Diagnostic and Interventional Endoscopy

Research Article

Is the Prevalence of *Helicobacter pylori* Really Decreasing?

Etibar Mammadov[1], Mehmet Hadi Yaşa[2], İsmail Taşkıran[2], Altay Kandemir[2], Adil Coşkun[2]

[1]Department of Gastroenterology, Muğla Sıtkı Koçman University Research and Training Hospital, Muğla, Turkey
[2]Department of Gastroenterology, Aydın Adnan Menderes University Faculty of Medicine, Aydın, Turkey

Cite this article as: Mammadov E, Yaşa MH, Taşkıran İ, Kandemir A, Coşkun A. Is the prevalence of *helicobacter pylori* really decreasing?. *Diagn Interv Endosc.* 2023;2(3):71-74.

Corresponding author: İsmail Taşkıran, e-mail: dr_istaskiran@hotmail.com

Received: December 10, 2023 **Accepted:** December 11, 2023 **Publication Date:** December 27, 2023 **DOI:** 10.5152/DiagnIntervEndosc.2023.23091

Abstract

Objective: *Helicobacter pylori* (Hp) infection is one of the most common infections in the world. There are studies showing that the prevalence of Hp has decreased over the years. In this study, while trying to determine the prevalence of patients diagnosed with Hp histopathologically in our region and the change in this prevalence over the years, it was also tried to determine the relationship between endoscopic diagnosis and Hp and the change in this relationship over the years.

Methods: Patients who underwent esophagogastroduodenoscopy at the Adnan Menderes University Gastroenterology Endoscopy Unit between 1998 and 2000 and 2018 and 2020 were included in the study. *Helicobacter pylori* status and endoscopic diagnoses were recorded in the patients. *Helicobacter pylori* was detected histopathologically.

Results: A total of 6622 patients, 3791 between 1998 and 2000 and 2831 between 2018 and 2020, were included in the study. *Heliobacter pylori* positivity rate was 49.5% between 1998 and 2000, and 27.3% between 2018 and 2020 (*P* .0001). While Hp positivity rate was 78.1% in bulber ulcer, 54.4% in gastric ulcer, and 34.3% in gastric cancer between 1998 and 2000, this rate was found to be 32.3% in bulber ulcer, 38.1% in gastric ulcer, and 8.3% in gastric cancer between 2018 and 2020. (*P* = .0001, *P* = .004, *P* = .012).

Conclusion: In this study, we found that the prevalence of Hp decreased from 49.5% to 27.3% in 20 years in our region. This decrease was observed in all endoscopic diagnoses, and the decreases were statistically significant. In the decrease of Hp prevalence, in addition to eradication treatment, we think that factors such as improved sanitation conditions and increased education/socioeconomic level also play a role.

Keywords: Bulber ulcer, Helicobacter pylori, prevalence

INTRODUCTION

Helicobacter pylori (Hp) was first discovered in 1983 by Marshall et al.[1] *Helicobacter pylori* is a spiral-shaped gram-negative bacterium and has urease, catalase, and oxidase enzyme capacity.[2] *Helicobacter pylori* can cause various gastroduodenal diseases such as gastritis, peptic ulcer disease, gastric cancer, and gastric mucosa-associated lymphoma (MALT).[3] It is known that approximately 50% of the world's population is infected with this bacterium. *Helicobacter pylori* prevalence may show a different geographical distribution depending on hygiene conditions. While this infection is detected at a rate of 20%-50% in developed countries, this rate rises to 80% in developing countries.[4] *Helicobacter pylori* infection is mostly acquired during childhood, and if no eradication treatment is received, it becomes permanent throughout life. While this infection is mostly transmitted from mother to child in developed countries, the prevalence reaches higher levels in developing countries as it is also transmitted horizontally. It is known that the prevalence of Hp has decreased recently in developing countries due to increasing hygiene conditions.[5,6] While the average Hp prevalence in our country was around 70% before the 2000s, this rate decreased to 50% after the 2000s.[7] Similarly, in China, the prevalence of Hp decreased from 60.5% to 52% before and after the 2000s.[8] In this study, we tried to determine the prevalence of patients diagnosed histopathologically with Hp in our region and the change of this prevalence over the years, while also trying to determine the relationship between endoscopic diagnosis and Hp and the change of this relationship over the years.

METHODS

Patients who underwent esophagogastroduodenoscopy (EGD) examination at Aydın Adnan Menderes University Faculty of Medicine Gastroenterology Endoscopy Unit between 1998-2000 and 2018-2020 were included in the study. The study was designed retrospectively. There were at least 2 (antrum-corpus) biopsy materials in the EGD examination of the patients. Histopathological Hp status and endoscopic diagnoses of the patients were recorded. Patients who had an upper gastrointestinal tract resection, who were <18 years of age, who used proton pump inhibitors or antibiotics in the last 2 weeks, and who presented with upper gastrointestinal tract bleeding were not included in the study. Approval

for the study was obtained from the ethics committee of Aydın Adnan Menderes University (Date: October 21, 2021, Number: 2021/164). All patient information was kept confidential, and the study was conducted according to the principles of the Declaration of Helsinki.

Statistical Analysis

Research data were evaluated using the Statistical Package for Social Science Statistics software, version 21.0 software (IBM Corp.; Armonk, NY, USA). The suitability of continuous variables to normal distribution was investigated using visual (histogram and probability graphs) and analytical methods (Kolmogorov–Smirnov/Shapiro–Wilk tests). For the descriptive statistics of the research, mean and SD were used for data that complied with normal distribution, and median and minimum–maximum were shown for data that did not comply with normal distribution. The Chi-square test was used in the study to show whether there was a difference between categorical variables. The Student-*t* test was used to compare continuous variables with parametric properties in independent groups, and the Mann–Whitney *U*-test was used to compare continuous variables without parametric properties in independent groups. For statistical significance, a *P*-value of less than .05 was accepted.

RESULTS

A total of 6622 patients were included in the study: 3791 between 1998 and 2000 and 2831 between 2018 and 2020. Of the 3791 patients, 47% were female, and the median age was 54 (18-91). Of the 2831 patients, 49% were female, and the median age was 56 (18-94). The demographic data of the patients are summarized in Table 1. The prevalence of Hp we found in our study and the change in Hp prevalence over the years with endoscopic diagnosis are shown in Table 2.

While the Hp prevalence we detected between 1998 and 2000 was 49.5%, this rate decreased to 27.3% between 2018 and 2020 ($P = .0001$). When the relationship between endoscopic diagnosis and Hp is examined in Table 2, it is observed that Hp positivity has decreased statistically significantly for each endoscopic diagnosis over the years.

DISCUSSION

The importance of spiral-shaped microorganisms, which have been known to exist in the gastric mucosa for a long time, came to the fore in 1983 with the production of Hp and its relationship with stomach diseases by Marshall et al.[1] It is known that Hp infection is clinically responsible for the etiology of chronic active gastritis, peptic ulcer (stomach and duodenal ulcer), gastric adenocarcinoma, and MALT lymphoma.[9,10]

While the prevalence of Hp is decreasing in developed countries, its prevalence continues to be high in developing countries. In developed countries, 20% of people under the age of 40 and 50% of people over the age of 60 are infected with Hp. In developing countries, the prevalence reaches 80%.[4]

MAIN POINTS

- *Helicobacter pylori* infection is one of the most common infections in the world.
- *Helicobacter pylori* prevalence may show a different geographical distribution depending on hygiene conditions.
- The prevalence of *Helicobacter pylori* is decreasing both in our country and around the world.

Table 1. Demographic Characteristics of Patients

	1998-2000	2018-2020
Female n (%)	1781 (47%)	1387 (49%)
Male n (%)	2010 (53%)	1444 (51%)
Age*, female	54 (18-91)	56 (18-94)
Age*, male	53 (18-88)	54 (18-90)

*Median.

In a comprehensive meta-analysis published by Li et al in 2023, it was reported that while the average Hp prevalence was 58.2% between 1980 and 1990, the Hp prevalence decreased to 43.1% between 2011 and 2022. In the same study, it was reported that the prevalence of Hp remained stable between 1991 and 2010 and decreased sharply between 2011 and 2022. The region with the highest prevalence decrease was reported to be Africa. This situation is explained by increasing hygiene conditions.[11] A meta-analysis conducted by Zamani et al[12] in 2018 reported that the Hp positivity rate was 44.3% in the world (34.7% in developed countries, 50.8% in developing countries) and 42%-68% in Turkey. These results are associated with the development levels of the countries. In a comprehensive study conducted in Turkey by Özaydın et al[13] in 2013, the prevalence of Hp was reported as 82.5%. On the other hand, different results were obtained in studies conducted in different regions of our country. As a matter of fact, Hp seroprevalence was reported as 81% in the study conducted by Özden et al[14] in Ankara in 1992, and Hp prevalence was reported as 66.3% and 47.6% in the studies conducted by Yaşa et al in Aydın in 1998 and 2001.[15,16] In the study conducted by Uyanıkoğlu et al[17] in the Eastern Anatolia region in 2012, Hp prevalence was reported as 71%, and finally, in the study conducted by Çakmur et al[18] in Kars in 2021, Hp positivity was reported as 37.3%. Again, in the study conducted by Özden et al[19] in 2004, it was reported that Hp seroprevalence gradually decreased when 2 different 10-year periods were compared. Studies have shown that the prevalence of Hp has decreased significantly over the years, both in the world and in our country. This decrease has been attributed in studies to increased socioeconomic status, improved hygiene conditions, and eradication treatments.

In our study, the Hp frequency between 1998 and 2000 was found to be 49.5%, and the Hp frequency between 2018 and 2020 was 27.3%. The decrease in Hp prevalence in the last 20 years was found to be statistically significant. When the studies in the literature are examined, different results were obtained in studies conducted in different years and different regions. The reason for this is that the methods used to detect Hp are different and the regional hygiene conditions are not the same. We think that the result in our region, which is below the national

Table 2. Hp Prevalence and Endoscopic Diagnoses We Detected in Endoscopies Performed between 1998-2000 and 2018-2020

Diagnosis	1998-2000			2018-2020			
	n	Hp (+) %	Hp (−) %	n	Hp (+) %	Hp (−) %	*P*
Esophagitis	208	47.6	52.4	181	26.0	74.0	.0001
Gastric ulcer	136	54.4	45.6	168	38.1	61.9	.004
Gastritis*	2738	40.6	594	2336	23.6	76.4	.006
Gastric carcinoma	102	34.3	65.7	24	8.3	91.7	.012
Bulbus ulcer	579	78.1	21.9	31	32.3	67.7	.0001
Duodenitis+gastritis	28	82.1	17.9	91	31.9	68.1	.0001
Total EGD	3791	49.5	50.5	2831	27.3	72.7	.0001

*Gastritis: pangastritis, antral gastritis, erosive gastritis, and alkaline reflux gastritis.

average and shows a significant decrease over the years, is related to the high level of development.

Reflux symptoms and gastroesophageal reflux disease (GERD) are very common conditions around the world. There is conflicting information in the literature about the relationship between Hp and GERD. Some studies have reported that the frequency of reflux symptoms and esophagitis increases after Hp eradication, and therefore Hp may be protective against these conditions.[20] However, in a meta-analysis on this subject, it was reported that there was no increased risk of GERD in those who received successful Hp treatment.[21] In our study, it was found that Hp positivity decreased from 47.6% to 26.0% in patients diagnosed with esophagitis over the years. Although the relationship between Hp and esophagitis is not clear, we think that Hp positivity has decreased in esophagitis cases as the Hp positivity rate has decreased over the years.

Helicobacter pylori infection is present in 90% of patients with duodenal ulcers and 60%-70% of patients with gastric ulcer. 3%-25% of people with Hp infection develop a peptic ulcer at any time. For this reason, Hp eradication has been found to be very effective in reducing peptic ulcer recurrence and increasing the ulcer healing rate.[22] In a study that included a meta-analysis of 5 randomized controlled studies, it was stated that the prevalence of Hp was quite high in cases of perforated peptic ulcers and that Hp eradication significantly reduced ulcer recurrence.[23] In our study, Hp positivity in gastric ulcers was found to be 54.4% and 38.1%, respectively, and Hp positivity in bulbus ulcers was found to be 78.1% and 32.3%, respectively, in patients who underwent EGD in the period between 1998 and 2000 and 2018 and 2020. When the 2 periods were compared, we found that the Hp positivity rate had decreased statistically significantly in the last 20 years. This was associated with a decrease in Hp positivity in all cases.

It is known that there is a close relationship between Hp and gastritis (antral gastritis, erosive gastritis, pangastritis, and alkaline reflux gastritis). In a study comparing endoscopic and histological findings in patients with functional dyspepsia infected and uninfected with Hp, gastritis scores were found to be significantly higher in the Hp-infected patient group.[24] In a study conducted by Konakçı et al[25] (2010), Hp positivity was reported at a rate of 50.5% in patients with a histopathological diagnosis of chronic active gastritis after EGD. In our study, the prevalence of Hp between 1998 and 2000 and 2018 and 2020 was found to be 40.6% and 23.6% in patients diagnosed with gastritis, and 82.1% and 31.9% in patients diagnosed with duodenitis+gastritis. When the changes over the years were compared, we found that the frequency of Hp positivity in gastritis diagnoses decreased statistically significantly over the years. We thought that the decrease in the frequency of Hp in gastritis diagnoses was related to the decrease in the frequency of Hp in society, as in other diagnoses.

The International Cancer Study Group classified Hp infection as a group 1 carcinogen in 1994. This infection causes chronic active gastritis, atrophic gastritis, intestinal metaplasia, and dysplasia, and ultimately it may cause the development of gastric cancer.[26] However, it is not known exactly what role Hp plays in carcinogenesis. In a study conducted by Li et al[27] in 2014, it was reported that Hp treatment reduced the incidence of gastric cancer in patients over 55 years of age. In our study, Hp positivity in patients diagnosed with gastric cancer between 1998-2000 and 2018-2020 was found to be 34.3% and 8.3%, respectively. When looking at the change over the years, it was determined that both the frequency of gastric cancer diagnosis and the relationship with Hp decreased. We think that the decrease in Hp transmission and the increase in eradication caused this result.

CONCLUSION

Helicobacter pylori causes significant gastroduodenal diseases. Looking at the period within 20 years, it was seen that the prevalence of Hp decreased in total and in each endoscopic diagnosis. We think that, in addition to eradication treatment, factors such as urbanization, industrialization, improvement in sanitation conditions, an increase in education level, an increase in clean water use, and an improvement in socioeconomic level also play a direct role in this decrease.

Ethics Committee Approval: Ethics committee approval was received for this study from the ethics committee of Aydın Adnan Menderes University (Date: October 21, 2021, Number: 2021/164).

Informed Consent: Written informed consent was obtained from patients who participated in this study.

Peer-review: Externally peer-reviewed.

Author Contributions: Concept – E.M., M.H.Y.; Supervision – M.H.Y.; Resources – İ.T., E.M.; Data Collection and/or Processing – E.M.; Analysis and/or Interpretation – İ.T., A.K., A.C.; Literature Search – İ.T., E.M.; Writing Manuscript – İ.T.; Critical Review – M.H.Y.

Declaration of Interests: The authors declare that they have no competing interests.

Funding: The authors declared that this study has received no financial support.

REFERENCES

1. Marshall BJ, Warren JR. Unidentified curved bacilli in the stomach of patients with gastritis and peptic ulceration. *Lancet*. 1984;1(8390):1311-1315. [CrossRef]
2. Dunn BE, Cohen H, Blaser MJ. Helicobacter pylori. *Clin Microbiol Rev*. 1997;10(4):720-741. [CrossRef]
3. Suerbaum S, Michetti P. Helicobacter pylori infection. *N Engl J Med*. 2002;347(15):1175-1186.
4. Moayyedi P, Hunt RH. Helicobacter pylori public health implications. *Helicobacter*. 2004;9(1)(suppl 1):67-72. [CrossRef]
5. Yokota SI, Konno M, Fujiwara SI, et al. Intrafamilial, preferentially mother-to-child and intraspousal, Helicobacter pylori infection in Japan determined by mutilocus sequence typing and random amplified polymorphic DNA fingerprinting. *Helicobacter*. 2015;20(5):334-342. [CrossRef]
6. Kamada T, Haruma K, Ito M, et al. Time trends in Helicobacter pylori infection and atrophic gastritis over 40 years in Japan. *Helicobacter*. 2015;20(3):192-198. [CrossRef]
7. Çiftel S, Okçu N, Dursun H, Albayrak F, Usta S. Bölgemizde Helicobakter pylori sıklığı. *Akad Gastroenteroloji Derg*. 2016;15(1):1-4.
8. Hooi JKY, Lai WY, Ng WK, et al. Global prevalence of Helicobacter pylori infection: systematic review and meta-analysis. *Gastroenterology*. 2017;153(2):420-429. [CrossRef]
9. Cave DR. Transmission and epidemiology of Helicobacter pylori. *Am J Med*. 1996;100(5A):12S-7S; discussion 17S-18S. [CrossRef]
10. Wyl FA. Helicobacter pylori: current perspectives. *J Clin Gastroenterol*. 1991;13(1):114-115.
11. Li Y, Choi H, Leung K, Jiang F, Graham DY, Leung WK. Global prevalance of Helicobacter pylori infection between 1980 and 2022: a systematic review and meta-analysis. *Lancet Gastroenterol Hepatol*. 2023;8(6):553-564. [CrossRef]
12. Zamani M, Ebrahimtabar F, Zamani V, et al. Systematic review with meta-analysis: the worldwide prevalence of Helicobacter pylori infection. *Aliment Pharmacol Ther*. 2018;47(7):868-876. [CrossRef]
13. Ozaydın N, Turkyilmaz SA, Cali S. Prevalence and risk factors of helicobakter pylori in Turkey: a nationally-representative cross-sectional, screening with the 13C- urea breath test. *BMC Public Health*. 2013;13:1215. [CrossRef]
14. Özden A, Dumlu Ş, Dönderici Ö, et al. Helikobakter pilori infeksiyonunun ülkemizdeki epidemiyolojisi. *Gastroenteroloji*. 1992;3(4):664-668.

15. Yaşa MH, Karaoğlu AÖ. Endoskopik tanı ile HP arasındakı ilişki. *Turk J Gastroenterol*. 1998 [suppl]:40.
16. Yükselen V,Yaşa MH, Karaoğlu AÖ, Yavaşoğlu İ. Endoskopik tanı ile Helikobakter Pilori İlişkisi. *Turk J Gastroenterol* P-L/24. 2001 [suppl].
17. Uyanıkoğlu A, Coşkun M, Binici DN, et al. Endoskopi yapılan hastalarda Helicobakter pylori sıkılığı. *Dicle Med J*. 2012;39(2):197-200.
18. Çakmur H, Yapılan Hastalarda HEİ. Helicobacter pylori Sıklığı ve Komorbid Hastalıklar ile İlişkisi, Tıpta Uzmanlık Tezi, Kars: T.C. *Kafkas Univ Tıp Fak Aile Hekimliği Anabilim Dalı*. 2021.
19. Özden A, Bozdayı G, Özkan M, Köse KS. Changes in the seroepidemiological pattern of Helicobacter pylori infection over the last 10 years. *Turk J Gastroenterol*. 2004;15(3):156-158.
20. Fallone CA, Barkun AN, Friedman G, et al. Is Helicobacter pylori eradication associated with gastroesophagealreflux disease? *Am J Gastroenterology*. 2000;95(4):914-920. [CrossRef]
21. Yaghoobi M, Farrokhyar F, Yuan Y, Hunt RH. Is there an increased risk of GERD after Helicobacter pylori eradication ?: a meta-anaylsis. *Am J Gastroenterol*. 2010;105(5):1007-1013. [CrossRef]
22. Kurata JH , Nogawa AN. Meta-analysis of risk factors for peptic ulcers. Nonsteroidal anti-inflammatory drugs, Helicobacter pylori, and smoking. *J Clingastroenterol*. 1997;24(1):2-17.
23. Wong CS , Chia CF, Lee HC, et al. Eradication of Helicobacter pylori for prevention of ulcer recurrence after simple closure of perforated peptic ulcer: a meta-analysis of randomized controlled trials. *J Surg Res*. 2013;182(2):219-226. [CrossRef]
24. Ohkusa T, Fujiki K, Takashimizu I, Kumagai J, Tanizawa T, Eishi Y. Endoscopic and histological comparison of non ulcer dyspepsia with and without Helicobacter pylori infection evaluated by the modified Sydney system. *Am J Gastroenterol*. 2000;95(9):2195-2199. [CrossRef]
25. Konakcı N. *Kronik Aktif Gastritli Olgularda Endoskopik Bulgular Ve Helicobacter Pylori Varlığının Incelenmesi*. [*Tıpta Uzmanlık Tezi, Bursa:T. C. Uludağ Üniversitesi Tıp Fakültesi İç Hastalıkları Anabilim Dalı*], 2010.
26. Fischbach W, Chan AO, Wong BC. Helicobacter pylori and gastric malignancy. *Helicobacter*. 2005;10(s1):34-39. [CrossRef]
27. Li WQ, Ma JL, Zhang L, et al. Effects of Helicobacter pylori treatment on gastric cancer incidence and mortality in subgroups. *J Natl Cancer Inst*. 2014;106(7):dju116. [CrossRef]