PREVALENCE OF HELICOBACTER PYLORI INFECTION AMONG SUSPECTED PEPTIC ULCER PATIENTS IN PORT HARCOURT, SOUTH-SOUTH, NIGERIA.

Ayodele, M. B. O.[1], Aaron U. U,[1] Oluwatayo G. A.[2], Wariso, K. T.[1]
1. Department of Medical Microbiology and Parasitology, University of Port Harcourt Microbiology Unit,
2. RNZ Global Hospital for Specialist Care, Port Harcourt

CORRESPONDENCE :
E-mail: drohamble1@yahoo.com

ABSTRACT

Background information

Helicobacter pylori is a ubiquitous organism that causes infections that are asymptomatic, and with no specific clinical signs and symptoms. Various diagnostic tests for H. pylori have been developed. This study was intended to understand the prevalence of H. pylori among suspected peptic ulcer patients in a tertiary medical facility in Port Harcourt.

Methodology

The ninety-eight (98) patients who consented were properly instructed before being given a capsule containing urea. This was swallowed with 50mls of water and they waited for ten minutes, after which, they breathed into a breath card until the indicator changed colour from orange to yellow. The breath card was then inserted into a device which detects the production or otherwise of the carbon dioxide with isotopically labelled carbon by displaying positive if present or negative if absent.

Result

I*n this study, out of the forty-five male and fifty-three female subjects that participated in this study, a study prevalence of 39.8% was observed. Also, a male to female prevalence ratio of 15.3:24.5 was observed with no statistical significance (X2=0.1519, P=0.6911). Similarly, the age group distribution of H. pylori infection among the male population showed age group 41-50 years as the modal (11.6%) prevalence, followed by age group 51-60 years (9.3%) with P>0.05 (X2=3.478, P=0.7470). In the same vein, the female distribution of H. pylori infection revealed that there was no significance among the different study groups with P>0.05 (X2=3.115, P=0.7943) and age group 31-40 years (16.1%) had the modal prevalence.*

Conclusion

The high incidence of H. pylori infection among suspected peptic ulcer patients in Port Harcourt has been established, though not as high as other studies elsewhere. Therefore, public enlightenment should be encouraged by all public health stakeholders to arrest this trend.

Key Words: *Helicobacter pylori, Infection, Prevalence, Peptic ulcer, Port Harcourt*

INTRODUCTION

Helicobacter pylori (*H. pylori*) is a type of bacterium that is responsible for infection in the stomach. *Helicobacter pylori* is an ubiquitous organism, found in about two-thirds of the world's population[10]. It causes peptic ulcers and can also cause stomach cancer[1]. It may be spread by unclean food and water. The most common route of *H. pylori* infection is either oral-to-oral or fecal-to-oral contact[10].

Chronic infection with *H. pylori* causes atrophic and even metaplastic changes in the stomach, and it has been well linked with peptic ulcer disease[9]. In general, patients infected with *H. pylori* are asymptomatic, and no specific clinical signs and symptoms have been described[10]. However, commonly associated signs and symptoms include nausea, vomiting, abdominal pain, heartburn, diarrhea, hunger in the morning and bad breath (halitosis)[1].

Up to half of *H. pylori* strains produce cytotoxins, of which some have been specifically linked to

active gastritis and peptic ulceration. These cytotoxins, along with its other secretions like proteases and phospholipases, can attack and damage mucosal cell membranes and cause local lacerations. Thus, reducing the strength of the gastric-mucosal barrier and permitting reverse-diffusion of hydrogen ions, resulting in further tissue injury, as well as causing local immune responses against the pathogen[13].

Before 1983 when Warren and Marshall identified the bacterium *Helicobacter pylori* (*H. pylori*)[11], as a Gram negative, spiral organism, with flagella and the ability to produce urease in high quantities, diagnosis of upper gastrointestinal diseases that present as dyspepsia was with much more complexity[9]. However, today, *H. pylori* has become a major etiological factor considered in cases of chronic gastritis, peptic ulcer disease, gastric carcinoma, and gastric mucosa associated lymphoid tissue (MALT) lymphoma[4]. Because of this fact, peptic ulcer disease has recently been considered an infectious disease due to the fact that, eradication of *H. pylori, a frequently incriminated pathogen, in a diseased patient* leads to its cure[12].

Various diagnostic tests for *H. pylori* have been developed and they can be broadly classified into invasive and non-invasive tests. Invasive tests utilize endoscopic biopsy samples for histology, culture, rapid urease test (RUT) and polymerase chain reaction. All these tests have been found to have sensitivity and specificity that are well above 90%[3]. Patients with symptoms of a peptic ulcer will be required to test their blood, breath or stool to see if it contains *H. pylori*. The best treatment is a combination of antibiotics and acid-reducing medicines. However, monitoring the patient after treatment is very important to make sure the infection is gone completely and avoid relapse of symptoms later[10].

The non-invasive tests do not require endoscopy. These include urea breath test (UBT), immunoglobulin G and M serology, stool antigen test, saliva antibody test and urinary antibody test[4]. In Nigeria, the non-invasive assays are not popularly available but Immunoglobulin G (IgG) serology is more routinely carried out[3]. The value of serological tests in a hyper-endemic area like Nigeria is limited, because of their low discriminatory power between previous and current infection[3]. According to Santacrose (2017), to prevent *H. pylori* infection, practices such as washing of hands after using the bathroom and before eating, eating properly prepared food and drink water from a clean and safe source are all useful and effective[10].

The aim of this study was to determine the prevalence of *H. pylori* among patients who were seen presenting with upper gastro-intestinal disease or peptic ulcer symptoms using rapid urease test at a tertiary medical centre in Port Harcourt, Nigeria. Ethical clearance was not required.

MATERIALS AND METHODS

Area of Study

This study was conducted at a health facility in Port Harcourt, the Rivers State capital, south-south, Nigeria. It is a metropolitan city with over five million people of different cultures, tribes, and religions from all parts of the world who work and do business here in Port Harcourt.

Consent

All patients who participated in this study were properly educated on the procedure to be carried out and the essence of the test. All who gave oral consent were admitted into the study.

Exclusion Criteria

Patients who had been on antibiotic medication/treatment for a period less than 28 days and those who were on acid reducing medication (proton pump inhibitors) for less than 14 days before presenting themselves for the test were excluded from the study.

Laboratory Procedure

This study involved the recruitment of ninety-eight (98) patients who were sent for laboratory analysis after presenting with symptoms relating to gastritis or peptic ulcer disease to the physician. All consented patients were properly instructed before being given a capsule containing urea, this was swallowed with 50 mls of water and then the patient was asked to wait for ten minutes. After which, the patient breathed into a breath card until the

indicator changed colour from orange to yellow. The breath card was then inserted into a device which detects the production or otherwise of the carbon dioxide by displaying positive if present or negative if absent. Concentration of the isotopically labeled 13-carbon is high in breath only when urease is present in the stomach, a reaction possible only with *H pylori* infection. Positive cases signify the presence of *H. pylori* in gastro-intestinal tract of the patient whereas a negative result means *H. pylori* is not present.

RESULTS

In this study, out of the forty-five male and fifty-three female subjects that participated in this study, a study prevalence of 39.8% was observed. Also, fifteen male and twenty-four female subjects were positive to the urea breath test giving a male to female prevalence ratio of 15.3:24.5 with no significance (X^2= 0.1519, P=0.6911). Also, the age group distribution of *H. pylori* infection among the male studied population showed that age groups 41-50 years had the highest (11.6%) occurrence of *H. pylori* infection in this study, followed by age group 51-60 years (9.3%) with P>0.05 (X^2=3.478, P=0.7470). Similarly, the female distribution of *H. pylori* infection showed that there was no significant difference in the distribution of the infection among the different study groups with P>0.05 (X^2=3.115, P=0.7943), whereas, the highest female age group prevalence was observed among age group 31-40 years (16.1%) followed by age group 41-50 years with a prevalence of 10.7%. Comparatively, among age group 11-20 years for both the male and female sub-groups, there was observed a *H. pylori* incidence ratio of 4.7:5.4 and a general study age group prevalence of 5.1% for age group 11-20 years. Nevertheless, there was no significant linear trend among the ordered categories of age groups for this study with P>0.05.

Table 1: Sex Distribution of *Helicobacter pylori* Infection in Port Harcourt

	Positive	Negative	Total	Prevalence
Male	15	30	45	15.3
Female	24	29	53	24.5
Total	39	59	98	39.8

X^2=0.159, P= is 0.6911 (P>0.05 : Not Significant), N=98

Table 2: Age Distribution of *Helicobacter pylori* Infection Among Males in Port Harcourt

Age Group	1-10yrs	11-20yrs	21-30yrs	31-40yrs	41-50yrs	51-60yrs	61-70yrs
Positive	0	2	1	2	5	4	1
Negative	1	2	1	5	12	9	0
Total	0	4	2	7	17	13	1
% Positive	0	50	50	28.6	29.4	30.8	100
Male Study Prevalence	0	4.7	2.3	4.7	11.6	9.3	2.3

X^2=3.478, P=0.7470 (P>0.05: Not Significant), N=45

Table 3: Age Distribution of *Helicobacter pylori* Infection Among Females in Port Harcourt

Age Group	1-10yrs	11-20yrs	21-30yrs	31-40yrs	41-50yrs	51-60yrs	61-70yrs
Positive	1	3	2	9	6	3	0
Negative	0	5	2	8	10	3	1
Total	1	8	4	17	16	6	1
Prevalence	100	37.5	50	52.9	37.5	50	0
Age Group Prevalence	1.8	5.4	3.6	16.1	10.7	5.4	0

X^2 3.115, P=0.7943(P>0.05: Not Significant), N=53

Table 4: Age Distribution of *Helicobacter pylori* Infection Among the Study Population in Port Harcourt

Age Group	1-10yrs	11-20yrs	21-30yrs	31-40yrs	41-50yrs	51-60yrs	61-70yrs
Positive	1	5	3	11	11	7	1
Negative	1	7	3	13	22	12	1
Total	2	12	6	24	33	19	2
Prevalence	100	41.7	50	45.8	33.3	36.8	50
Age Group Prevalence	1	5.1	3	11.1	11.1	7.1	1

X^2=2.871, P=0.8249(P>0.05: Not Significant), N=98

DISCUSSION

Helicobacter pylori infection has been established from this study to be a serious concern for suspected peptic ulcer and gastritis patients in Port Harcourt metropolis even though its overall study prevalence was lower than published studies in southern Nigeria and other parts of the globe [13,7,3]. It is important to note that 39.8% (see Table 1) of the sampled population were positive for *H. pylori* urea breath test with no significant difference observed (X^2=0.1579, P=0.6911) in the infection distribution among the two sexes. This is low compared to other studies conducted in Southern Nigeria. For instance, in a study published by Jemilohun et al., [3] in south-western Nigeria, *H. pylori* infection was observed in 64% of the subjects. This may be as a result of the fact that the patients involved in this study were patients with a high living condition considering that they were working in the petroleum industry in Nigeria, one of the industries with the highest average staff salary. Therefore, there was need for all *H. pylori* positive patients to be treated with anti *H. pylori* drugs to avoid complications. This view was consistent with the published report of Mustapha *et al.*, and Ndububa *et al.,* [6,7].

This study showed that 45% of the females studied had prevalence (24.5%) higher than that of males (15.3%) while the general prevalence of *H. pylori* infection among the studied population was 39.8%. Although this incidence is lower than most reported prevalence of *H. pylori* in this region, their comparison may be limited because of the difference in methodology adopted as most of them used serological method whose limitation arises from the fact that antibodies to *H. pylori* can remain in blood circulation for 3 months after it had been eradicated[10]. Thus, this is important as there is a low awareness about the infection in this part of the globe. More critical is the fact that, *H. pylori* breath test is less commonly used for detection of the infection in this region which is a measure of the concentration of the labeled carbon present in the stomach of patients as it is high in breath only when

urease is present in the stomach, a reaction possible only with *H. pylori* infection.

Perhaps, age as a factor in the distribution of infection was statistically observed in this study to have no significant effect with age group 31-50 years carrying the highest burden of the infection. This is the age group with the largest active labour force, shouldering the highest family responsibility in any society and was also the height population presenting with cases relating to peptic ulcer disease in this study. This may be as a result of the fact that people within this age group often find it convenient to eat out in restaurants and fast food joints, which do not meet satisfactory food hygiene standards, mainly because of their economic considerations as these road-side food vendors offer cheaper food than the more standardized eateries, in order to manage available scarce resources. This implies that, for this percentage of people to be down with *H. pylori* infection among the work force, there will be increased percentage frequency of excused duty for medical checkup and absenteeism on health grounds, leading to reduction in the manpower output and efficiency of production of goods and services in the society.

Nevertheless, this study showed that the female population studied had (24.5%) higher prevalence than males (15.3%) while the general prevalence of *H. pylori* infection among the studied population was 39.8% (see Table 1). Although this incidence is lower than most reported prevalence of *H. pylori* in this region, their comparison may be limited because of the difference in methodology adopted as well as their target population, and the fact that, most of these studies used serological method whose limitation arises from the fact that antibodies to *H. pylori* can remain in blood circulation for 3 months after it had been eradicated [10]. Thus, this is important as there is a low awareness about the infection in this part of the globe. More critical is the fact that, *H. pylori* breath test is less commonly used for detection of the infection in this region which is a measure of the concentration of the labeled carbon present in the stomach of patients as it is high in breath only when urease is present in the stomach, a unique feature peculiar to *H. pylori* infection [10, 13]. This study has a major limitation because it was conducted in a single hospital setting whereas community settings could have given a more encompassing inference and as such, may not be a true representation of the prevalence of *H. pylori* among persons with symptoms relating to peptic ulcer disease in the larger society of the South-South region of Nigeria.

Therefore, there is the need to create awareness for the disease; especially now that more studies have indicated a high incidence of *H. pylor*i infection in the Nigeria, with major considerations given to the food and public health hygiene of the people without neglecting hand washing practices as a key mode of preventing pathogen transfer. Also, critical appraisal should be carried out on the possible sources of the pathogen and its possible modes of infection in order to curb its wide spread and reduce its impact on the public health of general population. Therefore it is imperative for increased grants/sponsorships for research to be carried out in this region as there are scarce data on this infection in Port Harcourt and Rivers state at large.

CONCLUSION

This study showed that the prevalence of *H. pylori* among symptomatic patients using the urease based method is high in the South-South of Nigeria. It also suggests that there is no significant difference in the age distribution of *H. pylori* infection among the studied population in the south-south of Nigeria. Of note is the high prevalence of *H. pylori* among the large population of people under the main work force age group. Thus, it is imperative for all symptomatic patients to be tested and treated for *H. pylori* in Niger Delta region of Nigeria.

Authors Contributions

Conception and design of the study; (AMBO and AUU); patient preparation, testing and data collation (AMBO and OGA); analysis and interpretation of data (AUU); manuscript write up (AUU and AMBO); oversight of all the stages of the research (WKT, and OGA) and all authors read through and approved the final manuscript.

Conflict of Interest

Authors declared no conflict of interest in this

study.

REFERENCES

1. Adesanya, A.A., Oluwatowoju, I.O., Oyedeji, K.S., da Rocha-Afodu, J.T., Coker, A.O., Afonja, O.A. Evaluation of a locally-made urease test for detecting *Helicobacter pylori* infection. *Niger Postgrad Med J 2002;* 9(1):43–47.
2. Baako, B. N., Darko, R. Incidence of *Helicobacter pylor*i infection in Ghanaian patients with dyspeptic symptoms referred for upper gastrointestinal endoscopy. *West Afr J Med1996;* 15(4):223–227.
3. Jemilohun, A.C Otegbayo J. A., Ola, S. O.,Oluwasola, O. A., and Akere, A. (2010). Prevalence of *Helicobacter pylori* among Nigerian patients with dyspepsia in Ibadan.Pan African Medical J*ournal 2010;6(1).*
4. Malfertheiner, P., Megraud, F., O'Morain, C., Bazzoli, F., El-Omar, E., Graham, D., Hunt R, Rokkas, T., Vakil, N., Kuipers, E.J. Current concepts in the management of *Helicobacter pylori* infection: the Maastricht III Consensus Report. *Gut* 2007; 56(6):772–781.
5. Mbengue, M., Diouf, M.L., Dangou, J.M., Ka, M.M., Ba-Seck, A., Ndiaye, M. F. et al. Frequency of *Helicobacter pylori* infection in symptomatic patients in Senegal. *Med Trop (Mars) 1997;* 57(3):256–258.
6. Mustapha, S. K., Ajayi, N.A., Nggada, H.A., Pindiga, U.H., Bolori, M.T., Ndahi, A., *Gashau,W., Khalil, M. I.* Endoscopic findings and the frequency of *Helicobacter pylori* among dyspeptic patients in North-Eastern Nigeria. *Highland Medical Research Journal 2007*; 5(1):78–81.
7. Ndububa, D.A., Agbakwuru, A.E., Adebayo, R.A., Olasode, B,J., Olaomi, O. O., Adeosun, O. A.,Arigbabu, A. O. Upper gastrointestinal findings and incidence of *Helicobacter pylori* infection among Nigerian patients with dyspepsia. *West Afr J Med 2001;* 20(2):140-145.
8. Ola, S. O., Yakubu, A., Otegbayo, J.A., Oluwasola, A,O., Ogunbiyi, J. O., Akang, E.E. and Summerton, C. B. The most appropriate site for endoscopic biopsy for the detection of *H. pylori* among Nigerians in Ibadan. *West Afr J Med 2006;25(4):269-72*
9. Oluwasola, A.O., Ola, S.O., Saliu, L. and Solanke, T.F. *Helicobacter pylori* infection in South Nigerians: a serological study of dyspeptic patients and healthy individuals. *West Afr J Med 2002;* 21(2):138–141.
10. Santacrose L. Helicobacter pylori infection https://emedicine.medscape.com/article/176938-overview. Retrieved on November, 15, 2017.
11. Suerbaum, S. and Michetti, P. *Helicobacter pylori* infection. *N Engl J Med* 2002; 347(15):1175–1186.
12. Talley, N. J. and Vakil, N.. (2005). Guidelines for the management of dyspepsia. *Am J Gastroenterol* 2005; 100(10):2324–2337.
13. Yangchun, Z., Xiaoying, Z., Junbei, W, Jing, S., and Guoxin, Z. Risk Factors and Prevalence of *Helicobacter pylori* Infection in Persistent High Incidence Area of Gastric Carcinoma in Yangzhong City. *Gastroenterology Research and Practice*,Volume 2014,1-10, Article ID 481365.