

Serological Detection of *Helicobacter pylori* Antibodies in Patients Suffering from Gastric Symptoms in Kano, Nigeria

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Abstract: *Background:* *Helicobacter pylori* is a major gastroduodenal pathogen and its seropositivity is associated with increased risk of development of human active chronic gastritis, peptic and duodenal ulcer and gastric cancer. *Objectives:* The aim of this study was to determine the seroprevalence of *H. pylori* infection among subjects with gastrointestinal problems. *Methods:* From May 2014 to October 2014, a seroprevalence study was carried out among 100 subjects who had clinical gastric symptoms, with a mean age of 37.77 years (range, 2 to 70 years). Serum samples collected from 44 male and 56 female were screened for detection of anti *H. pylori* IgG using commercial DIAQUICK *Helicobacter pylori* (manufactured by DIALAB Production, GMBH) kit. Statistical analyses were performed using SAS software, version 9.1 (SAS Institute Inc., Cary, NC). *Results:* The overall seropositivity rate of anti *H. pylori* IgG was 53%. Seropositivity of anti *H. pylori* IgG increased markedly with age and highest infection rate (96%) was seen in individuals 40 to 50 years old. Anti *H. pylori* IgA was also correlated with increasing age. Analysis of results for gender showed that there were no significant differences in seropositivity to *H. pylori* between men and woman ($p > 0.05$) but there was a significant correlation between anti *H. pylori* IgG and age of subjects ($p < 0.01$). Analysis of results for inflammatory markers (WBC and ESR) showed normal mean of WBC count (7000 cells/ml) and ESR rate (8mm/h) levels in these subjects. No association was detected between *H. pylori* seropositivity, gender and inflammatory laboratory parameters. *Conclusion:* This study revealed the high prevalence of *H. pylori* infection among symptomatic subjects in the study area suggesting necessity of screening for *H. pylori* infection in symptomatic patients. The results also did not show any strict relations between *H. pylori* seropositivity, gender and inflammatory markers.

Keywords: *Helicobacter pylori*, Seroprevalence, IgG, Gastritis, Nigeria

1. Introduction

Helicobacter pylori is the most common cause of chronic gastritis, infecting more than half of the world's population (Torres *et al.*, 2000). It is implicated in the etiology of a variety of gastrointestinal diseases, including duodenal ulcer, non-ulcer dyspepsia and active and chronic gastritis (Marshall *et al.*, 1985; Soll, 1990). This bacterium is also associated with a variety of disease ranging from asymptomatic gastritis to severe gastric ulcer which can progress to a gastric malignancy. Numerous reports have confirmed an association between the presence of *H. pylori* on the gastric mucosa of patients and increased risk for gastric carcinoma (Peterson *et al.*, 2000; Suerbaum and Michetti, 2002). Several seroepidemiological study have shown that the presence of serum IgG antibodies to *H. pylori* is related to an increased

risk for developing peptic disease and duodenal ulcer (Peterson *et al.*, 2000; Gdalevich *et al.*, 2000) hence, detection of antibodies is a critical step in management and prevention of serious outcomes and complication of *H. pylori* infection. The seroprevalence of *H. pylori* has been studied in healthy subjects and asymptomatic populations by chromatographic immunoassays, in both developed and developing countries (Best *et al.*, 1994; Lindkvist *et al.*, 1996) and high infection rates have been reported from developing countries (Torres *et al.*, 2000). Moreover, several studies have shown a wide variation in the prevalence of *H. pylori* antibodies among age groups in different geographical regions (Atalay *et al.*, 2003). No local studies are available regarding seroprevalence of *H. pylori* infection in North-western Nigeria. Measurement of serum immunoglobulin G (IgG) antibodies to *H. pylori* can be used to determine the prevalence of the infection. This study

was conducted to evaluate the seroprevalence of *H. pylori* infection among symptomatic subjects using rapid immunochromatographic method to determine anti *H. pylori* IgG.

2. Materials and Methods

2.1. Study Population

From May 2014 to October 2014, a seroprevalence study was carried out among 100 subjects who had clinical gastric symptoms, with a mean age of 37.77 years (range, 2 to 70 years). All patients had blood drawn for serological testing at the time of attending in Decent Medical laboratories, Kano, Nigeria. After collection, the serum was separated, aliquoted and frozen at -20°C until being tested. Demographic data including age and gender as well as Laboratory parameters such as WBC (White blood cell) and ESR (Erythrocyte sedimentation rate) were analysed in all subjects.

2.2. Rapid Chromatographic Immunoassay

Rapid chromatographic immunoassay was used for the qualitative detection of antibodies (IgG) to *H. pylori* in serum samples, according to previously reported methods (Jafarzadeh *et al.*, 2007). Assays were performed by a commercial DIAQUICK *Helicobacter pylori* kit, (manufactured by DIALAB Production, GMBH) following the manufacturer's instructions. Conditions were the same for all assays. Serum was separated from blood as soon as possible to avoid hemolysis. All the test samples, kits, buffer and controls were allowed to reach room temperature (15-30°C) prior to testing. Approximately 100 µl of each test samples were transferred to the specimen wells of the test cassette. Results were read at 10 minutes. All equivocal results were repeated.

2.3. Statistics

Statistical analyses were performed using SAS software, version 9.1 (SAS Institute Inc., Cary, NC). p-value of 0.05 or less was regarded as statistically significant.

3. Results

This study was performed in 100 subjects with gastric symptoms, including 56 female and 44 male with an age range of 2 to 70 years (mean age 37.77 years). All subjects were from Kano, Northwestern Nigeria.

3.1. Diagnosis of *H. pylori* by Serological Tests

Among 100 serum specimens tested for anti *H. pylori* IgG, 53 (53%) were positive and 47 (47%) were negative (Table 1).

3.2. Correlation of Age and Sex with Seropositivity of *H. pylori*

Screening for anti *H. pylori* IgG revealed that 53 (53%) subjects were positive and 47 (47%) was negative. Analysis of results for gender showed that there were no significant

differences in seropositivity to *H. pylori* between men and woman ($p>0.05$) but there was a significant correlation between anti *H. pylori* IgG and age of subjects ($p<0.01$). The rate of IgG seropositivity increased markedly with age, being maximum (45.2%) in 30 to 50 years old age group. After that, there was a small and steady decrease between age 50 and 60, but a slight arise was seen above 60 years old as shown in Table 2. Analysis of results for inflammatory markers (WBC and ESR) showed normal mean of WBC count(7000 cells/ml) and ESR rate (8mm/h) levels in these subjects. This study revealed no significant correlation between inflammatory markers and seroprevalence of *H. pylori* infection.

Table 1. Distribution of *H. pylori* IgG among subjects with gastric symptoms based on gender (n=100).

| Subjects with gastric symptoms (%) | | | |
|------------------------------------|-----------------------------------|-----------------------------------|-----------|
| Sex | <i>H. pylori</i> IgG Positive (%) | <i>H. pylori</i> IgG Negative (%) | Total |
| Male | 23 (52.3) | 21 (47.7) | 44 (44.0) |
| Female | 30 (53.6) | 26 (46.4) | 56 (56.0) |
| Total | 53 (53.0) | 47 (47.0) | 100 (100) |

$p>0.05$

Table 2. Distribution of immunoglobulin (IgG) antibodies to *H. pylori* in 53 subjects in different age groups.

| Age groups (years) | Male | Female | Total |
|--------------------|-----------|-----------|----------|
| 0– 10 | 0(00.0) | 1(3.3) | 1(1.9) |
| 11 – 20 | 1(4.3) | 2(6.7) | 3(5.7) |
| 21 – 30 | 2(8.7) | 3(10.0) | 5(9.4) |
| 31 – 40 | 4(17.4) | 5(16.7) | 9(16.9) |
| 41 – 50 | 7(30.4) | 8(26.7) | 15(28.3) |
| 51 – 60 | 3(13.0) | 4(13.3) | 7(13.2) |
| 61 – 70 | 6(26.1) | 7(23.3) | 13(24.5) |
| Total | 23 (43.4) | 30 (56.6) | 53 (100) |

Mean age 37.77 years, $p<0.01$

4. Discussion

H. pylori infection is an important risk factor for development severe gastric problems (Malekzadeh *et al.*, 2009). Detection of *H. pylori* infection with non-invasive methods such as serological tests are useful, widely available and inexpensive (Ricci *et al.*, 2007). These methods contribute an advantage to epidemiological research in which typically large numbers of subjects can be studied from easily obtained blood samples. The results of this study showed that the overall seroprevalence of *H. pylori* infection based on anti *H. pylori* IgG was 53%. This result indicated that our seroprevalence is higher than many developed countries reported as 37% in United States (Graham *et al.*, 1991) and 40% in Germany (Seher *et al.*, 2000) but lower than some developing countries reported as, 90% in Bangladesh (Mahalanabis *et al.*, 1996). It has been reported that IgG titre indicates chronic infection. Our result revealed an age-related increase of anti *H. pylori* IgG. The seropositivity of IgG varied in different age group, from 1.9% in 0 to 10 years old group to 24.5% in the age group of 60 to 70 years. In

addition there was a slight decrease in the seropositivity of IgG over 50 years of age in our study, similar to results reported by Kate *et al.* (2001), and this may be related to eradication of the bacterium due to potentiation of immune response. The age-related increase in antibody prevalence in the present study was similar to results of previously published studies. In a study carried out in Southeastern Nigeria with 1,206 ulcer patients confirmed positive by faecal occult blood test, 703 (58%) were positive for *H. pylori* IgG antibody serological test (Ifeanyi O. C. O and Prosper O. U. A, 2013). Another study in South-western Nigeria with 185 children tested for *H. pylori* antigen found 134 (68.7%) and 51(26.2%) as seropositive and fecal HpSA positive respectively (Olufemi *et al.*, 2015).

A study conducted in southern of Iran (Shiraz) revealed that 82% of children aged nine months and 98% of two year old children were *H. pylori* infected (Alborzi *et al.*, 2006). Also in Rafsanjan, another city of Iran, high infection rate of *H. pylori* in children and adults and its correlation with age has also been reported (Jafarzadeh *et al.*, 2007). This result also is in accord with many reports from other countries (Gisbert *et al.*, 2001; Gill *et al.*, 1994). A study by Fock (1997) showed that seroprevalence of *H. pylori* infection in Singapore increases with age from 3% in children under 5 years old up to 71% in adults above 65 years. The age-related increase of seroprevalence is attributable to the fact that *H. pylori* infection is usually acquired during childhood and carried for life. This study also demonstrated that gender had no influence on *H. pylori* infection rate. A number of other studies have yielded similar results and shown no significant correlation between *H. pylori* infection and gender (Jimenez-Guerra *et al.*, 2000). However, there are few studies reported a significant association of *H. pylori* infection with male gender (Leandro *et al.*, 2005). The results from this study, although indicated that inflammatory marker such as WBC (white blood cell) and ESR (erythrocyte sedimentation rate) were not correlated with seropositivity of *H. pylori* infection.

5. Conclusion

The results of this study showed high prevalence of *H. pylori* IgG antibodies in patients suffering from gastric symptoms suggesting necessity of screening for *H. pylori* infection in symptomatic patients. This result also did not show any strict relations between *H. pylori* seropositivity, gender and inflammatory markers.

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