

Original Research Article

Prevalence of *Helicobacter pylori* in students with Stomach ulcer attending School of Health Technology Gwadabawa, Sokoto, North-Western Nigeria

ABSTRACT

Aim: The aim of the present study was to determine the prevalence of *Helicobacter pylori*, (*H. pylori*) among students of Sultan Abdurrahman School of Health Technology Gwadabawa, Sokoto State.

Methodology: A total of 147 subjects, made up of 45 (30.6%) males and 102 (69.4%) females were recruited for this study. Randox qualitative in vitro diagnostic screening test kit was used to screen for *H. pylori* infection.

Results: Of the 147 subjects tested, 116 (78.9%) were positive and 31 (21.1%) were screened negative and of the 45 male subjects studied, 38 (25.9%) were positive compared to females 80 (54.4%).

Conclusion: The Prevalence of *Helicobacter pylori* among the subjects was 78.9%, and the frequency was higher in females than males, and much higher in those that are married than singles. Symptoms of abdominal pains and ulcer were strongly associated to infection of *Helicobacter pylori*. There is a need for the routine screening of subjects on a much wider scale for *Helicobacter pylori* to allow for evidence-based management of subjects the infection and also educate them on the factors that will predispose them to infection, as well as good water sources and proper sanitation in our environment especially in the rural areas where personal and environmental hygiene is poor.

Keywords: *Helicobacter pylori*, stomach ulcer, Gwadabawa, Sokoto

INTRODUCTION

Helicobacter pylori (*H. pylori*) formerly known as *Campylobacter pyloridis*, then *Campylobacter pylori* [1]. is one of the commonest bacterial infections worldwide [2]. Nearly 50% of the world's population is affected. *H. pylori*, is unipolar, multi-flagellate, spiral shaped, micro-aerophilic, gram negative micro-organism that was discovered by Warren and Marshall in 1982, from gastroscopy biopsy specimens [3][2]. It is the only organism capable of colonizing the hostile acidic environment of the stomach. This is due to its ability to produce an enzyme called urease, which

hydrolyzes urea to produces ammonia which in turn buffers external acid and creates a suitable pH environment [4]. *H. pylori* weaken the protective mucous coating of the stomach and duodenum, which allows acid to get through to the sensitive lining beneath. Both the acid and the bacteria irritate the lining and cause a sore, or ulcer [5]. Its helix shape is thought to have evolved to penetrate the mucoid lining of the stomach [6].

Majority of *H. pylori* infected persons has no symptoms. Approximately 10-15% of the infected persons develop associated illnesses, with 1 to 10% developing peptic ulcer disease, 0.1 to 3% developing gastric cancer and less than 0.01% developing gastric mucosa- associated lymphoid tissue (MALT) lymphoma. Early studies have estimated the rate of *H. Pylori* infection in patients with duodenal ulcer to be as high as 90% and in gastric ulcer to be as high as 70 to 90% [2].

There are several lines of evidence implicating *H. Pylori* in the development of gastric and duodenal ulcers.

1. *H. Pylori* is found in most patients who have peptic ulcers in absence of NSAID use.

2. Eradication of *H. Pylori* significantly reduces the recurrence of gastric and duodenal ulcers.

3. Treatment of *H. Pylori* infection leads to more rapid and reliable ulcer healing than treatment with anti-secretory therapy alone.

[2].

Chronic *H. pylori* infection, particularly when acquired early in childhood, can predispose a person to a significantly increased risk of development of gastric cancer. These studies are so compelling that the World Health Organization has recently classified *H. pyroli* as a type I human carcinogen [7], because chronic inflammation and atrophy can further lead to malignant transformation [6].

Humans are the only known host of *H. Pyroli*, with the stomach been considered as the reservoir of this pathogen [8]. *H. pylori* is contagious, although the exact route of transmission is not known [6], the transmission seems to be direct from person-to-person via faecal-oral or oral-oral routes in developing countries. And gastro-oral routes in developed countries [8]. Although, certain epidemiological studies have suggested the possibility of water-borne and food-borne transmissions [2]

H. pylori is present in 95% of patients with duodenal ulcers, and in 70% of those with gastric ulcers [9]. Its prevalence is highly variable in relation to geography, ethnicity, age, and socioeconomic factors. The prevalence of the infection is more common in developing countries than in developed countries,

with the prevalence ranging from as low as 10% to as high as 80% respectively [8]. Although the prevalence of this infection appears to be decreasing in many parts of the world, *H. pylori* remains an important factor linked to the development of peptic ulcer disease, gastric malignancy and dyspeptic symptoms [2].

Colonization with *H. pylori* virtually always leads to infiltration of the gastric mucosa in both antrum and corpus with neutrophilic and mononuclear cells. This chronic active gastritis is the primary condition related to *H. pylori* colonization, and other *H. pylori* associated disorders in particular result from this chronic inflammatory process [10].

Methods for diagnosis of *H. pylori* infections includes Endoscopy, Histology, Rapid urease test which is based on immunological detection of urease, Urea breath test which is accurate and robust, Stool antigen test which is a noninvasive alternative to diagnose *H. pylori* when the urea breath test is not available and Antibody detection [8].

MATERIALS AND METHODS

Study area

Gwadabawa local government is located in Sokoto state, north-western part of Nigeria. With a population of 231,569 in 2006 census and a projected population of 269,050 in 2011, with a land mass of 991 km² [11], with the inhabitants been mainly Hausa-Fulani.

Study population

A total of 200 students within the age range of 20 – 60 years of birth, with history of abdominal pain, ulcer and have been taking medication for stomach ulcer for the past one to six years; attending the School of Health Technology Gwadabawa were recruited for this study. Informed consent was obtained from the study subjects and ethical approval obtained from the school authority.

Study Design

This research is a prevalence study. The patients were conveniently enrolled into the study. Quantitative data was elicited using interviewer administered questionnaire, while the qualitative data was obtained by screening the subjects for *Helicobacter Pylori*. Information on marital status, history of upper abdominal complaints within the previous years, dyspeptic symptoms, substantial burning pain, decrease appetite and constipation were investigated. Frequency of

consumption of raw vegetable, coffee, alcoholic beverages and meat were collected. Age was recorded in complete years. Ethical clearance was obtained from the school management and the subjects consent was obtained before enrolment.

Inclusion criteria

Subjects with clinical history of stomach ulcer, and are on treatment were recruited for this study.

Exclusion criteria

All subjects with no clinical history of stomach ulcer, or on medication for ulcer.

Specimen collection and processing

Three (3) milliliters of blood was collected in plain containers and allowed to clot, then centrifuged at 3000 rpm for 5 minutes. The serum obtained were transferred into serum containers and stored in a refrigerator until needed for the analysis. The screening for *H. pylori* was carried out using a rapid test kit.

Procedure

The method used in this study is a Chromatographic immunoassay [CIA] for the rapid determination of antibodies of *H. pylori* in serum specimens. During the assay the serum specimen is first allowed to react with *H. pylori* specific antigen-gold conjugate complexes. The mixture then moves laterally on the membrane to the test region which is coated with immobilized antibodies of *H. pylori*. If *H. pylori* antibodies are present in the specimen, a colour band is formed on the test [T] region. Absence of the coloured band in the test region indicates a negative result, to serve as a procedural control a coloured band in the control [C] region will always appear regardless of the presence of *H. pylori* antibodies in the serum specimen.

Principle; the *H. pylori* specific antigens are pre-coated onto membranes as a capture reagent on the test band region. During the assay the serum specimen is first allowed to react with *H. pylori* specific antigen- gold conjugate complexes. The mixture then moves laterally on the membrane to the test region which is coated with immobilized antibodies of *H. pylori*.

Data analysis

The data generated were analyzed using SPSS for windows version 21.0 (SPSS Inc., Chicago, IL) and chi-square test. A p value of < 0.05 was considered to be statistically significant.

RESULTS

Table 1: This study was conducted with the aim of determining the prevalence of *Helicobacter pylori* deficiency among students of Sultan Abdurrahman School of Health Technology Gwadabawa, and its environs

Demographic aspect	Rapid test (Positive)	Rapid test (Negative)	Chi-square (95 % CI)	<i>p</i>
Sex				
Male (<i>n</i> =45)	38 (25.9%)	9 (6.1%)	7.587	0.023
Female (<i>n</i> =102)	80 (54.4%)	20 (13.6%)		
Age (years)				
20–30 (<i>n</i> =98)	71 (48.3%)	27 (18.4%)	0.143	0.705
31–40 (<i>n</i> = 43)	39 (26.5%)	4 (2.7%)		
41–54 (<i>n</i> =6)	6 (4.1%)	0 (-)		
Above 55 (<i>n</i> =0)	0 (-)	0 (-)		
Marital status				
Single (<i>n</i> =62)	48 (32.6%)	14 (9.5%)	0.143	0.705
Married (<i>n</i> =85)	68 (46.3%)	17 (11.6%)		
Period of episodes				
0-6 months (<i>n</i> =51)	37 (25.2%)	14 (9.5%)	4.241	0.237
7-12 months (<i>n</i> =8)	6 (4.1%)	2 (1.4%)		
1-6 years (<i>n</i> =85)	68 (46.3%)	17 (11.6%)		
7-12 years (<i>n</i> =3)	3 (2.0%)	0 (-)		

Demographic aspect	Rapid test (Positive)	Rapid test (Negative)	Chi-square (95 % CI)	<i>p</i>
History				
Abdominal pains				
Yes (<i>n</i> =139)	114 (77.5%)	25 (17.0%)		
No (<i>n</i> =8)	2 (1.4%)	6 (4.1%)		
Ulcer				
Yes (<i>n</i> =143)	115 (78.2%)	28 (19.1%)		
No (<i>n</i> =4)	1 (0.7%)	3 (2.0%)		

169 Values computed at significance level of 5%.

170 DISCUSSION

171
172 The overall prevalence of *Helicobacter pylori* in this study was within the range of
173 what is reported for Nigeria. In the course of this study, out of the 147 subjects
174 tested, 116 (78.9%) were positive and 31 (21.1%) were negative. This is similar to
175 a study carried out by Ratha-korn *et al*, 2013 [12], in a study in Bhutan Thailand
176 that reported a prevalence of 73.4% and Newton *et al*, 2006 [13] in Uganda that
177 reported a positive prevalence of 87% among adults, even though the prevalence
178 was a bit higher than ours, and that of Aguemon *et al*, 2005 [14] in Benin republic
179 that reported prevalence of 72.3% - 74.4% in rural and urban settlements
180 respectively, and Benberin *et al*, 2013[15] that reported a percentage prevalence Of
181 62.4% in Kazakstan, and Akin *et al* 2004 [16], that reported a prevalence of 77.5%
182 in a study in Turkey.

183 Comparing the frequencies based on sex, out of the total number of 147
184 subjects, 45 were males and 102 were females, out of which 38 (25.9%) males
185 were positive and 9 (6.1%) negative, and 82 (54.4%) of the females were positive
186 and 20 (13.6%) were negative. This shows that the prevalence is higher in females
187 than males, which is contrary to reports by most studies that reported a higher
188 prevalence in males most especially in developed countries while others reported
189 no differences between sexes which is commonly found in developing countries
190 [16]. this might be due to the higher number of females in the study or other factors
191 not captured by the scope of this study

192 When compared based on age groups, 98 subjects are between the age of 20 – 30
193 years, out of which 71(48.3%) were positive and 27 (18.4%) were negative. 43
194 subjects were within the age range of 31 – 40 years, out of which 39 (26.5%) were

positive and 4 (2.7%) were negative and finally 6 subjects were between 41 – 54 years, and all were positive, having a percentage of (4.0%). From this result it can be seen that the prevalence of the infection decreases with age. Which is similar to findings by Newton *et al*, 2006 [13] in Uganda, and Cataldo *et al*, 2004 [17] in Cote d'Ivoire that reported a decline in prevalence with age.

In the current study, when the frequencies are compared based on marital status, out of 62 subjects comprising of 26 males and 36 female, 48 (32.6%) were positive and 14 (9.5%) were negative, and of the 85 married subjects comprising of 19 males and 65 females, 68 (46.3%) were positive and 17 (11.6%) were negative. This shows that the prevalence of the disease is high in the married group than with those that are single. This is in partial conflict with reports by Tsongo *et al* 2015 [18] in a study carried out in Uganda that reported a similar frequency of 32.7% and 38.8% for singles using Elisa and rapid test kit respectively, but has a frequency of 30.3% and 25.8% for the married group. These current findings might be due to other risk factors like socio-economic status, living in rural communities, crowded households (exceeding 8 person/ home), poor sanitation all of which are positively associated with the presence of *Helicobacter pylori* infection as reported by Leonardo *et al*, 2014 [19], Hasosah *et al*, 2015 [20], Langat *et al*, 2006 [21]. The difference noticed in the married group might be as a result of living in a crowded household in rural areas, and the fact that the former practices polygamy more than the later, due to religious differences as well as cultural affiliations.

When compared based on duration of reported disease manifestation and clinical signs and manifestations of ulcer, out of the 51 subjects having signs between 1 – 6 months 37 (25.2%) were positive and 14 (9.5%) were negative, out of the 8 subjects experiencing signs between 7 – 11 months, 6 (4.1%) were positive and 2 (1.4%) were negative, 85 were having signs between 1 – 6 years, out of which 68 (46.3%) were positive and 17 (11.6%) negative, of the 3 subjects having signs between 7 – 12 years all were positive having (2.0%).

Out of the 147 subjects screened, 139 subjects answered yes to having abdominal pains, and 8 answered no. out of which 114 (77.5%) were positive and 25 (17.0%) negative and of the 8 that answered no 2 (1.4%) were positive and 6 (4.1%) are negative. Out of the 143 subjects that answered yes to having ulcer, 115 (78.2%) were positive and 28 (19.1%) are negative. 4 subjects answered no to having ulcer out of which 1 (0.7%) was positive and 3 (2.0%) were negative. This finding is in line with findings by a study in Uganda by Tsongo *et al* 2015 [18] that reported a frequency of 79.2% positive, for those that answered yes to having abdominal pains and a 75% frequency for those that responded yes to ulcer, although the study could not establish a significant association of the infection to a symptom. However the current finding is in line with reports linking *Helicobacter*

pylori infection to the development of peptic and duodenal ulcers. As reported by Ratha-korn *et al*, 2013 [12] in a study in Bhutan Thailand.

Limitations

The blood test can only identify *H. pylori* antibodies that could be from an active or previous infection. Though there are other testing options available to diagnose or confirm the cure of an *H. pylori* infection, like the Urea breath test and the stool test which can both diagnose active infections in the stomach.

CONCLUSION

The prevalence of *H. pylori* among the students with ulcers was established as 78.9%, there was a difference in the results between sexes, the highest frequency was observed among students that have the infection between 1 – 6 years. Abdominal pain and ulcer were strongly linked to *H. pylori* infections.

RECOMMENDATION

There is a need for the routine screening of subjects especially new patients complaining of ulcer before the commencement of treatment and those on treatment on a much wider scale for *Helicobacter pylori* to allow for evidence-based management of subjects with the infection, and save treatment cost, and also educate them on the factors that will predispose them to infection, as well as good water sources and proper sanitation in our environment especially in the rural areas where personal and environmental hygiene is poor. Longitudinal study that will follow the progress of the patient right from infection to about 6 years should be carried out, to ascertain whether the frequency increases with duration of infection, decreases or fluctuates should be carried out.

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