

Seroprevalence of HIV among persons with *Helicobacter pylori* in a Tertiary Healthcare Institution, Rivers state, Nigeria

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Abstract: Background: *Helicobacter pylori* is one of the most common chronic infections in the world, with a prevalence ranging from 79–90% in low-income countries. The infection is mostly asymptomatic but can manifest as dyspeptic disease, malignant complications such as gastric and esophageal cancer, and non-malignant complications, for example iron-deficiency anemia. These tend to increase the disease burden among persons living in low- and middle-income countries, while it hampers the efforts to meet the sustainable development goals (SDG) for health.

Aim: To determine pattern of HIV infection among persons infected with *Helicobacter pylori* in a tertiary healthcare institution.

Method: The study assessed the demographic distribution of persons tested for *H. pylori* in a tertiary healthcare institution within a 1-year period (January – December 2021) in Rivers state University Teaching Hospital. A Rapid diagnostic *H. pylori* Enzyme-linked immunosorbent assay (ELISA) test kit was used to assess the presence of *H. pylori* in blood samples collected from 457 persons. HIV tests was conducted from blood samples drawn from each participant using commercially available HIV I/II test kits.

Results: The results showed that 64.8% of the infected persons were female compared to males which made up 35.2% of the infected persons. The *H. pylori* infection was found to be relatively higher among persons aged 30 – 39 years (44.9%), followed by persons between 40 – 49 years (22.1%) and persons between 50 – 29 years (7.7%). However, the age-group with the lease occurrence of *H. pylori* infection were persons between 1 – 9 years (2.8%), followed by persons between 10 – 19 years (6.3%) and persons that were 60 years and above (5.9%). There was a 0.7% prevalence of HIV among the persons infected with *H. pylori*. 1.24% (2/161) of male subjects had HIV compared to 0.34% (1/296) of female subjects with HIV. Among the persons infected with *H. pylori*, 0.99% (1/101) of persons aged 40 – 49 years had HIV, while 0.97% (2/205) of persons with *H. pylori* infection aged 30 – 39 years had HIV. The distribution of HIV by demographic characteristics among the persons with *H. pylori* infection was not statistically significant.

Conclusion: The study showed that the occurrence of HIV infection among persons with *H. pylori* was relatively low. However, *H. pylori* infection was found to be higher among females and persons aged between 30 and 49 years old.

Keywords: HIV, *Helicobacter pylori*, ELISA, Port Harcourt.

I. INTRODUCTION

Helicobacter pylori infection is a gastric flagellate Gram-negative rod bacterium, is considered as the major etiology of chronic gastritis and peptic ulcer disease[1]. Over half of the world's population is estimated to be infected with *H. pylori*. The prevalence of *H. pylori* infection varies across different geographical regions with the range of 32% and 65% [2]. The infection has been seen in more than 90% of the patients with gastritis and 70% to 100% of those with peptic ulcer diseases[3–5]. HIV-infected individuals are more likely to be infected with *H. pylori* than HIV-uninfected individuals[6]. The prevalence of *H. pylori* infection in HIV-infected individuals varies depending on the population studied and the geographic location[7]. HIV-infected individuals with *H. pylori* infection have been shown to have a higher risk of developing peptic ulcer disease compared to HIV-uninfected individuals with *H. pylori* infection[8]. Additionally, *H. pylori* infection has been associated with an increased risk of developing gastric cancer[9]. The treatment of *H. pylori* infection in people living with HIV is associated with several challenges, including those related to drug metabolism which plays a major role in treatment efficacy[9].

While HIV and *H. pylori* infections are two separate conditions, people with HIV may have a higher prevalence of *H. pylori* infection due to their weakened immune system. Additionally, studies have shown that *H. pylori* infection can affect the progression of HIV infection, potentially leading to poorer health outcomes. Therefore, it is essential to diagnose and treat both HIV and *H. pylori* infections promptly to minimize the risk of complications and improve overall health outcomes. Public health efforts should focus on promoting awareness and prevention measures for both conditions, including safe sex practices, access to clean water and food, and good hygiene practices.

Although some studies have shown that *H. pylori* infection is less common among HIV-positive individuals with GI symptoms other investigations suggested a higher prevalence of *H. pylori* infection in HIV-positive patients because of immune suppression[4, 9–11]. Hence, the relationship between *H. pylori* infection and HIV remains controversial. Moreover, there are limited data regarding the seroprevalence of *H. pylori* in HIV-positive patients, particularly in our region. The current study assessed the seroprevalence of HIV among persons with *Helicobacter pylori* infections in a tertiary healthcare institution in Southern Nigeria.

II. METHODS

Study Population

The study population consisted of 457 persons diagnosed of *Helicobacter pylori* infection within a one-year period (1st January to 31st December 2021) at the Rivers state University Teaching, Rivers state, Nigeria.

Specimen collection and Analysis

Five milliliters clotted blood and 3 cc anticoagulated blood with EDTA were obtained from subjects. The clotted blood was centrifuged in 3000 g for 15 minutes. Extracted serum was then stored in a -70 centigrade Celsius freezer. Ig A and Ig G anti-*H. pylori* antibody titer was measured by ELISA techniques in room temperature using Mono bind Inc, Lake Forest, CA, USA kit. Following the instruction provided by the manufacturer. Diagnosis of HIV infection confirmed with serology, polymerase chain reaction (PCR) or Western blot following the recommendation of National AIDS Control Organization (NACO 2007).

Data collection

Demographic information of each participant was obtained with a structured PROFORMA data sheet, where the results of the *H. pylori* and HIV assessment were also recorded.

Data Analysis

The data collected was analyzed using the SPSS v25 software (IBM, USA) at a 95% confidence interval. Frequencies and percentages was used to summarize the data as appropriate. The chi-square statistics was used to assess the distribution of HIV among the patients diagnosed with *H. pylori* and a p-value less than 0.05 was considered statistically significant.

Ethical Consideration

The study was approved by Research Ethic Committee of Rivers state University Teaching Hospital and informed consent was obtained from each patient before enrollment in this study.

III. RESULTS

Table 1 shows the demographic characteristics of the study participants. The table showed that 35.2% (161/457) were male and 64.8% (296/457) were female. The distribution of the age groups showed that 44.86% (205/457) were between 30 – 39 years, 22.10% (101/457) were between 40 – 49 years. Also, 10.28% (47/457) were between 20 – 29 years, followed by 7.66% (35/457) that were between 50 – 59 years, 5.91% (27/457) were at least 60 years old and 2.84% (13/457) were between 1 – 9 years old.

Table 1: Demographic characteristics of persons with *Helicobacter pylori* infection

Variable	Frequency (n=457)	Percent (%)
Gender		
Male	161	35.2
Female	296	64.8
Age Groups		
1 - 9	13	2.84
10 - 19	29	6.35
20 - 29	47	10.28
30 - 39	205	44.86
40 - 49	101	22.10
50 - 59	35	7.66
60 and above	27	5.91

Figure 1 shows that 0.7% (3/457) of the persons with *Helicobacter pylori* had HIV.

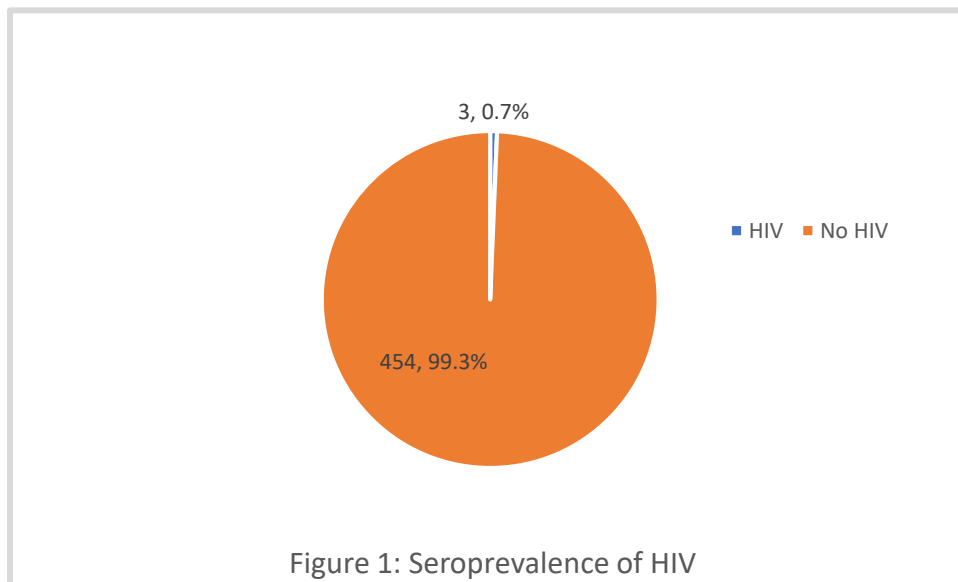


Table 2 shows that distribution of HIV infection by demographic characteristics among the persons diagnosed with *Helicobacter pylori*. The table shows that 1.24% (2/161) of male subjects had HIV compared to 0.34% (1/296) of female subjects with HIV. The table also showed that among the persons infected with *H. pylori*, 0.99% (1/101) of persons aged 40 – 49 years had HIV, while 0.97% (2/205) of persons with *H. pylori* infection aged 30 – 39 years had HIV. The distribution of HIV by demographic characteristics among the persons with *H. pylori* infection was not statistically significant.

Table 2: Distribution of HIV infection by Demography

Variable	Presence of HIV infection		Total n, (%)	Chi-square (p-value)
	Yes n, (%)	No n, (%)		
Gender				
Male	2 (1.24)	159 (98.76)	161 (100.0)	1.30 (0.2536)
Female	1 (0.34)	295 (99.66)	296 (100.0)	
Age groups				
1 - 9	0 (0.0)	13(100.0)	13(100.0)	5.65 (0.4633)
10 - 19	0 (0.0)	29(100.0)	29(100.0)	
20 - 29	0 (0.0)	47(100.0)	47(100.0)	
30 - 39	2 (0.97)	203 (99.03)	205(100.0)	
40 - 49	1 (0.99)	100 (99.01)	101(100.0)	
50 - 59	0 (0.0)	35(100.0)	35(100.0)	
60 and above	0 (0.00)	26 (96.30)	27(100.0)	

IV. DISCUSSION

The findings of the current study showed that *H. pylori* was higher among women compared to men. The findings of the current study suggest that the prevalence of *H. pylori* infection is higher among women compared to men, which contrasts with similar reports from other publications[12–14]. This difference in prevalence rates could be due to various factors such as differences in study design, population characteristics, and diagnostic methods. The observed higher prevalence among women may be related to various factors such as hormonal changes, lifestyle factors, and environmental factors[14]. For instance, studies have shown that female sex hormones such as estrogen may increase the risk of *H. pylori* infection by altering the gastric microenvironment and promoting bacterial growth. Additionally, women are more likely to engage in certain lifestyle behaviors such as smoking and alcohol consumption, which may also contribute to the higher prevalence rates[15]. It is also important to note that the differences in prevalence rates between men and women may have implications for the clinical management of *H. pylori* infection. For example, women may require different treatment regimens or longer treatment durations compared to men, and healthcare providers should take these differences into account when treating patients with this infection[13, 16].

The current study showed that persons between the age of 30 and 49 years accounted for majority of the individuals infected with *H. pylori* (66.96%). The implication of the finding that individuals between the age of 30 and 49 years accounted for the majority of those infected with *H. pylori* is that this age group may be at a higher risk of developing associated gastrointestinal disorders such as peptic ulcer disease and gastric cancer[12, 17, 18]. This age range corresponds to the peak productive years of an individual's life, during which they may be exposed to various environmental risk factors such as unhealthy diet, smoking, and alcohol consumption[18]. These factors have been shown to increase the risk of *H. pylori* infection, and this may partly explain why this age group had the highest prevalence. Furthermore, the high prevalence of *H. pylori* infection in this age group highlights the need for increased public health education to raise awareness about the risk factors and symptoms of this infection[16].

The current study showed there was a 0.7% prevalence of HIV among the persons infected with *H. pylori*. The co-infection of HIV and *H. pylori* may lead to a more severe clinical course of both infections, and individuals with both infections may have a higher risk of developing associated gastrointestinal disorders such as peptic ulcer disease and gastric cancer[15, 19, 20]. Therefore, early detection and treatment of both infections may be important in improving outcomes for affected individuals. The finding of a 0.7% prevalence of HIV among persons with *H. pylori* infection suggests that routine screening for HIV may be beneficial for individuals with *H. pylori* infection, especially those who are at high risk of acquiring HIV, such as men who have sex with men and people who inject drugs[12, 16, 17].

The distribution of HIV among persons with *H. pylori* infection was found to be relatively higher among males (1.24%), compared to females (0.34%). This finding suggests that gender-specific factors may play a role in the acquisition and transmission of HIV and *H. pylori* infections. For example, the higher prevalence of HIV among males may be due to a higher risk of exposure to HIV through risky sexual behavior, such as having multiple sexual partners or engaging in unprotected sex. Similarly, the higher prevalence of *H. pylori* among females may be due to factors such as poor hygiene, dietary habits, or hormonal factors that are more prevalent among females[12, 17, 18, 21].

V. CONCLUSION

In conclusion, the findings of this study highlight the need for continued efforts to address the burden of *H. pylori* and HIV infections, especially among individuals between the age of 30 and 49 years. Increased access to screening, testing, counseling, and treatment services, as well as public health education programs aimed at raising awareness about the risk factors for these infections, may help to reduce the prevalence and impact of these infections in this population.

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