disease, Celiac disease and Lactose intolerance. HPSAT was also done in all the patients and patients were labeled to have HP infection if they tested positive using HPSAT.

Information on gastrointestinal symptoms, risk factors and medical history were collected from the children's parents by means of an interview conducted by the researcher and as recorded on a data form.

The stool assay used was the commercially available diagnostic HP Antigen Rapid test (by Cer Test Biotec S.L. Spain). It is a one step colored chromatographic immunoassay for the detection of HP antigen in stool assay. The samples were collected in clean containers and assayed right after their collection. This test has a sensitivity of >94% and specificity of >99%. HP infection was labeled to the patients who were positive for HPSAT indicated by a red line in the test region of the *in vitro* qualitative immunochromatographic assay by Cer Test Biotec S.L. based on the antigen immunoassay in stool by enzyme-linked immunosorbant assay (ELISA).

The children were followed up in Paediatric OPD on weekly basis and were put on HP eradication regimen for 14 days until their stool tested negative for HP Antigen.

All data had been analyzed using Statistical Package for Social Sciences (SPSS) version 18.0. Frequencies and percentages were taken out for the qualitative variables while mean and standard deviation (SD) were taken out for the quantitative variables. Associations between the qualitative variables were studied by applying Pearson's Chi-Square test / Fisher's Exact Test where appropriate. A *p*-value less than 0.05 was taken as significant.

RESULTS

A total of 100 patients fulfilling the inclusion criteria were included in the study. Mean age was 7.04 years (SD=2.85). Majority of the children (66%) belong to the age group of 5 – 10 years. Fifty eight (58%) of the children tested were males with a male to female ratio of 1.4:1. Sixty six (66%) children used filtered

drinking water. Forty one (41%) children had family history of dyspepsia. Majority of the children (59%) came from families with net monthly income <15,000 PKR (table-1).

HPSAT was positive in 38 (38%) of the children and negative in 62 (62%) of the children. Frequency of HP infection was similar in both the genders (p = 0.204) and in all the age groups (p = 0.652). Frequency of HP infection was significantly associated with source of drinking water with higher frequency in children who drank filtered water (p = 0.014). Similarly HP infection was significantly higher in lower income class (p = 0.001). Patients with positive family history of dyspepsia had higher frequency of HP infection (p=0.023).

DISCUSSION

The prevalence of HP infection in children depends upon a number of factors and may range from 10% to 80% in healthy population. This depends upon the age of the patients, their socioeconomic class, their geographical region, source of drinking water and family history[11]. HP seropositivity increases with age, in low-middle socioeconomic class and is related to father's educational status; reducing HP seroprevalence will require improvement in sanitary conditions and educational status of the population[15].

A lot of controversy is going on whether RAP is associated with HP infection or not. Telmesani et al studied on the same lines and found that 73% of patients with RAP had HP infection[16]. On the other hand, Spee et al. showed no association between RAP and HP[17]. No latest study in children for association between RAP and HP in our country is available. However Hafeez et al's study conducted in 1999 in Pakistan showed 75% of children positive for HP infection who had RAP but the testing of Anti HP IgG antibodies was used for its screening, which has a low sensitivity and specificity[12].

A lot of tests, both invasive and non-invasive, are being used for the diagnosis of HP infections. Culture of HP in gastric tissue biopsy sample after endoscopy, though, considered the gold-standard for the identification of this bacterium, is expensive, invasive and cumbersome for the patients[18]. That's why most children or their parents do

Table: Association of HP with demographic variables.

	Total	Positive (n = 38)	Negative (n = 62)	*p*-value
Gender				
Male	58 (58%)	19 (50%)	39 (62.9%)	0.204
Female	42 (42%)	19 (50%)	23 (37.1%)	
Age groups (Years)				
< 5	21 (21%)	9 (23.7%)	12 (19.4%)	0.652
5 – 10	66 (66%)	23 (60.5%)	43 (69.4%)	
> 10	13 (13%)	6 (15.8%)	7 (11.3%)	
Source of drinking water				
Well water	20 (20%)	6 (15.8%)	14 (22.6%)	0.014
Filtered water	66 (66%)	31 (81.6%)	35 (56.4%)	
Mineral / boiled water	14 (14%)	1 (2.6%)	13 (21%)	
Monthly Income (PKR)				
< 15,000	59 (59%)	30 (78.9%)	29 (46.8%)	0.001
15,000 – 50,000	32 (32%)	4 (10.5%)	28 (45.2%)	
> 50,000	9 (9%)	4 (10.5%)	5 (8.1%)	
Family History of Dyspepsia				
Positive history	41 (41%)	21 (55.3%)	20 (32.3%)	0.023
Negative history	59 (59%)	17 (44.7%)	42 (67.7%)	

not approve for such an invasive procedure considering dyspepsia as a minor symptom.

Likewise serological tests for HP are highly inaccurate and cannot be applied to children due to their low sensitivity[19]. Similarly another investigation used is 13C Urea Breath Test but it's expensive, bothersome, and unavailable in some countries and does not give accurate results in young children[20]. On the other hand, HPSAT is an inexpensive, accurate, rapid and non-invasive test in both paediatric and adult age group and therefore was used in this study. According to Pourakbari et al, sensitivity and specificity of HPSAT were 88.2% and 100%, respectively, in children[21].

Age has been implicated as a risk factor for HP infection. Study by Jafri et al shows that there is a higher risk of HP infection with increasing age approaching 53.5% in children 11 to 15 years of age[15]. The present study showed insignificant relationship between the age groups and the HP infection.

Male gender has been implicated as having increased prevalence for HP infection as indicated by one of the local studies conducted by Javed et al[22]. However Goodman et al's study showed no significant association between gender and HP infection[23]. The present study also showed equal prevalence of HP in both genders and there was insignificant association between the gender and HP infections.

Source of drinking water has been implicated as a risk factor as water supplies are prone to contamination. Gião et al revealed that contaminated water can actually harbor HP and this organism can survive in water[24]. Also, the present study showed that out of those who were HPSAT positive, 81.6% of the subjects drank filtered water, 15.8% drank well water and 2.6% drank mineral/boiled water with significant relationship. This showed that there is an increased risk of HP infection with the use of filtered water.

There is substantial evidence on the association of HP prevalence and a positive family history of dyspepsia. Ceylan et al while studying on Turkish population proved that the prevalence of HP was higher among the children whose family member was infected with HP as compared to the children without having any family member infected (p<0.0001)[25]. In the present study, 21 children (55.3%) who were HPSAT positive, had a positive family history of dyspepsia. There was a significant association between the HP infections and the positive family history of dyspepsia.

Socioeconomic status of a family has been implicated as a risk factor for higher incidence of HP infections as per studies by Qureshi et al and Hafeez et al[11,12]. The present study showed a significant relationship between socioeconomic status and HP infections and 78.9% of the children with HPSAT positivity belonged to low socioeconomic class.

CONCLUSION

HPSAT was positive in 38% of the children with RAP in the present study. The family history of dyspepsia, source of drinking water and the socioeconomic status showed significant association with HP infection. These may be considered as risk factors in acquiring the infection. Age and gender of the children showed no association with HP infection.

CONFLICT OF INTEREST

This study has no conflict of interest to declare by any author.

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