

Prevalence of *Helicobacter pylori* Infection in Patients With Down Syndrome and Mental Retardation

Fariba Fayaz^{1,2,*}; Latif Gachkar¹; Sara Rahmati Roodsari¹; Bitá Pourkaveh¹

¹Infectious Diseases and Tropical Medicine Research Center, Shahid Beheshti University of Medical Sciences, Tehran, IR Iran

²Department of Microbiology, Faculty of Medicine, Shahid Beheshti University of Medical Sciences, Tehran, IR Iran

*Corresponding author: Fariba Fayaz, Infectious Diseases and Tropical Medicine Research Center, Shahid Beheshti University of Medical Sciences, Tehran, IR Iran. Tel: +98-2122439963-8, Fax: +98-2122439964, E-mail: Faribafayaz@yahoo.com

Received: September 8, 2013; Revised: November 3, 2013; Accepted: December 14, 2013

Background: Clinical and epidemiological data indicate that *Helicobacter pylori* (*H. pylori*) are acquired during childhood and remains for the life time of the host. Patients with physical and mental disabilities may be particularly exposed to this microorganism, because of different dietary, abilities, living, and sanitary condition.

Objectives: The current study aimed to investigate the prevalence of *H. pylori* infection among institutionalized patients with Down syndrome and mental retardation.

Patients and Methods: Seventy five institutionalized patients with Down syndrome and mental retardation, with the age range of < 10 to 50 years were selected from welfare Center, an institute for caring mental retardation and Down syndrome patients. Seventy five out patients were also included as controls too. The control population was from the same geographical area as the study group, and had comparable socioeconomic features. Sanitary condition and personal hygiene of both the intervention and control groups were considered. Serum immunoglobulin G (IgG) produced in response to *H. pylori* infection was measured, with the Helori-test IgG with 92% sensitivity and 95% specificity; urea breath test (UBT) was also done for all.

Results: The differences between the groups were compared by t-test and χ^2 test. Seropositivity for *H. pylori* was significantly higher in patients with Down syndrome and mental retardation than in those of the control group ($P < 0.001$) as the socioeconomic features did not differ between the two groups, this can be a strong consideration of the validity of this comparison (the current study showed that out of 75 specimens, 41 cases were positive by Elisa test; accordingly, UBT test results were positive too).

Conclusions: The current study indicated that *H. pylori* infection occurs at a higher rate in patients with Down syndrome and mental retardation. This may provide more reasons to control the transmission of *H. pylori* among them.

Keywords: *Helicobacter pylori*; ELISA; Down syndrome

1. Background

Helicobacter pylori (*H. pylori*) infection is the most common gastrointestinal bacterial disease worldwide (1). The bacteria is the major contributor of gastritis and many of the other diseases associated with gastritis are induced by *Helicobacter* species (1). Patients with *Helicobacter pylori* are at risk of peptic ulcer, at least four times more than the negative ones (2). Retrospective and prospective studies have shown previous infections with *H. pylori* in 90% of the patients with stomach cancer including gastric lymphoma (3, 4). Risk of gastric cancer associated with *H. pylori* is estimated 80% in developing countries and 70% in developed countries (2). On the other hand, recent studies have indicated strong relationship between *H. pylori* and mental retardation and patients' lifestyle (5). Risk factors of *H. pylori* acquisition are low social class in adulthood, and facing poor living conditions along with chronic diseases in childhood (6). Also the epidemiological and clinical statistics show that *H. pylori* infection in childhood will remain throughout the

life, hence children and adult with physical and mental disabilities are more vulnerable to *H. pylori* infection (7). The life style, nutrition, and sanitary condition of these patients are completely different with those of normal people, especially in Down syndrome (8). Given that most of the patients with mental disabilities live in welfare centers; therefore, person to person contact, use of common devices and oral contact are considered as *H. pylori* transmission risk factors.

2. Objectives

The current study aimed to determine the prevalence of *H. pylori* in patients with Down syndrome in Tehran Welfare Center in 2013, in order to standardized *H. pylori* eradication protocol among these patients.

3. Patients and Methods

Formal testing for mental impairment was performed

using the Brunet-Lezin (13) and Terman-Merill test 14. No patient had undergone anti-*Helicobacter pylori* therapy previously, informed consent was obtained for all procedures in the study; moreover the study was approved by the University Ethical Committee. This cross sectional study was performed and sampling was conducted randomly from 75 children who were institutionalized in the welfare centers, and other 75 gender-matched outpatients as controls. A 5 mL blood sample was obtained from each of the 75 subjects and serum immunoglobulin G (IgG) was produced in response to *H. pylori* infection using ELISA kit with 92% sensitivity and 95% specificity (Europital, Italy), also the serum samples were examined by rapid test regardless of negative or positive result, then urease breath test (UBT) was used as the gold standard. The findings were analyzed by SPSS software version 17 and absolute and relative frequency of the data was obtained. To determine the relationship between *H. pylori* and the variables such as age and sex, the Chi square test and, in some cases, Fisher's exact test were used. In addition a One-Way ANOVA was used for data with normal distribution. It should be mentioned that due to cultural issues, female patients are kept in home; thus, in the current study the samples were selected from the male patients.

4. Results

The result of ELISA test showed 34 negative and 41 positive cases, all of the positive cases were approved by UBT test ($P < 0.0001$) (Figures 1 and 2). Comparing ELISA test results with patients' age showed that the age of most positive ELISA cases were 11-20 and 31-50 years, also 15 positive and 20 negative ELISA cases were in 11-20 age range, and five positive and four negative ELISA cases were in 31-50 age ranges. There were nine patients in the 0-9 age range with eight negative and one positive ELISA cases ($P < 0.001$) (Figure 3) (Table 1). Comparing the relationship between age and *H. pylori* by rapid test showed that most of the positive cases were in 31-50 age group, and most of the negative cases were in 11-20 age group (Figure 3). In addition, in order to find the relationship between age and *H. pylori* by UBT we found that most of the positive cases were in 31-50 age group, and most of the negative cases were in 11-20 age group (Figure 4).

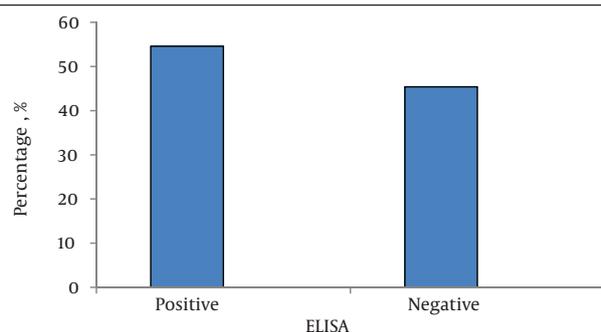


Figure 1. ELISA Test Result of *Helicobacter pylori* Infection in Patients With Down Syndrome and Mental Retardation

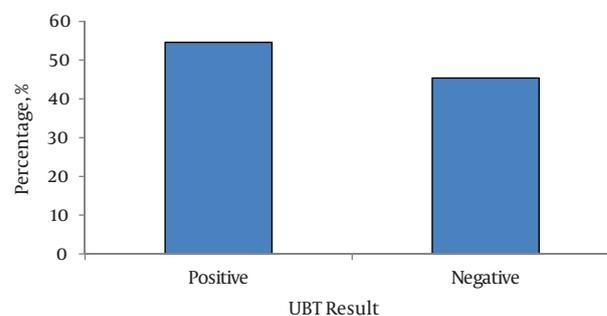


Figure 2. UBT Result of *Helicobacter pylori* Infection in Patients With Down Syndrome and Mental Retardation

Table 1. Comparing the Relationship Between Age and *Helicobacter pylori* Infection in the Patients With Mental Retardation and Down Syndrome by ELISA

Age Group	ELISA		Total
	Negative	Positive	
0-10 Years			
Count	8	1	9
% Within age group	88.9	11.1	100.0
% of Total	10.7	1.3	12.0
11-20 Years			
Count	20	15	35
% Within age group	57.1	42.9	100.0
% of Total	26.7	20.0	46.7
21-30 Years			
Count	2	10	12
% Within age group	16.7	83.3	100.0
% of Total	2.7	13.3	16.0
31-50 Years			
Count	4	15	19
% Within age group	21.1	78.9	100.0
% of Total	5.3	20.0	25.3
Total			
Count	34	41	75
% Within age group	45.3	54.7	100.0
% of Total	45.3	54.7	100.0

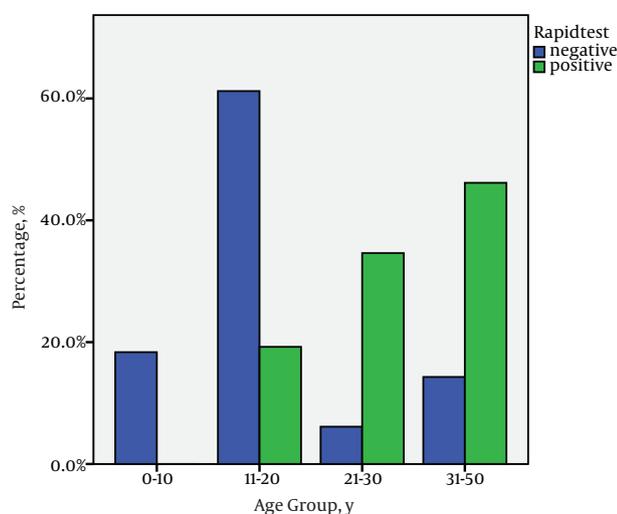


Figure 3. Comparing the Relationship Between Age and *Helicobacter pylori* Infection in Patients With Mental Retardation and Down Syndrome by Rapid Test

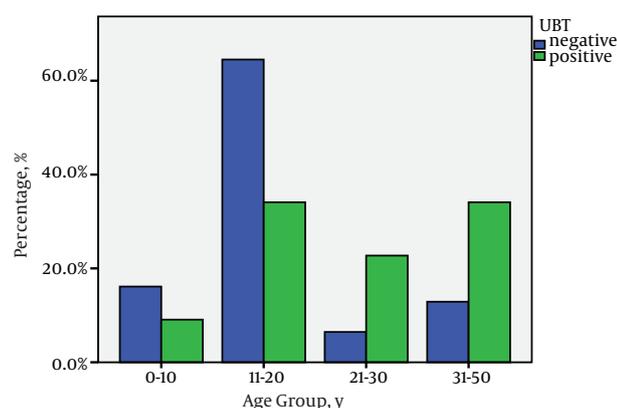


Figure 4. Comparing the Relationship Between Age and *Helicobacter pylori* Infection in Patients With Mental Retardation and Down Syndrome by Urease Breath Test (UBT).

5. Discussion

Helicobacter pylori is the most common persistent bacterial infection which causes chronic inflammation of the inner lining of the stomach (9). These bacteria are the main factor of causing gastritis and other diseases related to gastritis such as peptic ulcer, stomach cancer and lymphoma, more over they are known to be connected with the increase risk of precancerous lesions such as chronic atrophic gastritis (AG), or gastric intestinal metaplasia (GIM), and cancer. In addition, *H. pylori* can cause ischemic heart disease (IHD), chronic obstructive pulmonary disease (COPD), iron deficiency anemia (IDA), cerebral and neurological disease such as Alzheimer and migraine (9-11). Owing to the fact that

patients with Down syndrome have genetic defects and physical problems, it seems vital to prevent the prevalence of infection among them; hence, early detection of the infection in such patients can prevent the spread of it (12). Due to the life condition of the institutionalized children, transmission of *H. pylori* can occurred easily; therefore, it is a serious matter to recognize and determine transmission risk factors of *H. pylori*. With rapid diagnosis of this infection it can be treated faster and the occurrence of complications will be prevented (13). Wallace et al. studied the adult mentally retarded (54% males and 46% females) in 2003 and showed that serological and urea breathing test (UBT) have acceptable sensitivity, specificity, positive and negative predictive value, although UBT could not be performed in all patients (14). Luzza et al. studied 42 children with Down syndrome in terms of *H. pylori* in 2004. They reported that 50% of the patients were seropositive, which was confirmed by C-UBT test in 95%. Luzza et al. also studied 42 children with Down syndrome (34 males and 50 females 2-18 years) in terms of *H. pylori* in 2004 and concluded that 50% of the patients were seropositive which was confirmed by C-UBT test in 95%, while in the current study 54.6% were seropositive, and it was also confirmed by C-UBT test (12). Considering that UBT is an expensive test, in the first step the current study used ELISA test then UBT test was used to confirm the positive cases. ELISA test was used in order to determine the prevalence of *H. pylori* in patients with mental retardation and Down syndrome, ELISA test results were evaluated in 34 negative and 41 positive cases; also all of the positive cases were confirmed by UBT ($P < 0.0001$). The most positive ELISA cases were reported in the age range of 11-20. According to Palka et al., UBT and ELISA tests in 50.9% and 49.7% of the peptic ulcer cases can detect *H. pylori*, respectively (15).

To sum up, the findings of the current study indicated that *H. pylori* infection occurs at a higher rate in children with mental retardation and Down syndrome; therefore, it seems highly vital to control the transmission of *H. pylori* among such children.

Acknowledgements

Authors highly appreciate Miss Azar Darvishi for her great contribution and Ahang Welfare Center staff and the nice patients for their patience and help to conduct the current research project.

Funding/Support

This Survey is supported by Infectious Diseases and Tropical Medicine Research Center of Shahid Beheshti University of Medical Sciences and was done by its financial support.

References

1. Plummer M, Franceschi S, Vignat J, Forman D, de Martel C. Global burden of gastric cancer attributable to *pylori*. *Int J Cancer*. 2014.

2. Howden CW. Clinical expressions of *Helicobacter pylori* infection. *Am J Med*. 1996;**100**(5A):27S-32S. discussion 32S-34S.
3. An international association between *Helicobacter pylori* infection and gastric cancer. The EUROGAST Study Group. *Lancet*. 1993;**341**(8857):359-62.
4. Wong BC, Lam SK, Wong WM, Chen JS, Zheng TT, Feng RE, et al. *Helicobacter pylori* eradication to prevent gastric cancer in a high-risk region of China: a randomized controlled trial. *JAMA*. 2004;**291**(2):187-94.
5. Douraghi M, Goudarzi H, Rostami MN, Mirsamadi ES. *Helicobacter pylori* seropositivity in institutionalized children with Down syndrome. *Pediatr Infect Dis J*. 2011;**30**(12):1123-4.
6. Hagymasi K, Tulassay Z. *Helicobacter pylori* infection: new pathogenetic and clinical aspects. *World J Gastroenterol*. 2014;**20**(21):6386-99.
7. Wallace RA, Schluter PJ, Forgan-Smith R, Wood R, Webb PM. Diagnosis of *Helicobacter pylori* infection in adults with intellectual disability. *J Clin Microbiol*. 2003;**41**(10):4700-4.
8. Kitchens DH, Binkley CJ, Wallace DL, Darling D. *Helicobacter pylori* infection in people who are intellectually and developmentally disabled: a review. *Spec Care Dentist*. 2007;**27**(4):127-33.
9. Kong YJ, Yi HG, Dai JC, Wei MX. Histological changes of gastric mucosa after *Helicobacter pylori* eradication: a systematic review and meta-analysis. *World J Gastroenterol*. 2014;**20**(19):5903-11.
10. Marques SB, Mattar R, Artifon EL, Sakai P, Carrilho FJ. High prevalence of duodenal ulcer in a tertiary care hospital in the city of Sao Paulo, SP, Brazil. *Arq Gastroenterol*. 2011;**48**(3):171-4.
11. Gatta L, Vakil N, Vaira D, Scarpignato C. Global eradication rates for *Helicobacter pylori* infection: systematic review and meta-analysis of sequential therapy. *BMJ*. 2013;**347**:f4587.
12. Lizza F, Concolino D, Imeneo M, Pascuzzi A, Pietragalla E, Pallone F, et al. High seroprevalence of *Helicobacter pylori* infection in non-institutionalised children with mental retardation. *Clin Microbiol Infect*. 2004;**10**(7):670-3.
13. Douraghi M, Nateghi Rostami M, Goudarzi H, Ghalavand Z. Comparison of stool antigen immunoassay and serology for screening for *Helicobacter pylori* infection in intellectually disabled children. *Microbiol Immunol*. 2013;**57**(11):772-7.
14. Wallace RA, Webb PM, Schluter PJ. Environmental, medical, behavioural and disability factors associated with *Helicobacter pylori* infection in adults with intellectual disability. *J Intellect Disabil Res*. 2002;**46**(Pt 1):51-60.
15. Palka M, Tomasik T, Windak A, Margas G, Mach T, Bohonos A. The reliability of ELISA in predicting *H. pylori* infection in dyspeptic populations under age 45. *Med Sci Monit*. 2010; **16**(1): PH24-28.