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The correlation between atrophic gastritis and *Helicobacter pylori* infection in patients referred to Shohadaye Ashayer Hospital in Khorramabad

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Abstract

Background: *Helicobacter pylori* and atrophic gastritis are both known as risk factors for gastric cancer. The purpose of this study is to investigate the prevalence of *Helicobacter pylori* infection in patients with atrophic gastritis. In addition to being aware of the prevalence of this infection, it is crucial to eliminate this bacterium due to its carcinogenicity.

Methods: In this descriptive-cross-sectional study, all patients referred to the endoscopy unit of Shohadaye Ashayer Hospital in Khorramabad city for endoscopy during 2015–2016 were included. Patients with atrophic gastritis were classified as patients, while those without the condition were classified as the control group. Then, the frequency of *H. pylori* infection in patients with atrophic gastritis and people without atrophic gastritis was investigated. After sample collection, the primary data was entered into the SPSS software version 22 for analysis.

Result: The collected results showed that 41 % patients did not have *H. pylori* and 59% patients had *H. pylori*. The population over 50 years old had the highest age frequency in the study subjects, while the female group had the majority gender group. As a result, the frequency of *H. pylori* in the antrum area was higher than in other locations in both endoscopy and pathology, but it was not statistically significant (P value >0.05). While the frequency was higher, the overall difference across all locations was not statistically significant, but the association between *H. pylori* and atrophy in the antrum was statistically significant when evaluated more specifically. 54.1% of those who had endoscopy-discovered atrophy also had severe atrophy. *H. pylori* was found in the antrum in 50% of cases, and in 61.1% of cases when the pathology showed atrophy. This finding was statistically significant (P value <0.05).The incidence of reporting atrophy was 2.8 times higher in the age group of over 50 compared to those under 20. *H. pylori* was detected in 56.4% of people over 50 who had atrophy; that was statistically significant.

Conclusion: According to the results, there is a significant risk of developing atrophic gastritis in patients with *H. pylori*, and among females, those over 50 years old have the highest frequency of occurrence.

Introduction

Chronic diseases such as gastric cancer is the second most prevalent cancer among cancer patients in terms of mortality, which is the fourth most common disease in terms of incidence [1, 2]. The risk of chronic diseases and gastric cancer is different among countries and individuals [3]. About 80% of gastric cancer cases occur in Asia [4]. The progression stages of gastric cancer, known as Correa's cascade, have the following intermediate stages or precancerous lesions: gastritis, atrophic gastritis, intestinal metaplasia, dysplasia, and finally gastric cancer [5-7]. Gastric cancer has two types, intestinal and diffuse. Although the pathogenesis of the diffuse type is not well known, the pathogenesis of the intestinal type is associated with precancerous lesions [8]. Atrophic gastritis is a long-term inflammatory condition of the gastric mucosa that impairs the secretory capacity of the stomach and is associated with an increased risk of developing gastric cancer. The variables that impact the severity and spread of atrophic gastritis define the association between *H. pylori* and gastric cancer [9]. Both atrophic gastritis and *H. pylori* are recognized as risk factors for stomach cancer. Atrophic gastritis affects about one-third of *H. pylori* infection patients, and Helicobacter removal has been shown to reverse this precancerous lesion [10]. In general, the prevalence of atrophic gastritis is higher in countries with high prevalence of *Helicobacter pylori* and gastric cancer [9]. *H. pylori* is a spiral microaerophilic Gram-negative bacterium that colonizes in the mucosa of the human digestive tract [11]. According to reports, the prevalence of this infection ranges from 30% in the United States to 90% in developing countries as Iran [12-14].World Health Organization (WHO) considers *Helicobacter pylori* as a first-class carcinogen in the occurrence of gastric cancer, so that the eradication of *H. pylori* is effective in preventing the development of precancerous lesions [15]. Colonization of bacteria in the gastric mucosa leads to chronic inflammation that creates a carcinogenic sequence and causes gastric cancer after a few decades [5]. Helicobacter is responsible for 80% of atrophic gastritis cases and the association of this infection with atrophic gastritis or intestinal metaplasia increases the risk of gastric cancer 5-6 times [7].Considering this important role, the aim of this study is to investigate the frequency of *Helicobacter pylori* infection in patients with atrophic gastritis. In addition to being aware of how common this infection is, the necessary strategies for eradicating this organism ought to take its carcinogenicity into consideration.

Methods

All patients who were referred to the endoscopy unit of Shohadaye Ashayer Hospital in Khorramabad for endoscopy during 2015–2016 were analyzed in this cross-sectional descriptive study. All those in whom atrophic gastritis was confirmed were regarded as patients, whereas the others were regarded as the control group. Patients whose pathology reports were not available were excluded from the study. Small mucosal vessels can be recognized when atrophic gastritis is present because it appears in endoscopy as hypopigmented and bright areas. Atrophy can be limited to a specific area (focal) or several areas (multifocal) or involve the entire gastric mucosa (diffuse). After retrieving the endoscopic report for these patients from the hospital database, the pathology report for these patients was requested from the public and private pathology laboratories in the city. A checklist that is particular to the same patient is used to record demographic data such as age and sex, gastric atrophy information such as the location and severity (focal, multifocal, diffuse) based on the endoscopic report, and Helicobacter information based on the pathology report. The frequency of *H. pylori* infection was then compared between individuals with and without atrophic gastritis. Following sample collection, the fundamental data was input into the SPSS version 22 software, which then used descriptive statistics (mean, standard deviation, and frequencies), Contingency table, the chi-square test, and logistic regression. A significance level of less than 0.05 was taken into consideration.

Results

According to the data, 2889 patients (55.8%) had H. pylori, while 2285 patients (44.2%) did not. People over 50 years old were the most frequent age group, and females were the most frequent gender among the study subjects. As a result, the frequency of *H. pylori* in the antrum area was higher than in other locations in both endoscopy and pathology, but it was not statistically significant (P value>0.05). 54.1% of those who had endoscopy-discovered atrophy also had severe atrophy. In 50% of cases, *H. pylori* was detected in the antrum, and in 61.1% of cases when the pathology showed atrophy. This result was statistically significant (P value <0.05).

The probability of observing atrophy was 2.8 times higher in the age group of people over 50 compared to those under 20. *H. pylori* was only detected in 56.4% of people who were older than 50 and had atrophy, which was statistically significant. The frequency of demographic and clinical variables of participants under investigation is given in Table 1.

Variables	Cumulative abundance	Number (%)
Age (20 and under)	3.1	162 (3.1)
Age (21-30)	16.9	714 (13.8)
Age (31-40)	36.9	1035 (20)
Age (41-50)	57.6	1067 (20.6)
Age (more than 50)	100.0	2196 (42.4)
Sex (male)	49.1	2539(49.1)
Sex (female)	100	2635(50.9)
Atrophy in endoscopy (negative)	88.9	4452(89.9)
Atrophy in endoscopy (positive)	100.0	558(47.1)
Focal atrophy (negative)	95.73	4793(95.73)
Cardia atrophy (positive)	95.75	1(0.02)
Fundus atrophy (positive)	95.82	3(0.07)
Body atrophy (positive)	96.43	35(0.61)
Antrum atrophy (positive)	99.77	167(3.34)
Body and Antrum atrophy (positive)	100.0	11(0.23)
Multifocal atrophy in endoscopy (negative)	93.5	4684(93.2)
Fundus atrophy (positive)	93.5	2(0.4)
Body atrophy (positive)	95.1	81(1.6)
Antrum atrophy (positive)	99.3	208(4.2)
Body and Antrum atrophy (positive)	100.0	35(0.6)
Severe atrophy in endoscopy (negative)	99.22	4970(99.22)
Cardia atrophy (positive)	99.25	2(0.03)
Body atrophy (positive)	99.49	12(0.24)
Antrum atrophy (positive)	99.9	20(0.41)
Body and Antrum atrophy (positive)	100.0	5(0.13)
Atrophy in pathology (negative)	97.8	5061(97.8)
Atrophy in pathology (positive)	100	113(2.2)
Mild atrophy in pathology (negative)	98.06	5073(98.06)
Cardia atrophy (positive)	98.08	1(0.02)
Body atrophy (positive)	98.39	16(0.31)
Antrum atrophy (positive)	99.88	77(1.49)
Cardia and Antrum atrophy (positive)	99.9	1(0.02)
Body and Antrum atrophy (positive)	100.0	5(0.1)
Severe atrophy in pathology (negative)	99.7	5160 (99.7)
Body atrophy (positive)	99.8	3 (0.1)
Antrum atrophy (positive)	100	11(0.2)

Table 1: Frequency of demographic and clinical variables of participants.

5010 people were investigated in this study. The average age of the patients was 48.3 ± 17.3, and the minimum age was 11 and the maximum was 95 years. Table 1 displays the frequency of demographic and clinical characteristics. *H. pylori* was detected in 3053 patients (59%) but not in 2121 (41%) of the cases. The highest frequency of age in the study subjects was related to the group over 50 years old and the highest frequency according to gender was related to the female group. The antrum region had the highest prevalence of atrophy in both endoscopy and pathology.Table2 displays the prevalence of *H. pylori* in various areas in both with and without atrophy cases in both endoscopy and pathology. The results showed the frequency of *H. pylori* in the antrum area was higher than in other areas in both endoscopy and pathology, but it was not statistically significant (P value >0.05).

Table. 3 shows the prevalence of *H. pylori* in endoscopy and pathology samples from individuals with or without atrophy. It has shown 54.1% of those with endoscopic atrophy, 50% of those with severe antrum atrophy, and 61.1% of those with pathological atrophy all had *H pylori*, which was statistically significant (P value <0.05). Additionally, logistic regression was used to control confounders, and it was shown that, when other complicating factors were held constant, there was a 2.92-fold higher probability of endoscopic atrophy in people who had H. pylori than in people who did not (95% CI: 1.92–4.97). In addition, patients with H. pylori had a 14.3 times higher chance of having atrophy in their pathology than those without it (95% CI: 5.3–9.5). In the age group of patients over 50 compared to those under 20, the frequency of observing atrophy was 2.8 times higher (95% CI: 1.3–4.5). As shown in the Table 4, *H. pylori* was detected in 56.4% of patients over 50 years old who had atrophy, which was statistically significant. Although there was atrophy in both the male and female groups, and there were more than 50% pylori infections, the results in the above table demonstrate that they were not statistically significant.

Discussion

Various studies on the correlation between *H. pylori* infection and atrophic gastritis have been carried out in different countries. For example, in the study of Chen and his colleagues in China, 3969 patients with atrophic gastritis were examined, of which 21.01% had *Helicobacter pylori* infection. Also, 92.33% of patients infected with *Helicobacter* had experienced inflammation in the gastric mucosa at the same time [20]. Furthermore, in a study that took place in Cameroon during 2013-2014, 79 patients who were diagnosed with gastritis based on histological findings were examined. The results revealed that *Helicobacter pylori* infection was present in 71.2% of patients with atrophic gastritis and was absent in 28.8% of patients [8]. Moreover, Darnindro et al., investigated 69 patients with Helicobacter in the case group and 71 people in the control group in Indonesia in 2014. According to the study, there was more mild and moderate atrophy and intestinal metaplasia in the Helicobacter group than in the control group. Additionally, 62.3% of *Helicobacter* patients and 12.7% in the control group reported having chronic active gastritis [21]. The outcomes of these studies support our findings about the association between *H. pylori* infection and the occurrence of atrophic gastritis.

In 2007, a study has been well established to investigate the correlation between *H. pylori* infection, gastritis, and mucosal atrophy [2]. Also,In Bhutan in 2010, 381 patients with dyspepsia were screened, and 71.1% of them were found to have *Helicobacter pylori* infections. 341 patients had atrophy in the antrum and 140 patients had atrophy in the corpus in addition to the antrum. This study demonstrated a strong correlation between atrophic gastritis of the stomach and antrum and *Helicobacter* infection [3].Later in 2015, Myint conducted research on 252 dyspepsia patients in Myanmar, who had endoscopy and biopsy.

In this study, 48% of participants had Helicobacter. Atrophic gastritis affected the antrum in 54.7% of

Characteristics	*H. Pylori*						Total	P value
	Negative Number (%)	Cardia Number (%)	Body Number (%)	Antrum Number (%)	Cardia and Antrum Number (%)	Fundus and Antrum Number (%)		
Atrophy in endoscopy (negative)	1865(41.9)	36(0.8)	233(5.2)	2272(51)	6(0.1)	40(0.9)	4452(100)	0.43
Atrophy in endoscopy (positive)	256(45.9)	4(0.7)	25(4.5)	263(47.1)	1(0.2)	9(1.6)	558(100)	
Atrophy in pathology (negative)	2077(41)	45(0.9)	272(5.4)	2611(51.6)	7(0.1)	49(1)	5061(100)	0.25
Atrophy in pathology (positive)	44(38.9)	0(0)	8(7.1)	58(51.3)	1(0.9)	2(1.8)	113(100)	

Table 2: Consensus table of the presence or lack of atrophy in endoscopy and pathology based on the existence of *H. pylori* infection in various stomach regions.

Characteristics	*H. Pylori*		Total	*p*-Value
	Negative Number (%)	Positive Number (%)		
Atrophy in endoscopy (negative)	1865(41.9)	2587(58.1)	4452(100)	0.04
Atrophy in endoscopy (positive)	256(45.9)	302 (54.1)	558(100)	
Focal atrophy in endoscopy (negative)	2018 (42.1)	2775 (57.9)	4793(100)	0.45
Cardia atrophy (positive)	0(0)	1 (100)	1(100)	
Fundus atrophy (positive)	1 (33.3)	2 (66.7)	3(100)	
Body atrophy (positive)	16 (45.7)	19 (54.3)	35(100)	
Antrum atrophy (positive)	79 (47.3)	88 (52.7)	167(100)	
Body and Antrum atrophy (positive)	7 (63.6)	4 (36.4)	11(100)	
Multifocal atrophy in endoscopy (negative)	1975 (42.2)	2709 (57.8)	4793(100)	0.31
Fundus atrophy (positive)	2 (100)	0 (0)	2(100)	
Body atrophy (positive)	34 (42)	47 (58)	81(100)	
Antrum atrophy (positive)	97 (46.6)	111 (53.4)	208(100)	
Body and Antrum atrophy (positive)	13 (37.1)	22 (62.9)	35(100)	
Severe atrophy in endoscopy (negative)	2099 (42.2)	2871 (57.8)	4790(100)	0.04
Cardia atrophy (positive)	2 (100)	0 (0)	2(100)	
Body atrophy (positive)	9 (75)	3 (25)	12(100)	
Antrum atrophy (positive)	10 (50)	10 (50)	20(100)	
Body and Antrum atrophy (positive)	1 (20)	4 (80)	5(100)	
Atrophy in pathology (negative)	2077 (41)	2984 (59)	5061(100)	0.02
Atrophy in pathology (positive)	44 (38.9)	69 (61.1)	113(100)	
Mild atrophy in pathology (negative)	2082 (41)	2991 (59)	5071(100)	0.1
Cardia atrophy (positive)	1 (100)	0 (0)	1(100)	
Body atrophy (positive)	9 (56.3)	7 (43.8)	16(100)	
Antrum atrophy (positive)	25 (32.5)	52 (67.5)	77(100)	
Cardia and Antrum atrophy (positive)	0 (0)	1 (100)	1(100)	
Body and Antrum atrophy (positive)	4 (80)	1 (20)	5(100)	
Severe atrophy in pathology (negative)	2115 (41)	3045 (59)	5160(100)	0.63
Body atrophy (positive)	2 (66.7)	1 (33.3)	3(100)	
Antrum atrophy (positive)	4 (36.4)	7 (63.6)	11(100)	
Age (20 and under)	83 (51.2)	79 (48.8)	162(100)	0.01
Age (21-30)	289 (40.5)	425 (59.5)	714(100)	
Age (31-40)	427 (41.3)	608 (58.7)	1035(100)	
Age (41-50)	419 (39.3)	648 (60.7)	1067(100)	
Age (more than 50)	903 (41.1)	1293 (58.9)	2196(100)	

Table 3: The consensus table describes the presence or absence of atrophy and its many manifestations in endoscopy and pathology in accordance with *Helicobacter pylori* infection.

Atrophy in Endoscopy			*H. Pylori*		Total	*p*-Value
			Negative	Positive		
Age (20 and under)	No	Number	77	69	146	0.32
		(%)	52.7%	47.3%	100.0%	
	Yes	Number	6	3	9	
		(%)	66.7%	33.3%	100.0%	
	Total	Number	83	72	155	
		(%)	53.5%	46.5%	100.0%	
Age (21-30)	No	Number	266	372	638	0.5
		(%)	41.7%	58.3%	100.0%	
	Yes	Number	23	31	54	
		(%)	42.6%	57.4%	100.0%	
	Total	Number	289	403	692	
		(%)	41.8%	58.2%	100.0%	
Age (31-40)	No	Number	375	520	895	0.09
		(%)	41.9%	58.1%	100.0%	
	Yes	Number	52	54	106	
		(%)	49.1%	50.9%	100.0%	
	Total	Number	427	574	1001	
		(%)	42.7%	57.3%	100.0%	
Age (41-50)	No	Number	371	568	939	0.05
		(%)	39.5%	60.5%	100.0%	
	Yes	Number	48	50	98	
		(%)	49.0%	51.0%	100.0%	
	Total	Number	419	618	1037	
		(%)	40.4%	59.6%	100.0%	
Age (more than 50)	No	Number	776	1058	1834	0.04
		(%)	42.3%	57.7%	100.0%	
	Yes	Number	127	164	291	
		(%)	43.6%	56.4%	100.0%	
	Total	Number	903	1222	2125	
		(%)	42.5%	57.5%	100.0%	

Table 4: The consensus table describes the presence or absence of atrophy in different age groups in accordance with Helicobacter pylori infection.

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Atrophy in Endoscopy			*H. Pylori*		Total	*p*-Value
			Negative	Positive		
Male	No	Number	865	1311	2176	0.105
		(%)	39.8%	60.2%	100.0%	
	Yes	Number	127	163	290	
		(%)	43.8%	56.2%	100.0%	
	Total	Number	992	1474	2466	
		(%)	40.2%	59.8%	100.0%	
Female	No	Number	1000	1276	2276	0.107
		(%)	43.9%	56.1%	100.0%	
	Yes	Number	129	139	268	
		(%)	48.1%	51.9%	100.0%	
	Total	Number	1129	1415	2544	
		(%)	44.4%	55.6%	100.0%	

Table 5: Relationship between *H. pylori* Infection and Atrophy in Different Sex Groups.

patients and the corpus in 12.6% of individuals. In this study, the group with Helicobacter infection had much more atrophy and more severe atrophy than the non-infected group [23]. A study published in 2012 by Leja et al. Included the evaluation of 3564 individuals from the general community in Latvia. *H. pylori* infection was determined in these individuals through the serological examination, and 79.21% of the population had the infection. Pepsinogen levels showed that 40.52 percent of the participants under study had different levels of atrophy, indicating a significant prevalence of Helicobacter and atrophic gastritis in Latvia [24].

The use of natural compounds is recommended for the treatment of digestive factors and diseases [25-28] because they are rich in natural antioxidants [27-30]. These findings show that patients with *H. pylori* have a considerably greater risk of developing atrophic gastritis. Also, individuals over 50 years old have the highest incidence of this condition, and females are more likely than males to have it.

According to the results, there is a significant risk of developing atrophic gastritis in patients with *H. pylori*, and while the frequency was highest in females over 50, the association between gender and atrophy was not statistically significant in this study.

Competing Interest

The authors declare that there is no conflict of interest.

Author Contributions

Mosayeb Moradniani (Co-coresponding authors): Conception and design, Experimental Work, Analysis and interpretation of data, Rough Draft.

Mosayeb Moradniani: Supervision, Research Project Administration.

Ahmed Hjazi, Rana Sherdil Amin, Ghadeer Sabah Bustani, Rosario Mireya Romero-Parra, Rahman S. Zabibah: Analysis and Interpretation.

Marzbali, Mohamad Reza Nazer: Final Draft and Revision.

Ghobad Abangah, Mahsa Yousefpour Marzbali, Mohamad Reza Nazer: Draft editing.

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