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Serological Prevalence of Helicobacter pylori in HIV patients attending a Tertiary Health Facility in Port Harcourt, Nigeria.

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Abstract

This study was carried out to detect anti-Helicobacter pylori antibodies in HIV-infected patients in Port Harcourt, Nigeria. Samples of blood were collected from 100 HIV-infected patients and processed using standard laboratory procedures. Alere determined HIV1/2 rapid test strip and the One Step Anti-HP Rapid test kit were used in a step-wise order for the detection of HIV and H. pylori antibodies respectively in the blood samples. Commercial ELISA by Dia Pro (Italy) was also used to assay for the presence of H. pylori IgG and IgM antibodies among these subjects. Results showed that the overall prevalence of H. pylori was 38.0%. The age ranges of the participants were from 20-67 years. Higher prevalence of HIV/H. pylori coinfection occurred age group 40-49 years (41.7%), males (38.5%), married (47.5%), tertiary education (56.5%), traders (60.0%), Christian religion (41.7%), polygamous family type (42.8%) and history of STDs (42.9%). This study has shown that the prevalence of H. pylori infection is very high among HIV-infected patients in Port Harcourt, Nigeria, and among socio-demographic variables studied, only marital status, educational level and occupational status were strongly associated with

increased risk of H. pylori infection. This study further confirms the presence of HIV/Helicobacter pylori coinfection among HIV-infected patients in Port Harcourt, Nigeria. The underlying mechanisms are needed to be further investigated.

Keywords: Antibodies, H. pylori, HIV, Prevalence, Port Harcourt

Introduction

Patients with HIV and AIDS frequently experience gastrointestinal (GI) symptoms. Yet, it is unclear what impact H. pylori infection plays in the GI tract mucosa of HIV patients (Fialho et al., 2011). Many gastrointestinal opportunistic diseases, such as cytomegalovirus (CMV), cryptosporidium, microsporidia, and fungal oesophagitis, are linked to HIV infection (Romanelli et al., 2007; Abdollahi et al., 2014). It is still debatable whether HIV/AIDS infection affects the prevalence of H. pylori. H. pylori prevalence in HIV-positive patients has been noted in several investigations (Chiu et al., 2004; Moges et al., 2006; Lv et al., 2007; Fialho et al., 2011; Hestvik et al., 2011), either in tropical nations with lower frequency of H. pylori infection or in the eastern globe, which has a larger prevalence (Abdollahi et al., 2014).

There have been reports of Helicobacter pylori infections in HIV-positive people. The co-infection of H. pylori with HIV can impair the humoral immunity of the infected people and raise their risk of short-term morbidity and mortality. People with HIV infection and/or low CD4+ T cell counts would lose the protective mechanism that H. pylori use to maintain colonization, and the severity of the illness would decline with effective antibiotic treatment and a reduction in gastric acidity (Lee et al., 2003). Therefore, for any effort targeted at its treatment and control to be successful, it is vital to know the prevalence rate of H. pylori infection among HIV-infected patients.

During an infection, Helicobacter pylori trigger an immune response, leading to the patient's production of certain IgG, IgA, and IgM antibodies. ELISA tests are presently utilized to check for acute active infection caused by some virulent strains of Helicobacter pylori in patients with gastritis or peptic ulcers. IgA and IgM antibodies, in particular, are said to be associated with the acute stage of sickness, whereas IgG antibodies start to appear at various titres soon after primary infections and remain in the blood for a long time.

The prevalence of H. pylori antibodies among HIV-1 patients and the extent and severity of HIV coinfections with H. pylori have received a great deal of attention from researchers around the world. However, there is a dearth of literature and data on these topics, particularly in Nigeria. To the best of our knowledge, there aren't many studies comparing H. pylori among HIV-1 patients, particularly in Nigeria. To ascertain the seropositivity of anti-H. pylori antibodies among HIV patients at the University of Port Harcourt Teaching Hospital, (UPTH), Port Harcourt, Rivers State, Nigeria this study was conducted to evaluate some of the HIV patients' sociodemographic and clinical variables that are associated with H. pylori seropositivity.

Materials and methods

Study Area

At the University of Port Harcourt Teaching Hospital (UPTH), Port Harcourt, Rivers State, in the southern part of Nigeria, the study involved HIV patients. The hospital acts as a referral centre for a substantial portion of Nigeria's South-South area. The study was only conducted on HIV-positive patients at the University of Port Harcourt Teaching Hospital from February to

November 2019 in Port Harcourt, Rivers State, Nigeria (UPTH). The hospital acts as a referral centre for a substantial portion of Nigeria's South-South area.

Study design

A hospital-based cross-sectional design was adopted and used to determine the serological prevalence of Helicobacter pylori among HIV-positive patients in Port Harcourt, Nigeria. ELISA and a one-step fast-strip test were used to look into the prevalence of Helicobacter pylori in HIV-positive patients. The occurrence of Helicobacter pylori among HIV-positive patients was investigated using ELISA and one step rapid strip test. The influence of the patient's age, marital status, occupation and educational status among others on the prevalence of Helicobacter pylori was also considered.

Study population

The study population comprised 100 HIV-infected patients. Blood samples were collected from 100 HIV patients patronizing the University of Port Harcourt Teaching Hospital (UPTH) located at Port Harcourt, Rivers State, Nigeria. Blood samples were collected randomly from patients and carried to the Virus & Genomics Research Unit, Department of Microbiology, University of Port Harcourt, Nigeria for serological analysis.

Sample Collection

The method of sample collection was the venepuncture technique. A soft tubing tourniquet was fastened to the upper arm of the patient to enable the index finger to feel a suitable vein. The puncture site was then cleansed with methylated Spirit (methanol) and venepuncture was made with the aid of a needle attached to a 5ml syringe. When sufficient blood had been collected, the tourniquet was released and the needle was removed immediately while the blood was transferred into an EDTA bottle. Which was centrifuged and the plasma was then pipetted.

Serological Analysis of anti-Helicobacter pylori

A parallel test was carried out for the Helicobacter pylori antibody using step ANTI-FTP. Rapid screen cassette and commercially available ELISA kit for anti-Helicobacter pylori manufactured by Dia Pro, Italy. The test was performed according to the instruction of the kit's manufacturers.

Data Analysis

Data were analyzed using the Statistical Package for Social Sciences (SPSS) version 11.5. The seroprevalence for H. pylori was expressed as a percentage for the entire study group.

Results

Overall Prevalence of Helicobacter pylori

Of the 100 HIV-infected patients tested, 38 (38.0%) were positive for Helicobacter pylori (Table 1).

Age-Specific Prevalence of Helicobacter pylori

Among the cohorts of HIV-infected patients, a higher prevalence rate of Helicobacter pylori was observed in the age group 40-49 years (41.7%) compared to others. This was followed by ages 30-39 years (39.0%), ages 50 years & above (35.0%) and ages 20-29 years (33.3%) had the least prevalence of Helicobacter pylori (Table 1). However, these differences were not significantly associated ($p = 0.93$) as shown in Table 1.

Sex-Related Prevalence of Helicobacter pylori

A higher prevalence rate of Helicobacter pylori was also found among HIV-infected patients that were males (38.5%) than their male counterparts (37.7%). However, the sex differences were not significantly associated ($p = 0.94$) as shown in Table 1.

Helicobacter pylori in relation to marital status

A higher prevalence of Helicobacter pylori was also observed among the married HIV-infected patients (47.5%) than the singles (24.4%). Statistically, marital status was significantly associated with the prevalence of H. pylori among HIV-infected patients (p = 0.02) as shown in Table 1.

Helicobacter pylori in relation to educational background

A higher prevalence of Helicobacter pylori was observed among HIV-infected patients with tertiary education (56.5%) than those with primary/secondary education (20.6%) and those with no formal education (16.7%) as shown in Table 1. The level of education of the HIV-infected patients had a significant relationship with the prevalence of Helicobacter pylori (p = 0.001).

Helicobacter pylori in relation to occupational status

A higher prevalence of Helicobacter pylori was found among HIV-infected patients that were traders (60.0%) compared to other occupational groups. This was followed by civil servants (46.7%), business executives (30.0%), unemployed (22.2%), artisans (20.0%) and students (16.7%). Statistically, there was a significant relationship (p = 0.05) between occupation and prevalence of Helicobacter pylori (Table 1).

Helicobacter pylori in relation to religion

A higher prevalence of Helicobacter pylori was observed among HIV-infected patients with Christian religion (41.7%) than those with no religion (33.3%) and Muslims (20.0%) as highlighted in Table 3.2. However, no significant association (p = 0.22) was found between religion and the prevalence of Helicobacter pylori (Table 1).

Helicobacter pylori in relation to family types

A higher prevalence of Helicobacter pylori was observed among HIV-infected patients with the polygamous family type (42.8%) than those with the monogamous family type (36.7%) as shown in Table 1. However, no significant association (p = 0.61) was found between the family type and the prevalence of Helicobacter pylori (Table 1).

Helicobacter pylori in relation to the history of STDs

A higher prevalence of Helicobacter pylori infection was found among HIV-infected patients with a history of STDs (42.9%) than those with no such history (37.6%), as shown in Table 1. However, no significant association (p = 0.78) was found between the history of STDs and the prevalence of Helicobacter pylori (Table 1).

Table 1: Prevalence of Helicobacter pylori in relation to the socio-demographic characteristics of the HIV Patients

Table 1: Prevalence of Helicobacter pylori in relation to the socio-demographic characteristics of the HIV Patients

Variables	Groups (years)	No. Tested	No. Positive (%)	Chi-square Analysis
Age Groups	20-29	21	7(33.3)	P = 0.93
	30-39	36	14(39.0)	
	40-49	24	10(41.7)	
	50 & above	20	7(35.0)	
Sex	Males	39	15(38.5)	P = 0.94
	Females	61	23(37.7)	

Marital Status	Married	59	28(47.5)	P = 0.02
	Single	41	10(24.4)	
Educational Status	None	6	1(16.7)	P = 0.001
	Primary	14	2(20.6)	
	Secondary	34	7(20.6)	
	Tertiary	46	26(56.5)	
Occupational Status	Student	12	2(16.7)	P = 0.05
	Unemployed	18	4(22.2)	
	Civil servants	30	14(46.7)	
	Trading	20	12(60.0)	
	Artisans	10	2(20.0)	
	Business Executive	10	3(30.0)	
Religion	Christianity	84	35(41.7)	P = 0.22
	Muslims	10	2(20.0)	
	None	6	1(33.3)	
Family Type	Monogamous	79	29(36.7)	P = 0.61
	Polygamous	21	9(42.8)	
History of STDs	Yes	7	3(42.9)	P = 0.78
	No	93	35(37.6)	
Total		100	38(38.0)	

Discussion

The study concentrated on the serological prevalence of antibodies specific to Helicobacter pylori among HIV-positive individuals in Port Harcourt, Nigeria. Infection with H. pylori is quite prevalent in underdeveloped nations (Lee et al., 2003). Throughout and even within a single country, there are notable variations in the frequency of illness. Overcrowding and socioeconomic status are intimately tied to this (Abdolvahab et al, 2006). According to reports, the incidence rate is higher in developing countries because the majority of the population is from a poor or middle socioeconomic level (Waleed et al, 2010).

The study was generally targeted at HIV patients who attended a tertiary health facility in Port Harcourt, Nigeria based on age, sex, marital status, educational status, and occupation among other socio-demographic characteristics, even though H. pylori have been widely reported to be coinfected with other infections and diseases such as HIV, dyspepsia, and anaemia (Magdy et al., 2012).

In the current investigation, Helicobacter pylori were detected in 38.0% of the 100 HIV-infected patients that were evaluated. This is different from the figures that had previously been reported in Nigeria. The prevalence rates previously reported in Nigeria and other underdeveloped nations are higher than the 38.0% observed in this study (Lee et al., 2003). The value differed from the 6.0% and 44.4% recorded by Okosigha (2014) and Barine (2014), respectively, in their

investigations in Port Harcourt, Nigeria, the 81.7% recorded by Bello et al. (2018) in Kano, Nigeria, and the 72.1% reported by Chen et al. (2014). However, the value found in this study is greater than the 12.7% found in a previous study by Jemikalajah and Okogun (2014) in Warri, Nigeria.

The 38.0% recorded in this study is higher than the 26.2% reported among HIV patients by Efere (2019) in Calabar, Nigeria. That is greater than the 2.0% prevalence of HIV/H. pylori coinfection in Port Harcourt, Nigeria, as reported by Barine (2014). Geographical differences in H. pylori prevalence are significant (Kusters et al., 2006).

The results of this study are consistent with those of Abdollahi et al. (2014), who found that anti-H. pylori IgG seropositivity was more common in HIV patients than in HIV-negative people whereas IgA seropositivity was less common in HIV patients.

This study further established the existence of both illnesses and their coexistence in Nigeria by revealing a coinfection rate of 38.0% for HIV/H. pylori. Olmos et al. (2004) reported a coinfection rate of 41.1%, which is somewhat in agreement with this one. Nonetheless, several studies have reported findings that diverge from the findings of the current study. The overall prevalence of H. pylori in children with HIV infection was previously estimated by Waleed et al. (2010) to be 22.5%. This value makes sense given that children are less likely than adults to contract H. pylori.

In this study, a univariate analysis of sociodemographic variables revealed that there was a higher prevalence of H. pylori in male participants than in females, but this difference was not statistically significant (p= 0.1467). This is consistent with Bello et al. (2018) findings, which also found that males are more likely than females to have H. pylori infections. Similarly to this, Omosor et al. (2017) found that males were more likely than females to have an infection with H. pylori. Moreover, Woodward et al. (2000) noted that men were more likely than women to have H. pylori. Male gender has been identified by Ford and Axon (2010) as a risk factor for H. pylori infection. In contrast, research from Warri, Nigeria, found that females were more likely than males to have H. pylori (Jemikajah and Okogun, 2014).

Female gender was previously established as a separate risk factor for upper gastrointestinal problems (Oluyemi et al., 2017). This study found no association between sex and participants' coinfections with HIV/H. pylori (p= 0.1467). The study by Efere (2019) in Calabar, Nigeria is different from this. This also conflicts with Okosigha (2014), who claimed that H. pylori infection affects both sexes equally and is not specific to either the male or female sex. Our results are comparable to a situation in Bangladesh where Lee et al. (2003) reported that there was no discernible variation in the infection concerning sex. Just those who are susceptible to the sickness would matter. The genders did not appear to differ significantly, according to Chen et al. (2014). The results of this study also contrast that of Zhu et al. (2014) who claimed that there was a large gender gap and that women had a greater infection rate than men. According to Xia et al. (2001), one of the hypothesized underlying reasons for this connection is that oestrogen and progesterone production may affect GI motility (Oluyemi et al., 2017), and psychological factors play a significant role in this difference as Talley et al. (2001) reported that emotional and psychological distress was independently associated with upper gastrointestinal symptoms in diabetes while Wredling and colleagues (1995) found no such association.

We observed no statistically significant age-specific prevalence (p=0.7478). This is consistent with research conducted in Calabar, Nigeria in 2019 by Efere. This contrasts with Okosigha's (2014) findings from Port Harcourt, Nigeria, who observed an age-specific prevalence of H. pylori infection in their study. Moreover, the age group of 40-49 years had a greater prevalence rate of Helicobacter pylori than the other age groups. According to a study conducted in Israel, the frequency was low in children but quickly rose in people over 60 in the second decade of life. No co-infection of HIV/Helicobacter pylori was found by Barine (2014) in children or adolescents, indicating that there was a substantial difference in the individuals who had both diseases.

Also, compared to singles, married HIV patients and pregnant women had higher prevalences of Helicobacter pylori. Among HIV-positive patients, the study discovered a link between marital status and H. pylori infection. This can be attributed, among other things, to stress and having a family. Marital status and H. pylori infection were linked, according to Chen et al. (2014). According to Chen et al. (2014), the transmission of H. pylori later in life may occur by spousal transfer from a partner who does not have Helicobacter. Also, according to Brenner et al. (1999), the length of time a person spent living with an infected spouse increased their likelihood of contracting H. pylori infection. According to Marshall (2006), a patient who married into a family with gastric ulcers later experienced duodenal ulceration. The prevalence of Helicobacter pylori did not significantly correlate (p=0.4304) with the subjects' educational level. Those with tertiary education had a higher prevalence of Helicobacter pylori (16.7%) than those with another educational level. Similar findings were made in Denmark by Steffen et al. in 1996, who discovered that a decline in socioeconomic position increased the probability of chronic H. pylori infection. Low socioeconomic class individuals are more likely to have low levels of education, inadequate health education, and a greater propensity to reside in environments that increase the risk of faecal contamination of food and water (Bello et al., 2018). To reduce the impact of socioeconomic status on findings, Abdollahi et al. (2014) attempted to match the cases and controls regarding gender, age, place of residence, and educational level status. They found no significant difference in the distribution of serum anti-H. pylori IgG between the two groups.

According to Hida et al. (1999), the age, ethnicity, and socioeconomic position of the individual patients were tested to affect the prevalence of H. pylori. Compared to other occupational groups, HIV-infected individuals who were traders had a higher frequency of Helicobacter pylori. Civil servants, business leaders, the unemployed, artisans, and students came after this. According to statistics, there was no connection between employment and the frequency of Helicobacter pylori in HIV-positive patients. Bello et al. (2018) claim that being a member of a lower social class increases the probability of H. pylori infection.

HIV-infected individuals who identified as Christians (41.7%) had a higher frequency of Helicobacter pylori than those who identified as atheists (33.3%) or Muslims (20.0%). However, no correlation between religion and the frequency of Helicobacter pylori was discovered. Infection with H. pylori is substantially correlated with crowding (Bello et al., 2018). Participants with polygamous family types had higher rates of Helicobacter pylori than monogamous family types. In

cohorts of HIV-infected patients, a significant correlation (p=0.0013) between the family type and Helicobacter pylori prevalence was discovered. In a similar vein, many studies conducted in Nigeria by Etukudo et al. (2012) and Olufemi et al. (2015) revealed that the prevalence of H. pylori infection increased with household size. Also found as risk factors for H. pylori infection by Khalifa et al. (2010) were overcrowding, sharing of beds, and growing household contact.

Moreover, HIV-infected patients with a history of STDs had a higher prevalence of Helicobacter pylori infection than HIV-infected patients without such a history. Between the history of STDs and the prevalence of Helicobacter pylori in HIV-infected patients, a statistically significant correlation (p=0.5659) was discovered.

Since there is still a need for adequate counselling and education about HIV and AIDS, mother-to-child transmission (MTCT), and H. pylori /HIV coinfection, it is important to note the prevalence rate of HIV/H. pylori coinfection in this study is high. Of all the risk factors examined, they also appeared to be associated with seropositivity. Hence, the connection between H. pylori infection and HIV is still debatable (Abdollahi et al., 2014).

Conclusion

In Port Harcourt, Nigeria, study participants, particularly those with HIV, have a very high prevalence of H. pylori infection. Of all the sociodemographic factors examined, only family type and HIV seropositivity were found to be significantly associated with an increased risk of H. pylori infection. This study provides additional evidence that HIV/Helicobacter pylori co-infection exists among HIV-positive individuals and expectant mothers in Port Harcourt, Nigeria. According to the study, H. pylori infection is widespread and a significant public health issue in Port Harcourt, Nigeria. More research on the underlying mechanisms is required. This emphasizes the need for routine blood testing for H. pylori and HIV coinfection to reduce their spread among the general population.

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Disclosure of conflict of interest

The authors have declared that no competing interests exist.

Statement of ethical approval

All authors hereby declare that all experiments have been examined and approved by the University of Port Harcourt Teaching Hospital (UPTH), Port Harcourt, Rivers State, Research Ethic committee and have, therefore, been performed following the ethical standards laid down in the 1964 Declaration of Helsinki.

Statement of informed consent

"All authors declare that informed consent was obtained from all individual participants included in the study."

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