Prevalence of Helicobacter pylori infection among patients with dyspepsia in South-Western Saudi Arabia

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ABSTRACT

Objective: *Helicobacter pylori (H. pylori*) infection is a major cause of various upper gastrointestinal (UGI) disorders. The aim of this study was to determine the prevalence of *H. pylori* among patients with dyspepsia.

Methods: A prospective study was carried out in the Gastroenterology Division, King Fahd Central Hospital, Gizan, Kingdom of Saudi Arabia from January 1995 to December 1998. Four hundred and eighty-eight patients with dyspepsia were consecutively examined using the UGI endoscopy during a 4-year period. Data analyzed included demographic details, clinical indications for the examination, endoscopic findings and results of the histopathologic assessment for *H. pylori*.

Results: Overall, *H. pylori* were detected in 268 (54.9%) of the gastric biopsies from 488 patients (322 males and 166 females, aged 13-90 years). *Helicobacter pylori* infection was present in 140 (60.1%) of 253 patients with chronic gastritis diagnosed by endoscopy and in 49 (62.8%) of 78 patients with duodenal ulcers (DU). The rate in DU patients was significantly higher than the rate (43.6%) in patients with normal endoscopic findings (odds ratio [OR]=2.18, 95% confidence interval [CI] 1.02-4.70; p=0.04]. Of 455 biopsies with histologic gastritis, 268 (OR=58.9%, 95% CI 54.2-63.4) were positive for *H. pylori* and all specimens (n=33) with no histological evidence of gastritis were negative.

Conclusion: The well-described association of *H. pylori* with DU and non-ulcer dyspepsia was confirmed by our study. However, the rate of *H. pylori* in our patients was at the lower end of the range (50-80%), which was previously reported among largely urban populations in Saudi Arabia suggests differences in the prevalence of *H. pylori*-infections between urbanized and rural populations. *Helicobacter pylori* negative peptic ulcer disease remains an important entity that may be associated with the use of non-steroidal anti inflammatory drugs and in our environment, the habitual chewing of qat leaves (*catha edulis*).

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Helicobacter pylori (*H. pylori*) infection has a worldwide distribution and is causally associated with chronic gastritis, peptic ulcer disease, gastric cancer and mucosal associated lymphoid tissue (MALT) lymphoma.[1-5] Its prevalence is low in developed countries and relatively high in developing countries where the infection occurs early in life and is often associated with low socio-economic status.[6-8] Peptic ulcer disease and gastric carcinoma are common in the Kingdom of Saudi Arabia (KSA) and as in many populations, they account for major health care cost and significant economic loss from absenteeism, morbidity and deaths from complications.[9-10]

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Reports, mainly from urban populations indicated a relatively high prevalence of *H. pylori* infection in KSA, in association with *H. pylori*.[11-16] The epidemiological characteristics of the infection in a population, is influenced by environmental factors and differences in prevalence have been found between urban and rural populations.[1,2,6] Some of the factors that contribute to such differences may include household density and source of water supply.[17,18] Furthermore, habitual chewing of qat (catha edulis) leaves that was associated with a high prevalence of *H. pylori* infection in Yemeni patients[17] is a common habit among Gizan population, in whom information regarding *H. pylori* infection is lacking. A study was carried out to determine the prevalence of *H. pylori* infection in an endoscopic population.

Methods. The prospective study was carried out in King Fahd Central Hospital (KFCH), a regional medical center located at Gizan, KSA that provides endoscopy and histopathology facilities for the patient (population of the region) through a referral network system. Although rapid socio-economic development has continued, the region is still a rural area populated by approximately 1 million people who are mainly traders and farmers.

The subjects comprised consecutive patients with dyspepsia who were evaluated by upper gastrointestinal (UGI) endoscopy in the Division of Gastroenterology of KFCH, from January 1995 to December 1998 (4-years). Patients with active UGI bleeding, bleeding varices and patients for elective sclerotherapy were excluded from the analysis. Upper gastrointestinal endoscopy was performed with a Pentax or Fujinon video-endoscopy system as previously described.[19] Using sterile biopsy forceps, 2-3 biopsies were taken each from the gastric antrum and corpus for the detection of *H. pylori* in addition to the biopsies from specific lesions that were found. The endoscope was sterilized between consecutive patients in 2% glutaraldehyde as directed by the manufacturers. Biopsies were fixed in 10% buffered formalin overnight, embedded in paraffin wax, serially sectioned and stained with routine hematoxylin and eosin, alcian blue and Giemsa stains for the detection of *H. pylori*. Standard criteria were used for the histopathological evaluation of the biopsies.[20] *Helicobacter pylori* organisms were identified by the characteristic curved morphology located on the mucus layer or within the gastric pits.

Statistical analysis. Data were expressed as mean ± standard deviation. Groups of continuous data were compared by the student t-test. Categorical data were stated as proportions in percentages with respective 95% confidence intervals (95% CI) and compared using the x^2 or Fisher's exact test as appropriate. The Statistical Package for Social Sciences (SPSS Inc version 11; Chicago, Illinois, USA) was used in the statistical analysis.

Results. *Helicobacter pylori* were identified in 268 (54.9%) of gastric biopsies obtained from 488 patients (322 males and 166 females, aged 13-90 years). As summarized in **Table 1**, gastritis, occurring in 253 patients (51.8% of 488) was the most frequent endoscopic diagnosis and was associated with *H. pylori* in 140 patients (60.1% of 253). *Helicobacter pylori* was detected in 49 (62.8%) of 78 patients with DU, a rate that was significantly higher than the rate (43.6%) in patients with no abnormal endoscopic findings (OR=2.18, 95% CI; 1.02-4.70; p=0.04). However, no statistically significant difference was observed by comparing the frequencies of *H. pylori* in patients with different endoscopic diagnoses (gastric ulcer, gastritis and duodenitis) (**Table 1**) or according to gender (**Table 2**). Irrespective of the endoscopic diagnosis, histological gastritis was found in 455 of 488 biopsies, of which 268 (58.9 %, 95% CI 54.2-63.4) were positive for *H. pylori*. In contrast, the organism was not detected in any of 33 specimens with no histological evidence of gastritis (**Table 3**).

Discussion. The histological identification of *H. pylori* in 54.9% of patients in this study is comparable with the rates in earlier reports of 53% and 61.6% from Riyadh[21] but lower compared with other regions such as Jeddah (85%)[16] and Dammam (87%).[14] The wide variation in the prevalence of infection in different areas of KSA may be attributable to the differences in the methods of identification in part, and the demographic characteristics of patient-populations in different surveys. Our findings supported the suggestions that dyspeptic symptoms are idiopathic and in most instances, associated with negative tests for *H. pylori* infection.[22] Recently, it has become apparent that the incidence of the infection in individuals with and without peptic ulcer disease has been declining in many populations, likely due to its wide spread use of antibiotics.[23] It is possible although speculative, that a similar change in the epidemiologic pattern might be occurring in the Saudi population.

It has been suggested that *H. pylori*-negative peptic ulcer was rare.[1] Some reports from Japan[24] and Asir region of KSA[25] indicated that the organism may be responsible for DU in 96% of cases. On the other hand, our result, by which only 60% of the cases of chronic DU were associated with *H. pylori* infection was in agreement with

Table 1 - Frequency of *Helicobacter pylori (H. pylori*) and mean±SD age of patients with dyspepsia.

Endoscopic diagnosis	N of patients	*H. pylori* n	(%)	Age of patients Mean ± SD	Range
Normal	55	24	(43.6)	38.1 ± 16.7	27 - 86
Ulcer disease					
Duodenal	78	49	(62.8)	44.1 ± 20.8	13 - 90
Gastric	28	15	(53.6)	42.3 ±18.0	21 - 70
Non-ulcer lesions					
Gastritis	253	140	(55.3)	44.6 ± 16.1	14 - 95
Duodenitis	18	11	(61.1)	44.9 ± 11.5	20 - 80
Esophagitis	22	12	(54.5)	49.8 ± 11.5	32 - 70
Neoplastic lesions					
Gastric cancer	15	6	(40)	59.3 ± 12.6	46 - 83
Gastric lymphoma	3	2	(66.7)	-	25 - 60
Esophageal cancer	1	1		89	-
Miscellaneous					
Hypertensive gastropathy*	14	7	(50)	42.6 ± 16.1	30 - 72
Barrett's esophagus	1	1		-	-
Total	**488**	**268**	**(54.9)**		

Table 2 - Gender-related frequency of *Helicobacter pylori (H. pylori*) in patients with dyspepsia.

Endoscopic diagnosis	Males			Females		
	N of positive patients	Tested for *H.pylori* n	(%)	N of positive patients	Tested for *H.pylori* n	(%)
Normal	18	43	(41.8)	6	12	(50)
Ulcer disease						
Duodenal	42	65	(64.6)	7	13	(53.8)
Gastric	10	18	(55.5)	5	10	(50)
Non-ulcer lesions						
Gastritis	81	149	(54.3)	59	104	(56.7)
Duodenitis	7	12	(58.3)	4	4	(66.7)
Esophagitis	7	13	(53.8)	5	9	(55.6)
Neoplastic lesions						
Gastric cancer	4	9	(44.4)	2	6	(33.3)
Gastric lymphoma	1	2	(50)	1	1	
Esophageal cancer	1	1	-	-	-	
Miscellaneous						
Hypertensive gastropathy*	5	9	(55.6)	5	2	(33.3)
Barrett's esophagus	1	1	-	-	-	
Total	**177**	**322**	**(55)**	**91**	**166**	**(54.8)**

lower infection rate (70%) by an earlier report in KSA.[14] Peterson et al[26] and Lanza et al[27] found infection rates of 74% (136 of 185 cases) and 70% (129 of 183 cases) among American patients with DU, suggesting that the prevalence rates of the infection in patients with DU are often lower than the commonly quoted levels of 90%.[1,8,24] It is evident that ulcers may be associated with non-*H. pylori* related factors and clearly, not all who are infected developed-peptic disorders. The clinical outcomes of infection are determined by host susceptibility, bacterial virulence and environmental factors.[28] For example, the cytotoxin-associated gene (CAG) bearing strains of *H. pylori* have been linked with significant gastroduodenal pathology.[28]

Helicobacter pylori infection commonly associated with gastric ulcer, was relatively low, occurring in only 53.6% and was in agreement with a low prevalence reported among US patients.[8] The explanation for the low prevalence is unclear but as speculated by some authors, the frequent use of occult or overt use of non-steroidal anti inflammatory drugs (NSAID) might have accounted for a proportion of our cases.[8,9] The history of NSAID used was found in approximately 15% of patients referred to our unit for UGI endoscopy (unpublished data). Nevertheless, the findings indicate that only 50% cases of GU in Saudi patients are due to *H. pylori.* Also, the frequency of its detection (40%) was surprisingly low in our patients with gastric carcinoma (n=21) and was not higher than in those with no lesions. Fallone et al[8] found a similar low rate (44%) among Canadian patients with gastric cancer and suggested that the prevalence of the organism may be underestimated by the difficulty of its detection in the atrophic mucosa that is highly frequent in these patients.

The detection rate of *H. pylori* in patients with gastritis (55%) by endoscopy or by histology (59%) was comparable to the rate (67%) that were reported from other areas of KSA.[11] Our findings did not support the suggestion that histologic evidence of gastritis is rare in *H. pylori*-negative patients. Conversely, we found no *H. pylori* in the histologically-normal mucosa, although 2 earlier studies from KSA detected the organisms in 9% and 13% in normal mucosa by culture.[14,16] The detection rate of *H. pylori* (43.6%) in our patients with endoscopically-normal mucosa was within the range (21-76%) reported in KSA and elsewhere.[8,11,14-16,28] The role of *H. pylori* infection in causing dyspepsia among patients with normal endoscopy is unknown, but its prevalence in these patients is often higher than in patients without dyspeptic symptoms.[22,23,29,30] Our study and earlier reports from urban populations provide evidence for a significant association of *H. pylori* and "acid-peptic" diseases among Saudi Arabian patients with dyspepsia. However, a wide variation

Table 3 - Frequency of *Helicobacter pylori (H. pylori*) in patients with histologically-proven gastritis.

Endoscopic diagnosis	**Histology**				
	Normal		**Gastritis**		
	N of patients	**Positive**	**N of patients**	**Positive n**	**(%)**
Normal	9	0	46	24	(52.7)
Ulcer disease					
Duodenal	0	0	78	49	(62.8)
Gastric	0	0	28	15	(53.6)
Non-ulcer lesions					
Gastritis	20	0	233	140	(60.1)
Duodenitis	0	0	18	11	(61.1)
Esophagitis	2	0	20	12	(60)
Neoplastic lesions					
Gastric cancer	0	0	15	6	(49)
Gastric lymphoma	0	0	3	2	(67.7)
Esophageal cancer	0	0	1	1	
Miscellaneous					
Hypertensive gastropathy*	2	0	12	7	(58.3)
Barrett's esophagus	0	0	1	1	
Total	**33**	**0**	**455**	**268**	**(58.9)**

(50-80%) in the prevalence is notable and may be due to different methods for *H. pylori* identification, as well as the possible under-estimation of prevalence that may occur in retrospective analyses. Although large studies have shown that none of the tests of *H. pylori* currently available has sufficient accuracy to be used alone. The histological detection has a sensitivity of 93% compared to urease test (87%), urea breath test (90%) and immunoglobulin G serology (91%). Serology is not recommended for clinical assessment of *H. pylori* infection.[31] Therefore, histological diagnosis has been used commonly as the "gold standard" in many studies.[8,29,30] This method is particularly suitable in the Gizan patient-population, where a proportion of patients were treated usually, with histamine-2-receptor antagonists (H_2RA) or proton pump inhibitors and antibiotics prior to the referral for UGI endoscopy. Cultures for the organism may be falsely negative under such circumstances. The sites of biopsy, the number of specimens and the accuracy of histological techniques may influence the detection rates of *H. pylori*. In the present study, adequate biopsies were taken, processed carefully and assessed by experienced pathologists. However, it is likely that the application of multiple tests (urease test or culture) may provide a more accurate diagnosis of infection and might have increased the rate of infection in our patients. Results of cultures in some of our patients were not included in this analysis.

Despite these limitations, some conclusions are pertinent. First, *H. pylori* infection has only a modest prevalence among dyspeptic patients in the largely rural population of the Gizan region. Second, only 60% of ulcer diseases were associated with the infection, speculatively indicating the contributory role of other factors such as NSAID in some patients. Third, the organisms frequently colonized the mucosa of the majority of patients with non-ulcer dyspepsia, especially in those with histologic gastritis.

The implication of these findings in relation to therapy of ulcer disease and non-ulcer dyspepsia lies in the fact that about one third of our patients may have non-*H. pylori* related causes (for example, habitual chewing of qat leaves) for the dyspepsia. Therefore, careful clinical history and UGI endoscopy will continue to play a major role in the evaluation of dyspepsia. The 'test and treat' approach (urease testing and treatment if positive) that has been advocated by some authors may probably, not be applicable in our population.[22]

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