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Helicobacter pylori Infection in the general population: A Middle Eastern perspective

Abstract

Helicobacter pylori (*H.pylori*) infection is probably the most important factor that has been associated with the development of gastric cancers in human populations. However, there are no reliable data on the prevalence of this infection in the Middle East. In this article, based on a comprehensive literature review, we aimed to evaluate the situation in this region. The literature has been searched for the incidence and prevalence of *H.pylori* infection by Pubmed and Google Scholar. Search was repeated for each of the Middle Eastern countries, and to empower the method, citations of each found article were searched for the related studies. Seventy seven reports from the countries of the Middle East region had been reviewed and they all indicated a high rate of infection either in the general population or in the dyspeptic patients, the rate seemed to be higher in patients with dyspepsia, in patients with histologically confirmed gastritis and in patients of older age groups.

Keywords: Hpylori, Gastric cancer, Middle eastern

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H.*pylori* infection is probably the most important factor that has been associated with the development of gastric cancers in human populations. Since its isolation in 1982, evidence for its substantial casual role in the pathogenesis of gastric cancer has substantially increased. *H.pylori* is a gram-negative bacillus that colonizes the stomach and is probably the most common chronic bacterial infection worldwide (1). Evidence suggests that communities with a high prevalence of stomach cancer commonly have a high rate of infection with *H.pylori* infection and it has been suggested that the observed decrease in the incidence of gastric cancer parallels the decreasing rate of the prevalence of *H.pylori* infection, especially in the developed countries (2, 3). Nevertheless, controversial reports, especially from African countries where despite the high rate of *H.pylori* infection, gastric cancer has a very low prevalence, making it hard to conclude on the significant role of *H.pylori* infection on the incidence and prognosis of gastric cancers (4). On the other hand, in the largest study with the most powerful methodology on the subject, a prospective cohort of 1526 Japanese patients with non cancerous gastric and duodenal pathologies was conducted by Uemura et al. which demonstrated that patients who were positive for *H.pylori* infection in the study initiation was significantly more likely to develop gastric cancers (mean follow up of 7.8 years) (5). The Middle East is an intermediate prevalent region regarding stomach cancers, but the rate of *H.pylori* infection in this region is high (6). Nevertheless, several risk factors associated with this infection have been identified as predictors of gastric cancers in this region (7). There are several studies investigating *H.pylori* infection and its surrounding issues by Iranian or Middle Eastern researchers (8-11). Unfortunately, in the current literature, there is not a comprehensive literature review representing our evidence-based knowledge on the prevalence of *H.pylori* infection and its potential associations with dyspeptic symptoms in Iran and in the Middle Eastern countries. In this literature review, we aimed to evaluate the situation of Iran and the Middle Eastern countries regarding *H.pylori*- related gastric diseases.

Figure 1 summarizes the data of *H.pylori* seropositivity in the general population of the Middle Eastern countries.

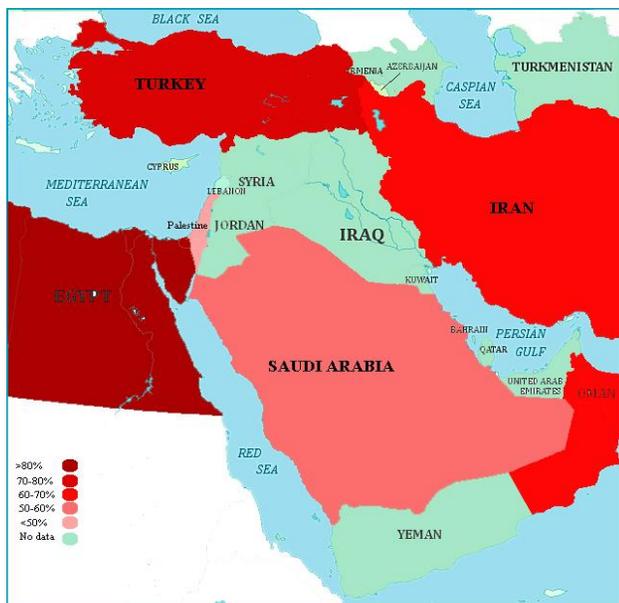


Figure 1. Epidemiology of *H.pylori* seropositivity in the Middle East

Iran

General population: The *H.pylori* infection rate is very high in the Iranian general population (12, 13). In population-based study performed through 2001 – 2002 on 1011 people in Ardabil, where the incidence of gastric cancers hits a peak among all Iranian provinces, about 90% of adults aged 40 or older were reported to be infected diagnosed with histopathology and rapid urease test (14, 15). In a large population-based study of serology of 2326 people in Tehran, the overall reported infection rate was 69% which was directly correlated with age (16). In Babol, near the Caspian Sea, *H.pylori* infection rate detected by urease breath test was reportedly 78% and 82% for men and women, respectively (17). In Rasht, another major city near the Caspian Sea, the prevalence of *H.pylori* infection was 83.6% (18). In Rafsanjan located in South East Iran, the prevalence of serologically positive subjects in 200 adults was 72% in men and 62% in women (19). In Nahavand in Western Iran, 71% were serologically positive (20). In a study of 1028 individuals randomly selected from Golestan Province, northern Iran, an overall prevalence rate of 66.8% seropositivity for *H.pylori* infection has been reported with an increasing trend in different age groups: 30.6% in <5,

58.5% in 5-14, 72.9% in 15-24, 69.9% in 25-34, 66% in 35-44, 67.3% in 45-54, 75.4% in 55-64, and 71.7% in >65 years old (21).

In symptomatic patients: In 303 Iranian patients attending the Endoscopy unit of Taleghani Hospital, in Tehran for dyspeptic symptoms, Shokrzadeh et al. reported a total prevalence of 86.8% *H.pylori* infection. A very unexpected observation in this study was that the infection rate was higher in the symptomatic patients of younger age, in a way that the highest infection rate was in patients younger than 30 years (22). It may suggest that symptomatic dyspepsia is more frequently induced by *H.pylori* infection in the younger ages. Another study in Southern Iran on 1000 Iranian patients with dyspepsia demonstrated that 67.1% were *H.pylori*-infected, patients with peptic ulcer disease were significantly more likely to be *H.pylori*-positive than – negative (23). A study from Tabriz, Northwestern Iran investigated the prevalence of *H.pylori* infection in 90 patients with hereditary bleeding disorders using stool antigen test and serology. Thirty patients had a history of upper gastrointestinal bleeding (group A) and 60 patients (group B) did not. *H.pylori* infection rates were 23 (77%) of patients in group A versus 31 (52%) in group B, respectively serologically and 23 (77%) vs. 33 (50%), respectively by stool antigen test, demonstrating *H.pylori* infection a significant factor in inducing upper gastrointestinal bleeding (24).

In children: The epidemiology of *H.pylori* infection in Iranian children is highly diverse. While in Shiraz in Southern Iran, the prevalence of *H.pylori* antigen positivity in the stool exam was as high as 98% in 2 year old children (25). In Rasht, northern Iran, only 40% of children aged 7-11 years were reported *H.pylori* positive by stool exam (26). In Rafsanjan, Southeast of Iran also reported quite lower infection rate (52% in boys, 42% in girls) although in this study, serology has been used as the diagnosis tool (19). A study on 96 children with dyspeptic symptoms aged 1-15 years old in Tabriz, north western Iran, 35.4% were positive by stool exam for *H.pylori* antigen, and 64.6% were positive by histology (27). In Shiraz, Southern Iran, reported that from 113 pediatric patients with abdominal pain and other dyspeptic symptoms 52% were positive for *H.pylori*, detected by UBT (28). Eight hundred and six adolescents aged 13-15 years from Tabriz, Iran were evaluated for the presence of *H.pylori* infection by stool antigen test which revealed 35.2% infection rate in this series (29). In another

study from Guilan, Northern Iran, 103 school children with abdominal pain were screened by serology and endoscopic evaluations for H.pylori infection. In serology, 47 (45.6%) were detected positive, while in pathology the infection rate was confirmed in only 28.2% children (30). Two hundred seventy-eight children of 7-9 years old, selected by multistage random sampling in Zanzan were evaluated in 2004 for anti H.pylori antibody (IgG) which indicated the prevalence of 52.8% of H.pylori infection in 7-9 years old children (31).

Turkey:

General population: The rate of H. pylori infection in Turkey is also high. A cross-sectional study of serum samples in Turkey showed a progressive rate of infection with seropositivity rates of 58.4% for individuals aged 15-19; 62.6% for age 20-29; 67.6% for age 30-39; 81.3% for age 40-49; and 66.3% for over 50 years of age (32). Another study reported H. pylori prevalence rate of 66% in 20-29 years, 78% in 30-39 years, 79% in 40-49 years, 91% in 50-59 years, 100% in 60-69 years, and 80% in those >70 years of age (33). An interesting study evaluating the prevalence of H.pylori infection among mothers of infected and non-infected school children found that 69% of mothers of infected children were positive for the infection compared to only 8% in mothers of uninfected children (34). A large study of 1672 individuals selected a stratified random sampling in Turkey revealed an overall prevalence of H.pylori of 77.5% among people aged between 25 and 64 years. A study on students revealed 63% prevalence of H.pylori seropositivity in this population (35).

In symptomatic patients: Fifty-six Turk patients with complaints of dyspepsia were H.pylori IgG seropositivity in 82.1%, while IgA was positive in 48.2% of them (36). Another study on 1680 patients with a broad spectrum of gastrointestinal complaints in Ankara, Turkey, Seyda et al. reported a H.pylori positivity rate of 68% (37). Five hundred forty Turk patients attending a gastrointestinal outpatient clinic in Ankara underwent H.pylori serological analysis, and 273 (50.6%) were tested positive, with higher prevalence in non-smokers versus smokers (38). Ninety-six patients with bleeding ulcer and 106 patients with non-bleeding ulcer were investigated with H.pylori infection rate of 66.7% and 89.6%, respectively (39).

In children: A total of 403 healthy school children aged 7-14 in an urban part of Ankara in 1990 and 2000 found the overall prevalence of H.pylori antibodies to be 78.5% in

1990 and 66.3% in 2000 (40). Another study from Van, Turkey evaluated 275 children, aged 1-15 years suffering from different gastrointestinal complaints and 65 (23.6%) of the children were positive for H.pylori either by serology or stool exam and this positivity had a significantly increasing correlation with age. Forty-two patients with recurrent abdominal pain and 50 healthy children revealed that in 71.4% and 64% cases, H.pylori infection was seen respectively which showed no difference (41). In Izmir tested sera of 226 healthy children showed that 120 (53%) of them were positive for H.pylori IgG (42). In Istanbul, H.pylori infection rates were 42% in subjects <10 years of age, 55% in 10-19 years (43). One hundred forty-one children with recurrent abdominal pain and 21 without it underwent diagnostic evaluations of H.pylori infection and they found 60.3% and 20.8% were H.pylori positive respectively which showed a statistically significant correlation (44).

Serum samples of 466 randomly selected healthy schoolchildren from Erzurum, eastern Turkey, were tested for the presence of anti-H.pylori IgG antibodies and finally 300 (64.4%) samples were confirmed seropositive (45). Another study from eastern Turkey on 346 healthy children showed 152 (43.9%) were confirmed seropositive by H.pylori IgG antibody (46). Twenty-nine children with dyspeptic symptoms, 32 asymptomatic children were assessed regarding H.pylori infection and was determined in 14 (48%) and 16 (50%) dyspeptic patients and asymptomatic children, respectively, representing no significant difference (47). Two hundred and forty consecutive Turk children underwent endoscopy in Istanbul, western Turkey were evaluated for H.pylori infection on the basis of a positive rapid urease test and histology of the mucosal specimens, which revealed a H.pylori positivity rate of 121 (50.4%) in the study group (48). A cohort of 90 children aged 2-16 years were evaluated for H.pylori seropositivity and finally 60 (67%) of them have been detected as infected children (49).

Egypt:

General population: There is data scarcity on the prevalence of H.pylori infection in an Egyptian population truly representative of this nation and the only study we found was a study in a rural area of this country. Six hundred and five people were screened for anti-H.pylori antibodies and the overall seropositivity rate of 91.7% has been found in this Egyptian population. The rate of infection was

different in different age groups with an increasing trend in older ages (50).

In symptomatic patients: In a study comparing 30 patients with gastric cancers and 30 with simple gastritis, all patients were positive for *H.pylori* infection by culture, but the density of *H.pylori* was higher in cancer cases than in gastritis patients (51). One hundred and six dyspeptic patients undergoing upper endoscopy in Giza, Egypt, were enrolled into a study; 32 (30.2%) had apparently normal gastric mucosa while the remaining 74 (69.8%) patients had gastritis. *H.pylori* was detected in 76 out of 106 (71.7%) cases of dyspeptic patients. A strong association was observed between *H.pylori* infection and gastritis patients with *H.pylori* existence in 63 out of 74 (82.9%) of patients with gastritis compared to only 13 out of 32 (40.6%) of patients with normal histology of stomach biopsy specimens (52).

In children: A cohort study of 187 Egyptian children from Abu Homos, older than 6 months over a 36 month period showed a seropositivity rate of 10.2%, and within 4 months an incidence rate of 15% new cases of infection has been detected while 8 out of 19 (42%) of the seropositive children seroconverted to negative (53). In a cross-sectional population-based study of 286 school children, the prevalence of *H.pylori* infection has been 72.4% of the study participants (54). One hundred children aged 2-17 years who were already scheduled for upper endoscopy were evaluated with UBT, stool antigen test, and histology, for the presence of *H.pylori* infection, at the Cairo University School of Medicine pediatric gastroenterology clinic and overall, the prevalence of *H.pylori* infection among the study population was 46% (55). Another study on 50 symptomatic children revealed that 34 (68%) of patients were positive for *H.pylori* test (56).

Saudi Arabia

General population: We found three major studies investigating the seroprevalence of *H.pylori* in two major cities of Saudi Arabia (57). Three hundred ninety six healthy individuals aged 15-50 years with no history of dyspepsia were screened for *H.pylori* infection in Mecca, Saudi Arabia. The overall prevalence of infection was 51% which had an increasing trend for older age groups: 46% in 15-20 yr, 48% in 21-30 yr, 52% in 31-40 yr, and 61% in 41-50 years old individuals (57). The second study issued the prevalence of *H.pylori* infection in Medina, another major city of Saudi Arabia investigating 456 healthy people, Hanafi et al. have

reported an overall prevalence of 28.3% with an increasing trend of infection with more advanced age: 17% in patients younger than 20 and 37% by the age of 50 (58). The third study investigated the prevalence of *H.pylori* infection among 1200 students of 16-18 years old in three regions of Saudi Arabia found an overall 47% seroprevalence of *H.pylori* infection (59).

In symptomatic patients: Blood samples collected from 5782 of an urban outpatient population (aged 2 to 82 years) suffering from dyspepsia symptoms were evaluated. Patients with epigastric pain had 74% *H.pylori* infection, while this rate was 49% in patients with gastritis. The rate was on an increasing trend upon patients age category: 32.4% in <10, 49.6% in 11-20, 66.4% in 21-30, 70.5% in 31-40, 72.4% in 41-50, 75.3% in 51-60, 72% in >60 years old (60). A prospective study was carried out in the Gastroenterology Division, King Fahd Central Hospital, Gizan, Kingdom of Saudi Arabia, 488 patients (aged 13-90 years) with dyspepsia were consecutively examined using the upper gastrointestinal (UGI) endoscopy during a 4-year period. *H.pylori* was detected in 54.9% of the gastric biopsies. *H.pylori* infection was present in 60.1% of 253 patients with chronic gastritis diagnosed by endoscopy. Of 455 biopsies from 488 biopsies with histological evidence for gastritis, 268 were positive for *H.pylori*, whereas, all the 33 out of 488 gastritis negative specimens were also negative for *H.pylori* infection (61). The presence of *H.pylori* was examined in 491 sequential patients, complaining mainly of epigastric pain, by three biopsy-based methods (rapid urease, histology, and culture), and by ELISA. *H.pylori* was detected in 70% of 491 patients examined by histology, 287 (59%) by rapid urease test, whereas 385 (78%) were seropositive by ELISA. The endoscopic findings revealed that 315 out of 456 (69%) patients with non-ulcer dyspepsia, 7 out of 9 (78%) patients with gastric ulcer, and 2 out of 3 (67%) patients with gastric cancer were *H.pylori* positive (62).

In children: Five hundred forty-three asymptomatic children were tested serologically for *H.pylori* IgG antibodies in Jeddah, Saudi Arabia and 23.6% were finally detected seropositive (63). In another study in 314 school children, *H.pylori* infection was found in 27.4% of them (64).

Oman: General population: One hundred thirty-three apparently healthy Omani people were screened and an overall prevalence of 69.5% was reported which was into different categories based on age: 71% in 15-20, 63% in 21-

30, 70% in 31-40, and 87% in subjects between 41-50 years of age (65).

Palestine: General population: A study on 89 people from Ghaza, Palestine revealed H.pylori positivity rate of 48.3% (66).

In Children: One hundred ninety seven healthy Arab children aged 3-5 years were evaluated for the presence of H.pylori antigen in stool test or anti-H.pylori IgG in serology, and the prevalence rate of H.pylori infection was reported 49.7% (67).

Israel, study: In Israel, 1466 Jewish and 575 Arabs in Tel Aviv was investigated. In Jewish subjects the seropositivity rate was 45.2% and in Arab it was 42.1% (68). One thousand six hundred twenty-three children aged 0-20 years attending hospitals, not essentially due to gastrointestinal issues were evaluated by serology for the H.pylori infection. H.pylori seropositivity was 22.9% among Jewish children of the general population, 25.2% among ultraorthodox Jewish children, and 45.6% among Arab children (69).

Libya: General population: In a report, 360 asymptomatic individuals aged 1-over 70 years have been investigated and an overall prevalence rate of 76% has been detected in this population, which was age dependent with a 50% infection rate in subjects 1-9 years of age that increased to 84% in subjects 10-19 years and continued with increasing age and reached up to 94% in those over 70 years of age (70).

In symptomatic patients: One hundred thirty two patients with the symptoms of dyspepsia aged 15-83 years attending the endoscopy unit at the El-Jamahiria Hospital, Binghazi, Libya, were examined. H.pylori was detected in 82% patients. The endoscopic findings revealed that 77% of patients with non-ulcer dyspepsia, and 100% of those with gastric ulcer and in one patient with gastric cancer were H.pylori positive (71).

United Arab Emirates: General population: A prospective study of 151 subjects (76 farmers and 75 non-farmers) was undertaken by determining their H.pylori IgG in their sera and the positivity rate was 74.2% (72). In another study from the same country, but on low socioeconomic workers showed H.pylori seropositivity rate by IgG for 78.4% in industrial workers compared to 64.3% in referent workers (73).

In symptomatic patients: In a study from Al Ain Hospital, United Arab Emirates, the significance of H.pylori

infection was assessed prospectively in 42 patients with dyspepsia and finally 90.5% patients were detected positive for the infection (74). In another study at the same hospital, 29 patients with perforated peptic ulcer and 88.9% were reported positive. From the 17 patients who underwent upper gastrointestinal endoscopy 6 weeks after discharge from hospital, 82.4% had a positive for H.pylori (75).

Morocco: In symptomatic patients, 429 patients from urban and rural areas of north-central Morocco, aged > 15 years who had undergone endoscopy for the diagnosis of abdominal pain or discomfort were included into the study, and finally 69.9% of patients were confirmed as H. pylori positive (76).

Jordan: In symptomatic patients the biopsy specimens from gastric antrum have been achieved from 250 patients with abdominal pain, epigastria pain, vomiting, or heartburn, and were tested by PCR for the presence of H. pylori infection, and 110 out of 250 (44%) were detected positive for the infection (77).

Bahrain: In symptomatic patients, all the 57 patients with dyspeptic syndromes attending gastroenterology clinics in Bahrain were seropositive for H. pylori infection by IgG test (78).

Yemen: In symptomatic patients with chronic dyspepsia the prevalence of H.pylori infection in two studies were reported between 75%-82.2% (79, 80).

In children: Five hundred seventy-two healthy children aged less than 10 years were assessed for the prevalence of H.pylori in Sana'a, Yemen, and finally 9% of them were detected as H.pylori seropositive (81).

Kuwait: In 204 symptomatic patients with gastrointestinal symptoms, H.pylori infection was detected in 96.6% of the patients (82). In 362 patients with dyspepsia, 49.7% were positive for H.pylori and the percentage increased with age (83). More than 96% of 32 two patients with nodular gastritis had seropositivity for H.pylori (84). Another study of 200 Kuwaiti patients referred for endoscopy, overall 85.5% patients were confirmed H.pylori infected. Three hundred forty-five consecutive patients with symptoms of dyspepsia were screened for H.pylori infection by gastric biopsy and serum examinations and finally 228 (66%) were labeled as H.pylori positive (85).

Tunisia: In children: One hundred ninety-one Tunisian healthy children were studied and the H.pylori infection rate was 30.4% (86). In another study, a total of 1055 first-grade primary-school pupils were included in a cross-sectional

study for determining the H.pylori IgG positivity rate. The prevalence of H.pylori infection was 51.4% (87).

Lebanon

In children: Four hundred and fourteen children aged 1 month to 17 years of different socioeconomic standards were selected for H. pylori antigen testing in stool. The prevalence of H .pylori infection was %21 (88).

In conclusion the incidence of H.pylori infection in the Middle East is high, and needs attention. The prevalence of H.pylori infection in most of the studies seems higher in symptomatic individuals compared to asymptomatic people. Moreover, the patients with histopathological evidence for gastritis are more likely to be H.pylori positive than those without. This comprehensive review also showed that several countries did not have research data in some of the epidemiological aspects of H. pylori infection, and this would be a priority for the scientists of those countries to direct their researches to evaluate these issues in their countries.

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