Original Article

Prevalence of *Helicobacter pylori* infection among patients with dyspepsia and other gastrointestinal diseases in King Abdulaziz Specialized Hospital in Taif

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ABSTRACT

Introduction: To estimate the prevalence of *H. pylori* in patients with dyspepsia as well as the prevalence of cancerous and precancerous nonmalignant lesions in patients with *H. pylori*. **Methods:** A retrospective cohort study has been conducted at King Abdulaziz Specialist Hospital (KAASH), Ministry of Health (MOH) in Taif city in the Western province of Saudi Arabia among patients who underwent endoscopy between July 2019 and July 2021. Data were collected from the endoscopy log book and consisted of four sections; demographic data (age and gender), presenting symptoms and indications of endoscopy, endoscopic findings, and histopathological findings in endoscopic biopsies. **Results:** The study included 680 patients. Their age ranged between 12 and 97 years with an arithmetic mean of 40.9 years and a standard deviation of 16.4 years. The prevalence of dyspepsia was 45.9% while that of *H. pylori* was 32.5%. The prevalence of *H. pylori* among patients with dyspepsia was 30.1% compared with 34.5% among those without dyspepsia, $P > 0.05$. The prevalence rates of *H. pylori* among male and female patients were 32.3% and 32.7%, respectively, $P > 0.05$. The prevalence rate of *H. pylori* was highest among patients aged between 41 and 60 years (38.7%) and lowest among those aged over 60 years (19.5%), $P = 0.005$. Active chronic gastritis was reported among almost two-thirds (65.6%) of patients with *H. pylori* compared with only 9.8% of those without *H. pylori*, $P < 0.001$. **Conclusion:** The *H. pylori* was a common health problem among patients suffering from dyspepsia, however, its prevalence was relatively lower than other rates reported from other developing countries.

Keywords: Dyspepsia, GIT, helicobacter, KAASH, prevalence, Taif

Introduction

Dyspepsia defined as epigastric pain is associated with symptoms that include early satiety, epigastric burning, and postprandial symptoms. The list of organic causes of dyspepsia are extensive while the most common causes are gastroesophageal, mostly peptic ulcer and gastroesophageal reflux disease. *Helicobacter pylori* (*H. pylori*) gastritis is one of the common causes of dyspepsia.[1]

H. pylori is the most common chronic bacterial infection in humans.[2] It has been demonstrated worldwide and in individuals of all ages. Conservative estimates suggest that 50% of the world's population is affected. Infection is more frequent and acquired at an earlier age in developing countries compared

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with industrialized nations.[3] In developing nations, where the majority of children are infected before the age of 10 years, the prevalence in adults' peak at more than 80% before the of age 50 years. It is associated with a number of important upper gastrointestinal (GI) conditions including chronic gastritis, peptic ulcer disease, and gastric malignancy. The prevalence of *H. pylori* is closely tied to socioeconomic conditions and accordingly, this infection is more common in developing countries than in developed countries such as the United States.[4]

H. pylori is a spirally curved gram-negative bacilli belonging to the microaerobic bacteria, whose main infection site is the stomach and duodenal sphere. In addition, the organism can be biochemically characterized as catalase, oxidase, and urease positive. Urease is the most important for its survival and colonization. It is produced in abundance, making up more than 5% of the organism's total protein weight. Bacterial urease activity is clinically important because it forms the basis for several invasive and noninvasive tests to diagnose infection.[5]

The route of transmission of *H. pylori* from one to another is still unclear.[6] It seems to be direct from person to person through either oral/oral or fecal/oral.[7] The major reservoir of infection is the human.

H. pylori has a significant correlation with chronic gastritis with gastric mucosal atrophy and erosion, peptic ulcer, mucosa-associated lymphoid tissue (MALT) lymphoma, and gastric cancer (GC). About 20% of *H. pylori*-infected patients develop precancerous lesions but only 2% develop gastric cancer, which is closely related to the host genetic, environment, and virulent strains of *H. pylori*.[8]

The majority of primary care physicians who treat dyspepsia patients are educated on the proper diagnosis and treatment of this infection through a variety of educational initiatives.[9,10] However, primary care physicians' understanding of *H. pylori* with regard to the pathophysiology, diagnosis, and therapy is still significantly clouded and inconsistent, according to the findings of multiple widely published surveys from various industrialized nations.[11] One of the biggest unknowns in treating patients with dyspepsia is whether primary care doctors should test for *H. pylori* infection and treat if positive or refer patients to a specialist.[12]

This study aimed to estimate the prevalence of *H. pylori* in patients with dyspepsia as well as the prevalence of cancerous and precancerous nonmalignant lesions in patients with *H. pylori*.

Material and Method

Study design, setting, and time frame: A retrospective cohort study has been conducted at King Abdulaziz Specialist Hospital (KAASH) under the Ministry of Health (MOH) in Taif city in the Western province of Saudi Arabia among patients who underwent endoscopy between July 2019 and July 2021.

Sample size: The minimum sample size of this study was calculated by online sample size calculator epidemiological information (EPI) version 3.01, based on the assumptions of population size of 175,000 inhabitants in Taif city, confidence interval of 95%, and desired precision of 0.05. Estimated prevalence of *H. pylori* infection in previous studies showed that about half of patients with dyspepsia were found to be *H. pylori* positive.[3] Accordingly, a sample size would be 384 patients. To achieve on conclusive endoscopic or histological result, the investigator could increase the sample size to 700 patients.

Sampling technique and participants: A simple random sampling technique was carried out to recruit the patients (inpatients/outpatients) with asymptomatic and symptomatic dyspepsia who underwent biopsy through upper endoscopy in King Abdulaziz Specialized Hospital (KAASH), Taif city, provided that they aged over 12 years. Patients who used omeprazole 2 weeks prior to endoscopy and those who used antibiotics 4 weeks prior to endoscopy were excluded.

Data collection: Data were collected by the investigator from endoscopy log book in a data collection form consisting of four sections; the first section was about a demographic data (age, gender., second section was about the presenting symptoms and indications of endoscopy, third section was about endoscopic findings (nonulcerative lesions, ulcerative lesion gastric, or duodenal), and the fourth section was about histopathological findings in endoscopic biopsies (presenting of *H. pylori* organisms, chronic gastritis, active chronic gastritis, cancerous lesion, and precancerous (metaplasia).

H. pylori positive was identified by the histopathological findings in endoscopic biopsy by Giemsa staining.

Ethical considerations
Permission of Ministry of Health in Taif city was obtained before conducting the study. Written permission from Program Director of Internal Medicine, KAASH, Taif Region was obtained before conducting the research. Written permission from the director of KAASH, Taif City was obtained. Regional Research and Ethics Committee has approved the study protocol.

Data analysis
Collected data were coded, verified, and analyzed using Statistical Package for Social Sciences (SPSS) program, version 26. Descriptive statistics (number, percentage for categorical variables, mean, standard deviation [SD], and range for continuous variables) and analytic statistics using Chi-square tests to test for the association and/or the difference between two categorical variables were applied and *P* values equal or less than 0.05 were considered statistically significant.

Results
The study included 680 patients. Table 1 summarizes their age and gender distribution. Their age ranged between 12 and 97 years

with an arithmetic mean of 40.9 years and standard deviation of 16.4 years and more than half of them (53.4%) aged 40 years or below. Males represented 51% of the patients.

Prevalence of *H. pylori* among the patients who underwent endoscopy was 32.5% as illustrated in Figure 1 while prevalence of dyspepsia among them was 45.9%. Figure 2

The prevalence of *H. pylori* among patients with dyspepsia was 30.1% compared with 34.5% among those without

dyspepsia. However, this difference was not statistically significant ($P > 0.05$). Figure 3

The prevalence rates of *H. pylori* among male and female patients were 32.3% and 32.7%, respectively, with no statistically significant difference $P > 0.05$. Figure 4

The prevalence rate of *H. pylori* was highest among patients aged between 41 and 60 years (38.7%) and lowest among those aged over 60 years (19.5%), $P = 0.005$. Figure 5

Active chronic gastritis was reported among almost two-thirds (65.6%) of patients with *H. pylori* compared with only 9.8% of those without *H. pylori* $P < 0.001$. Other lesions (chronic gastritis, metaplasia, atrophy, and gastric cancer/lymphoma) were not associated with *H. pylori*. Table 2

Regarding endoscopic findings, although antral gastritis and pan gastritis were more reported among patients with *H. pylori* compared with those without *H. pylori* (41.6% and 16.3% vs. 34.6% and 11.1%, respectively, yet this was not statistically significant (P values were 0.077 and 0.058, respectively). Table 3

Table 1: Age and gender distribution of the patients (*n*=680)

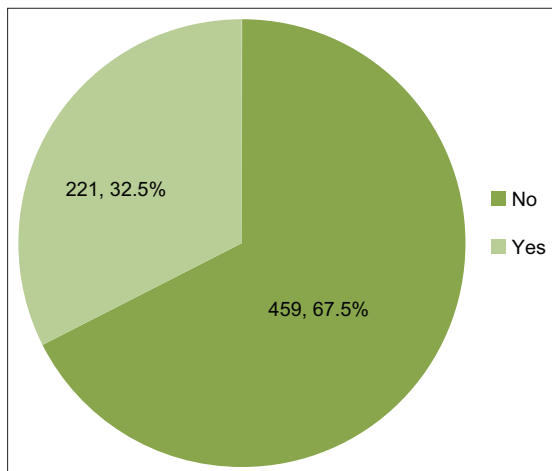|	
Age	
Range	12-97
Means±SD	40.9±16.4
≤40 (*n*; %)	363; 53.4%
41-60 (*n*; %)	230; 33.8%
>60 (*n*; %)	87; 12.8%
Gender (*n*; %)	
Males	347; 51.0%
Females	333; 49.0%

Figure 1: Prevalence of *H. pylori* among the patients who underwent endoscopy between July 2019 and July 2021, King Abdulaziz Specialist Hospital, Ministry of Health, Taif city

Figure 2: Prevalence of dyspepsia among the patients who underwent endoscopy between July 2019 and July 2021, King Abdulaziz Specialist Hospital, Ministry of Health, Taif city

Figure 3: Prevalence of *H. pylori* among the patients who underwent endoscopy between July 2019 and July 2021, King Abdulaziz Specialist Hospital, Ministry of Health, Taif city, according to presence of dyspepsia
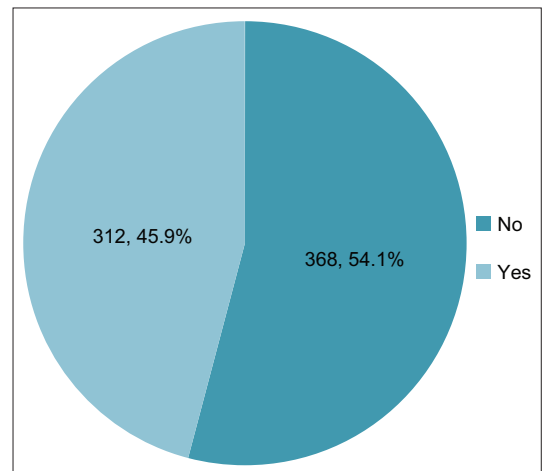

Figure 4: Prevalence of *H. pylori* among the patients who underwent endoscopy between July 2019 and July 2021, King Abdulaziz Specialist Hospital, Ministry of Health, Taif city, according to gender
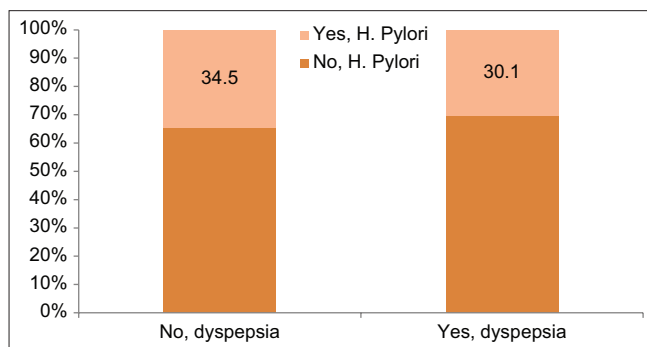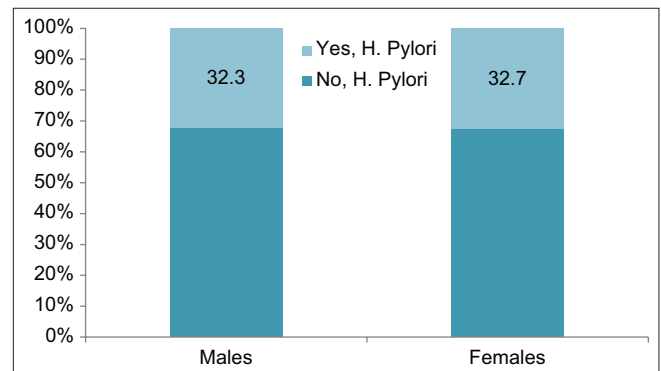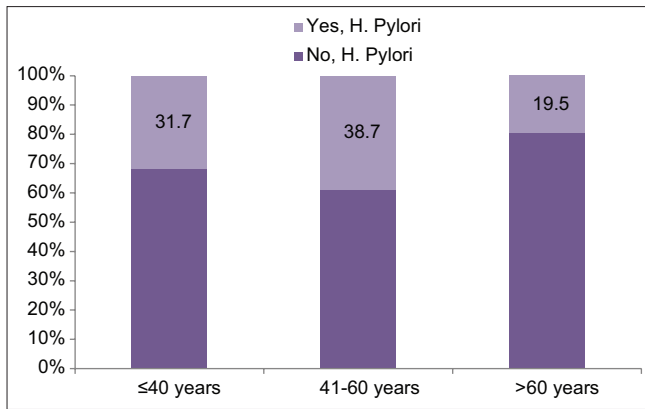
Figure 5: Prevalence of *H. pylori* among the patients who underwent endoscopy between July 2019 and July 2021, King Abdulaziz Specialist Hospital, Ministry of Health, Taif city, according to age

Discussion

The prevalence of *H. pylori* is closely linked to socioeconomic conditions and accordingly, it has been more reported in developing countries than in developed countries.[9] The present study revealed a prevalence of 32.5% among people who underwent endoscopy; 30.1% among those with dyspepsia and 34.5% among those without dyspepsia with no significant difference. Globally, it has been estimated that 50% or more of the world's population is infected by *H. pylori*, making it the most widespread infection across the globe.[3] It has been estimated that 20%–60% of the US population is infected with *H. pylori*; depending on ethinicity.[10] In a systematic review and meta-analysis including 184 studies from 62 countries, the pooled prevalence of *H. pylori* was highest in Africa (70.1%) and lowest in Oceania (24.4%) and as regards countries, the highest rate was observed in Nigeria (87.7%) and lowest one in Switzerland (18.9%).[11] In India, among dyspepsia patients with mucosal lesion, the prevalence of *H. pylori* was 78% and it was higher in patients with ulcer dyspepsia (88.4%) when compared with patients with nonulcer dyspepsia (72.4%).[12] In Ghana, a rate of 74.8% has been reported among patients with dyspeptic symptoms.[13] In United Arab of Emirates (UAE), among asymptomatic healthy people (children and adults), the prevalence of *H. pylori* was 41%.[14] In Riyadh, Saudi Arabia, a recent retrospective descriptive facility-based study revealed a prevalence rate of 34.7% among dyspeptic patients, which is close to our figure.[15] Also, a comparable figure has been reported in a study conducted in Oman (30.1%).[16]

The relatively lower *H. pylori* prevalence observed in the current study and in another Saudi study carried out in Riyadh[15] and even in other Gulf countries,[4,16] when compared with other developing countries may suggest a reduction in the trend of the disease in the region. The variation in the prevalence rates of *H. pylori* between different countries may largely be associated with the socioeconomic status of dyspeptic patients, which might be linked to improved standards of hygiene and widespread antibiotics` use.[9]

Table 2: Association between H. pylori and cancerous and precancerous nonmalignant lesions through histopathological findings among patients

Variable	H. pylori		P
	No *n*=459 *n* (%)	Yes *n*=221 *n* (%)	
Chronic gastritis			
No (*n*=248)	159 (34.6)	89 (40.3)	0.153*
Yes (*n*=432)	300 (65.4)	132 (59.7)	
Active chronic gastritis			
No (*n*=490)	414 (90.2)	76 (34.4)	<0.001*
Yes (*n*=190)	45 (9.8)	145 (65.6)	
Metaplasia			
No (*n*=658)	446 (97.2)	212 (95.9)	0.392*
Yes (*n*=22)	13 (2.8)	9 (4.1)	
Atrophy			
No (*n*=675)	455 (99.1)	220 (99.5)	0.477**
Yes (*n*=5)	4 (0.9)	1 (0.5)	
Gastric cancer/lymphoma			
No (*n*=674)	453 (98.7)	221 (100)	0.094**
Yes (*n*=6)	6 (1.3)	0 (0.0)	

*Chi-square test. **Fischer's exact test

Table 3: Association between H. pylori and endoscopic findings among patients

Variable	H. pylori		P
	No *n*=459 *n* (%)	Yes *n*=221 *n* (%)	
Endoscopy			
Normal (*n*=312)	210 (45.8)	102 (46.2)	0.921
Abnormal (*n*=368)	249 (54.2)	119 (53.8)	
Ulcerative lesion			
No (*n*=667)	450 (98.0)	217 (98.2)	0.578**
Yes (*n*=13)	9 (2.0)	4 (1.8)	
Antral gastritis			
No (*n*=429)	300 (65.4)	129 (58.4)	0.077
Yes (*n*=251)	159 (34.6)	92 (41.6)	
Pan gastritis			
No (*n*=508)	344 (74.9)	164 (74.2)	0.836*
Yes (*n*=172)	115 (25.1)	57 (25.8)	
Duodenitis			
No (*n*=593)	408 (88.9)	185 (83.7)	0.058*
Yes (*n*=87)	51 (11.1)	36 (16.3)	

*Chi-square test. **Fischer's exact test

Moreover, gradual urbanization over years with better access to healthcare facilities could be another explanation for this finding. Previous studies suggested that a low socioeconomic status might be a strong factor that helps in the transmission of *H. pylori*.[17-19]

The present study revealed that active chronic gastritis was more likely to be reported among patients with *H. pylori* compared with their peers. In another Saudi study, 15 majority of patients (81.7%) had gastritis, out of which, 39.9% were *H. pylori* positive. Also, Alwahaibi *et al.* observed a strong association between gastritis and H. *pylori* infection.[20]

The present study reported six cases with gastric cancer/lymphoma and all were negative for *H. pylori*. The same has been observed in Riyadh,[15] where three gastric cancer cases were observed and also all were negative for *H. pylori*. It has been suggested that *H. pylori*-associated gastric cancer depends upon several factors including infectious strain as well as genetic and environmental factors.[21] In addition, early treatment of *H. pylori* might have clinical benefits by reversing the para neoplastic lesion and decreasing the gastric cancer risk.[22]

In the current study, the prevalence rate of *H. pylori* was highest among patients aged between 41 and 60 years (38.7%) and lowest among those aged over 60 years (19.5%). The same has been observed in a similar study carried out in Nigeria.[23] Also, Agah *et al.*[24] and Megraud *et al.*[25] reported that the prevalence of H. *pylori* was highest between the 4th and 5th decades of life. This increased prevalence of infection in older age is attributed to toon-going acquisition throughout adult life.[26]

In accordance with others,[15] no gender difference was observed regarding the prevalence of *H. pylori*. However, other studies reported higher rate among males,[27] and some others reported that females are more likely to develop gastric cancers following *H. pylori* infection.[28]

Primary care physicians in this part of the world are not well-versed in the management of *H. pylori* infection. Primary care physicians' present practices are not significantly impacted by World Gastroenterology Organization (WGO) guidelines or publications about *H. pylori* infection for underdeveloped countries.[29] Government, public, and private academic institutions advise primary care physicians to participate in more teaching programs and ongoing medical education activities.[29]

Limitations

This study had few limitations including conduction of the study in one healthcare facility that could affect the generalizability of findings over the general population. Also, depending on reviewing of medical records to get information is subjected to bias as it depends on the quality and accuracy of information registered in medical records. Despite those two limitations, the study could have clinical benefits in identifying the prevalence of cancerous and precancerous nonmalignant lesions in patients with *H. pylori* in our community.

Conclusion

H. pylori was a common health problem among patients suffering from dyspepsia, however, its prevalence was relatively lower than other rates reported from other developing countries. The prevalence rate of *H. pylori* was highest among patients aged between 41 and 60 years. Active chronic gastritis was more likely to be reported among patients with *H. pylori* compared with their peers. Based on the study findings, we recommend screening of all patients with dyspepsia and active gastritis for *H. pylori* infection and conducted further larger population-based studies to have a clearer image of the situation in our region.

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Conflicts of interest

There are no conflicts of interest.

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