

## AN AGE- AND GENDER-SPECIFIC ANALYSIS OF *H. PYLORI* INFECTION

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The objective of this study was to determine the incidence of *Helicobacter pylori* infection in different age and sex groups from the southern region of Saudi Arabia, and to relate the results to the high incidence of gastric cancer in this region. The carcinogenic effect of *H. pylori* is considered to be age-dependent. *H. pylori* infection early in life predisposes patients to gastric cancer. In contrast, acquisition of infection later in life leads to development of duodenal ulcer. We studied 528 consecutive endoscopic biopsies over a period from March 1995 to August 1996. The presence or absence of *H. pylori* was tabulated according to age and sex of the patients. Three hundred and fifty-three (67%) of 528 patients were positive for *H. pylori*. There were 313 males, among whom 217 (69%) were positive. There were 215 females, among whom 136 (63%) were positive for *H. pylori*. The presence of *H. pylori* in various age groups was as follows: under 16 years, 62%; 16 to 25 years, 67%; 26-35 years, 69%; 36-45 years, 67%; 46-55 years, 66%; and 56 years and above, 65%. Statistical analysis revealed no significant difference between the groups. No significant rise in the infection rate was noted from childhood to advanced age. These data support the belief that *H. pylori* infection was acquired early in life, leading to multifocal gastritis and thus predisposing the patients to gastric cancer later in life. However, *H. pylori* may not be the single agent of gastric cancer inasmuch as the infection affects both genders equally, whereas gastric cancer has a male preference. Perhaps some additional factors augment the pivotal role of *H. pylori*. *Ann Saudi Med* 1998;18(1):6-8.

Epidemiological studies have shown that areas with high gastric cancer rates often have a correspondingly high prevalence of *Helicobacter pylori*.<sup>1</sup> The bacteria produce urease, which causes tissue damage.<sup>2</sup> Once acquired, the *H. pylori* infection persists for life if not treated and is responsible for major morbidity and mortality throughout the world. The incidence rate of *H. pylori* infection in chronic gastritis from various regions of Saudi Arabia ranges from 50% to 96%.<sup>3-5</sup> Men and women are equally affected by the infection. Six commonly used tests to detect *H. pylori* are the histological examination, microbial culture, poly-merase chain reaction, rapid urease test, serology (ELISA) and 13C-urea breath test.<sup>6</sup> The histopathologic detection is still considered to be the gold standard for the diagnosis of *H. pylori*.<sup>7</sup> Use of more than one diagnostic method improves *H. pylori* detection rate.<sup>8</sup>

Previous studies have shown that stomach cancer ranks sixth in all malignancies in the southern region of Saudi Arabia<sup>9</sup> and stands second among gastrointestinal malignancies.<sup>10</sup> A similar incidence of gastric cancer was reported from Dhahran,<sup>11</sup> and a slightly lower incidence from Riyadh.<sup>12,13</sup> The International Agency for Research

on Cancer has classified *H. pylori* as a group 1 carcinogen, a definite cause of gastric adenocarcinoma in humans. The development of cancer depends upon the time when the infection is acquired, either earlier in life or later.<sup>14</sup> *H. pylori* acquired early in life frequently progresses to multifocal atrophic gastritis that is associated with hypochlorhydria, predisposing the patient to gastric cancer. In contrast, if the infection is acquired later in life, acid-secreting capacity is maintained in the face of mucosal damage caused by *H. pylori*, and duodenal ulcer results.

In this study we have analyzed the age-specific and gender-specific incidence of *H. pylori* in order to see whether the incidence of *H. pylori* varies in different age groups.

### Material and Methods

From March 1995 to August 1996, the surgical pathology laboratory of Asir Central Hospital received 528 endoscopic biopsies for documentation of *H. pylori*. These patients were referred to gastroenterologists for upper abdominal pain, dyspepsia, or previous history of peptic ulcer disease. Two endoscopic specimens were taken from the gastric antrum of each patient. All the endoscopic biopsies were fixed in 10% formalin and were routinely stained with hematoxylin and eosin. When the organism could not be identified by the routine stains, additional specific stains were performed, such as Giemsa or

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modified Wright's (Diff-Quik<sup>®</sup>) stains. The histopathology reports of the specimens were reviewed and cases of gastric malignancy were excluded. The results were tabulated according to the age and gender of the patients and presence or absence of *H. pylori*. The results were statistically analyzed by the chi-squared method.

### Results

Of 528 cases, 353 patients were positive, giving an overall incidence of *H. pylori* infection of 67%. There were 313 males and 215 females. The infection rate in males was 69% and in females 63%. However, no significant statistical difference was noted in the two genders. The percentage frequencies in various age groups were as follows: below 16 years, 62%; 16 to 25 years, 67%; 26-35 years, 69%; 36-45 years, 67%; 46-55 years, 66%; and above 56 years, 65% (Table 1). Statistical analysis revealed no significant difference between the groups, and no significant rise in the incidence was noted from childhood to advanced age.

### Discussion

Understanding the ages at which people acquire *H. pylori* infection is critical. The mode of transmission of *H. pylori* remains poorly understood; no single transmission pathway has been identified.<sup>15</sup> In areas of low incidence of gastric cancer, an estimated 0.5% of susceptible population becomes infected each year and the incidence continues to rise with advancing age.<sup>16</sup> However, in those regions where gastric cancer is common, the infection acquisition starts early in life<sup>17</sup> and progresses at a much faster rate, between 3% and 10% per year. With this faster speed, the majority of the population will be infected by *H. pylori* early in life. Our study demonstrated that the incidence of *H. pylori* infection is virtually the same in different age groups. The gastritis due to *H. pylori* in children may progress to multifocal atrophic gastritis, thus predisposing the patients to gastric cancer.<sup>14</sup>

In our present study, 10 of 16 (62%) children in an age range of 3 to 15 years were positive for *H. pylori*. In one study from Canada, where the incidence of gastric cancer is low, Yoshida et al.<sup>18</sup> found four of nine children with acid-pepsin disease (44%) positive for *H. pylori*. From the United States, Gremse and Sacks<sup>19</sup> reported positivity of *H. pylori* in 23 of 74 children (31%) who presented with gastritis. However, from South America, Goodman et al.<sup>20</sup> determined a 69% prevalence of *H. pylori* by 13C-urea breath test in Colombian children.

If *H. pylori* plays a role in gastric carcinogenesis, we cannot explain why gastric cancer has a male predilection, whereas *H. pylori* shows no gender preference. We therefore cannot consider *H. pylori* to be the sole agent of

TABLE 1. *H. pylori* (HP)-positive patients according to age.

	Male	Female	Total
Age range (years)	HP-positive/total	HP-positive/total	HP-positive/total
<16	4/8 (50%)	6/8 (75%)	10/16 (62%)
16-25	28/41 (68%)	25/38 (66%)	53/79 (67%)
26-35	61/86 (71%)	41/62 (66%)	102/148 (69%)
36-45	52/72 (72%)	28/47 (60%)	80/119 (67%)
46-55	32/45 (71%)	10/19 (52%)	42/64 (66%)
>56	40/61 (66%)	26/41 (63%)	66/102 (65%)
Total	217/313 (69%)	136/215 (63%)	353/528 (67%)

$\chi^2$  was not statistically significant.

gastric cancer. The most likely scenario is that gastric cancer may be the result of a sequence of changes, some of which may have been initiated by *H. pylori*. Therefore, *H. pylori* could be considered as a co-factor in gastric carcinogenesis in a population exposed to other unknown carcinogenic factors. In conclusion, our study from the southern region of Saudi Arabia shows that *H. pylori* infection is acquired early in life, and there is no rise in the incidence with advancing age. The infection, in conjunction with other unknown factors, may be responsible for the high incidence of gastric cancer reported from this region.

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