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Prevalence of *Helicobacter Pylori* Infection in Patients with Dyspepsia in North of Iran

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ABSTRACT

BACKGROUND

Dyspepsia is a common complaint among patients who refer to gastroenterology clinics. Studies have shown that there is a strong relationship between dyspepsia and *Helicobacter pylori* (HP) infection. We have investigated the prevalence of HP infection in patients with dyspepsia and its correlation with age and socioeconomic status (SES) of patients in Mazandaran province, northern Iran.

METHODS

In this cross-sectional study, patients with dyspepsia who had undergone upper gastrointestinal endoscopy were enrolled. Diagnosis of HP infection was according to the results of rapid urease test (RUT), and Giemsa staining of pathology samples. A questionnaire including endoscopic findings, demographic data, and SES information was completed for each patient.

RESULTS

The mean age of the 614 patients was 45.8±5 years, and 60% of them were female. Most patients had normal endoscopy (56.1%), and gastric ulcer and erosion was the most common abnormal endoscopic finding (24.7%). The prevalence of HP infection in patients with dyspepsia was about 66.6%. HP infection was associated with a lower prevalence in people aged below 30 years and good SES.

CONCLUSION

The prevalence of HP infection in patients with dyspepsia was 66.6%. In addition, HP infection rate was lower in people under the age of 30 years and patients with good SES.

KEYWORDS:
Dyspepsia, upper GI endoscopy, HP infection, Socioeconomic status.

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INTRODUCTION

Dyspepsia is a common complaint among patients who refer to gastroenterology clinics.[1] Patients with dyspepsia usually present with persistent or intermittent epigastric pain or discomfort, accompanied by nausea and vomiting, weight loss, or anemia.[2] The prevalence of dyspepsia varies from 2.2% to 29.9% in

different regions of Iran.[1] The overall worldwide prevalence of dyspepsia varies from 18% up to 24%.[3,4] Studies have shown that there is a strong relation between dyspepsia and *Helicobacter pylori* (HP) infection[5-7] and the prevalence of HP infection varies in different regions worldwide.[4,8-10] Dyspeptic symptoms and endoscopic findings in patients with HP infection are significantly more prevalent than in those without HP infection.[11,12] HP infection is one of the most common bacterial infections among humans.[13] Humans are the only definitive source of HP infection.[14] HP is a gram-negative spiral micro-aerophilic bacterium and plays an important role in the pathogenesis of various upper gastrointestinal (GI) diseases such as peptic ulcer disease (PUD), gastric mucosa-associated lymphoid tissue (MALT), and ultimately gastric malignancy.[15] The prevalence of HP infection varies in different regions of the world depending on the age, socioeconomic status (SES), and race.[16,17] It is more common among people with lower health status and income.[18,19]

The prevalence of HP infection varies in different regions of Iran.[20-25] In 2014, a study by Nicknam and colleagues showed that the prevalence of HP infection in patients with dyspepsia was 31% in the south of Iran. The prevalence of HP infection in this study was low (21.6% for male and 34.8% for female patients).[26]

A study in Tehran in 2016 by Ghamar Chehreh and colleagues showed the prevalence of HP infection by Rapid Urease Test (RUT) in patients with dyspepsia was high (about 80%).[27]

A sero-epidemiological study of HP infection in Iran in two provinces with high and low incidence for gastric cancer (Ardabil and Yazd, respectively) showed that the prevalence of HP infection was 47.5% in Ardabil and 30.6% in Yazd. The results of this study indicated that the prevalence of HP infection in Ardabil was significantly higher than in Yazd and suggested a relationship between HP infection and gastric cancer.[28]

A study by Maleki and co-workers in the city of Sari and its surrounding rural areas, on ages of 15 to 65 years in the general population by serologic method, has shown that the prevalence of HP infection was equal to 47.8% in rural regions and 41.3% in urban areas. The prevalence of HP infection was significantly lower in educated and younger individuals.[29]

Given the change in the epidemiology of HP infection with improvements in socioeconomic and public health status [23,30,31] it is necessary to evaluate the prevalence of HP infection in the community every few years. Our aims in this study were to determine the prevalence of HP infection in patients with dyspepsia and to evaluate the correlation between SES and age of patients and the prevalence of HP infection.

MATERIALS AND METHODS

In this cross-sectional study, patients with dyspepsia, who had an indication for upper GI endoscopy, were enrolled in the study. According to the Iranian Gastrointestinal Association guideline, patients with dyspepsia over 40 years and/or with alarming symptoms have an indication for upper GI endoscopy. From May to December 2018, based on the inclusion and exclusion criteria, among 751 patients who were referred to gastroenterology clinics of Mazandaran University of Medical Sciences, 614 patients were enrolled in the study. Inclusion criteria were 14-80-year-old people with dyspepsia and alarming symptoms (nausea/vomiting, melena, weight loss, age above 40 years), and exclusion criteria were a contraindication for upper GI endoscopy, history of previous HP eradication, and antibiotic usage in the last month or proton-pump inhibitor (PPI) usage in the last two weeks. Endoscopy was performed by Pentax Endoscope version (EG2985). For HP infection evaluation, two biopsy samples were taken from the antrum and body for rapid urease test (RUT) – (Shim-enzyme Company). The test is a color-based test to detect HP infection. In patients with abnormal endoscopic findings, pathological specimens were obtained from the pathological lesions. Endoscopic gastric mapping (two biopsy samples from the antrum and one from the incisura angularis, and two biopsy samples from the body) was done for all patients. In addition, pathological specimens were evaluated by the Giemsa staining method for HP infection. HP infection was considered to be positive if both RUT and Giemsa staining were positive, or the Giemsa staining was positive, and RUT was negative.[32-34] A questionnaire for each patient, including demographic information, SES, endoscopic findings, and HP infection data (both RUT and pathology), was completed. To evaluate the SES of individuals, we used the following criteria: income, occupation, the surface

Table 1: Endoscopic findings and the prevalence of HP infection in patients with dyspepsia

Endoscopic findings	HP positive patients (%)	HP negative patients (%)	Total number of patients (%)
Gastric ulcer & erosion	94 (62%)	58 (38%)	152 (24.7%)
Duodenal ulcer & erosion	92 (81%)	22(19%)	114 (18.5%)
PUD (DU, GU and erosion)	186 (70%)	80 (30%)	266 (43.3%)
Normal EGD (NUD)	222 (64%)	123(36%)	345 (56.1%)
Gastric cancer	1 (33.3%)	2 (66.7)	3 (0.48%)
Total number of patients	409 (66.6%)	205 (33.4%)	614 (100%)

PUD; Peptic ulcer disease, DU; Duodenal ulcer, GU; Gastric ulcer, EGD; Esophagogastroduodenoscopy, NUD; Non-ulcer dyspepsia

area of the house, using a car or a computer, level of education, and residence in urban or rural areas. According to these indexes, patients were classified into three socioeconomic groups: first group (poor), second group (middle class), and the third group (good) SES.[35]

After data collection, the data were analyzed using SPSS software version 16. The central and dispersion indices were used to describe the data, and the Chi-square test for the quantitative and t test for qualitative data, respectively. p values < 0.05 were considered statistically significant.

RESULTS

751 patients with dyspepsia were enrolled in the study. 137 patients were excluded from the study for different reasons, including the history of PPI and/or antibiotic usage in the previous month, history of HP eradication and/or previous diagnosis of gastric cancer. Finally, we included 614 patients in the study. The mean age of the patients was 45.8 ± 5 years, 60% of the patients were female (368/614), and 40% were male (246/614). In our study, most patients (345/614) had normal endoscopy (56.1%), and gastric ulcer and erosion (152/614) were the most common abnormal findings (24.7%). Gastric cancer had the lowest prevalence (3/614) (< 0.5%), and the prevalence of duodenal ulcer and erosion was 18.5% (114/614) (table 1).

The overall prevalence of HP infection in patients with dyspepsia by RUT method and Giemsa staining on pathologic samples were 59.9% (368/614) and 66.6% (409/614), respectively (table 2). The difference in HP infection detection rate by RUT method and pathology is probably due to lower sensitivity of RUT than pathology in the diagnosis of HP infection.[36] In addition, HP infection rate was similar in both sexes (65.4% in women and 67% in men). HP infection was positive in 81% of the patients with duodenal ulcer and erosion. The rate of HP infection in patients with gastric ulcer and erosion and patients with normal upper GI endoscopy (non-ulcer dyspepsia) were 62% and 64%, respectively (table 1).

The prevalence of HP infection was not similar in different age groups. As the age of patients increased, the rate of HP infection also increased (table 3). The prevalence of HP infection in the age groups of under 30 years was 50.9% and in the age groups of over 30 years were 70%. However, the P value was not significant (p = 0.07, table 4).

Based on SES, the patients were classified into three groups. Patients with low SES had the highest prevalence of HP infection (70%) (120/170). HP infection rate in patients with middle SES was 68% (200/294), and patients with high SES had the lowest HP infection rate (59.3%) (89/150) (figure 1).

DISCUSSION

Dyspepsia is a common complaint in clinical practices.[1,3,4] The overall worldwide prevalence of dyspepsia varies from 18% up to 24%.[3,4] In a systematic review in Iran, the prevalence of dyspepsia varied from 2.2% up to 29.9%.[1] Chronic HP infection is an important risk factor in the pathogenesis of dyspepsia.[37-39] Some studies have shown that dyspeptic symptoms are more common among HP positive patients than HP negative patients.[11,12] In a meta-analysis, the overall worldwide prevalence of HP infection was 44.3%. This rate ranged from 34.7% in developed countries to 50.8% in developing countries.[40]

The pooled prevalence of HP infection in the general population of Iran was reported 54% in one meta-analysis and 63.8% in another one.[41,42] The results of studies conducted in Iran show that the prevalence of HP infection in patients with dyspepsia varies from 31.2% up to 92.8%.[25,26,43]

Table 2: Rate of HP infection by RUT and Pathology

HP infection	RUT No. of patients (%)	Pathology No. of patients (%)
Positive	366 (59.6%)	409 (66.6%)
Negative	248 (40.4%)	205 (33.4%)
Total	614 (100%)	614 (100%)

RUT; Rapid Urease Test

This study was performed on a large population of patients with dyspepsia with a wide range of ages, from 14 to 80 years, with a mean age of 45.8 ± 5 years. The overall prevalence of HP infection in our study was 66.6% (table 2). As previously mentioned, we performed gastric mapping for all patients to evaluate HP infection by Giemsa staining of pathologic samples. As we know, by increasing the number of biopsy samples taken and sampling more areas in the stomach, we get a better chance of true HP infection detection, and false negatives decrease. Therefore, gastric mapping has helped to increase the accuracy of this study in the detection of HP infection.

In this study, there was no relationship between HP positivity and sex (65.4% in women and 67% in men). This finding was similar to the results of other studies .[25,26,44,45]

In our study, 345 patients with dyspepsia (56.1% of sample size) had normal Esophagogastroduodenoscopy (non-ulcer dyspepsia) with HP infection rate of 64%. 114 patients (18.5%) had duodenal ulcer and erosion, with the highest HP infection rate (81%). HP infection rate in patients with gastric ulcers and erosion was 62%. In this study, the rate of HP infection with a significant *p* value is lower in gastric ulcers than duodenal ulcers ($p = 0.045$), which is similar to the findings of other studies.[44,45] Overall, HP infection rate in patients with PUD (gastric ulcer [GU], duodenal ulcer [DU], and erosive gastroduodenitis) was 70%. The results show no significant difference in the prevalence of HP infection among patients with PUD and non-ulcer dyspepsia (table 1). This finding was contradictory to the result of a previous study (44). The prevalence of HP infection in patients with GU could not be judged due to the lack of cases of GU.

In this study, the prevalence of HP infection was diverse in different age groups. The prevalence of HP infection in the age groups of under 30 years was about 50.9%, and in the age groups over 30, it was above 70% (table 3). Similar to another study, the rate of HP infection increases with age.[26] These findings are consistent with the hypothesis

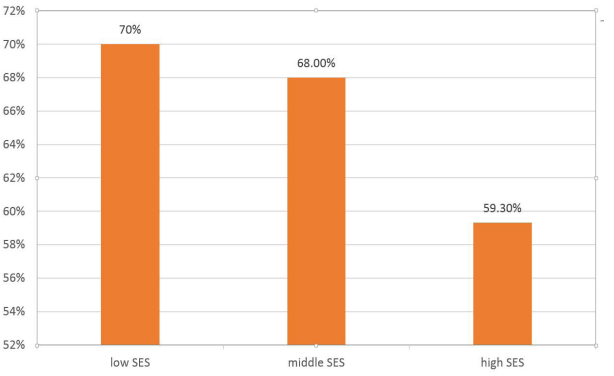

Fig. 1: HP infection and SES

of the birth cohort effect, which states that the prevalence of HP infection increases parallel with the increase in age.[29,30,40]

One of the positive features of our study is the classification of patients based on their economic and social status. The prevalence of HP infection in patients with dyspepsia was different depending on the SES. The highest prevalence of HP infection was seen in the first group (low SES), and as the SES improved, the prevalence of HP infection decreased (figure 1). Similar to the study of Maleki, in the north of Iran and three other studies in other parts of the world, in this study, a gradual decrease in the prevalence of HP infection was seen as the SES of patients improved, although *p* value was not significant ($p = 0.11\%$).[18, 19, 20,29]

CONCLUSION

The results of this study show that the prevalence of HP infection in patients with dyspepsia is about 66.6%. In addition, HP infection rate is lower in people under the age of 30 years and patients with good SES.

Limitations

Lack of patients' trust to share personal information such as income and amenities was one of the limitations of our study.

ETHICAL APPROVAL

There is nothing to be declared.

CONFLICT OF INTEREST

The authors have none to declare.

Table 3: The prevalence of HP infection in different age groups

Decade of age	No. of HP positive (%)	No. of HP negative (%)	Total No. of patients
14 - 20	20 (52.5%)	18 (47.5%)	38
21 - 30	36 (50.0%)	36 (50.0%)	72
31 - 40	88 (69%)	39 (31%)	127
41 - 50	114 (70%)	49 (30%)	163
51 - 60	53 (72%)	21 (28%)	74
> 60	98 (70%)	42 (30%)	140
Total patients	409 (66.6%)	205 (33.3%)	614

Table 4: The prevalence of HP infection in patients aged under and over 30 years

Age groups	No. of HP positive (%)	No. of HP negative (%)	Total No. of patients
Under 30 yrs.	56 (50.9%)	54 (49.1%)	110
Over 30 yrs.	353 (70.0%)	151 (30.0%)	504

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