Scientific Research Publishing

Journal of Biosciences and Medicines, 2019, 7, 28-37
https://www.scirp.org/journal/jbm
ISSN Online: 2327-509X
ISSN Print: 2327-5081

Prevalence of *Helicobacter pylori* Infection among Internally Displaced Persons from Bakassi Peninsular and Etim Ekpo in South Southern, Nigeria

Etanguno Effiong Owowo[1], Mary Anthony Christopher[1], Iquo Effiong Okon[2], Ukponobong Effiong Antia[1], Veronica Umoh[1]

[1]Department of Microbiology, Akwa Ibom State University, Mkpat-Enin, Nigeria
[2]Health Initiative for Stability & Safety in Africa (HIFASS), Uyo, Nigeria
Email: etangunoowowo@aksu.edu.ng, iquokon@gmail.com

How to cite this paper: Owowo, E.E., Christopher, M.A., Okon, I.E., Antia, U.E. and Umoh, V. (2019) Prevalence of *Helicobacter pylori* Infection among Internally Displaced Persons from Bakassi Peninsular and Etim Ekpo in South Southern, Nigeria. *Journal of Biosciences and Medicines*, **7**, 28-37.
https://doi.org/10.4236/jbm.2019.79004

Received: July 13, 2019
Accepted: August 27, 2019
Published: August 30, 2019

Abstract

Helicobacter pylori (*H. pylori*), *is* an important global infection with a worldwide prevalence of about 40 percent. This infection is contagious and mostly acquired during childhood through the fecal-oral and oral-oral route. A total of 1560 blood specimens were aseptically collected from Internally Displaced Persons comprising female and male from the warring communities of Bakassi Peninsular and Etim Ekpo Local Government Area in South Southern, Nigeria. The specimens were screened for *H. pylori* using Elisa kits following standard serological techniques. The overall prevalence rate was 464 (29.7%). There was significant difference ($p < 0.05$) in the inter-community endemicity of *H. pylori* infection; its distribution varied between age group, educational status, habits or behaviors of the subjects with children within 5 to 14 years having the highest rate of 274 (17.6%), followed by 78 (4.99%) from adults (51 years and above) and 17 (1.08%) from active age range of 36 - 45 years old. Subjects with primary and quranic level of education showed a total of 274 (17.56%) positive cases to *H. pylori.* Analysis of sex-specific distribution revealed that females had the highest prevalence of 312 (20%). The helicobacter infection shows a significant difference at ($p < 0.05$) among the occupational groups of the subject. The study of habits such as smoking and snuffing consumption have been linked as risk factors with a prevalence rate of 11%, 12.4% respectively, while regular alcoholic drink was indicted as enhancing factor for *H. pylori* infection. Crowding in camps and increasing household contact have been considered as risk factors of *H. pylori* infection. Adequate infrastructural provision and availability of portable water with good hygienic environment will drastically reduce the high rate spread of *H. pylori* bacterium in the IDPs communities in Nigeria.

Keywords

Helicobacter pylori, Internally Displaced Persons, Camp

1. Introduction

Helicobacter pylori is a microaerophilic, Gram-negative spiral bacterium. Its helix shape is thought to have evolved to penetrate the mucoid lining of the stomach, where they are protected by the mucus and the body immune cells are not able to reach them. The bacteria can interfere with immune response and ensure that they are not destroyed. This can lead to stomach ulcers [1]. *Helicobacter pylori* (*H. pylori*), *is* an important global infection with a worldwide prevalence of about 45%. This infection is mostly acquired during childhood through the fecal-oral and oral-oral route. *H. pylori* is contagious, although the exact route of transmission is not well known [2]. Person-to-person transmission by either the oral-oral or fecal-oral route is most likely. Initial infection with this organism is usually asymptomatic but symptoms and pathologic changes occur later in life. The clinical conditions and pathologic changes associated with *H. pylori* infection include gastritis, gastric and duodenal ulcers, gastric cancers, iron deficiency anaemia and idiopathic thrombocytopenic purpura [3]. *Helicobacter pylori is* a common type of bacteria that grows in the digestive tract and has a tendency to attack the stomach lining. It infects the stomach of approximately 45 percent of the world's adult population. *H. pylori* infections are usually harmless, but they are responsible for the majority of ulcers in the stomach and small intestine. *H. pylori* are adapted to live in the harsh, acidic environment of the stomach. These bacteria can change the environment around them and reduce its acidity so they can survive. It is still not known exactly how *H. pylori* infections spread. The bacteria have coexisted with humans for many thousands of years. *H. pylori* infection exhibits a varied geographic distribution on both local and global scales. A number of other symptoms may be associated with *H. pylori* infection, including: excessive burping, feeling bloated, nausea, heartburn, fever, lack of appetite, or anorexia, unexplained weight loss, trouble swallowing, anemia and blood in the stool. These are common symptoms that could be caused by other conditions. Some of the symptoms of *H. pylori* infection are also experienced by healthy people [4].

Their risk is higher mostly due to lack of proper hygiene. Adults risk for infection partly depends on the environment and living conditions. The risk is higher among people living in a developing country, sharing housing with others who are infected with *H. pylori,* living in overcrowded housing and hostel, having no access to hot water, which can help to keep areas clean and free from bacteria [5].

Most people with *H. pylori* do not have any symptoms. When the infection leads to an ulcer, symptoms may include abdominal pain, especially when your

stomach is empty at night or a few hours after meals. The pain is usually described as a gnawing pain, and it may come and go. Eating or taking antacid drugs may relieve this pain. Some of the symptoms of *H. pylori* infection are also experienced by healthy people [4]. Children are more likely to develop an *H. pylori* infection. About 10 percent of people infected with *H. pylori* develop a peptic ulcer [6]. Long-term use of nonsteroidal anti-inflammatories (NSAIDs) also increases the risk of getting a peptic ulcer. *H. pylori* infections can lead to peptic ulcers, but the infection or the ulcer itself can lead to more serious complications [7]. These include:

- internal bleeding, which can happen when a peptic ulcer breaks through your blood vessel and is associated with iron deficiency anemia
- obstruction, which can happen when something like a tumor blocks the food from leaving your stomach
- perforation, which can happen when an ulcer breaks through your stomach wall
- peritonitis, which is an infection of the peritoneum, or the lining of the abdominal cavity

Studies show that infected people also have an increased risk of stomach cancer. While the infection is a major cause of stomach cancer, most people infected with *H. pylori* never develop stomach cancer [8].

People suffering from *H. pylori* normally need to take a combination of two different antibiotics, together with another drug that reduces the stomach acid. Lowering stomach acid helps the antibiotics work more effectively. This treatment is sometimes referred to as triple therapy. Some of the drugs that are used in a triple therapy treatment include: clarithromycin, proton-pump inhibitors (PPI), such as lansoprazole (Prevacid), esomeprazole (Nexium), pantoprazole (Protonix), or rabeprazole (AcipHex), metronidazole (for 7 to 14 days) and amoxicillin (for 7 to 14 days). In most cases, only one round of antibiotics is needed to clear the infection, but you might need to take more, using different drugs [9].

According to the bulletin, *Helicobacter pylori* and cancer (2013), there is no evidence that food and nutrition play a role in preventing or causing peptic ulcer disease in people infected with *H. pylori*. However, spicy foods, alcohol, and smoking may worsen a peptic ulcer and prevent it from healing properly. If the infection still persists after one round of treatment, a peptic ulcer could return or, more rarely, stomach cancer could develop. Very few people infected with *H. pylori* will develop stomach cancer. However, people with a family history of stomach cancer, should get tested and treated for *H. pylori* infection [10].

1.1. Statement of the Problem

Helicobacter pylori accounts for 90% of 80 million peptic ulcer cases in humans worldwide due to consumption of contaminated food, water and in 45% adult population worldwide. In the USA, rate of peptic ulcer cases is between 10 to 15 per 100,000 people. Ten percent is caused by consumption of contaminated food. Contaminated source of water and food have been implicated as sources of

Helicobacter pylori in overcrowded camps and hostels, which could lead to wide scale epidemic. Open-air defecation and unhygienic environment have been indicted as easier source of contamination of water and food, a possible route of transmission to humans.

1.2. Significance of the Study

1) Rural setting sanitary facilities have been indicted as a cheaper source of carrier of *Helicobacter pylori* and a possible route of transmission to human.

2) The presence of asymptomatic carriers among internally displaced people and other rural dwellers makes *Helicobacter pylori* a serious public health challenge.

3) Heavy economic losses are incurred due to consistence treatments of the disease caused by *Helicobacter pylori.*

4) *Helicobacter pylori are* a bacterium infection in camps, unhygienic of rural setting and data on the prevalence and diagnostic test kits of peptic Ulcer is limited.

1.3. Aims and Objectives

1) To determine the prevalence rate of *Helicobacter pylori* among the internally displaced persons from Bakassi Peninsular and Etim Ekpo communities in the South Southern Nigeria, where there is a high prevalence of gastric cancer and peptic ulcer.

2) To assess the risk factors for *Helicobacter pylori* by using data on sex, age, educational level, smoking, drinking, as well as dietary factors.

3) To evaluate the sociocultural and demographic factors influencing the prevalence of this infection in the communities.

4) To evaluate the effectiveness of serological diagnostic test in the diagnosis of the disease caused by *H. pylori* in Nigeria.

2. Materials and Methods

2.1. Study Population and Design

This study is a descriptive cross-sectional study and was conducted from January 2018 to September 2018 within two rural communities in the Basin region of South Eastern zone of Nigeria. The South Eastern region is located at the South-South geopolitical zone with latitude 9.8˚-11.0˚ north and longitude 1.6˚-3.0˚ west, bounded to the estuaries of Cameron to the West. A total of 1560 persons (≥5 years) were recruited for the study. Informed consent was obtained through IDPs camp leaders, Health providers and parents of those who participated in the study.

2.2. Demographic Details

The age, gender, type of toilet facility, source of drinking water, number of people in their household or camp, number of siblings, the educational level of

the people as well as their smoking, snuffing and alcoholic drinking habits were collected from all participants using a structured questionnaire.

2.3. Sample Collection

A total of one thousand five hundred and sixty (1560) blood specimens were aseptically collected (2 mls) randomly from the participants between 5 - 75 years of age, in the IDP camps within the South Eastern rural communities. The blood sample was collected using sterile vacutainers, needles and EDTA containers were labeled accordingly. The samples were transported to the Microbiology laboratory of Akwa Ibom State University (AKSU) with minimum delay for processing.

2.4. Specimen Preparation and Analysis

The kits are designed for qualitative detection of *H. pylori* antigens in the specimen through antigen antibody reaction with high degree of specificity and immune chromatography analysis. The membrane is immobilized with *H. pylori* antibodies-specific on the test well (T), and corresponding antibodies on the control well (C). The blood specimen was brought to the room temperature and 5 ul of the specimen was added aseptically into the test well (S). Procedures were followed according to the manufacturer recommendation. The Elisa kit used for the detection of *H. pylori* is manufactured by Zhuhai Encode Medical Engineering Co., Ltd. China.

2.5. Result Interpretation

During testing, the blood sample is added to the sample well (S) of the cassette and reacts with anti *H. pylori* antibodies conjugated to colored particles and pre-coated onto the sample pad of the test. The mixture migrates through the membrane by capillary action and interacts with reagents on the membrane. The *H. pylori* is positive, when the colored bands is formed at test well (T). No matter if the *H. pylori* antigen exist or not, red band will appear in control well (C) which serves as a procedural control.

2.6. Invalid Result

When the control band or both the control band and the test band is not seen, indicating an invalid result which may be as a result of following the direction correctly or expired kits, such specimens were retested using a new test kit.

2.7. Statistics

The data was captured using Microsoft excel, 2007 and exported to STATA version 11.0 for processing and analysis. Pearson's chi squared and Fisher's exact tests employed to test associations between various background characteristics of participants and the outcome of interest (*H. pylori* status) at $p < 0.05$ significance level.

3. Discussion

H. pylori infection affects more than half of the global population including children. Due to it fecal-oral mode of transmission, it is more prevalent in poor socioeconomic environments and developing countries. *H. pylori* is described as a group 1 carcinogen but the health implications of infection in adult and children remains uncertain [10]. This may be problematic particularly in African countries that may harbor more virulent strains. *H. pylori* infection has been described as "African enigma". It has however been shown that all complications including carcinoma do occur in the African population. Our study used a non-invasive serologic method to qualitatively detect *H. pylori* antigen in human blood specimen.

Transmission of *H. pylori* infection is rapidly decreasing in the developed countries predictably because of improvement in the sanitation [11]. There is infrequent *H. pylori* infection during childhood in the developed countries with the United States reporting less than 5% among under five years and up to 10% by adolescent age. In developing countries the story is different with over 48% of children under five years old infected and as high as 60% in some adult populations [12]. We recorded overall prevalence rate of 29.7% among symptomatic and asymptomatic internally displaced persons living in camps in South Southern Nigeria (**Table 1**). Out of this, 17.6% prevalence was demonstrated between the ages of 5 - 16 years and the prevalence decreases as the age of the people living in the various IDP camps advances according to our report in **Table 2**. This finding was not consistent with the developing countries data on the prevalence of *H. pylori* infection within this younger age group. This could be attributed to the differences in the study design, population dynamics, geographic values and hygienic conditions as well as the specificities of techniques employed in the studies.

The gender effect on prevalence of *H. pylori* infection in many populations varied, in our study female had dominance of 20% with higher *H. pylori* prevalence, than males (9.7%), and this is a reverse of the pattern in most population studies (see **Table 3**). Woodward and colleagues reported a higher prevalence in men than women, whiles others reported no difference. A meta-analysis reported a male predominance in adults but not in children [13]. **Table 4** shows educational status has been used as a proxy marker of socioeconomic status and an important determinant of *H. pylori* prevalence in developed and resource limited settings [14]. The educational status of parents and children in our study did not show significant effect on the prevalence of *H. pylori* in the IDP camps in Nigeria. A total rate of 220 (14.08%) persons with primary education were recorded, 88 (5.68%) of secondary followed by tertiary with 69 (4.42%), none educated and Quranic shows 60 (3.84%) and 27 (1.73%) respectively [12].

In our study, occupational status recorded 92 (5.89%) in farmers, 88 (5.63%) among Unemployed population, 80 (5.12%) in business group and 3.33% with a lower prevalence rate of 2.18% in civil servants (see **Table 5**). Habits such as smoking and snuffing consumption have been linked as risk factors with a pre-

valence rate of 11%, 12.4% respectively (Table 6). In contrast, our study shows that regular alcohol drinking was a protective factor for *H. pylori* infection. Crowding in camps and increasing household contact have been considered as risk factors of *H. pylori* infection [15]. As the number of people in a household increases the prevalence of *H. pylori* also increased. Source of drinking water other than pipe and borehole increased the prevalence of *H. pylori* infection as well as open-air defecation [16] (Table 7).

Table 1. Percentage distribution of *Helicobacter pylori* among IDPs Camps in the South Eastern Nigeria.

IDP Camp	Number Examined	Number Positive	Percentage
Ibaka	240	80	5.12
Eyonsek	120	32	2.05
Ubenekang	202	68	4.35
Ikang	303	82	5.25
Bakassi	380	106	6.78
Abak	210	72	4.61
Ukanafun	105	24	1.54
TOTAL	**1560**	**464**	**29.70**

Table 2. Socio-demographic characteristics of IDPs in the South Eastern Nigeria.

Age (Yrs)	Number Examined	Number Positive	Percentage (%)
5 - 10	620	195	12.48
11 - 15	246	79	5.06
16 - 20	120	30	1.92
21 - 25	98	20	1.28
26 - 30	48	13	0.83
31 - 35	44	11	0.70
36 - 40	42	09	0.58
41 - 45	86	08	0.51
46 - 50	89	21	1.34
51 - above	167	78	4.99
Total	**1560**	**464**	**29.70**

Table 3. Socio-demographic characteristics of IDPs in the South Eastern Nigeria.

Gender	Number Examined	Number Positive	Percentage (%)
Male	658	152	9.70
Female	902	312	20.00
Total	**1560**	**464**	**29.70**

Table 4. Socio-demographic characteristics of IDPs in the South Eastern Nigeria.

Education	Number Examined	Number Positive	Percentage (%)
Tertiary	305	69	4.42
Secondary	409	88	5.63
Primary	680	220	14.08
Quaranic	058	27	1.73
None	108	60	3.84
Total	**1560**	**464**	**29.70**

Table 5. Socio-demographic characteristics of IDPs in the South Eastern Nigeria.

Occupation	Number Examined	Number Positive	Percentage (%)
Civil Servant	204	34	2.18
Fishing	389	78	5.00
Farming	287	92	5.89
Business	202	80	5.12
Housewife	98	40	2.56
Student	108	52	3.33
Unemployed	272	88	5.63
Total	**1560**	**464**	**29.70**

Table 6. Socio-demographic characteristics of IDPs in the South Eastern Nigeria.

Habit/Behaviors	Number Examined	Number Positive	Percentage (%)
Smoking (any)	106	52	10.97
Drinking (alcohol)	205	32	6.75
Snuffing	164	58	12.24
Total	**475**	**142**	**29.96**

Table 7. Socio-demographic characteristics of IDPs in the South Eastern Nigeria.

Sources of Drinking Water	Number Examined	Number Positive	Percentage (%)
Sachet (packaged)	108	16	14.81
Wall	76	32	42.11
Stream	120	21	17.50
Total	**304**	**69**	**22.70**

Water is an important source of *H. pylori* spread as confirmed by other studies. Therefore, handling of water and poor sanitation will be a good milieu for the spread of this infection. In our environment, poverty and poor socioeconomic status are associated with higher household numbers. It is therefore not surprising giving the mode of transmission that prevalence in our study increased with increasing household numbers. Proper hand washing and waste disposing systems will help control infection in households especially in crowded places.

4. Conclusion

Our study demonstrated a high prevalence of *H. pylori* infection among various cadres of internally displaced persons in a rural camping. Educational status of parents did affect *H. pylori* prevalence and increasing household numbers, female gender, younger age, open-air defecation, habit addictions and source of drinking water other than pipe and borehole being associated with a higher prevalence. Adequate infrastructural provision and availability of portable water with good hygienic environment will drastically reduce the high rate of spread of *Helicobacter pylori* bacterium in the developing countries such as ours.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

References

[1] Kamboj, A.K., *et al.* (2017) *Helicobacter pylori*: The Past, Present, and Future in Management. *Mayo Clinic Proceedings*, **92**, 599-604. https://doi.org/10.1016/j.mayocp.2016.11.017

[2] Sonnenberg, A. (2013) Review Article: Historic Changes of *Helicobacter pylori*-Associated Diseases. *Aliment Pharmacological Therapy*, **38**, 329-342. https://doi.org/10.1111/apt.12380

[3] Alvarado-Esquivel, C. (2013) Seroepidemiology of *Helicobacter pylori* Infection in Pregnant Women in Rural Durango. *Mexico Internal Journal Biomedical Science*, **9**, 224-229.

[4] Hooi, J.K.Y. (2017) Global Prevalence of *Helicobacter pylori* Infection: Systematic Review and Meta-Analysis. *Gastroenterology*, **153**, 420-429. https://doi.org/10.1053/j.gastro.2017.04.022

[5] Sethi, A., Chaudhuri, M., Kelly, L. and Hopman, W. (2013) Prevalence of *Helicobacter pylori* in a First Nations Population in Northwestern Ontario. *Canadian Family Physician*, **59**, e182-e187.

[6] Van Blankenstein, M., van Vuuren, A.J., Looman, C.W., Ouwendijk, M. and Kuipers, E.J. (2013) The Prevalence of *Helicobacter pylori* Infection in the Netherlands. *Scand Journal Gastroenterology*, **48**, 794-800. https://doi.org/10.3109/00365521.2013.799221

[7] Everhart, J.E. (2000) Seroprevalence and Ethnic Differences in *Helicobacter pylori* Infection among Adults in the United States. *The Journal of Infectious Diseases*, **181**, 1359-1363. https://doi.org/10.1086/315384

[8] Mayo Clinic Staff (2017) *Helicobacter pylori* (*H. pylori*) Infection: Overview. http://mayoclinic.org/diseases-conditions/h-pylori/home/ovc-20318744

[9] Hildreth, C.J. (2008) *Helicobacter pylori*.

[10] Porras, C., Nodora, J. and Sexton, R. (2014) Epidemiology of *Helicobacter pylori* Infection in Six Latin American Countries (SWOG Trial S0701). *Cancer Causes Control*, **24**, 209-215. https://doi.org/10.1007/s10552-012-0117-5

[11] den Hollander, W.J., Holster, I.L. and den Hoed, C.M. (2013) Ethnicity Is a Strong Predictor for Infection in Young Women in a Multi-Ethnic European City. *Journal Helicobacter pylori Gastroenterological Hepatology*, **28**, 1705-1711. https://doi.org/10.1111/jgh.12315

[12] Bastos, J., Peleteiro, B. and Barros, R. (2013) Sociodemographic Determinants of Prevalence and Incidence of *Helicobacter pylori* Infection in Portuguese Adults. *Helicobacter*, **18**, 413-422. https://doi.org/10.1111/hel.12061

[13] Lim, S.H., Kwon, J.W. and Kim, N. (2013) Prevalence and Risk Factors of *Helicobacter pylori* Infection in Korea: Nationwide Multicenter Study over 13 Years. *BMC Gastroenterology*, **13**, 104. https://doi.org/10.1186/1471-230X-13-104

[14] Sodhi, J.S., Javid, G. and Zargar, S.A. (2015) Prevalence of *Helicobacter pylori* Infection and the Effect of Its Eradication on Symptoms of Functional Dyspepsia in Kashmir India. *Journal Gastroenterological Hepatology*, **28**, 808-813. https://doi.org/10.1111/jgh.12178

[15] Ozaydin, N., Turkyilmaz, S.A. and Cali, S. (2013) Prevalence and Risk Factors of *Helicobacter pylori* in Turkey: A Nationally-Representative, Cross-Sectional, Screening with the (1)(3)C-Urea Breath Test. *BMC Public Health*, **13**, 1215. https://doi.org/10.1186/1471-2458-13-1215

[16] Zhu, Y., Zhou, X., Wu, J., Su, J. and Zhang, G. (2014) Risk Factors and Prevalence of *Helicobacter pylori* Infection in Persistent High Incidence Area of Gastric Carcinoma in Yangzhong City. *Gastroenterol Research Practical*, **2014**, Article ID: 481365. https://doi.org/10.1155/2014/481365