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HIV and *Helicobacter pylori* Co-infections among Patients visiting two selected medical facilities in Port Harcourt, Rivers State, Nigeria

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Abstract: The co-infection of HIV and *Helicobacter pylori* amongst patients visiting selected medical facilities in Port Harcourt, Rivers State Nigeria was investigated. One hundred patients were recruited from selected hospitals in the city. HIV (Determine) and *H. pylori* (ANTI-HP Rapid) rapid test kits were used to assay for antibodies against the virus and bacterium in the sera of participants respectively. Other demographics such as age, sex and marital status was obtained using questionnaires. The result outcomes showed a 2.0% prevalence of HIV and *H. pylori* coinfection specifically in those within age bracket of 17-19 years. No co-infection was observed among children and adolescent signifying that significant difference ($p<0.05$) existed in patients with both infections. Similarly, no significant difference ($p>0.05$) was noted in the co-infection rates reported for males (2.4%) and females (1.7%). Conversely, no marital status-specific difference ($p>0.05$) was noted, though HIV and *H. pylori* coinfection was only detected in singles. In conclusion, the study further confirms the presence of HIV and *Helicobacter pylori* coinfection among patients in Port Harcourt, Rivers State, Nigeria. This highlights the necessity for routine screening of blood for HIV and *H. pylori* coinfection to minimize their transmission among the general population. The need for intensive health education to enlighten the public on the risk factors associated with both infections and possible control measures. Further studies of larger numbers of HIV-1 patients with and without *H. pylori* co-infection for a prolonged period of time are needed in order to define the role of *H. pylori* co-infection and eradication in immune reconstitution of HAART-treated HIV-1- infected patients

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1. Introduction

Human immune deficiency virus (HIV) is a retrovirus belonging to group VI of Baltimore's classification that houses single-stranded RNA viruses that encodes reverse transcriptase. The virus has been implicated to cause continuous destruction of the body's cellular defence mechanisms by infecting CD4+ T helper cells resulting in an increased vulnerability to infections, tumours and acquired immune deficiency syndrome (AIDS) (Cheesbrough, 2004).

HIV/AIDS is a disease with worldwide distribution (Cohen *et al.*, 2008). In, 2011 about 34 million people were reported to have HIV infection worldwide (UNAIDS, 2011). Of these, approximately 17.2 million were men, 16.8 million were women and 3.4 million were less than 15 years old. There was about 1.8 million mortality from AIDS in 2010, down from 2.2 million in 2005 (UNAIDS, 2011). Sub-Saharan Africa is the most affected region. In 2010, an about sixty-eight per cent (68.0%) (22.9 million) of all HIV occurrence and sixty-six per cent (66.0%) of all mortality (1.2 million) were reported in this Sub-Saharan region of Africa.

This suggests that around 5.0% of the adult populations are infected. Here in dissimilarity to other regions women compose nearly 60.0% of cases. *Helicobacter pylori* is a bacterium that is implicated in the widespread infection of the linings of the stomach making them ulcerate. With over 50.0% of the total population on earth infected, although about 80.0% of the people infected are asymptomatic. *H. pylori* infection has been linked with low-grade inflammation of the duodenum and stomach. The bacterium can adapt the acidic nature of the stomach where digestion of food is facilitated by enzymatic actions. *H. pylori are* considered the most implicated organism that causes gastritis. A percentage of people diagnosed to harbour the bacterium may develop an ulcer and have a higher risk of stomach ulcer.

The occurrence of *Helicobacter pylori* infection in a community may be directly related to some factors such as the rate of acquisition of infection with *H. pylori*- that is, incidence; the rate of loss of the

infection and the prolonged persistence of the bacterium in the gastroduodenal mucosa between infection and eradication.

At least half the world's population is infected by the bacterium, making it the most widespread infection in the world (Pounder and Ng, 1995). *Helicobacter pylori* infections occurring among individuals infected with HIV have been reported. The co-infection of *Helicobacter pylori and* HIV can degrade the humoral immunity of the individuals infected and increases their risk of falling sick and mortality over a short period of time. Adults infected with HIV and/or showing low CD4+ T cells count would lose the tropic mechanism by which *H. pylori* colonization is sustained, and severity of the infection which would lessen with adequate antibiotic treatment with a useful decrease of gastric acidity (Lee *et al.*, 2003).

Consequently, the co-infection of HIV and *H. pylori* interferes with humoral immunity of patients making them susceptible to other opportunistic infections. We embarked on this study to evaluate the co-infection of HIV and *Helicobacter pylori* antibodies among patients in Port Harcourt, Rivers State, Nigeria.

2. Materials and Methods

2.1 Sample collection

One hundred samples were sourced from the University of Port Harcourt Medical Center (UPTH) and Braithwaite Memorial Specialist Hospital (BMSH), Port Harcourt. The population recruited for the study included 100 volunteers collected at random from the two medical facilities. About 3-5ml of samples was collected aseptically participants by vein puncture into EDTA bottles. A short ended questionnaire requiring the participants to provide their demographic information (age, sex and marital status) were given to the patients to fill after which they were documented appropriately.

2.2 Serological Assay

Serum was separated from whole blood by centrifugation for 10minutes at 2000rpm and left at room temperature (25 $\pm 8^0$C) in properly labelled plain bottles until the samples were assayed same day. Each serum sample was analyzed for HIV and *H. pylori* antibody using Determine and ANTI-HP rapid test kits for the qualitative detection of antibodies to both infections in serum samples. Recommended quality control measures and precautions were observed in the course of the analysis in adhering manufacturer's instructions; repetitive freezing was not a case as samples were analysed the same day. We also ensured the test kits were valid (Stainer *et al.*, 1987; Talaro and Talaro, 2002).

2.3 Interpretation of result

Results obtained were interpreted based on the rules contained in the kits manufacturer's instruction.

2.4 Statistical analysis

Results from the analysis were subjected to statistical analyses using the SPSS statistical package for Windows; 95% C.I for key proportions was done using the actual binomial distribution. The chi-square test was used to test the differences in proportion when appropriate; differences with P>0.05 were deemed significant.

3. Results

The results are presented in Tables 1 to 3. These included the prevalence in relation to sex, age group and marital status. This study showed that only 2.0% of the subjects were positive for both anti-HIV and *H. pylori* antibodies.

3.1 Prevalence of *H. pylori*/HIV co-infection in relation to Age

Thirty-nine of the 100 samples tested were within the age group 1-18 years, of these, none tested positive for HIV but a few tested positive for *H. pylori.* Hence, there was no coinfection recorded among the age bracket. A co-infection of 2.0% was however recorded amongst the 61 participants that were between the ages of 19-37 years as shown in Table 1.

Table 1: Prevalence of HIV/ *H. pylori* co-infection in relation to Age

Age groups (years)	No. Tested (%)	HIV/*H. pylori* co-infection (%)
0-18	39 (39.0)	0 (0.0)
19-37	61 (61.0)	2 (3.3)
Total	**100(100.0)**	**2 (2.0)**

Table 2: Prevalence of HIV/*H. pylori* co-infection in relation to marital status

Marital status	No. Tested (%)	HIV/*H. pylori Co-infection* (%)
Single	**77(77.0)**	**2(2.6)**
Married	**23(23.0)**	**0(0.0)**
Total	**100 (100)**	**2(2.0)**

3.2 Prevalence of HIV/ *H. pylori* co-infection in relation to marital status

Seventy-seven (77) serum of the 100 tested participants was single, of these, 2(2.6%) tested positive to the co-infection of *H. pylori* and HIV. Twenty-three were married from which none was positive for HIV though, a few were positive for *H. pylori* antibodies as seen in Table 2.

3.3 Prevalence in relation to sex

Forty-two (42) of the 100 tested samples were male, out of which a coinfection of 2.4% was reported and 58 were female, out of which 1(1.7%) tested positive to HIV/*H. pylori* antibodies as shown in Table 3.

Table 3: Prevalence of HIV/ *H. pylori* coinfection in relation to sex

Sex	No. Tested (%)	HIV/*H. pylori* Co-infection (%)
Males	42(42.0)	1(2.4)
Females	58(58.0)	1(1.7)
Total	**100(100.0)**	**2(2.0)**

4. Discussions

The International Agency for Research on Cancer (IARC) reported that *H. pylori* are a type I carcinogen (Atlas, 1995; Magdy *et al.,* 2012; Abdolvahab *et al.,* 2006). This report was based on epidemiological evidence. It has been argued that *H. pylori* are only a risk factor in some regions. The study centred on the co-infection of Human immunodeficiency virus and *Helicobacter pylori* among patients attending selected Hospital in Port Harcourt, Rivers State, Nigeria. *H. pylori* have been reported to be distributed in developing countries with high occurrence (Brown, 2000; Bontem *et al.,* 2003; Joav *et al.,* 2004; Blaser, 2005). Reported data on HIV/*H. pylori* co-infection are mainly based on adults and from endemic areas using serological methods. There are conflicting prevalent patterns of *H. pylori* in HIV infected patients using various methods of detection (Konturek, 2003; Kusters *et al.,* 2006; Malaty, 2007). However, significant differences ($p<0.05$) have been observed in the prevalences globally.

In our study, no participant below 19 years of age tested positive for both HIV and *H. pylori.* Hence, there was no co-infection recorded among the age bracket. A co-infection of 2 (2.0%) was recorded amongst the 61 participants that were between the age of 19-37 years, of this age group, 2(2.6%) had co-infection of HIV and *H. pylori.*

Also in this study, 23 participants were married, of which none was positive for HIV though, a few were positive *H. pylori* antibodies. In relation to sex, 1(2.4%) of the 42 males had coinfection of HIV and *H. pylori* and of the 58 females, 1(1.7%) was to both HIV and *H. pylori* antibodies.

Our study which revealed a coinfection rate of 2.0% for HIV and *H. pylori* further confirmed the presence of both infections and their coexistence in Nigeria. This study agrees with that of Olmos *et al.* (2004) who reported coinfection rate of 41.1%, stating that the frequency of *H. pylori* in gastric mucosa in HIV-patients and non-HIV patients were similar.

Also, this study showed similar outcomes as reported by Ali *et al.* (2002) who concluded that *H. pylori* prevalence was not significantly different between HIV-positive and HIV-negative subjects and a decrease in HIV positive subjects with decreasing CD4+ cell counts.

Some studies have however reported results that differ from the present study. Waleed *et al.* (2004) had earlier reported the overall prevalence of *H. pylori* in HIV-infected children to be 22.5%. This value is understandable as *H. pylori* are not common in children as in adults. Their report also stated a lower prevalence of *H. pylori* in HAART-naïve children compared to healthy children (44.3%). Previous studies carried out had aired a different opinion that *H. pylori* prevalence was low in HIV-patients compared

to healthy members of the population (Nester, *et al.*, 1998; Prescott *et al.*, 2005; Ramadas *et al.*, 1995).

Conclusion

This study further confirms the presence of HIV and *Helicobacter pylori* coinfection among patients in Port Harcourt, Rivers State, Nigeria. This highlights the necessity for routine screening of blood for HIV and *H. pylori* coinfection to minimize their transmission among the general population. The need for intensive health education to enlighten the public on the risk factors associated with both infections and possible control measures. Further studies of larger numbers of HIV-1 patients with and without *H. pylori* co-infection for a prolonged period of time are needed in order to define the role of *H. pylori* co-infection and eradication in immune reconstitution of HAART-treated HIV-1- infected patients.

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