Detection of Helicobacter pylori and Risk factors among healthy blood donors and adult dyspepsia patients

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Background: Helicobacter pylori (*H. pylori*) infection is the foremost pathogenic factor for peptic ulcer disease in different parts of the world. *H. pylori* epidemiology is not fully known, however, few data are available in patients with chronic Dyspepsia in Libya. Dyspepsia is a combination of symptoms in the upper gastrointestinal (UGI) tract.

Aims: This study aimed to determine the seroprevalence of *H. pylori* infection and to identify factors associated with the infection in healthy blood donors and patients with chronic Dyspepsia at Tripoli Central Hospital, Libya.

Materials and Methods: A Blood sample of 175 adult healthy blood donors (37 Female, 138 male mean age 35 years), and 125 Dyspeptic patients (42 Female, 83 male mean age 32 years). *H. pylori* infection was determined by ELISA method (EUROIMMUN, Germany), for *H. pylori* IgG antibody against specific H. pylori antigen. A questionnaire was filled out to cover sociodemographic variables at the start of the study.

Results: An overall of *H. pylori* seroprevalence was 85.1% in healthy blood donors and 83.2% in Dyspeptic patients *(p=0.05)*. There was a gradual increase with age, and no statistical difference between genders.

Conclusion:- In Tripoli region, *H. pylori* detection in adult healthy blood donors and dyspeptic patients was the highest in age-group 25-40 years old, which might be related to the socioeconomic status, domestic crowding and the source of drinking water as a major risk factors for *H. pylori* infection. Also we confirm that as a non-invasive method, the serologic test such as (ELISA) is a useful technique to detect *H. pylori* infection among healthy population and dyspeptic patients. However, larger studies in other region of Libya should be conducted to confirm our study finding .

Key words: *H. pylori* – cagA – serology – Blood donors.

Introduction

Helicobacter pylori (*H. pylori*) is one of the most frequent bacterial gastric pathogen in different parts of the world. In developing countries the infection can be almost ubiquitous, whereas in industrialized countries *H. pylori* infects around 30-50 % of adults. The risk of being colonized by *H. pylori* depends on geographic area, socio-economic status and age of the host. Now, *H. pylori* has been associated with the most of gastro duodenal diseases.

More than half of the world's entire population is known to be infected with H. pylori, it is generally acquired during the first 5 years of life (Rajindrajithb *et al* 2009).The proportion of infection of H. pylori acquired by children ranges from 30 to 50%, whereas it reaches a limit of over 90% during adulthood in developing countries (Salih 20090) . Helicobacter pylori colonize the stomach and provoke a local inflammation in almost all host, a continuous process increases the risk of developing atrophic gastritis, intestinal metaplasia, and noncardia gastric adenocarcinoma (Akbar and El Tahawy 2005). H. pylori is contagious, although the exact route of transmission is not known (Megraud 1995). A number of authors have emphasized the role of factors such as age, socio-economic status, poor hygiene/deficient sanitation, density/ crowded living conditions, smoking, use of a nonsteroidal anti-inflammatory drug (NSAID), blood group O, high body mass index and family history of gastric disease in the acquisition and transmission of *H. pylori* (Segal and Ally 2001). Techniques utilized to detect *H. pylori* infection are grouped as invasive and noninvasive tests and include the rapid urease test (RUT), microbiological culture, histology, and polymerase chain reaction (PCR), in which esophagogastroduodenoscopy (OGDS) is required to obtain the stomach biopsy (Ou *et al* 2013). Noninvasive methods consist of the stool antigen test(SAT), urea breath test (UBT), and Blood test for detection of *H. pylori* antigens or anti *H. pylori* antibody (Czinn 2005).

In Libya , a country of huge size,, important regional differences are to occur. Nevertheless no local data are available on the epidemiology of *H . pylori* infection ; therefore , the primary aim of this study was to determine the incidence of seropositivity *H . pylori* infection among asymptomatic Blood donors . The secondary aim to correlate with the risk factors in voluntary healthy Blood donors and Dyspeptic patients in Tripoli region and its surrounding .

Materials and Methods

A cross- sectional seroprevalence study was conducted from August 2016 to May 2017 among two different groups (Healthy Blood volunteers and Dyspeptic patients in Tripoli city attending Central Blood bank and Tripoli central hospital. Based on the questionnaire data, Blood donors individuals with a history of gastro duodenal ulcer, current chronic complaints of the upper digestive tract for more than two months (nausea, vomiting, heartburn, pyrosis or indigestion) or those currently using anti-acid or anti- ulcer medications were excluded from the study.

After all subjects examined by a physician, and the purpose and procedures of the study were explained, we obtained written informed consent from each participant, a standard questionnaire was completed by direct interview to obtain individual socio-demographic data regarding each Blood donor participant (age, gender, number of family members, Blood group, smoking, source of drinking water, coffee and Tea consumption, monthly family income, family history of gastric ulcer or gastric cancer, etc). 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 collected from each participant by peripheral venipuncture Blood bank laboratory. After separation, 250µl serum samples were labelled and frozen at -20ºC until analysis

Determination of anti- H. pylor

For the diagnosis of infection with *H. pylori*, Three hundred (79 Female, 221 Male mean age 32 years) serum samples were collected for the study and tested for evaluation of immunoglobulin G (IgG) antibodies against *H. pylori*. by using the commercial enzyme – linked immunosorbent assay (EUROIMMUN Anti – *Helicobacter pylori* ELISA (IgG), Germany). The serum concentration of anti-H. pylori IgG were expressed in relative units (RU/ ml) as no international standard is available. According to the manufacturers instructions the sensitivity of the kit was amounted to 100% , and the value of 5 RU/ml used to discriminate the negative from positive sample .

Data analysis

Data analysis was made by using SPSS version (24) software, Chi-square test for present of association between prevalence of H. pylori and different parameters, and standard of living P. values < 0.05 over considered to show significant difference.

Results

Three hundred individual samples (221 male , 79 female) mean age (32 years) were included in the study. The individual subjects were divided into two groups according to the health status, namely an Dyspeptic group and healthy Blood donors group, Dyspeptic group is defined as group of patients with chronic or recurrent pain or discomfort centered in the upper abdomen . the healthy Blood donors group is defined as an asymptomatic Blood donors that display No signs or symptoms .

The overall seroprevalence of H. pylori among the Healthy Blood donors group was 85.1% as table (1) and was 83.2 % among the Dyspeptic patients Fig (1) . Distribution of H. pylori positive according to gender it was found among healthy Blood donors (90.5 % male and 64.8 % female) as Shawn in Fig (2). and (33.6 % male and 66.3 % female) among Dyspeptic patients as table (2).

Table (2) The prevalence of *H. pylori* infection by IgG.

IgG Antibody detection	Result of H. pylori IgG Test in No.	Result of H. pylori IgG test in %
Positive	149	85.1%
Negative	26	14.9%
Total No.	175	100%

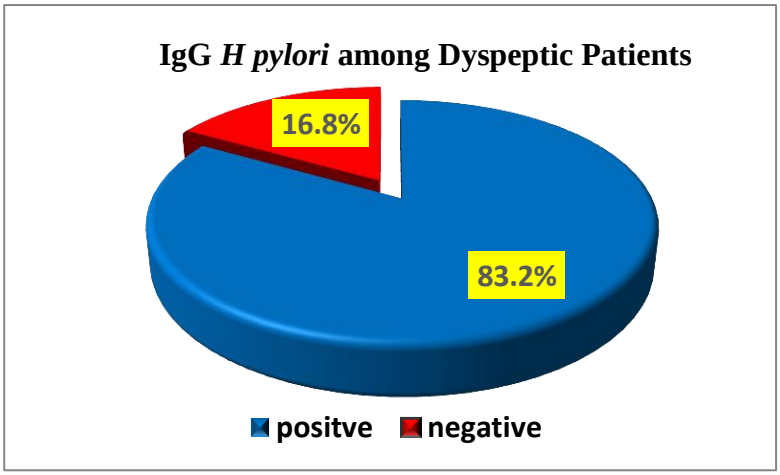
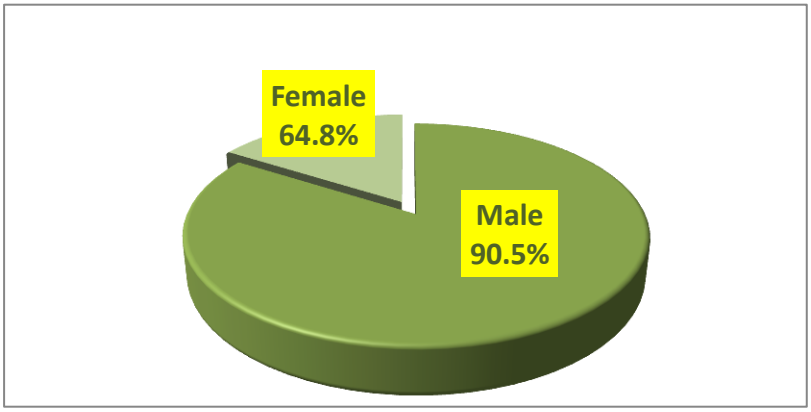


Figure (4) The overall seroprevalence of *H. pylori* among the Dyspeptic Patients



Figue (5) The seroprevalence of *H.pylori* among the Healthy Blood donors Males and Females.

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Table (2) Distribution of *H. pylori* positive and negative Dyspeptic Patients according to gender.

Gender	H. pylori Positive	H. pylori Negative	Total	*P*_Value
Male	(83.1%)35	(16.9%)7	(33.6%)42	0.304111
Female	(83.3%)69	(16.9%)14	(66.4%)83	
Total	(83.2%)104	(16.8%)21	125 (100.0%)	

In our study, no significant association was found between *H. pylori* infection and age group in the two study groups, asymptomatic adults and Dyspeptic patients with P value 0.03 as shown in Table (4 ,5).

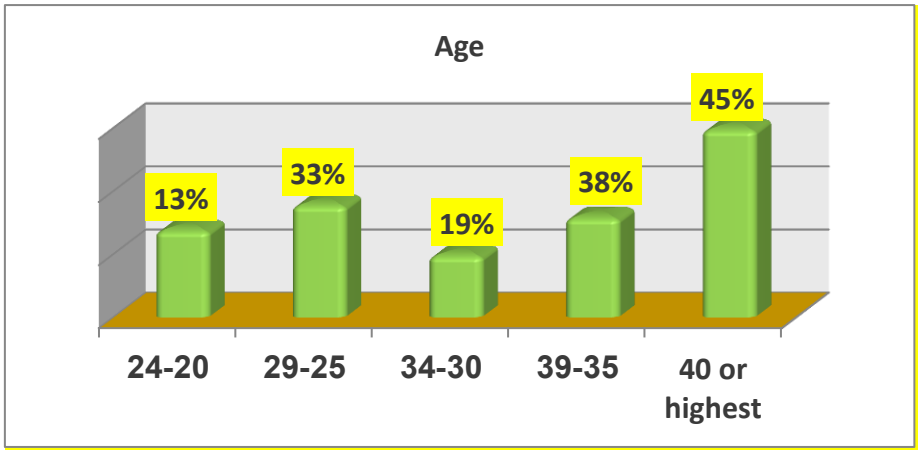

Figure (21) Prevalence of *H. pylori* of Healthy blood donors in different age groups

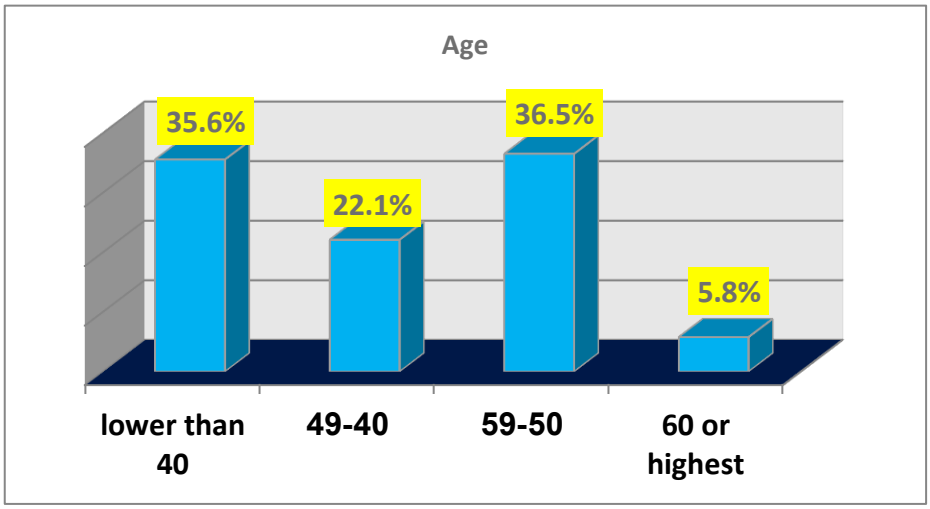

Figure (4) Prevalence of *H. pylori* of Dyspeptic Patients in different age groups.

In our study, no significant association was found between *H. pylori* infection and age group in the two study groups, asymptomatic adults and Dyspeptic patients with as shown in Fig (3 ,4). Regarding the blood group, it was found positive result among Healthy Blood donors (36.4% A ,18.1% B,41% O,4% AB) as shown in Fig (3) , and was found (39.2% A, 4.9% B, 52% O,3.9% AB) in Dyspeptic patients Fig (4) . .

The parameter of the source of water the results shown that (74.4%) from the sample had consumed filter water ,(12) had consumed well water and (13) had consumed tape water among healthy Blood group As Fig (5) , While the resulte shown that (81.7%) had consumed filter water,(13.4%) had consumed well water and (4.8%) had consumed tape water in Dyspeptic group As table show (3).

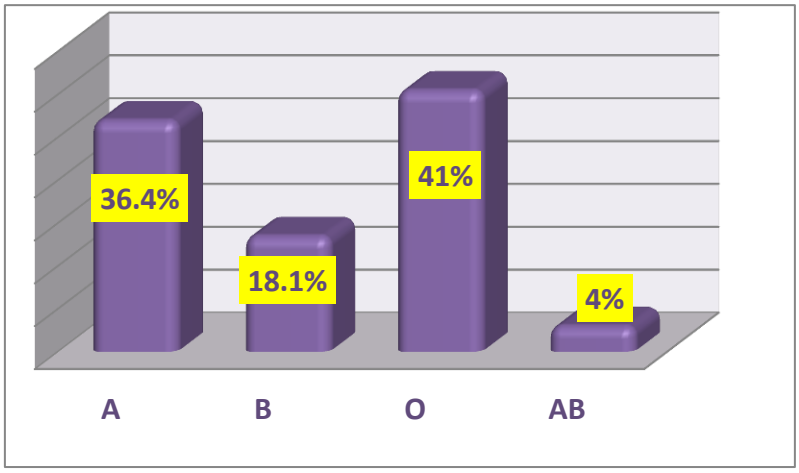

Figure (5) Prevalence of *H. pylori* of Blood donors in different Blood groupe

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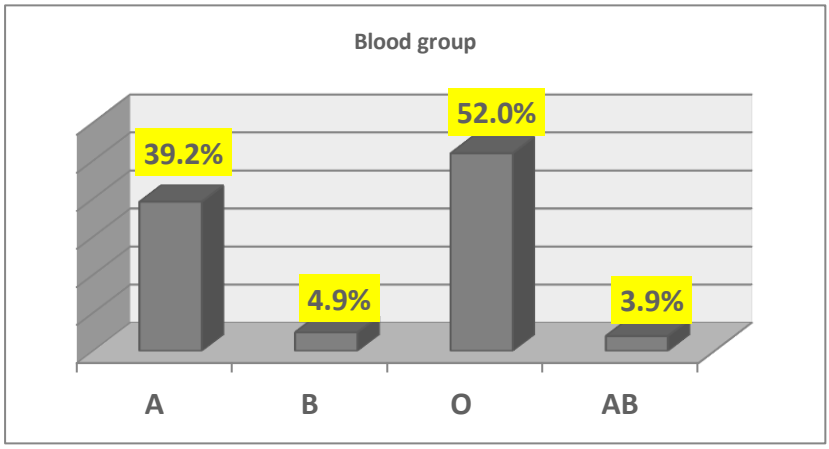

Figure (27) Prevalence of *H. pylori* of Dyspeptic Patients in different blood groups.

Discussi

Infection with H. pylori is not a disease by itself but a condition associated with a number of disorders of the upper gastrointestinal tract (Kusters et al., 2006).The serological testing for *H. pylori* antibody helps in early detection of "silent" peptic ulcer (Vaira et al.,1994). The present study was the first seroprevalence of H. pylori infection in a adult healthy Blood donors in western region of Libya. The results of the present study demonstrate that the prevalence of (85.1%) of asymptomatic individuals was high in Tripoli city and the area surround it, which is similar to other reported in Tripoli (71.%) among a group of obse & Non – obse subjects (Nami et al 2020) and from other several Libyan cities e.g. Benghazi,, where the authors found in healthy individuals (71.4%) infected with *H. pylori* (Mohammad et al., 2011), However, five years later other study from Benghazi found (56.5%) (Almehdawi & Ali, 2016), the reason for the decrease might be the use of antibiotics during the last few years. In Al-Komes region, an epidemiological studies found that (65%) of asymptomatic persons were infected with the gastric pathogen *H. pylori* (Lragaa et al., 2014, Nami et al., 2017), 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 (Souto et al., 1998).

In Kosovo, the seropositivity of *H. pylori* is moderately high (56.9%) among healthy Blood donors (Zhubi et al., 2011). In Kenya 93% of the (14) asymptomatic volunteers were found to have *H. pylori* infection (Lachlan et al., 1989). 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 (Hussen et al., 2013).

Our results indicate that the seroprevalence of *H. pylori* is increasing with the age, which is similar to other study such as among the Algerian children the seropositive of the bacterium were 43%, and the prevalence rose steadily with age, reaching a peak of 92% between the ages of 40 and 49 years (Megraud et al., 1989). An age specific increase in the prevalence of *H. pylori* infection was observed in Ivory Coast population, where the seroprevalence of the gastric bacteria *H. pylori* in children was 54% rising gradually to a plateau of 70% - 80% throughout adulthood (Lachlan et al., 1989). In Ghana (Awuku.et al., 2017).

H. pylori infection is usually acquired in childhood from either a parent or a sibling; however the acquisition of H. pylori from the environment source (contaminated water of food in the community and endoscopy in the hospital environment) usually only occurs in those countries with a poor public hygiene infrastructure. In our study most of the healthy blood donors 74.4% presented H. pylori seropositivity using water from the commercial supermarket compare to 13.4% and 12% who using private untreated well water and tape water as a source of

drinking water respectively

Drinking filter water from the commercial places which possibly contaminated with the H. pylori, since a sewage network was not exist, and consequently our study population was exposed to the fecal-oral route of bacterial transmission, a condition similar to that observed in other developing countries such as in Brazil where water has been regarded as a source of infection (Rocha et al., 1994).In Kazakhstan, a study suggest that high prevalence of H. pylori among healthy individuals is related to poor sanitation and hygienic practices , and transmission of *H. pylori* can be water borne (Nurgalieva et al., 2002).

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 contaminated water should be considered a risk factor for *H.pylori* infection (Baker and Hegarty, 2001).

Our results showed that the prevalence of anti-*H. pylori* antibody was significantly higher in males compared to females 88.6%, 11.4% respectively although results similar to ours were reported from other countries such as Iran (jafarzadeh et al., 2007) Italy (Gasbarrini et al., 1995) , New Zealand (Fraser et al., 1996) . However, in dyspeptic patients anti-*H. pylori* antibodies was higher prevalence in females (66.3%) compared to males (33.7%). However, in some studies no significant statistical difference were observed between sexes (Jimerez et al., 2004).

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