

1 **DOI: <https://doi.org/10.47391/JPMA.01-082>**

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3 **Helicobacter Pylori infection among dyspepsia patients in suburbs of**
4 **Riyadh, Saudi Arabia**

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15
16 **Abstract**

17 **Objective:** The objective of the study was to determine the current prevalence
18 of Helicobacter pylori infection among Dyspepsia patients and correlate this
19 with Endoscopic findings.

20 **Methodology:** A retrospective, descriptive facility-based study conducted from
21 June to December 2017 to estimate the prevalence of Helicobacter pylori among
22 dyspepsia patients from Majmaah, Sudair, Zulfi and Shaqra areas of Riyadh
23 region, Saudi Arabia. Four years data from January 2012 to December 2016
24 were reviewed by a checklist and analyzed by SPSS.

25 **Results:** Out of 1398 dyspepsia patients, 485 (34.7%) were positive, and 913
26 (65.3%) were negative for H-Pylori infection. Majority of patients (81.7%) had
27 gastritis, out of which, 39.9% of gastritis patients were H-pylori positive. The
28 frequency of H-pylori infection was significantly higher among patients with

29 gastritis ($p < 0.001$). There was no statistically significant difference in the
30 frequency of H-pylori infection among patients with erosion, ulcer, polyp and
31 cancer ($p > 0.05$).

32 **Conclusion:** The prevalence of H.Pylori was low as compared to other
33 governorates in the kingdom and regional countries. Gastritis was dominating
34 finding on upper gastrointestinal (GI) endoscopy.

35 **Keywords:** Helicobacter pylori, Prevalence, Dyspepsia, Riyadh region
36

37 **Introduction**

38 Helicobacter pylori (*H.pylori*) is rapidly declining in developed countries.¹ The
39 prevalence of infection remained high (>50%) in significant part of the world.
40 *H. pylori* expand the risk of developing other serious diseases, starting from
41 peptic ulcer disease, non-cardiac gastric cancer, to B-cell non-Hodgkin's
42 lymphoma.² The cost of care to this related disease could be substantially
43 higher, therefore, early eradication by using appropriate antibiotics is
44 recommended. Infection is usually acquired in childhood; although the exact
45 route is uncertain, once acquired, the infection persists for life unless treated.
46 Lower socioeconomic status, utilization of outlet food, meat, non-processed
47 drinking water, and smoking are the influential causes for *H. pylori*.³
48 The overall prevalence of *H. pylori* infection, irrespective of time and age
49 group, ranged from 30.6% to 82% in neighboring countries of the region
50 showing variable results with declining trends in economic stable nations .⁴ The
51 infection is quite common with 54-62% of gastric biopsies being positive in
52 different areas of Saudi Arabia. The most frequent endoscopic diagnosis was
53 gastritis associated with H. pylori in majority of patients.⁵ Children have high
54 prevalence in cities of Jeddah and Riyadh.⁶ There was a significant relation
55 between H. pylori infection and chronic recurrent abdominal pain.⁷

56 The prevalence of *H.pylori* is on the decline because of better hygiene,
57 sanitation, clean water source, improved housing and educational level in
58 numerous parts of developed nations. However, such a reduction has not been
59 noticed for in most developing countries.⁸ There is a rapid change in the living
60 standards in Saudi Arabia and have resulted in a noticeable decrease in *H. pylori*
61 transmission as reflected in different studies.⁹

62 Upper gastrointestinal endoscopy is the investigation in patients with
63 longstanding dyspepsia.¹⁰ *H. pylori* eradication has been one of the primary
64 therapeutic strategies to reduce gastric cancer. The success of a gastric cancer
65 prevention strategy depends on timing because the treatment must be introduced
66 before the progression of gastric carcinogenesis.¹¹ To the best of our knowledge,
67 no study available in this region, our research will help in answering the current
68 prevalence, which is required for the early eradication of this infection and
69 improved medical care. Therefore, the objective of this study is to estimate the
70 current burden of *Helicobacter pylori* infection among dyspepsia patients and to
71 correlate the *H.pylori* infection with endoscopic findings.

72

73 **Research methodology**

74 This is a retrospective, descriptive facility-based study conducted from June to
75 December 2017; we reviewed the records for four years from January 2012 to
76 December 2016 in King Khalid hospital, Almajmaah that is a referral hospital in
77 the region. The ethical review committee of Majmaah University approved the
78 study (MUREC-May22/COM-2017/7), permission was also obtained from King
79 Khalid hospital administration.

80 The study sample size was calculated at 95% level of confidence, assuming
81 50% prevalence of *H.Pylori* infection and 5% level of significance. A design
82 effect of 2 was applied to expand the sample size with a purpose to capture
83 variation in the various regions included in the study. The sample size was

84 further inflated to 16% to adjust for the incomplete medical records; hence a
85 final sample size of 1398 was obtained. Sudair, Majmaah, Zulfi and Shaqra
86 regions referrals from primary health care center with long-standing symptoms
87 of dyspepsia in outpatient clinics to this hospital. The diagnosis for *H-Pylori*
88 was made by having an upper gastrointestinal endoscopy. An expert reported
89 distinctive endoscopic features, based on the Sydney System and Biopsy
90 specimens were collected from each patient at the three different sites for
91 histopathology and *H. Pylori* detection.

92 Total enumeration of dyspepsia patient's records was included in the study. A
93 pre-tested checklist was used to collect data. The list contained diagnosis and
94 demographic data (age, sex, and other demographic details). The data were
95 analyzed using the SPSS-23 software. Descriptive statistics, including
96 frequency distribution and percentages, were calculated. The chi-square test was
97 applied to determine significant differences in the frequency of H-pylori
98 infection in relation to patients' gender, nationality and endoscopic findings. P-
99 value of less than 0.05 was considered statistically significant.

100

101 **Results**

102 The total number of study participants was 1398, out of which 712 (51.1%) were
103 males. The age of study participants was ranged from 11 to 95 years. Among
104 1398 study participants, 34.69% (n=485) were positive for H-Pylori infection.
105 Majority of all the dyspepsia patients records, 67.3% (n=941) were contributed
106 from Zulfi region. Almost half of all the study participants, 49.2% (n=690) were
107 between 20 to 39 years of age. Majority of the study participants (n=1199)
108 (85.7%) were Saudi nationals. (Table 1).

109 There was no statistically significant difference in the frequency of H-Pylori
110 infection on the basis of gender and nationality ($p > 0.05$) as shown in Table 2.

111 Table-3 shows frequency of various gastrointestinal problems among the study
112 participants, diagnosed/ identified on endoscopy. Majority of the patients

113 (81.8%) had gastritis, 7.7% of them were having erosion, while only 1.5% of
114 these patients had ulcers and less than 1% had polyp and cancer.

115 Table 4 shows the association between endoscopic findings and H-pylori
116 infection. Majority of the patients (81.74%) had gastritis. The frequency of H-
117 pylori infection was significantly higher among patients with gastritis ($p <$
118 0.001). Conversely, 39.9% of gastritis patients were H-pylori positive. On the
119 other hand, there was no significant difference in frequency of H-pylori
120 infection among patients who had erosion, ulcer, polyp and cancer as compared
121 to who didn't have such findings on endoscopy ($p > 0.05$).

122

123 **Discussion**

124 There are many reasons for recurrent upper abdominal discomfort and pain
125 including peptic ulcer disease, gastroesophageal reflux disease,
126 malignancy, pancreatic or biliary diseases. Still, there are patients who have no
127 definite structural or biochemical explanation for their symptoms, however,
128 most commonly *H-pylori* infection has been implicated.¹³ This study showed
129 34.7% of dyspepsia patients were having *H-pylori* infection; these patients had
130 longstanding non-responding dyspepsia on conventional treatment. The
131 prevalence is higher from a regional study in Oman that estimated prevalence of
132 30.1%, although age group was almost similar to our study.¹⁴ Although our study
133 showed less prevalence than what has been reported in recent past in other
134 regions of Saudi Arabia¹⁵, nonetheless, similar to one recent study conducted in
135 Riyadh.¹⁶ This study finding might be attributed to better living standards and
136 good hygienic condition in this region and as a result reduction in
137 the infection prevalence. Nevertheless, our study didn't explore and compared
138 the burden of H.Pylori infection in relation to differences in environmental
139 hygiene. There is great extent of infection in underdeveloped countries than

140 industrialized nations 80-90% vs. 25% respectively, the most likely because of
141 poor sanitation and substandard of hygiene.¹⁷

142 This study found no significant difference in the frequency of H.Pylori infection
143 on the basis of gender and nationality ($p>0.05$). However, epidemiological
144 studies conducted among the general populations have shown a male
145 preponderance in infection rate by H pylori, although there are controversial,
146 reports representing comparable rates.¹⁸ Moreover, to the best of authors'
147 knowledge, no studies have reported a female predominance. However, females
148 are more vulnerable to develop gastric cancers after getting H pylori infection.¹⁹
149 Gastritis was most frequent finding on endoscopy. Our study reported that
150 39.9% of gastritis patients were H-pylori positive. This finding is similar to
151 many developed countries like Japan and Italy but much higher than UK and
152 USA, recently reported in a study that suggested the possible association
153 between gastritis and H-pylori infection ($p < 0.001$).²⁰ Acute gastritis results
154 histologically in neutrophilic gastritis, with the passage of time, a gradual
155 infiltration by different inflammatory cells, predominantly lymphocytes and this
156 in association with transient hypochlorhydria lead to serious complication
157 including malignancy.²¹ Literature has shown improvement in gastritis and even
158 reversal following eradication of the infection.²²

159 Patients with erosion and ulcers with positive H.pylori are less in our study, and
160 we did not find a statistically significant difference in frequency of H.Pylori
161 among those with positive endoscopic findings versus patients with negative
162 endoscopic findings ($p>0.05$). The result is similar to a recently published study,
163 where they did not find any statistically significant association between H.pylori
164 and erosion.²³ The finding might be explained by the previous adequate
165 treatment of *H. pylori*, the prevalence of this infection is changing, and the
166 proportion of ulcers that are not associated with *H. pylori* infection seems to be
167 increasing. One of the reasons may be increased use of non-steroidal anti-

168 inflammatory drugs (NSAIDs) in the general population.²⁴ However, our study
169 didn't collect information regarding use of NSAIDs.

170 Our study reported only three cases with gastric cancer and those were H pylori
171 negative. Development of gastric cancer related to H pylori is multifactorial and
172 depend upon infectious strain, genetic and environmental factors.²⁵ Literature
173 supported that early H pylori treatment might provide strong clinical benefit by
174 reversing the paraneoplastic lesion and even reduce the risk of gastric cancer in
175 certain group of patients.²⁶

176 **Clinical Implication**

177 Despite of low prevalence compared to another part of the region locally and
178 nearby regional countries,^{5, 27} still there is a need for early detection and
179 eradication for *H.pylori* infection from the community. This could improve
180 clinical outcome and prevent patients from severe complications like gastric
181 cancer.

182

183 **Limitations**

184 The present study had some limitations. We reviewed patients from four major
185 cities of suburbs in Riyadh region, the detailed description of their symptoms
186 and whether they received H-pylori eradication regimen is mostly not well
187 written. Therefore, our results on the estimated levels of infection prevalence
188 might not be applied to the general population.

189

190 **Conclusion**

191 The *H.pylori* was common among patients suffering from long-standing
192 dyspepsia. However, the prevalence was low as compared to other governorates
193 in the kingdom and regional countries. Frequency of gastritis was significantly
194 high among H.Pylori infected patients (p-value <0.05). This finding highlighted
195 the importance of H. Pylori screening among patients with dyspepsia and
196 gastritis in Saudi region.

197 **Disclaimer:** None to declare.

198 **Conflict of Interest:** None to declare.

199 **Funding Sources:** None to declare.

200

201 **References**

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278 **Table 1: Socio-demographic characteristics of the participants (n=1398)**

<i>Socio-demographic Data</i>		<i>Frequency</i>	<i>%</i>
Age	0-19 years	141	10
	20 – 39 years	690	49.3
	40-59 years	413	29.5
	> 59	154	11

Nationality	Saudi	1199	85.7
	non-Saudi	199	14.2
Gender	Male	715	51.1
	Female	683	48.9

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Table-2: Comparison of H-pylori infection burden on the basis of gender and Nationality (n=1398)			
Gender	Positive n (%)	Negative n (%)	p-value
Male	249 (34.8)	466 (65.2)	>0.05
Female	236 (34.6)	447 (65.4)	
Nationality			
Saudi	420 (35.1)	779 (64.9)	>0.05
Non-Saudi	65 (32.7)	134 (67.3)	

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Table-3: Frequency of various gastrointestinal problems among study participants diagnosed/ identified on Endoscopy (n=1398)		
<i>Endoscopic findings</i>		<i>Frequency(%)</i>
Gastritis	Absent	255 (18.3)
	Present	1143 (81.7)
Erosion	Absent	1291 (92.3)
	Present	107 (7.7)
Ulcer	Absent	1377 (98.5)
	Present	21 (1.5)
Cancer	Absent	1395(99.8)
	Present	03(0.2)
Polyp	Absent	1389(99.4)
	Present	09(0.6)

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Table-4: Association between endoscopic findings and H-pylori infection (n=1398)			
Endoscopic finding	H-pylori Infection		
	Positive	Negative	p-value
Gastritis			
Present	457 (40.0)	686 (60.0)	0.00
Absent	28(11.0)	227(89.0)	
Erosion			
Present	29 (27.1)	78(72.9)	0.06
Absent	456(35.3)	835(64.7)	
Ulcer			
Present	06 (28.5)	15(71.5)	0.72
Absent	479 (34.8)	898(65.2)	

Cancer			
Present	00(0.0)	03(100.0)	0.89
Absent	485(34.7)	910 (65.3)	
Polyp			
Present	01(11.1)	08 (88.8)	0.09
Absent	484(34.8)	905(65.2)	

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Provisionally Accepted for Publication