



Helicobacter pylori Infection in Healthy and Dyspeptic Adult populations Resident in Tripoli and Sabha of Libyan cities: A Seroepidemiologic Study

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Abstract *Helicobacter pylorus* (*H. pylori*) is the commonest bacterial pathogen found worldwide and more than half the world population is colonized with it. The infection rate is 85-90 % in developing countries. The prevalence of *H. pylori* infection varies according to geographic area, socioeconomic conditions and method used to detect *H. pylori* infection. There is a lack of information about the seroprevalence of anti- *H.pylori* antibodies in asymptomatic & symptomatic patients in Libya. **Aims:** - To determine the prevalence of the *H.pylori* infection in Healthy and Dyspeptic adult populations resident in two communities, Tripoli and Sabha regions. To correlate with the risk factors associated with *H.pylori* seropositivity in such two populations. **Materials & Methods:-** A Blood sample from (100) healthy individuals from Sabha region & (175) healthy from Tripoli area. The dyspeptic patients (125, 94) were attending Gastroenterology Unit of Central Tripoli Hospital & Sabha Hospital respectively. Anti-*H.pylori* IgG was determined with ELISA method, questionnaire covering Sociodemographic variables were completed by interview. **Results:-** In Sabha region, the overall prevalence of *H.pylori* was 57% in healthy & 37% in Dyspeptic patients respectively. In Tripoli region, the Healthy was 85.1%, dyspeptic patients was 83.2%. **Conclusions:-** In the two cities, *H.pylori* detection in healthy and dyspeptic was high of individuals of aged 25-35 years. Further research in Libya is needed to establish the potential role of *H. pylori* in gastric and extra gastric pathologies.

Keywords: *Helicobacter pylori*, Prevalence, Serology, Asymptomatic, Libya.

عدوى بكتيريا المعدة الحلزونية فئة البالغين الاصحاء وذوى العسر الهضمي في مدينتي طرابلس وسبها

الليبية: دراسة مصلية وبائية

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المخلص بكتيريا الهيليكوباكتر بلوري (بكتيريا المعدة الحلزونية) تتواجد بشكل شائع كمرض في جميع انحاء العالم وفي اكثر من نصف سكان العالم. معدل العدوى بها 85-90% في الدول النامية وانتشار العدوى بهذه البكتيريا وفقا للاماكن الجغرافية و الوضع المعيشي والظروف الاقتصادية والطرق المعملية المستخدمة للكشف عنها. لا توجد معلومات حول مدى الانتشار المصلي للأجسام المضادة لبكتيريا الهيليكوباكتر بلوري لكلا من المرضى بأعراض او بدون ظهور اعراض للإصابة في ليبيا لذا كان هدفنا هو التحري عن مدى انتشارها بين الاصحاء والذين يعانون من عسر الهضم بين البالغين في المجتمع الليبي في كلا من مدينتي طرابلس وسبها. جمعت عينات دم (100) من اصحاء من مشفى سبها (175) من مشفى طرابلس كما جمعت ايضا عينات اخرى من الذين يعانون من عسر هضم (94 و125) على التوالي لكلا المدينتين من وحدة المناظير بالمشفى وتم تحديد الايجابية من عدمها باستخدام تقنية الاليزا مع تجميع معلومات من المرضى عبر استبيان. في منطقة سبها كانت النتائج 75% موجبة بين الاصحاء 37% بين من يعانون من عسر الهضم بينما النتائج من مدينة طرابلس كانت 85.1%

و 83.2% معدل الانتشار لكلا المدينتين كان بين الفئة العمرية 25-35 سنة كما نتطلع لأجراء دراسات مستقبلية لدور هذه البكتيريا في الامراضية بقرحة المعدة والاثني عشر.

الكلمات المفتاحية: الهيليكوباكتر بلوري، السيرولوجي، انتشار، بدون اعراض، ليبيا.

Introduction

Helicobacter pylori (*H.pylori*) is a spiral gram-negative microaerophilic bacterium which was first isolated by Warren and Marshall in 1984 [1]. In human, since its discovery, *H.pylori* infection considers to be the main cause of various upper gastrointestinal diseases including chronic gastritis and peptic ulcer disease. *H.pylori* infection has been linked to several extra gastric disorders [2]. In 1994 *H.pylori* infection has been consider a class 1 carcinogen - inducing gastric cancer. However, there is a marked difference in clinical outcomes due to bacterial infection among different regions in the world. The risk of being colonized by *H.pylori* depends on geographic area, socioeconomic status and age of the host [3]. Most *H.pylori* transmission occurs in childhood, and in some countries up to 90% of children become infected by the age of 10 years, with reports of infection as early as the first months of life [4-5]. In developing countries the infection can be almost ubiquitous [6], whereas in industrialized countries *H. pylori* infects around 30-50 % of adults [7].

Several tests are available for determining the presence of *H. pylori* infection. These may be invasive or non-invasive. Seroepidemiological investigations (Non- invasive methods) represent the most rapid and convenient way of obtaining a picture of the prevalence of *H.pylori* infection in a population. A majority of serological studies from developing countries are now conducted with commercial kits which are inexpensive, simple, and available in the local market.

In Libya, a country of huge size, important regional differences are likely to occur. Nevertheless no local data are available on the epidemiology of *H.pylori* infection from different regions of Libya; therefore, the primary aim was to evaluate the incidence of seropositivity *H.pylori* infection among asymptomatic and symptomatic population resident in two communities, Tripoli and Sabha regions. The secondary aim was to determine the risk factors (age, gender, blood group & socioeconomic status) which might be related to the infection with the *H.pylori*.

Materials and Methods:-

A cross-sectional descriptive study was conducted, on two groups: one group of hundred (100) healthy individuals (mean age 25 years), attending Sabha clinics, (175) healthy blood donors from Tripoli area (mean age 35 years), another group which consist of (125) & (94) dyspeptic patients attending Gastroenterology Unit of Central Tripoli Hospital, and Sabha Teaching Hospital respectively. Based on the questionnaire data, Individuals with a history of gastro duodenal ulcer, with current chronic complaints of the upper digestive tract for two months (nausea, vomiting, heartburn, pyrosis or indigestion) or those currently using anti-acid or anti-ulcer medications were excluded from the study. After we obtained written informed consent from each participant ,

and a standard questionnaire was completed by direct interview to obtain individual socio-demographic data regarding each participant (age, gender, number of family members, Blood group, smoking , monthly family income, family history of gastric ulcer or gastric cancer, eating outside the house). Health status, local of residence and medication taken one month before the interview (particularly proton pump inhibitor and antibiotics) were also recorded. A Blood sample (5 ml) was obtained from each participant by peripheral venepuncture under aseptic conditions and the study was approved by our local committee for Medical and Research Ethics. Samples were refrigerated on ice during transport to the laboratory. After separation, 250µl serum samples were labelled and frozen at -20°C until testing. Detection of anti-*H.pylori* IgG were determined with ELISA method (Biotech USA), performed according to the manufacturer instructions. The linear tendency of the proportions of positivity of anti-*H.pylori* antibodies in different parameters of exposure was analysed by the chi-square test for trends. The level of significance was set at $p < 0.05$.

Results

In Sabha region, serological testing revealed that 57% & 37% of adult healthy individuals & dyspeptic patients were positive for anti- *H.pylori* IgG respectively. There was a gradual increase with age, where it was 10.2% of age group of 16-26 years old, increasing to 14.1 % of individuals of 38-48 years old. However, no statistical significant difference was between genders. *H.pylori* infection was found with 15.3%, 10.2%, 6.4 %, & 5.1% in the employees, the professionals, the students, and the Housewives respectively. Related to Blood group IgG anti- *H.pylori* was 16.6% , 10.2%, 8.9% and 1.2% of the participants of Blood group of O, B, A, and AB respectively.

Regarding the socioeconomic state as a risk factor of *H.pylori* infection , anti *H. pylori* IgG was higher in families with middle class level 85%, compare to the 10% , 5% of low and high socioeconomic status respectively.

However, in Tripoli area, antibodies to *H.pylori* were detected in the serum of 85.1%, 83.2% the healthy and dyspeptic patients respectively. There was a gradual increase with age, where it was 13% of age group of 20-24 years, increasing to 45 % of individuals of 40 years or older (Figure 1).

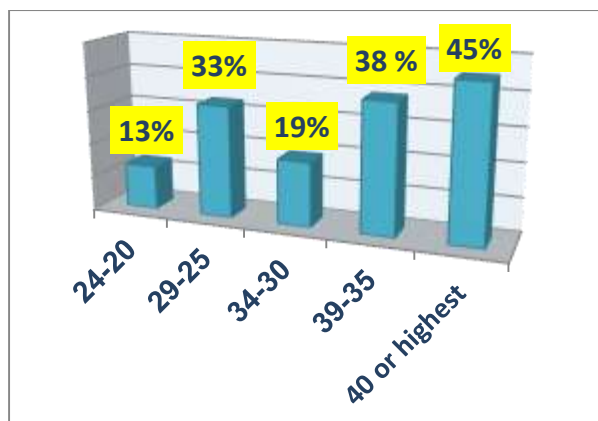


Fig. (1) Prevalence of *H. pylori* of Healthy Blood donors in different age groups.

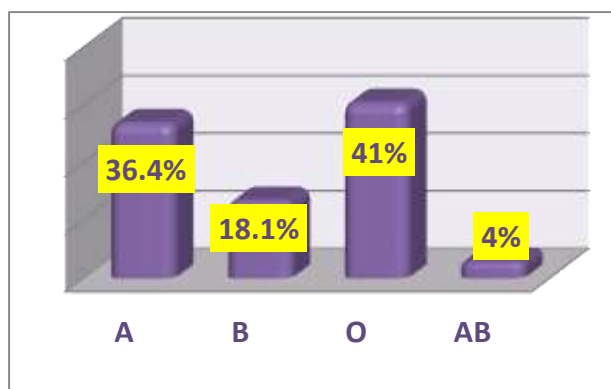


Fig. (2) Prevalence of *H. pylori* of Healthy blood donors in different Blood groups.

The anti *H.pylori* IgG was higher in individuals of (O) blood group (41%), following by (A) blood group (36.4%) & was 18.1% , 4% of the participants of Blood groups of (B) , (AB) respectively (Figure 2)

Discussion

Colonization with *H.pylori* is not a disease by itself but a condition associated with a number of disorders of the upper gastrointestinal tract [8].The serological testing for *H.pylori* antibody helps in early detection of “silent” peptic ulcer [9]. The present study was the first seroprevalence of *H.pylori* infection in a comparison of two different communities in Libya. This *H.pylori* serological results of the present study demonstrate that the overall prevalence of (57%) of asymptomatic population & (37%) among the dyspeptic patients resident in Sabha city, however, in Tripoli region the results demonstrate that the IgG anti- *H.pylori* was 85.1% & 83.2% of the healthy blood donors & the dyspeptic patients respectively which is similar to other reported from several Libyan cities e.g. Benghazi, where the authors found in healthy individuals (71.4%) infected with *H.pylori* [10]. However, five years later other study from Benghazi found (56.5%) [11], the reason for the decrease might be the use of antibiotics during the last few years. In Al-Komes region, a study found that (65%) of asymptomatic persons were infected with the gastric pathogen [12-13], our results is similar to other developing countries in which (69%) to (82%) of adults and children who are infected by 10 years of age. In a rural area from Brazil the antibodies to

H.pylori were detected in the serum of (77.5%) children & teenagers, and in (84.7 %) adults [14]. In Kosovo, the seropositivity of *H.pylori* is moderately high (56.9%) among healthy blood donors [15]. In Iraq, a study conclude that *H.pylori* are highly prevalent (55.8%) among university students in Erbil region, higher prevalence found in older students and those from low social class [16].

A Norwegian group tested 1416 subjects of all age groups in an urban and rural community in Northern Norway by stool detection and found *H.pylori* infection in 0.6% of children, 20% of adolescents, and rising to 45% in the highest age group. They concluded that transmission might start not only in childhood, but also in adolescence, where potential transmission routes could be outdoor toilet use, private well water, and farm animals [17].

In our study, the prevalence of *H.pylori* in both regions is high; this could be explained by the increased chances of *H.pylori* transmission in these two populations was, due to improper hygiene, food, vegetable contamination, and health care system. It is well known that *Helicobacter* species have been detected in 142 vertebrate species, including animals from every continent and all four non fish vertebrate taxonomic classes [18]. In a rural community, the prevalence of enteric *Helicobacter* species was investigated in domestic and free -living birds [19]. *Helicobacter pullorum* was detected in 68.6% of intensively farmed poultry and 21.7% of poultry raised in the rural farms. *Helicobacter canadensis* was detected in intensively reared Guinea fowl and for the first time in pheasants from rural farms. The detection of *H. pullorum* in turkeys was also reported for the first time [20].

One limitation of our study population is the source of water as a risk of *H.pylori* infection, where there is no data available of the source of water of our population study in both communities. In Libya, for the difficulty to culture *H.pylori* which required selective medium and Microaerophilic condition, Therefore, analysis the private well water from different regions of Libya, using molecular techniques such as Polymerase Chain Reaction (PCR) to confirm the presence of *H.pylori* or other *Helicobacter* species. Using molecular methods for detection of *H.pylori* in untreated well water, a study concluded that the presence of *H.pylori* in the wells correlated with clinical infection in the consumers, and with the presence of *Escherichia coli*, indicating fecal contamination, and consumption of untreated well water should be considered a risk factor for *H.pylori* infection [21].

Conclusion

The high prevalence of *H.pylori* positivity that we obtained in adult populations of two communities (Sabha & Tripoli), *H.pylori* detection in healthy and dyspeptic was high of aged 25-35 years, indicates that infection with this gastric gram negative bacterium is still a common health problem among our population. However, we find that the strict relations between *H.pylori* seropositivity, socioeconomic state and living in a crowded conditions, as risk factors in our study

populations. These data support the finding that personal and environmental conditions do affect *H.pylori* infectivity in young subjects living in rural region of Libya. Our data indicate that, knowledge about the reservoirs and modes of transmission could help to explain the high prevalence rates found for *H.pylori* in the developing countries. Also we confirm that as a non- invasive method, the serologic test such as (ELISA) is a useful technique to detect *H.pylori* infection in a country like Libya where the resources and the facility of the diagnosis of *H.pylori* is limited. However Further research is needed to establish the potential role of *H. pylori* in gastric and extra gastric pathologies.

Abbreviations and Acronyms

Helicobacter pylorus (*H. pylori*), Enzyme-linked immunosorbent assay (ELISA).

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