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The predominance of *Helicobacter pylori* infection in children with abdominal cramping

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Abstract

Helicobacter pylori (H. pylori) infection is a common problem in pediatric practice, and its acquisition is related to poor socioeconomic conditions. Although the organism is thought to be responsible for many diseases, it starts its symptoms from abdominal cramping and ultimately leads to gastric ulcer. The current research aimed to evaluate the occurrence of *H. Pylori* infection in children presented with abdominal cramping in a tertiary care setting at Lahore. The cross-sectional descriptive study was conducted at The Children Hospital and Institute of Child Health (CH & ICH) Lahore, Pakistan. In this study, 94 children of both genders were included. Blood samples were collected in a clotted gel vial after obtaining informed consent. Immunoassay method was used for the quantitative detection of IgG class antibodies. 49% of patients were positive for Anti *H. Pylori*IgG immunoglobulin. The *H. pylori* prevalence rate in females is more than that of males. Among positive patients, 15 (33%) males and 31(67%) females were affected. The results of the current study revealed that females are more infected by *H. pylori* than males. The statistical analysis obtained from the present study showed that the occurrence of *Helicobacter pylori* infection is the leading cause of recurrent abdominal discomfort in children.

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Introduction

Helicobacter pylori (H. pylori) is a gram-negative, microaerobic human pathogen. *H. pylori* infection is usually acquired in childhood and continues until treated(Grad *et al.* 2011). An inflammatory response involving plasma cells, neutrophils and macrophages is initiated by the *H. pylori* within the mucosal layer and results in injury to the epithelial cells. Gastritis is usually more severe in the antrum, with little or no inflammation in the corpus. All patients found to have peptic ulcers should be tested for *H. pylori*(Chey *et al.* 2007).

The finding of *H. pylori* and its involvement with the gastric disorder has revolutionised the management and perception of gastric diseases. Peptic ulcer disease is no more considered a chronic recurrent disorder(Atherton *et al.* 2009). *H. pylori* infection is an essential issue throughout the world; more than one million deaths/ annum was caused due to peptic ulcer and Gastric cancer(Axon 2014). The literature showed a positive relation of *H. pylori* with abdominal diseases and various risk factors (Mehmood *et al.* 2014). The faecal and gastro-oral routes are the primary source of transmission of *H. pylori* infection in developing countries depending upon the age distribution of susceptible and resistant persons(Peleteiro *et al.* 2014).

Worldwide, *H. pylori* infect more than half of adult individuals, but the incidence rate depends on race, geographical area, socioeconomic status, and age(Peleteiro *et al.* 2014). In developed countries, a frequent cause of *H. pylori* is directly proportional to economic conditions and is higher due to migrated persons(Mehmood *et al.* 2014). In Pakistan, the o6ccurrence rate is reported in a range of 50-90%(Hassan *et al.* 2007). The high prevalence of *H. pylori* infection in Pakistan is masked due to the availability of limited data. The ratio of students infected with *H. pylori* infection is higher in japan(Nagy *et al.* 2016) as compared to other developed countries like China and the USA. Urbanisation may reduce the prevalence of *H. pylori* infection(Nagy *et al.*2016). *H. pylori* infections are less common in North American and Northern European individuals, but still 1/3rd of adults are affected. The occurrence rate is high in these areas due to immigrants(Banatvala *et al.* 1993). The symptoms include bloating, tenderness, and cramping pain in the abdomen(Mohsen *et al.* 2018).

The current research work was aimed to determine the *H.Pylori*infection in children with recurrent abdominal pain.

Materials and methods

A cross-sectional study of 8 months from December 2017 to October 2018 was conducted at The Children Hospital and Institute of Child Health (CH & ICH). Ninety-four children (both males and females) between the ages of 1 to 18 years with recurrent abdominal cramping were included in this study. Before the study, the guardians of the children were informed about the research and consents were taken. Blood samples of patients complaining of episodic abdominal cramping were collected in a clotted gel vial. For the detection of IgG antibodies against *H. pylori* infection, human anti-helicobacter pylori IgG ELISA Kit was used. *H. pylori* infection was considered positive when the antibodies titer was more than 15IU/ml. Data wereanalysed using IBM SPSS statistics v 25.0.

Results

Ninety-four children, complaining of episodes of abdominal cramping, were included in the study and based on the age differences, the children were divided into three groups. Group 1 comprised of children from 1 to 6 years of age, children from 7 to 12 years of age were included in group II, and group III included children from 13 to 18 years. Among these 94 complainants, 60 (64%) were females, and 34 (36%) were males as shown in Fig.1.The result of the current study revealed that 46 children (49%) were host to the *H. pylori* bacteria whereas the anti-helicobacter pylori IgG test was negative for 48 children (51%) as given in Fig.2. Out of 34 males, 15 (44.12%) were positive, and 19 (55.88%) were negative whereas among 60 females 31 (51.67%) were

positive, and 29 (48.33%) were negative as shown in Fig. 1.

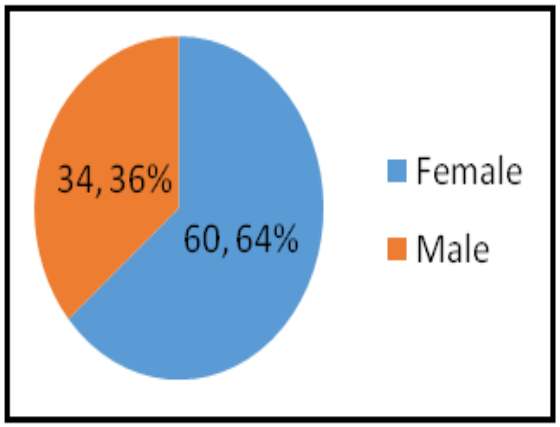

Fig. 1. The total number of male and female participants.

The obtained results were further analysed based on age, and it was found that in group I amongst five patients under study two were positive for *H. Pylori* bacteria and three were negative (6%). Twenty-two children were reported in group II out of which eleven were positive for *H. pylori* whereas the remaining eleven were negative (23%). In group III among Sixty-seven complainants under study, 34 were found positive for H. pylori, and 33 were negative, i.e. is 71% as shown in Figs 3 and 4.

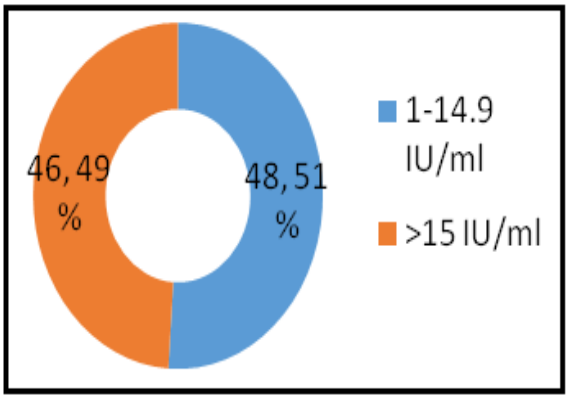

Fig. 2. Percentage of *H. pylori*-positive and negative individuals.

Discussion

The present study was conducted to find a relation between abdominal cramping and *H. pylori* infection in children from 1 to 18 years of age. This survey study reported that 46% of patients with episodic abdominal cramping were positive for *H. pylori* infection. The prevalence rate of this study was higher as compared to a similar study conducted in CMH Quetta (32.5%)(Punhal *et al.* 2016). In Karachi, the percentage of affected individuals with *H. pylori* was 53%(Jafri *et al.* 2010) which was higher compared to the current study. The prevalence rate in India was 79%(Jafri *et al.* 2010) and in Bangladesh, that was 52%(Windsor *et al.* 2005).

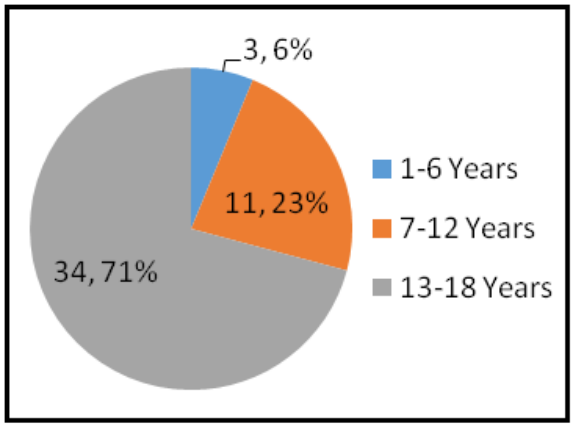

Fig. 3. Percentage of individuals in whom the anti-helicobacter pylori IgG test was negative.

The occurrence rate in rural and urban areas of Australiawas 76%(Teh *et al.* 1994). In Taiwan, 54.4% of patients were reported positive for *H.pylori*infection, out of which 53.7% were males, and 46.3% were females(Klein *et al.* 1994) which is quite comparable with current study. *H. pylori* infection occurs worldwide but the rate changes among countries and individuals in the same region (Drumm *et al.* 1987). The overall occurrence is linked to socioeconomic conditions (De *et al.* 1990). The risk of infection increased due to unhygienic food, filthy sanitary conditions, dental treatment and person living in one room or congested areas(Lindkvist *et al.* 1998). The decrease in the occurrence of illness is due to the improvement of sanitary conditions(Ueda *et al.* 2003). The prevalence of *H. pylori* showed significant geographical variations. In different developing countries, more than 80% of individuals were found positive at a young age(Perez-Perez *et al.* 2004)and in industrial areas it was 40%. During this study, a positive relation between *H. pylori* bacteria and different age groups was observed. This study revealed that a definite relation to the prevalence of *H. pylori* bacteria increased with an increase in age. Pounder *et al.*,1995 also concluded in his study that

occurs in children and young age group is low as compared to adults and elder people(Pounder *et al.* 1995).

In the current study occurrence rate in females 31(67%) is more than males 15 (33%) which is entirely dissimilar with another study conducted in Australia in which out of 63 children; 36 (57.1%) males and 27 (42.9%) females, were seropositive for *H. pylori(Chong et al. 1995).*

In most cases of *H. pylori* infection in children, it was not associated with siblings or grandparents but was commonly associated with infections in their parents. From the studies of interfamilial infection, there is conflicting evidence(Weyermann *et al.* 2009).

In current study a high rate of *H. pylori* infection (49%) was observed among children whoare quite comparable with a recent study in whichit was concluded that prevalence rate was high in children, but in some countries, it showed that prevalence rate in children was low, but it increased in adult and old age because of low family income, large family size, low education level and a poor diet(Mitchell *et al.* 1992).

In Korea, 22% of children at the age of 2 to 20 showed low percentages, but at the adult age, it showed a 75% prevalence.

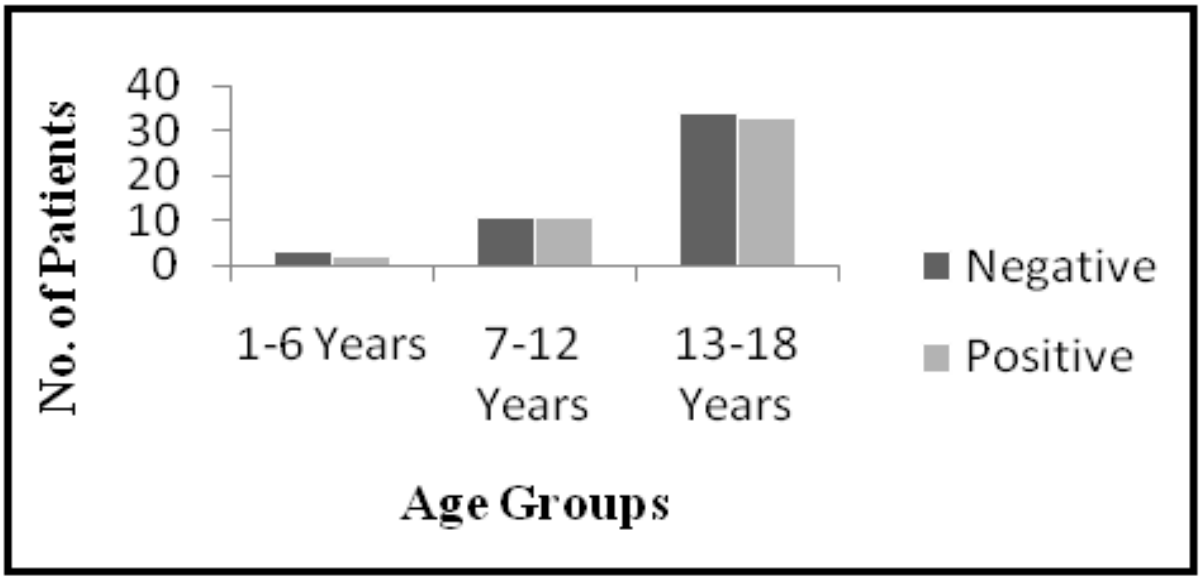

Fig. 4. Graphical representation of the total number of patients and positive and negative patients based on age groups.

We examined the children having *H. pylori* infection because if it is not controlled it could be deleterious as it has been observed in the last decade that*H. pylori* disease in the upper gastrointestinal tract increased. The relation between peptic ulcer and gastric ulcer is active in adults. The percentage observed of gastric ulcer and the peptic ulcer was 90% and 70% respectively(Sullivan *et al.* 1991). The epidemiology of ulcer disease in these particular developing countries is not known. Few studies have addressed this question in other places. A high frequency of severe peptic ulcers was found in rural Haitian men(Eastwood *et al.* 1986).*H. pylori* infection has been clearly shown to cause both gastric and duodenal ulcer disease in adult patients, but it is uncertain whether this is also true in children as stated by Drumm *et al.* (Drumm *et al.* 1987). In 1981, the annual incidence rate of duodenal ulcers was 3.8/1,000(Hugh *et al.* 1984),this rate varies from 1.4 to 3.3/1,000 in European countries(Megraud *et al.* 1989).

Conclusion

The data obtained from the above study concluded the predominant circulation of *H. Pylori* infection in children with abdominal cramping. So if children are

complaining about recurrent abdominal pain; it should not be ignored. It must be screened for *H.Pylori* infection as its ignorance may lead to multiple gastric complications.

Conflicts of interest

There are no conflicts of interest regarding this research work or its publication.

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