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HELICOBACTER PYLORI SEROPOSITIVITY AMONG CHILDREN IN DUHOK CITY, IRAQ

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ABSTRACT:
Introduction: *Helicobacter pylori* (*H. pylori*) is a gram negative bacteria that causes gastritis and peptic ulcer disease (PUD). It is widely accepted that the infection may occur early in life and may persist for decades before causing diseases. The aim of this paper was to determine the prevalence of *H. pylori* seropositivity in pediatric age group and to examine the associated risk factors. Patients and methods: Blood samples were collected from 100 subjects attending Hevi Pediatric Teaching Hospital over a period of 6 months and IgG positivity was determined. A questionnaire sheet was prepared and used for each study subject. Data were collected by a face-to-face interview.Results: It was found that 28/100 (28%) of the recruited sample was positive for *H. pylori* seropositivity. A significant association was found between the number of siblings and *H. pylori* positivity (P=0.01, OR=1.3). No significant relationships were found between other factors and *H. pylori* positivity. Conclusions: The prevalence of *H. pylori* infection was less than that reported in the city previously and less than that reported in neighboring countries. A significant positive association was found between number siblings and *H. pylori* infection rate. Further studies are needed recruiting larger sample size to explore *H. pylori* prevalence and its associated risk factors.

KEYWORDS: *Helicobacter pylori*, Pediatric, Children, Duhok, Iraq.

1. INTRODUCTION

Helicobacter pylori is a gram negative spiral-shaped bacillus bacteria which causes gastritis and peptic ulceration (Atherton, 2006). The eradication of such microorganism is pivotal in the treatment of peptic ulcer disease (PUD). Infection with this microorganism plays a major role in the pathogenesis of gastric adenocarcinoma (GA) (Hussein 2010; Wroblewski *et al*., 2010). GA is the second most important cause of cancer deaths worldwide (Atherton, 2006). It has been found that infection intermingles with environmental factors plus human genomic make up to develop cancer (Atherton, 2006) Hussein 2010; Wroblewski *et al*., 2010). Infection with *H. pylori* is very common and half of the world's population is estimated to be infected. The prevalence of infection increases markedly with age, such an increase might be due to a birth-cohort effect (Atherton, 2006) . Studies from Latin America showed variation in the prevalence rate of *H. pylori* in children (Santos *et al*., 2009). While the highest infection rate was found in Argentina where *H. pylori* prevalence was 25%, the highest infection rate was recorded in Bolivia (74%) (Santos *et al*., 2009). Additionally, *H. pylori* infection rates were 25%, 31% and 82% in Israel, Turkey and Iran, respectively (Falsafi *et al*., 2005; Muhsen *et al*., 2006; Ozbey *et al*., 2015). In a previous study conducted in Iraq, the prevalence of *H. pylori* varied according to age ranging from 27% in children to 58% in teenagers (Hussein *et al*., 2008). In the same study, the infection rate was found to be 78% and was significantly higher than the prevalence in children (Hussein *et al*., 2008). Overcrowding, parent's education and bad hygiene have been reported as risk factors for infection in children (Santos *et al*., 2009). The role of breastfeeding is controversial. Results of some studies found breastfeeding as a risk factor due to intimate contact between the infant and its infected mother (Malaty *et al*., 1996; Dore *et al*., 2002; Fialho *et al*., 2010; Choi *et al*., 2016). No study has been conducted in Duhok city determining *H. pylori* infection associated risk factors. Therefore this study was conducted to investigate the prevalence of *H. pylori* in children and to determine the risk factors associated with the infection.

2. PATIENTS AND METHODS

2.1 Blood samples

Blood samples were collected from 100 subjects attending Hevi Pediatric Teaching Hospital over a period of 6 months from November, 2017 to April, 2018. Five mL of blood was taken from each subject using 5 mL syringe and needle. Blood samples were centrifuged at 1500 rpm for 3 min to obtain serum samples that were kept frozen in –20°C until the test was performed. Anti- *H. pylori* IgG positivity was determined using commercial kit (AMP, Bucharest, Romania) and following manufacturer's instruction. All patients who attended nutrition clinic and whom their guardians agreed were included in this study. Only patients who their parents disagreed to participate were excluded.

2.2 Questionnaire

A questionnaire sheet was prepared and used to collect personal information by a face-to-face interview for each study subject. The questionnaire covered age, sex, residency, body mass index (BMI), number of siblings, education status of parents, and history of feeding type.

2.3 Ethics

The study was approved by the scientific and ethics committees of Hevi pediatrics hospital and the college of medicine, University of Duhok. Written consent was obtained from guardians of recruited subjects.

2.4 Statistics

Chi-squared test was applied to assess associations between *H. pylori* positivity and categorical variables. Linear regression

analysis test was used to compare continues data. P value of 0.05 or less was regarded significant. All computations were carried out using SPSS version 21.

3. RESULTS

3.1 Patients' characteristics and H. pylori prevalence

During the period of study between the first of November 2017 to the 30th of April 2018, 100 patients with the age average of 5.9±5 years were recruited. 47/100 (47%) of the recruited subjects were male and 72/100 (72%) were from rural area. 39/100 (39%) of recruited children gave a history of exclusive breastfeeding during the first 6 months of life. 48/100 (48%) of the mothers and 38% of the fathers claimed that they never entered school. Results for anti-HP IgG showed that 28/100 (28%) of the recruited sample was positive for *H. pylori* seropositivity.

3.2 *H. pylori* infection risk factors

The association between *H. pylori* positivity and different variables were studied. No association was found between types of feeding and *H. pylori* positivity (P>0.05 for all). Additionally, no associations were found between education levels of the parents and *H. pylori* positivity (P>0.05 for all). A significant association was found between the number of siblings and *H. pylori* positivity (P=0.01, OR=1.3). Finally, no significant relationships were found between age, gender, residency or BMI and *H. pylori* positivity (table 1).

Table 1. The association between *H. pylori* positivity and different variables

Variables	*H. pylori* positive	*H. pylori* negative	P value
Feeding			
Breastfeeding	11 (28.2%)	28 (71.8%)	0.9
Formula	8 (29.6%)	19 (70.4%)	
Mixed	9 (26.5%)	25(73.5%)	
Mother Education			
Illiterate	17 (35.4%)	31 (64.6%)	0.22
Secondary school	9 (19.6%)	37 (80.4%)	
Higher education	2 (33.3%)	4 (66.7%)	
Father Education			
Illiterate	11(28.9%)	28 (71.8%)	0.79
Secondary school	15(30%)	35 (70%)	
Higher education	2 (18.2%)	9 (81.8%)	
BMI	17.63	14.2	0.7
Age	12 months – 15 years	11 months – 9 years	0.1
Number of sibling	3 – 7	1 – 5	0.01
Rural	23	41	0.9

4. DISCUSSION

Infection with *H. pylori* is one of the most common chronic infections worldwide and it has been estimated that around 50% of world's population is infected with this microorganism (Hussein 2010; Wroblewski *et al.,* 2010). Persistent infection with *H. pylori* causes peptic ulcer diseases and plays an important role in the pathogenesis of gastric adenocarcinoma. Three factors interplay roles in disease development process: *H. pylori* virulence factors, immune response and environmental factors (Hussein 2010; Wroblewski *et al*., 2010). It is widely accepted that the infection may occur early in life and may persist for decades before causing diseases. *H. pylori* infection was studied thoroughly in Iraq (Hussein *et al*., 2008; Hussein *et al*., 2008; Hussein *et al*., 2016). Additionally, the prevalence of the infection was studied in different age groups (Hussein *et al*., 2008). However, no study has been conducted to determine the risk factors associated with the infection. Thus, this study investigated the prevalence of the infection and its risk factors. In this study, the prevalence of infection in the recruited subjects was found to be 28% which is less than what was found previously in the same city (10%) (Hussein *et al*., 2008). The decrease in the infection rates might be due to the improvement of life standards and hygiene in the region. Furthermore, the prevalence in our study was much lower than that found in Iran where *H. pylori* infection rates were found to be 47%-64% (Falsafi *et al*., 2005). In Saudi Arabia, another neighboring country to Iraq, recruiting similar study that recruited 303 children showed that the prevalence rate was found to be around 50% (Hasosah *et al*., 2015). In the other hand, the infection rate in our city was higher than that found in the majority of developing countries where around 10% of the pediatric population was shown to be infected with *H. pylori* (Hussein *et al*., 2008).

Different risk factors are associated with *H. pylori* infection during childhood. The role of breastfeeding is controversial in the transmission of *H. pylori* (Dore *et al*., 2013). While some reports showed a relationship between breastfeeding and the infection, others found a protective role for breastfeeding preventing the infection (Dore *et al*., 2013). In our study, we classified our patients into three groups: exclusive breastfeeding; mixed feeding or artificial milk feeding. No relationship was found between the type of feeding and *H. pylori* infection. In a study conducted in Brazil, it was found that the number of siblings played a substantial role in acquiring *H. pylori* infection during childhood (Fialho *et al*., 2010) . Same results were found in Japan (Osaki *et al*., 2005) and in agreement with this, a significant correlation between the number of siblings and *H. pylori* infection was found. In a meta-analysis conducted by de Martel and colleague, *H. pylori* was found more predominantly in male. Such relationship was not detected in our study. In addition, no correlation was found between age and *H. pylori* positivity in this study. A previous study conducted in Russia, a strong relationship between mother's education level and *H. pylori* infection rate was found (Malaty *et al*., 2015). In a study conducted in Taiwan, the lower education levels of mothers were associated with higher infection rates (Wu *et al*., 2015). In contrast to this, no relationship was found between education level and *H. pylori* infection in our study. This might be explained partly by the small sample that was used in our study. Further studies are needed recruiting a large sample size to explore this area. The role of *H. pylori* infection in obesity is under investigation. While *H. pylori* was associated in several studies, no relationship was found between *H. pylori* and increased BMI (Ioannou *et al*., 2005; Marcela *et al*., 2007; Arslan *et al*., 2009). On the other hands, several studies showed an increase in BMI after *H. pylori* eradication (Ioannou *et al*., 2005; Choi *et al*., 2016). In our study, no relationship was found between BML levels and *H. pylori* positivity. This might be due to the small sample size recruited in this study. Further studies are needed to explore the effect of *H. pylori* eradication on BMI levels.

To conclude, the prevalence of *H. pylori* infection was found in 28% of the recruited children. This was less than that reported in the city previously and less than that reported in neighboring countries. A significant positive association was found between number of siblings and *H. pylori* infection rate.

No association was found between parent's education, gender, age or BMI and *H. pylori* positivity. Further studies are needed recruiting larger sample size to explore *H. pylori* prevalence and its associated risk factors.

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