

CHARACTERISTICS OF HELICOBACTER PYLORI INFECTION IN LIBYAN HEALTHY PEOPLES IN TWO TEACHING HOSPITALS IN BENGHAZI

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SUMMARY: Helicobacter pylori (HP) is common in Libyan patients with chronic dyspeptic symptoms. In healthy peoples, however, the picture is not well known. This study try to find answers on the prevalence rate in healthy individuals as well as the influence of age, gender, marital status, occupation, socioeconomic status, smoking and living condition is ascertained.

Six hundred and sixty two (662) subjects aged between 1-83 years were screened for serum anti- H. pylori IgG using a locally validated quantitative commercial EIA test system.

Seropositivity for (HP) was found in 71.4 % of all the recruited individuals. HP infection was acquired as early as one year of age and maintained through the whole individual life if kept untreated.

More than half (53.3 %) of children aged 1-12 years and most of middle age and elderly subjects (84.6 %) were seropositive. Multiple regression analysis revealed associations between HP seropositivity and marital status, education level, socioeconomic status, occupation, infrequent medication, and living conditions.

These data suggest that in a general population sample, living with a partner, low socioeconomic status, low education degree and poor living conditions associated with increased risk of H. pylori infection.

Key Words: Helicobacter pylori, IgG- anti- H. pylori EIA, risk factors, prevalences, H. pylori serology.

INTRODUCTION

Helicobacter pylori (HP) is associated with a number of serious digestive tract diseases including chronic gastritis, peptic ulcers, mucosa-associated changes to lymphoma and gastric cancers in adults (1). Striking differences exist in the prevalence of HP infection among people of various professions, ethnic and

social background. High prevalence rates are reported in Greek, Italian, Lebanese, Chinese, Vietnamese and Algerians. In contrast, Australian aboriginals have very low HP prevalence (2). In healthy Libyan population, the prevalence of HP infection is not well known (3, 4). In one of our recent data, however, we reported the rate of infection in a group of dyspeptic patients to be around 82% (5). In addition, the validation of IgG serology in diagnosis of HP infection was undertaken too.

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Table 1: Analysis of HP seropositivities by age groups.

Age group	Total No	Total positive* No. (%)	Active HP** from positive No. (%)	Active HP from total (%)	Conc. U/ml \pm SD	P value
Children 1-12 yr (1)	133	71 (53.3 %)	27 (38 %)	20.3 %	107 \pm 102	P \leq 0.05 vs. 3,4
Teenage 13-19 yr (2)	117	73 (62.3 %)	39 (53.4 %)	33.3 %	135 \pm 91	P \leq 0.05 vs. 3,4
Young adult 20-45 yr (3)	204	153 (75 %)	79 (51.6 %)	38.7 %	157 \pm 104	
Middle age + Elderly 46 \geq yr (4)	208	176 (84.6 %)	103 (58.5 %)	49.5 %	140 \pm 107	
Total	662	473 (71.4 %)	248 (52.4 %)	37.4 %	140 \pm 107	

* Seropositivity for HP defined as serum IgG \geq 49 U/ ml

** Active HP infection was defined as serum IgG \geq 123 U/ ml

Serologic tests for HP-IgG are essential epidemiologic tool for examining HP associated manifestations in the community.

The purpose of this work was to provide important answers on the seroprevalence of HP IgG in apparently-healthy individuals in various age groups and to see if gender, profession, lifestyle, marital status, household crowding and socioeconomic status has any effect on the prevalence. We conducted a relatively large based, controlled study in Benghazi area. Benghazi is the second largest city of Libya after Tripoli, located in the eastern region of Libya with about one million inhabitants. Two large teaching hospitals

(Aljamahiria Hospital and Alfateh Children Hospital) were selected for recruitment. Furthermore, some of normal volunteers have previously served as control for our previous paper on dyspeptic patients (5).

MATERIALS AND METHODS

Serum samples from 662 asymptomatic individuals who attended the outpatient departments of Alfateh and Jamahiria Hospitals, Benghazi, as well as some volunteering doctors and nursing staff were evaluated for HP-IgG antibody using the commercially available Cobas Core Enzyme Immunoassay method (Roche SA, Basel, Switzerland). They consisted of 340 (51.3 %) males and 322 (48.6 %) females at various

Table 2: Analysis of HP seropositivities by gender.

Age group	Total male	Positive No. (%)	Active HP No. (%)	Total female	Positive No. (%)	Active HP No. (%)
Children	69	35 (50.7 %)	14 (40 % of the positive only)	64	36 (56.2 %)	13 (36.1 %)
Teenage	60	38 (63.3 %)	21 (55.2 %)	57	35 (61.4 %)	18 (51.4%)
Young adults	105	78 (74.2 %)	43 (55 %)	99	75 (75.7 %)	36 (36.3 %)
Middle age and Elderly	106	90 (84.8 %)	47 (52.2 %)	102	86 (84.3 %)	56 (54.9 %)
Total	340	241(70.8 %)	125 (51.8 %)	322	232 (72 %)	123 (53 %)

* P \geq 0.05 for all figures

Table 3 : HP seropositivities by occupation.

Occupation	Total No. (%)	HP positive No. (%)	IgG conc.U / ml \pm SD	P values
Children with no occupation (1) 1-6 yr.	100	50 (50 %)	104 \pm 85	$P \leq 0.05$ (1 vs. 3,4,5)
Students (2)	182	125 (68.9 %)	111 \pm 89	
Employees (3)	178	140 (78.5)	133 \pm 107	
Housewives and retirees (4)	100	73 (73 %)	127 \pm 77	
Nursing staff and doctors (5)	100	85 (85 %)	157 \pm 104	
Total	662	473		

age categories (mean 36.3 year, age range 1-83 years). They were considered asymptomatic after they denied any clear, continuous gastrointestinal complain during the previous 2 months. Cobas Core anti-HP EIA kit has been previously validated in the Benghazi dyspeptic patients and was found to have adequate accuracy (sensitivity 99 % and specificity 88 %) (5).

Results were expressed as numbers and percentages. Comparison of percentages were assessed using chi-square test on SPSS software version 10. Pearson correlation was made between antibody responses and gender, age, marital status, occupation, level of education, residence conditions and socioeconomic status. Statistical significance was determined by $P \leq 0.05$.

RESULTS

Table 1 summarizes the overall HP seroprevalence by age . A total of 662 individuals took part of this survey. Positivity was demonstrated in 473 (71.4 %) persons using 123 U/ml as an arbitrary cutoff level for diagnosing active infection in those suffer symptoms (as concluded in our previous data, (5). Accordingly, active infection was suspected in 248 (37.4 % of the total individuals; 52.4 % of the total positives). Positive IgG responses were detected in 53.3 % of children compared to much higher rate in the other age groups. Differences were statistically significant. In addition, active HP infections increases by age from 38 % in children to 58.5 % in middle age and elderly (Table 1). The effects of gender on HP seropositivities is given in

Table 2. HP IgG was seen in 241 (70.8%) males compared to 232 (72%) of females. No significant differences, however, were attributable to gender.

Role of occupation on HP seropositivities is presented in Table 3. Significant differences concluded between children (50%), Students (68.9 %) and doctors and nursing staff members (85 %) ($p \leq 0.05$). Differences in between other groups were not significant. Table 4 summarizes demographic data as well as some of the assumed risk factors for acquiring HP infection. marital status, level of education, socioeconomic status, all positively correlated with positive HP seroprevalence. Other affecting variables include occasional epigastric pain and medications (antibiotics and anti-inflammatory drugs). Furthermore, number of persons living in the same household as well as number of siblings in family also significantly affected the HP seropositivity in the present recruited populations. In respect to smoking, data proved no significant association of this factor and HP seroprevalence.

DISCUSSION

The epidemiology of HP infection in Libyan population remains important for public health investigation because of high prevalence of this infection and its association with peptic ulcers and chronic dyspepsia (5). Compared to similar studies, this work is, to our knowledge, the first and the largest on HP seroprevalence in a selected group of normal population at various ages in Benghazi.

Table 4 : Demographic and potential predisposing factors to HP acquiring.

Parameter	Variable	Total No.	HP positive No. (%)	P values
Marital status	Single	312	210 (67.3 %)	P ≤ 0.05
	Married	350	287 (82 %)	
Education level	Children before school age (1)	100	50 (50 %)	P ≤ 0.05 (1 vs 2,3 ,4)
	Illiterates (2)	118	100 (84.7 %)	
	Primary + Secondary (3)	262	176 (67.1 %)	
	Univ. and higher (4)	182	147 (80.7 %)	
Socioeconomic Status	Low (1)	322	269 (83.5 %)	P ≤ 0.05 (2 vs 1,3)
	Median (2)	240	120 (50 %)	
	High (3)	100	84 (84 %)	
Numbers of person living in the same household	5 (a)	112	60 (53.5 %)	P ≤ 0.05 (a vs b,c,d)
	6 (b)	210	150 (71.4 %)	
	7 (c)	239	180 (75.3 %)	
	8-12 (d)	101	83 (82.1 %)	
Siblings in family	4 (a)	115	70 (60.8 %)	P ≤ 0.05 (a vs b)
	5	244	166 (68 %)	
	6	175	127 (72.5 %)	
	≥ 7 (b)	128	110 (85.9 %)	
Smoking	Yes	213	168 (78.8 %)	P ≥ 0.05
	No	449	305 (69.9 %)	
Occasional epigastric pain	Yes	231	204 (88.3 %)	P ≤ 0.05
	No	449	269 (62.4 %)	
Family history of Epigastric pain	Yes	465	382(82.1 %)	P ≤ 0.01
	No	197	91 (46.1 %)	
Medications (not within the last 2 months)	Antacids (1)	92	81 (88 %)	P ≤ 0.05 (1,2,3 vs. 4)
	NSAIDs (2)	85	83 (97.6 %)	
	Antibiotics (3)	90	77 (85.5 %)	
	No therapy (4)	395	232 (58.7 %)	

There is sparse information on HP seropositivity rates in Libyan populations on locally validated serological tests (3, 4). The present study demonstrated an overall seroprevalence rate of 70.8 % in normal healthy peoples. Lower, but non-significantly different rates were shown by us in those suffered of chronic dyspepsia (82%) (5). Correction of IgG levels to indicate an active or a non-active HP status ($\geq 123\text{U/ml}$) brought the rate to 37.4 % (Table 1). Similar rates (20-30 %) were seen in normal healthy blood donors in developed countries (6). This prevalence, however, is geographically-dependent and related to age. In Britain, for example, the frequency of anti-HP antibodies in children under 15 years of age is about 5 %, rising gradually to 50-70 % in general population over the age of 50 years (1). Our data reported 53.3% prevalences in children below 12 years, compared to 84.6% in middle age

and elderly. These differences were statistically significant. In developing countries, higher anti-HP antibodies are common in children with the higher proportion of seropositive adults (7). It should be remembered that high prevalence of asymptomatic HP-carrier individuals encountered frequently in developing countries, which could influence serological picture. These data are in agreement with those concluded on the value of application of sensitive serology for diagnosis of peptic ulcer disease and gastric cancer (8). This could result in significant reduction of use of endoscopy and radiology, both expensive and time consuming techniques. A decision scheme based on the present proposal of HP-IgG levels as screening method seems plausible. This plan, however, pose a risk that other disorders of upper GI tract associated with HP gastritis may be missed.

The large number of cases and the high cost of medical treatment have now turned the focus of epidemiologic research toward certain risk populations. Preschool children are thought to be the main risk population (9). Generally accepted risk factors for acquiring of HP infection are low socioeconomic status, childhood poor living conditions (10), and large family size (11). In one German study, family history of epigastric disease correlated with presence of the bacterium (12), whereas pets have not been considered a risk factor (13). As far as the routes of transmission are concerned, results of different studies have been contradictory (14). There is no doubt that the bacterium gains entry to the stomach via the mouth: oral-oral, fecal-oral, as well as iatrogenic spread. Several vectors such as domestic cats, nonhuman primates, and the domestic housefly, have all been discussed as possible routes of transmission, however, a major route has not been identified (15).

The present study assessed various factors associated with the acquiring HP infection using IgG serology. Epidemiological surveys usually use serological tests for high sensitivity and specificity which will not limit the accuracy of prevalence estimates (16). They allow the use of large sample size, more precise evaluation of factors associated with prevalences for HP. It is important to recognize that the risk factors that influence acquisition of infection and those influencing the persistence of infection in adult life may not be the same and this study is not designed to distinguish between the two. We showed that the socioeconomic deprivation significantly modifies the prevalence of HP infection as others have been shown (17). Education level and occupation of the recruits, especially doctors and nursing staff, gave a significant influence of the rate of seropositivity. No identical data are, however, available on that aspect for comparison. There is no doubt that the bacterium gain entry to the stomach via the mouth, orally-orally, feco-orally or iatrogenically (15).

Our data probably indicate the possibility of nosocomial transmission in the present setting. These findings are consistent with research that shows that *H. pylori* is recovered reliably from vomitus (up to 30,000 CFU/ml) and can be grown from aerosolized vomitus collected at short distances (around 1.2 meter) (15).

Number of siblings was a strong predictor of infection suggesting that transmission between siblings is an important mode of acquiring the infection. This is probably consistent with the observation that individuals of higher birth order have an increased prevalence of HP, particularly if the age gap between siblings is small (18).

The present investigation similarly did not find any association between gender and HP infection. A meta analysis indicated that male gender is a factor associated with increased prevalence for infection but the authors acknowledged that the study was limited by the unavailability of primary data from some studies, making it difficult to control for confounding variables (19). Studies investigating transmission of HP within household have often assessed prevalence of HP in spouses of infected and uninfected index cases (20). These case-control studies have given conflicting results due to possible bias in the patient groups selected and the lack of adjustment for confounding factors.

The present trial avoids some of these problems and has identified living with a partner as a factor associated with increased prevalence for HP infection. Exposure to an infected household member with vomiting was associated with a 6-fold greater risk for new infection, whereas exposure to diarrhea elevated the risk for new infection but not significantly (15). The influence of lifestyle on prevalence of HP infection remains controversial. In our study smokers were not more likely to have HP infection than non-smokers. Other cross-sectional surveys have reported an association between smoking and increased HP prevalence (21), but these studies may not have adequately controlled for confounding factors. Several studies have investigated the association between HP and infrequent intake of medications with conflicting results (21).

The mechanism that would promote an association are unclear, although our data supported that relationship. We cannot, formally exclude the possibility that participants may have changed their lifestyle at middle age and this may have masked an earlier association between HP and medication intake. The present study proved that occasional epigastric pain in the individual as well as family history of epigastric pain both increased the chance of *H. pylori* harboring. In a German study, the

history of gastric disease correlated with acquiring the infection (12). A weakness of our study is that only (662) individuals were evaluated for HP status. It is, however, extremely rare for individuals to know their HP status and so there is unlikely to be any systematic bias that would threaten the internal validity of our results.

The study participants may, however, not be repre-

sentative and indeed there were differences between this group and the general population in terms of social class and frequency of consultation for dyspepsia. Our results concerning the estimated levels of infection prevalence may not, apply to the general population but this should not be the case for our estimates of relative risk for the identified variables.

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