Seroprevalence of Helicobacter Pylori among Adult in Sokoto Metropolis

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Abstract: *Helicobacter pylorus is one of the human pathogens with highest prevalence around the world.*
Aim: *This study was conducted to investigate the prevalence of H. pylori among adults in Sokoto Metropolis.*
Methods: *The prevalence of H. pylori among adults was ascertained using the commercial Rapid Chromatographic Immunoassay Kits Labmann products inc. Ontario califonia 91761, USA (H. pylori serum test cassette). All procedures for the test were based on the recommendations of the manufacturer.*
Results: *Four hundred and thirty one (431) subjects (225 males and 206 females) participated in this study, out of which 236 (54.8%) were positive while 195 (45.2%) were negative. Among the positive cases, the prevalence in males was 32.5% (140 of 225) while the prevalence in females was 22.3% (140 of 225). The prevalence of H.pylory infection among the study group was 54.8%.*
Conclusion: *In conclusion, the prevalence of H.pylory infection among the study group was high, this study employed serology to determine the presence or absence of the infection by H.pylori among the population studied, there is need to employ the current advance techniques like PCR and biopsy culture to isolate the organism.*

I. Introduction

Helicobacter organisms were originally placed in the genus Campylobacter (12). Phylogenic studies have shown that they are not related to the group and haven classified as a new genus Helicobacter. The organisms are small 'S' shaped Gram negative bacteria (12).

Helicobacter pylori (H. pylori), previously named Campylobacter pyloridis, is a Gram-negative, microerophilic bacterium found in the stomach. It was identified in 1982 by Barry Marshall and Robin Waren, who found that it was present in patients with chronic gastritis and gastric ulcers, conditions that were not previously believed to have a microbial cause. It is also linked to the development of duodenal ulcers and stomach cancer. However, over 80 percent of adult infected with the bacterium are asymptomatic and it has been postulated that it may play an important role in the natural stomach ecology (2).

Infection of the gastric mucosa by H. pylori is an important risk factor for the development of gastric ulcer, duodenal ulcer, and development of upper gastrointestinal tumor [adenocarcinoma and mucosa associated lymphoid tissue (MALT)] (15). It is suggested that the T-cell immune responses to H.pylori leads to the secretion of lymphokines [such as interferon gamma (INFɣ) and tumor necrotic factor alpha (TNFα)], and the lymphokines may cause an inflammatory response that result in chronic gastritis. The damage mediated by the immune response may be augmented by the cytotoxin produced by H.pylori (15).

More than 50% of the world's population harbor H. pylori in their upper gastrointestinal tract. Infection is more prevalent in developing countries, and incidence is decreasing in Western countries. H. pylori's helix shape (from which the generic name is derived) is thought to have evolved to penetrate the mucoid lining of the stomach (4).

Over 80% of people infected with H. pylori show no symptoms (3). Acute infection may appear as an acute gastritis with abdominal pain (stomach ache) or nausea (5). Where this develops into chronic gastritis, the symptoms, if present, are often those of non-ulcer dyspepsia: stomach pains, nausea, bloating, belching, and sometimes vomiting or black stool (5).

Individuals infected with H. pylori have a 10 to 20% lifetime risk of developing peptic ulcer and a 1 to 2% risk of acquiring stomach cancer (8). Inflammation of the pyloric antrum is more likely to lead to duodenal ulcers, while inflammation of the corpus (body of the stomach) is more likely to lead to gastric ulcers and gastric carcinoma (14). However, it is possible that H. pylori plays a role only in the first stage that leads to common chronic inflammation, but not in further stages leading to carcinogenesis (4). A meta-analysis

conducted in 2009 concluded that the eradication of H. pylori reduces gastric cancer risk in previously infected individuals, suggesting that the continued presence of H. pylori is a risk factor for gastric cancer (7).

The seroprevalence of the infection increases with age, but it is not known whether this depends on a gradual acquisition of the infection by the adult population, or on a cohort effect, since the H.pylori infections, in the majority of cases, contracted in childhood (10). However, the prevalence has been reported in some studies to be higher in developing countries than in developed countries and the prevalence of the infection was found to be more than 70% of the populations studied, while in developed countries the prevalence was found to be between 27.6% to 32.5% of the populations studied (6, 11). However, some people harbor the organism throughout their lives without overt clinical symptoms.

No previous studies regarding the prevalence of H.pylori infection has been reported in Sokoto state, Nigeria. Hence in this study, will present the prevalence of H.pylori by serology. Possible predisposing factors include poor personal hygiene, contact of food and water etc.

When a pathogenic organism is difficult to isolate and culture in the laboratory, the best and sometime the available option is adopted. This underlies the importance of serology in the study of some pathogenic organisms. Basically, serology depends on the reaction of antibody and antigen. All pathogen when they enter the host always provoke specific antibody which can form the basis of their detection (10).

II.   Materials And Methods

Study Area

The study was carried out in Usmanu Danfodiyo University Teaching Hospital (UDUTH) and Sokoto state specialist Hospital.

UDUTH is located in Sokoto town, Sokoto State and was established in May 1980 as a second generation Teaching Hospital.

Sokoto State Specialist Hospital is located in Sokoto South Local Government of Sokoto State.

Study Population

The study was conducted among adults resident in Sokoto Metropolis. A total of 431 apparently healthy subjects were recruited in the study.

Eligibility Criteria

The inclusion criteria include 431 apparently healthy subject attending UDUTH and Specialist Hospital Sokoto who were willing to participate in the study provided they were between age range of 18-57, gender (male and female), Resident in Sokoto metropolis.

All adults who meet these criteria were given equal chance of being part of the study and a questionnaire was given to the participants.

Exclution Criteria

The exclusion criteria include ; person who had previously been diagnosed or treated for H. pylori infection, gastritis, gastric or duodenal ulcer; person who had been on medication with proton-pump inhibitors, antibiotic, steroids or non-steroid anti-inflammatory drugs (NSAIDS) for the past one month.

Study Design

The study was designed as cross-sectional descriptive study.

Data Collection And Analysis

The socio-demographic data and other relevant information of each participant were obtained using self-administered questionnaire. Subsequently, data were analyzed using statistical program for social science (SPSS) computer software program version 18.

Ethical Consideration

Ethical clearance was sought for and obtained from the Clinical Ethical Committee of Usmanu Danfodiyo University Teaching Hospital and Sokoto State Specialist Hospital all in Sokoto Metropolis. Informed consent was obtained from all the participants.

III.   Laboratory Technique

Sample Collection

3ml Venous blood was collected from each informed and consenting adult into plain containers, allowed to clot and then centrifuged at 3000 rpm for 5minutes and then the sera was separated and used for the test. The test was conducted within one hour of sample collection (1).

Serological Test

One step Anti-H. pylori rapid screen test is a lateral flow, immunochromatographic screening test. Two purified recombinant antigens of H. pylori are used in test band as capture materials and gold conjugates. If the antibody of H. pylori is present in concentration above the labeled, complex will be formed. This complex is then captured by antigens immobilized in the test zone of the membrane, producing a visible pink-rose color band on the membrane. The color intensity will depend on the concentration of the anti-H. pylori present in the sample. This one step test is very sensitive and only takes about 15-20 minutes. Test results are read visually without any instrument.

Detection Of H.Pylori Antigen

Qualitative detection of H. pylori was carried out using 3rd generation ELISA One Step cassette style Anti-HP Rapid screen test (serum) manufactured and described by labman (USA) with strict adherence to the manufacturer's instructional manual.

Principle

H.pylori was determined by the rapid immunoassay method based on the immunochromatographic sandwich ELISA principle.

Test Procedure

All procedures for the test are based on recommendation of the manufacturer. Test strip, serum specimen and controls are allowed to equilibrate to room temperature prior to testing. The steps are as follows:
- The test was performed at room temperature (18°C to 30°C)
- The strip was removed from the sealed pouch and then it was placed on a flat surface.
- Using the plastic pipettor provided, three drops of sample were drawn into the sample well of the cassette.
- The result was read at 15 minutes time.

IV.   Results

Interpretative Of Results

Positive: Two pink bands appear on test and control region of the cassette. This indicates that the specimen contains detectable amount of anti-H.pylori.

Negative: Only one pink band appears on control region of the cassette. This indicates that there is no detectable anti-H.pylori in the serum.

Invalid: If no colored band appears on control region, this is an indication of a possible error in performing the test or the kit. The test should be repeated using a new device.

The prevalence of Helicobacter pylori (H. pylori) in the study population was determined, four hundred and thirty one (431) adults (225 males and 206 females) with the age range of 18 to 57 years participated in the study. The H. pylori positive results were determined by serological test and socio- demographic characteristic of the participant was collected using self-administered questionnaire.

The overall prevalence of H. pylori infection among the population studied was 54.8% (236 of 431), 225 males and 206 females participated in this study. The prevalence in males was 32.5% (140 of 225) while the prevalence in females was 22.3% (96 of 206). The gender differences among the positive cases appear to be higher in males 32.5% in contrast to females 22.3%. However, this difference was considered statistically non significance ($p < 0.05$).
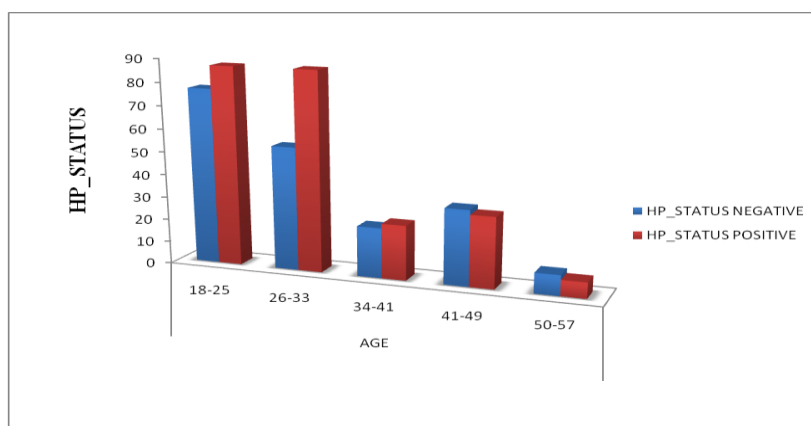
Table :1 shows prevalence of H. pylori infection while Figure :1 shows prevalence of H.pylori against age group and Figure2: Shows gender difference among positive and negative cases of H.pylori infection against males and females.

Table- 1: Prevalence Of Helicobacter Pylori Infection Based On Age.

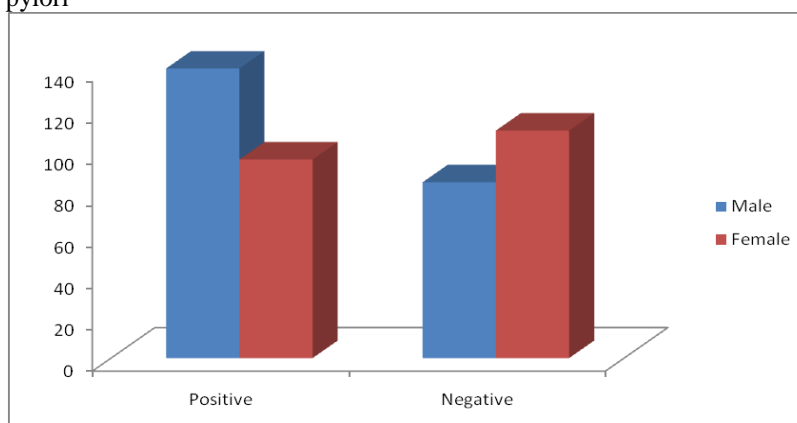| AGE RANGE	NEGATIVE	POSITIVE	TOTAL
18-25	77	87	164
26-33	54	87	141
34-41	22	24	46
41-49	33	31	64
50-57	9	7	16
Total	195	236	431

Table 2: Shows Diffirence In Positve And Negative Cases Of H.Pylori Infection Base On Occupation.

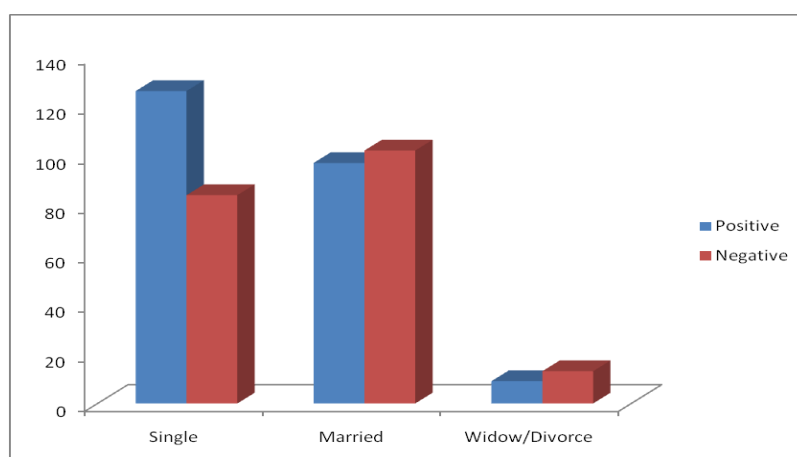| OCCUPATION	HP STATUS NEGATIVE	POSITIVE	TOTAL
Civil Servant	58	88	146
Farmers	13	16	29
Student/Others	124	132	256
Total	195	236	431

Figure 1: Prevalence Of H. Pylori Against Age Group

HP= Helicobacter pylori

Figure: 2 Gender Difference among Positive And Negative Cases Of H.Pylori Infection Against Male And Female

Figure: 3 The Prevalence Of H.Pylori In Relation To Marital Status

V.   Discussion

Helicobacter pylori is a major etiologic agent of peptic ulcer disease. Chronic gastritis, gastric carcinoma and gastric mucosal associated lymphoid tissue (MALT) lymphoma. The habitat of organism is mucus layer in the gastric pits were it lies in close opposition to gastric epithelial cell and causes damage to the cells resulting in various disease condition. Different diagnostic test have been developed for the diagnosis of H. pylori infection. These tests can broadly be classified into two; invasive and non invasive (serologic test) tests, all of these tests have been shown to have specificity and sensitivity that are above 90%. The invasive test uses endoscopy biopsy samples for culture, histopathology test, polymerase chain reaction (PCR) and rapid urease test (RUT). The non-invasive (serological test) tests do not use endoscopy but employs other sample for the test, they include serology, stool antigen test, urea breath test and urinary antibody test. (1).

In this study, the prevalence of H.pylori infection appears higher in Male 32.5% (140 of 225) than in Female 22.3% (96 of 206). However, this difference in the prevalence between Male and Female is statistically non-significance ($p < 0.05$). This is comparable to other studies (1).

The prevalence of H. pylori infection in this study was 54.8% . This is in contrast to the result found in other studies conducted in Nigeria, Ethiope East Local Government Area, Delta State with the prevalence of 38.35, also prevalence of 64% was found in a study conducted in Ibadan (1). A prevalence of 62% was found among Chinese population (14).

The seroprevalence of the infection increase with age but it is not known whether this depends on a gradual acquisition of the infection by the adult population, or on cohort effect, since the H.pylori infection, in the majority of cases, are contracted in childhood (9).

However, the prevalence has been reported in some studies to be higher in developing Countries than in developed countries (6, 11).

Also this study shows the prevalence of H.pylori is increases with the age, However some people harbour the organism throughout without overt clinical symptoms. Possible predisposing factor include poor personal hygiene, contamination of food and water, and eating food with higher concentration of spices.

It is noteworthy to state that with the increase in the level of education among the population studied on personal and environmental hygiene, it is expected that there would be a large decline in the rate of transmission of the infection and as such a concomitant decline in the incident rate and hence resulting in a drop in the prevalence of H. pylori infection.

VI.   Conclusion

The prevalence of H.pylory infection among the study group was 54.8%,   this study employed serology to determine the presence or absence of the infection by H.pylori among the population studied, there is need to employ the current advance techniques like PCR and biopsy culture to isolate the organism.

VII.   Recommendations

Since H.pylori infection is a very difficult to treat because there is no single drugs that cure H. pylori infection. The treatment involves taking several medications for 7 to14 days. Most of the treatment regimens include a medication called a proton pump inhibitor. This medication decreases the stomach's production of acids, which allows the tissues damaged by the infection to heal, example of proton pump which include ; Lansoprazole (Prevacid), Omeprazole (Prilosic), pantaparazole (Protonix), Dexlansoprazole (Dexilant) and esomeprazole (Nexium). Two antibiotics are also generally recommended, this reduces the risk of treatment failure and antibiotic resistance. The parent and government should be enlightened about the risk of H. pylori infection and there is also need for government to provide good sanitary measure and food control (like in restaurant). There is also need for government to encourage people about the H. pylori screening test since it is one of the etiological agent of ulcer.

The following precautions are necessary to reduce the risk of H. pylori infections.
- Woking in a ventilated area.
- Washing hands frequently and properly, always use soap.
- Avoidance of eating food prepare in an unhygienic setting;
- Always drink water from a reportable source.
- Washing hand when visiting hospitals and when leaving the hospital.

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