Journal of Microbiology and Infectious Diseases / JMID
2015; 5 (1): 10-14
doi: 10.5799/ahinjs.02.2015.01.0167

RESEARCH ARTICLE

Helicobacter pylori Stool Antigen Feco-prevalence in Food Workers in Van, Turkey

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ABSTRACT

Objectives: *Helicobacter pylori* contributes to the pathogenesis of peptic ulcers, cancer, and may also cause extra gastric infections. These bacteria can be transmitted by means of fecal-oral, oral-oral, and gastro-oral via an infected person. The present study aims to investigate the existence of *H.pylori* antigens in the stools of workers employed in the food industry.

Methods: The existence of the *H.pylori* stool antigen (HpSA) in the stool of food industry workers was researched via the stool antigen test.

Results: The *H.pylori* stool antigen was detected in 74 out of 154 people taking part in this study (48.05%). No statistical differences were found between the HpSA positivity and the branches of their works.

Conclusions: The fact that 48.05% HpSA was detected in the workers employed in the food industry reveals the potential significance of these people in terms of the *H.pylori* infections and the need for further studies on this subject. *J Microbiol Infect Dis 2015;5(1): 10-14*

Key words: *H.pylori* stool antigen, food worker, feco-prevalence

Van yöresinde gıda çalışanlarında Helicobacter pylori dışkı antijen feko-prevelansı

ÖZET

Amaç: *Helicobacter pylori* peptik ülser ve kanserin patogenezinde rol almakta, ayrıca ekstragastrik infeksiyonlara neden olabilmektedir. Bu bakteri infekte insanlar vasıtasıyla fekal-oral, oral-oral ve gastro-oral yolla bulaşabilmektedir. Bu çalışmayla, gıda sektöründe çalışan işçilerinin gaitalarında *H.pylori* antijenlerinin varlığını araştırmak amaçlanmıştır.

Yöntemler: Gıda sektöründe çalışan kişilerin dışkılarında *H.pylori* dışkı antijeninin varlığı, dışkı antijen testi ile araştırıldı.

Bulgular: Bu çalışmada yer alan 154 kişinin 74'ünde (%48.05) *H.pylori* dışkı antijeni tespit edildi. *H.pylori* dışkı antijeni varlığı ile iş kolları arasında istatistiksel bir fark tespit edilmedi.

Sonuç: Gıda sektöründe çalışan işçilerde %48.05 oranında *H.pylori* dışkı antijeni tespit edilmiş olması, bu kişilerin *H.pylori* infeksiyonları açısından potansiyel önemini ve bu konuda daha detaylı çalışmaların yapılması gereğini ortaya koymaktadır.

Anahtar kelimeler: Dışkı *H.pylori* antijeni, gıda çalışanı, fekoprevalans.

INTRODUCTION

H.pylori, a Gram-negative, spiral-shaped, and microaerophilic pathogen, has the ability to colonize mucous layers of the human gastric epithelium. Long-term *H.pylori* infection is thought to be a major causative factor in peptic ulcer disease, gastric adenocarcinoma, and chronic gastritis in the humans.[1] In addition, it can lead to extra gastric infections (such as idiopathic thrombocytopenic purpura, sideropenic anemia, and cardiovascular disease).[2] *H.pylori* infections can be identified through invasive and noninvasive tests. Serology, urea breath tests, and stool antigen tests are among the noninvasive tests, while gastric biopsies are among the invasive tests.[3] Among these tests, the stool antigen test is stated to be an easy-to-use, rapid, and useful for both the identification of the present infection and eradication of *H.pylori*.[4-6] Previous studies

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Received: 15 October 2014, Accepted: 09 February 2015

report that the prevalence of HpSA in our region is between 23.0% and 39.9%[7,8], while other regions of our country have varying degrees of the antigen (20.3% to 64.0%).[9-11] This bacteria most likely transmitted from person to person contact. *H.pylori* infection is related to poor living conditions. Fecal-oral, oral-oral, or gastro-oral contaminations have been suggested as possible ways of the infection despite the lack of strong evidence.[12] Various findings support the hypothesis of *H.pylori* water-borne infection. However, there is an increasing need for comprehensive studies emphasizing the significance of *H.pylori* as a food-borne pathogen.[13-14]

With this study, we aimed to investigate the HpSA in workers at different branches of the food industry and reveal the potential epidemiologic importance of *H.pylori* infections in these workers.

METHODS

The stool samples of 154 food workers (147 male and 7 female) with an average age of 32.11 ± 9.60 (from 16 to 64) employed in the various branches of the food industry in the Van region were collected. The distribution of participating workers according to their branch is summarized in Table 1. The existence of HpSA in these people was investigated through the stool antigen test (Rapid HpSA Test; LINEAR Chemical; Barcelona, Spain). The stool antigen test analyzed using LINEAR Chemical was performed according to the manufacturer's recommendations. Positive and negative results were evaluated according to the recommendation of the manufacturer.

Table 1. Distribution of food workers as to workplaces.

Workplaces	Number of food workers
Supermarket	32
Restaurant	26
Slaughter house	24
Canteen	21
Hospital Refectory	20
Doner shop	8
Pastry shop	7
Confectionery	6
Bakery	4
Tea House	3
Pita Restaurant	3
Total	154

Statistical analysis

Statistical analysis was performed by using SPSS software for Windows 20.0 (SPSS Inc., Chicago, USA), and χ^2 -test was used to analyze the feco-prevalence difference between the branches of their works and age groups. When the branches of their works are dealt one by one, the data relating to the staff of the bakery, the tea house, and the pita restaurant included in this study were excluded from the analysis as the number of personnel was low. Moreover, the number of women taking part in the study was too low; therefore, sex-based statistical analysis was not performed. A p-value of less than 0.05 was considered statistically significant.

RESULTS

As a result of this study, 74 out of 154 the people taking part in this study (48.05%) were found to have HpSA. When we consider the branches of their works (restaurant, slaughter house, hospital refectory, supermarket, and canteen staff; respectively), the feco-prevalences ranged from 53.8 to 33.3% (Table 2).

Table 2. Fecoprevalence rates of HpSA in food workers as to workplaces

Workplaces	Number of food workers	Number of HpSA positive food workers (%)
Doner, Pastry Shops and Confectionery	21	15 (71.4)
Restaurant	26	14 (53.8)
Slaughter house	24	12 (50)
Hospital Refectory	20	9 (45)
Supermarket	32	14 (43.8)
Canteen	21	7 (33.3)
Others	10	3*
Total	154	74 (48,05)

*Number of people working in other workplaces was not shown on the table as it was low.

In addition, HpSA was detected in 6 out of 8 Doner shop staff, 5 out of 7 pastry shop staff, 4 out of 6 confectionery staff, 2 out of 4 bakery staff, and 1 out of 3 tea house staff in Van. No HpSA, on the other hand, was detected in the 3 staff working in the pita shop. The feco-prevalence in food workers as to the age groups was presented in Table 3. Accordingly, the highest feco-prevalence rate (53.5%) was detected in the 26-34 age group. A statistically

meaningful difference was not detected between the rates of feco-prevalence obtained from professional groups as a result of statistical analysis (p = 0.22). Likewise, a statistically meaningful difference was not detected between the rates of feco-prevalence obtained from age groups as a result of statistical analysis (p = 0.5).

Table 3. Fecoprevalence rates of HpSA in foodworkers as to age groups.

Age groups (year)	Number of food workers	Number of HpSA positive food workers (%)
16-25	45	19 (42.2)
26-34	43	23 (53,5)
35-44	52	27 (51,9)
45>	14	5 (35,7)
Total	154	74 (48,05)

DISCUSSION

H.pylori infection prevalence in various populations of the world are reported to be between 7.3% and 92.0%.[15] Infection rate obtained from these three studies was found out to be in good agreement with the rate in our study.[5,16,17] A study carried out in Peru, Klein et al.[16] reported the prevalence of the illness among children between the ages of 2 months and 12 years (48.0%). Another study also carried out again in Peru, Begueet al.[17] reported the prevalence of the illness among children between the newborns and 17 years as 50.0%. Falsafi et al.[5] detected 47.0% HpSA positivity in a total of 430 people consisting of adolescents and children. Previous studies investigated HpSA prevalence in Van region. Erbey et al.[7] reported the HpSA prevalence in children between 1 to 18 years old in Lake Van basin to be 39.9%. Also, Çıkman et al.[8] reported that HpSA prevalence in patients with various ages to be 23.0%. The prevalence of the previous studies in our region was found less than the prevalence of our study. The same researchers report the highest prevalence in age group of 26 to 35 years old. In addition to that, we found the highest prevalence in age group between 26 to 34 years old, which is consistent with the results of the study by Çıkman et al.[8] However, the findings reported in previous studies carried out relating to the prevalence of this infection in various populations in our country were observed to be different from the results of our study. Ekmen et al.[18] reported the prevalence of the infections in an adolescent group complaining of gastrointestinal issues as 78.5% using the stool-antigen-ELISA method. Yücel et al.[19] reported 63.0% HpSA positivity in a study carried out among university students. Büyükbaba-Boral et al.[20] reported 36.6% HpSA positivity among people who were suspected to have *H.pylori* infection. In addition to that, Selek et al.[9] report the HpSA prevalence in adult patients as 20.3%, Demir et al.[10] reported the HpSA prevalence within study group of varying ages as 25.2%, and Özdemir and Baykan[11] reported the HpSA prevalence within adult patients as 64.0%.

In another study concerning food workers in our country, Altındiş[21] reported that he detected 92.0% *H.pylori* IgG seropositivity in food workers. Such percentage of this infection was found to be much higher than the percentages obtained in our study.

Previously, *H.pylori* was isolated from animals and was thought to be a zoonotic pathogen.[13] Ağaoğlu et al.[22] reported that they detected a high level of IgG seropositivity in 36.6% of slaughterhouse staff actively dealing with slaughter, whereas such rate was found out to be 13.3% among officer employed in the same workplace. The researchers stated that the urease positivity in cattle abomasum slaughtered was found out to be 6.0% in fundus and 36.0% in pylorus. The same researchers also detected that the rate of spiral bacteria resembling *H.pylori* was found out as 8.0% in fundus and 40.0% in pylorus with the histopathological investigation. Based on these findings, the researchers suggested that *H.pylori* infection might be zoonosis. Altındiş[21] reported that he detected a rate of 93.3% IgG seropositivity in slaughterhouse workers. HpSA was found out in 12 out of 24 (50.0%) staff dealing with slaughter in our study. Hospital personnel may not only be a source of infection but also fully exposed to the infection as stated by several researchers.[23-24] On the other hand, it was reported that the patients' length of hospital stay was not a risk factor.[25] In a study carried out on the hospital personnel, Mastromarino et al.[24] reported that they handled the hospital personnel in three groups: two were in touch with the patients and one was not in touch and searched for HpSA in the stools of these people. The researchers reported that they detected a positivity of 37.0% and 35.2% in the first two groups, respectively; whereas they detected 19.2% positivity in the group having no patient contact. HpSA was detected in 9 out of 20 (45.0%) of the hospital refectory personnel in our study.

There is no strong evidence on *H.pylori* as a food-borne pathogen.[26] However, it has been reported as water-borne depending on the possible

fecal contamination.[27] Furthermore, it can remain alive intracellularly in the Candida species. The Candida species and contaminated food may play role in the infection of *H.pylori* to human beings. Therefore, food contaminated with yeast including *H.pylori* may act as a vehicle for its transmission to the human gastrointestinal tract. Hence, the implementation of proper hygienic practices for decreasing yeast content while preparing food (especially by food handlers) would be very important in controlling *H.pylori* contamination in the food industry.[28] The prevalence of *H.pylori* infection may not be homogeneous, and there may be discrepancy among geographic locations. For this reason, more studies based on population are required in order to identify the epidemiology of *H.pylori*. Furthermore, this will provide an opportunity to determine the contamination dynamics of *H.pylori* infections.[29] Advancing our knowledge on *H.pylori*'s infection and epidemiology will help developing strategies in order to decrease *H.pylori*-related diseases and increase protection from the infection. Determining risk factors will help specify the population under the risk.[27] Within this framework, the use of stool antigen test is the most cost-effective approach.[30]

The limitations of this study were not obtaining HpSA prevalence on consumers of studied branches. In addition, investigating the clonal relationship between the isolates from food industry workers and consumers was lacking.

The prevalence of *H.pylori* infection was 48.05% in our study, which is consistent with several reports.[5,16,17] Although food workers have potential epidemiological significance in terms of *H.pylori* infection, to make such a validated assumption will only be possible with more comprehensive studies. These studies should focus on detection of the clonal relatedness among strains isolated from the food workers and the consumers.

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