

Distribution of *Helicobacter pylori* Prevalence in Adults with Gastrointestinal Complaints According to Age Levels in Eastern Turkey

Türkiye'nin Doğusunda Gastrointestinal Şikayeti Olan Erişkinlerde *Helicobacter pylori* Prevalansının Yaş Gruplarına Göre Dağılımı

Muhammet Güzel KURTOĞLU, MD,^a
Hamza BOZKURT, MD,^b
Gülhan ARVAS, MD,^c
Mustafa BERKTAŞ, MD^c

^aMicrobiology Laboratory,
Konya Training and Research Hospital,
Konya

^bMicrobiology Laboratory,
Ataturk Educational and
Research Hospital, Ankara

^cDepartment of
Microbiology and Clinical Microbiology,
Yüzüncü Yıl University
Faculty of Medicine, Van

Yazışma Adresi/Correspondence:
Muhammet Güzel KURTOĞLU, MD
Konya Training and Research Hospital, Mi-
crobiology Laboratory, Konya,
TÜRKİYE/TURKEY
kurtoglumg@hotmail.com

ABSTRACT *H.pylori* is a common bacterium, and approximately 50 percent of the world's population has been estimated to be infected. Human are the principal reservoir. *H.pylori* is known as one of important factors in the peptic ulcer, causing antral type chronic gastritis. So, it was aimed in the study to determine the relationship of the gastrointestinal complaints witnessed in Eastern Turkey with *H.pylori* seroprevalance in adults applying to the hospitals and the age level. A total of 993 adults applying to Medical School Hospital of Van Yüzüncü Yıl University and Van Training and Research Hospital between July 2002 and December 2003 with the complaints of abdominal pain, dispeptic symptoms, epigastric tenderness, pain or epigastric burning in the upper abdomen, meteorism and other gastrointestinal (GI) complaints such as reflux were enrolled into the study. *H.pylori* IgG seroprevalance was investigated in the blood samples isolated from the adults at and over 16 years of age. Serum samples obtained from the patients were examined by using TKA 4HD EIA device and *H.pylori* IgG kits. Of the patients, 539 were females (54.3%) and 454 were males (45.7%). Average age rate was 39.7 ± 13.9 (16-92) in the patients with *H.pylori* positive. Average age rate was detected as 39.2 ± 14.0 (16-92) in all patients. Total seropositivity rate of *H.pylori* IgG was 67.7%, and this rate was 66.6 % in men and 68.1 % in women. Evaluating the scores related to the age and sex, no statistically significant difference could be determined according to the age or sex ($p > 0.05$).

Key Words: *H.pylori*, seroprevalance, dispeptic complaints

ÖZET *Helicobacter pylori* (*H. pylori*), yaygın bir bakteri olup yaklaşık olarak Dünya nüfusunun %50'sinin bu bakteri ile infekte olduğu tahmin edilmektedir. Esas rezervuarı insandır. *H. pylori*, kronik antral gastritin sebebi olan peptik ülserlerin önemli bir etkeni olarak bilinmektedir. Bu nedenle çalışmada Türkiye'nin doğusunda gastrointestinal şikayetler ile hastaneye başvuran erişkin bireylerde *H. pylori* seroprevalansını ve yaş ile ilişkisini saptamak amaçlanmıştır. Bu amaçla hastanemize karın ağrısı, dispeptik yakınmalar, epigastrik hassasiyet, üst abdomende ağrı veya sızi, şişlik ve reflü gibi gastroentestinal şikayetler ile başvuran toplam 993 erişkin yaş grubundaki hastalar çalışma kapsamına alındı. On altı yaş ve üzeri hastalardan alınan kan örneklerinde *H. pylori* IgG seroprevalansı araştırıldı. Hastalardan alınan serum örnekleri *H. pylori* IgG kitleri ve TKA 4HD EIA cihazı kullanılarak değerlendirildi. Başvuran hastaların 539 (%54.3)'ü kadın, 454 (%45.7)'ü de erkek olup yaş ortalamaları da 39.2 ± 14.0 (16-92) idi. *H.pylori* pozitif olan hastaların yaş ortalaması ise 39.7 ± 13.9 (16-92) olarak saptandı. *H.pylori* IgG total seropozitiflik oranı %67.7 olup bu oran kadınlarda %66.6, erkeklerde ise %68.1 idi. İstatistiki olarak yaş ve cins arasındaki ilişki değerlendirildiğinde anlamlı bir fark saptanmadı ($p > 0.05$).

Anahtar Kelimeler: *H.pylori*, seroprevalans, dispepsi.

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H.*pylori* is known to be an important factor in the peptic ulcer, causing antral type chronic gastritis. It is a significant risk factor increasing gastric carcinoma from six to nine times and one of the

most frequent chronic infections encountered in the world¹. Upon investigation; the sera and gastric mucosa of infected people following the infection, antibodies are detected.^{1,2} In epidemiologic studies, the prevalence of the disease is reported as approximately half of the population in developed countries. However, in under developed or developing countries, the majority of the population is reported to be infected with this agent.^{3,4} There are some studies showing the presence of *H. pylori* in drinking water.⁵⁻⁷ Therefore, water is cited as a risk factor in transmission in some studies.^{8,9} Additionally, it has been reported that *H. pylori* infection could be resulted from animals.^{10,11} Besides, transmission from person to person is known to be more important than reservoirs.^{12,13} Although the transmission routes of *H.pylori* still remain unclear, it was determined that infection rates have been decreased due to some influences such as improvements in life standards, increasing sanitation levels, well-organized sewage systems in cities and changing life style from more crowded situations to less populated areas.^{14,15}

Invasive and non-invasive tests are being used in the diagnosis of *H. pylori*. Invasive tests are urease test, culture methods, polymerase chain reaction (PCR) and histological tests. Non-invasive tests are urea breath test, antigen (including *H.pylori* stool Antigen= HpSA) and antibody detecting tests.¹⁶ Enzyme Linked Immunosorbant Assay (ELISA), which is a serologic test, is one of the most frequently used methods, because it is not expensive, and it can be applied rapidly and easily, especially in the studies including large populations.¹⁷ Its sensitivity and specificity rates are 100% and 95%, respectively.¹⁸

The study was performed to investigate *H. pylori* seroprevalence in adult population in our region, Eastern Turkey.

MATERIAL AND METHODS

ELIGIBILITY CRITERIA OF THE STUDY GROUP

Applying to the different clinics of Medical School Hospital of Van Yüzüncü Yıl University between July 2002 and December 2003 with the complaints

of abdominal pain, dispeptic symptoms, epigastric tenderness, pain or epigastric burning in the upper abdomen, meteorism, reflux, satiety even after having very little meals, excretion of dark feces, nausea, vomiting and loss of appetite, not taking a salicylate or other non-steroid anti-inflammatory drugs (NSAIDs), a total 993 adults at the age of 16 and over were enrolled into the study.

Blood samples taken from 993 out and in-patients applying to Van Yüzüncü Yıl University hospital and Van Education and Research Hospital, which are metropolitan hospitals serving the provinces of Van, Hakkari, Bitlis, Mus and Agri were investigated. The socioeconomic and sociocultural status of these provinces are lower than the other parts of Turkey and the materials related to total 993 patients, 539 female (54.3%) and 454 male (45.7%) were provided from these provinces.

PROVISION OF THE MATERIAL

Nearly 3 ml of blood drawn from all patients was centrifuged at 3000 rpm for 5 minutes. Separated serum samples were stored at -20 °C and investigated in one week.

INVESTIGATION OF H.PYLORI IGG ANTIBODIES

Previously kept in fridge, *H.pylori* IgG Enzyme Immunoassay kits (General Biologicals Corp., Taiwan) were taken at room temperature. Serum samples were diluted at the rate of 1/40 (200µl serum diluent to 5µl serum). All later stages were performed using TKA-HDA (Teknolabo A.S.s. I.s.r.l. - Italy) ELISA device according to kit procedure.

Later stages were composed of the following: 1) Diluted at the rate of 1/40, the samples of 100 µl were put into all blanks (calibrator, positive and negative control blanks), 2) The samples were incubated at room temperature for 30 minutes, 3) The samples were washed four times with a diluted buffer, 4) Enzyme-conjugate of 100 µl was added into all blanks, 5) An incubation was performed at room temperature for 30 minutes, 6) All samples were washed four times with a diluted buffer, 7) Reagent A+Reagent B of 100 µl was added into all blanks, 8) Incubation process was carried out at room temperature for 20 minutes, and 9) After adding 100 µl

of stop solution, readouts of test results were performed under 450 nm optical intensity.

ASSESSMENT OF TEST RESULTS

A particular attention was paid for the blue colour in the blanks to turn into completely yellow. Within the 15-minute period after completing the experiment, microplates were placed under the reader, and the optical intensities were assessed at 45 nm wave length. In the assessment, optical intensity of cut-off calibrator and optical intensities of negative and positive controls and optical intensities of the samples obtained from patients were compared. According to the optical intensity rates in all blanks, the results of the samples, the cut off values of which were measured were recorded as negative or positive.

STATISTICAL EVALUATION

Accumulated data were evaluated using Chi-square test with Windows SPSS 10.0 statistical program.

The study protocol was approved by the local research ethics committee, in accordance with the declaration of Helsinki and written informed consent forms were obtained from all participants.

RESULTS

Serum IgG seropositivity rates in population living in Van and its surrounding were found to be 67.7%

in total, 66.6% in women and 68.8% in men. *H. pylori* seropositivity rates according to sex and age groups are shown in Table 1.

STATISTICAL ANALYSIS

For statistical data, SPSS 10.0 statistics package program was used. Scores were provided as mean \pm standard deviation (SD). Chi-Square test was used for the association between *H.pylori* positivity and sex. Spearman correlation test was used for the association between *H.pylori* and age. $P < 0.05$ was accepted as statistically significant value.

Average age rate was 39.7 ± 13.9 (16-92) in the patients with *H.pylori* positive, and 38.2 ± 14.2 (16-83) in those with *H.pylori* negative. Average age rate was detected as 39.2 ± 14.0 (16-92) in all patients.

DISCUSSIONS

In various regions and countries, *H. pylori* seropositivity varies according to socioeconomic and nutritional status and life standards of populations. It is also different among countries according to their development scales.¹⁹ The rates of *H. pylori* seropositivity are reported to be 70-80% in developing countries, but less than 40% in developed countries.²⁰⁻²² Total seroprevalence value of 67.7%, which we found in our study, is compatible with the reported values of the developing countries. Altho-

TABLE 1: *H.pylori* seropositivity rates according to age groups.

Age ranges	Females		Males		Total	
	n/N	Rate(%)	n/N	Rate(%)	n/N	Rate(%)
16-25	47/79	59.4	34/51	66.6	81/130	62.3
26-30	51/84	60.7	42/55	76.4	93/139	66.9
31-35	42/72	58.4	49/67	73.1	91/139	65.5
36-40	45/67	67.1	33/50	66	78/117	66.6
41-45	40/51	78.4	38/49	77.5	78/100	78
46-50	47/61	77	34/59	57.6	81/120	67.5
51-55	29/42	69	36/42	85.8	65/84	77.4
56-60	23/31	74.1	14/25	56	37/56	66
>60	35/52	67.3	33/56	58.9	68/118	62.9
Total	359/539	66.6	313/454	68.1	672/993	67.7

n: number of *H.pylori* IgG positive individuals

N: Total number of individuals examined.

ugh our region (Eastern Turkey) is socioeconomically and culturally weaker than other regions, our values are consistent with the ones determined in other regions.

The studies performed by different researchers from the other parts of the world and our country were presented in Table 2 and Table 3.

It was seen in the study that there is proportional and direct increase between *H.pylori* seroprevalence and the age rate. When we review studies performed outside Turkey, *H.pylori* IgG seroprevalence rates in adults change between 45.1% and 92.3%. In the studies performed in our country, it was seen that seroprevalence rates change between

TABLE 2: The studies performed in other countries.

Investigator(s)	Location	Group or age ranges	Rate (%)
Lin et al ²³	Taiwan	Teachers	45.1
Teh et al ²⁴	Taiwan	Residents in Taiwan	54.4
		>40	72.3
Nurgalieva et al ²⁵	Kazakhstan	10-60	74
Breuer et al ²⁶	Western Germany	>50	60.0
Camargo et al ²⁷	Mexico	18-24	59.8
Murray et al ²⁸	Northern Ireland	12-64	50.5
Kumar et al ²⁹	USA	Immigrant	92.3
Reshetnikov et al ³⁰	Novosibirsk	25-64	88.4
	Khanti-Mansijsk	25-64	77.4
	Touva	25-64	92.1
	Jakutsk	25-64	70.8
	Chkotha	25-64	76.5

TABLE 3: The studies performed in our country.

Investigators	Location	Group or age ranges	Rate (%)
Us et al ³¹	Turkey	20-29	62.6
		30-39	67.6
		40-49	81.3
		≥50	66.3
Altindiş et al ³²	Afyonkarahisar-Turkey	Adult	79.7
		11-20	57.1
		21-30	83.6
		41-50	88.8
		51-60	83.6
Dogan et al ³³	Turkey	>60	82.3
		20-29	75.86
		30-39	79.59
		40-49	87.50
		50-59	64.15
Kalkan et al ³⁴	Elazığ	>60	58.33
		21-30	68.42
		31-40	94.29
		41-50	76.47
		51-60	84.62
		>60	73.68

57.1% and 94.29%. In our study, the *H.pylori* IgG seroprevalence rates change between 62.3% and 78% and this result is compatible with the results of the studies performed in Turkey and other countries. The seroprevalence values were found to be higher than the values of other developed countries because Turkey is still in the category of developing countries.

The seroprevalence values found in some studies performed in Taiwan,^{23,24} Western Germany,²⁶ Mexico²⁷ and Northern Ireland²⁸ are lower than the seroprevalence value of 67.7% provided in our study. However, the seroprevalence values of some studies performed in Taiwan,³¹ Kazakhstan,²⁵ Northern Ireland,²⁸ Novosibirsk,³⁰ Khanti-Mansijsk,³⁰ Touva,³⁰ Jakutsk³⁰ and Chkotha³⁰ are higher than our values. In a study performed on the refugees having immigrated to USA from other countries with lower developmental criteria, seroprevalence values were determined to be higher (92.3%) than our values (67.7%).²⁹

Comparing the values found in different regions of Turkey, it will be seen that there are both higher and lower values than our values and these are presented in Table 3. All these seroprevalence values are strictly connected with the develop-

mental criteria of different nations and countries.¹⁹

In conclusion, comparing the findings in our study with those determined in other countries (Table 2), it is apparent that the seropositivity rates decrease consistently with the socioeconomic development level of the countries. Also, our results were consistent with those found in previous studies performed in our country (Table 3). In the differential diagnosis of the patients with the complaints of abdominal pain, dispeptic symptoms, epigastric tenderness, epigastric burning in the upper abdomen, meteorism, reflux, satiety even after having very little meals, loss of appetite, nausea and vomiting, *H.pylori* should be primarily taken into account as one of the causative agents. The contamination routes of *H.pylori* remain still unclear. Most of the studies performed are based on serological and epidemiological data. It was also concluded that infection rates will decrease due to the factors, such as improvements in life standards, increasing sanitation levels, well-organized sewage systems in cities and changing life style from more crowded situations to less populated areas.

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