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HELICOBACTER PYLORI AND INTESTINAL PARASITES CO-INFECTION IN PREGNANT WOMEN ATTENDING ANTENATAL CLINIC IN A HOSPITAL, SOUTH-SOUTH NIGERIA

Ebidor Lawani-Luwaji[1*], Alade Tolulope[2] and Ujile Love Monday[3]

[1-3]Department of Medical Laboratory Science, College of Health Sciences.

Niger Delta University.

[*]Corresponding Author's Email: ebilawani-luwaji@ndu.edu.ng

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ABSTRACT: *Pregnant women are susceptible to severe health problems caused by Helicobacter pylori and intestinal parasitic infections. These conditions include iron deficiency anaemia, hyperemesis gravidarum, gastritis, duodenal ulcers, and maternal morbidity and mortality. These infections usually spread due to poor personal hygiene and socioeconomic conditions. The study aimed to investigate the occurrence of H. pylori and intestinal parasitic infections amongst pregnant women attending the antenatal clinic in Okolobiri, Bayelsa State. We analysed the samples using the H. pylori antibody rapid tests, stool direct wet mounts, formal ether concentration, and saturated sodium chloride floatation. The data revealed that 34% of the women were infected with H. pylori and 20% with intestinal parasites. The highest occurrence of H. pylori infection and intestinal co-infection was in the 26-30 age group. Entamoeba histolytica was the most common type of protozoa present, while Ascaris lumbricoides and Trichuris trichuria were the most common forms of helminth infections. The Chi-square analysis showed a statistically significant difference with respect to age. These results provide essential epidemiological data on the prevalence of H. pylori and intestinal parasitic infections among pregnant women in Okolobri, Bayelsa State. The study highlights the need to screen pregnant women for H. pylori and intestinal parasites to improve antenatal care for both mother and child.*

KEYWORDS: *Helicobacter pylori*, intestinal parasites, pregnancy, antenatal, infections, co-infection.

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INTRODUCTION

Helicobacter pylori is a spiral-shaped bacterium discovered in 1982 by Australian researchers. It causes chronic gastritis, ulcers, reflux disease, and gastric cancer. *H. pylori* secretes urease, which neutralises stomach acid and allows it to colonise the stomach walls. Its unique properties enable it to persist in the gastric mucosa for a long time (Ansari & Yamaoka, 2019).

During pregnancy, *H. pylori* infection is the leading cause of various pregnancy-related disorders such as iron deficiency anaemia, malnutrition, hyperemesis gravidarum, miscarriage, and growth restriction. These disorders are potentially life-threatening for both the mother and the fetus. It is widely believed that hormonal and immunological changes occurring during pregnancy could activate latent *H. pylori* infection, which negatively impacts maternal health by causing nutritional deficiencies, organ injury, and even death. Moreover, such infection could also affect the fetus by causing insufficient growth, malformation, or even death. Since *H. pylori* infection is most likely acquired before pregnancy, it is crucial to take preventive measures to avoid such complications during pregnancy (Weyermann et al., 2009).

Intestinal parasitic infections (IPIs) are a primary worldwide health concern, especially in developing nations. Approximately 3.5 billion people in the world suffer from IPIs, with 450 million individuals affected by a broad range of IPIs. The global estimate suggests that 895 million people are infected with soil-transmitted helminths (STHs), as around 447 million, 290 million, and 229 million people are infected with *Ascaris lumbricoides*, *Trichuris trichiura*, and hookworms, respectively (James et al., 2018).

Women of reproductive age, especially those living in low-income countries and below the poverty line, are at a higher risk of developing multiple health conditions caused by intestinal parasite infections (IPI). Helminth infections, in particular, can negatively impact the immune system of both the mother and the fetus during pregnancy, increasing the risk of infectious diseases. These infections have also been linked to iron deficiency anaemia, compromised nutritional status, preterm birth, low birth weight, poor iron levels in newborns, and unfavourable birth outcomes (Taghipour et al., 2021).

Co-infection by *H. pylori* and intestinal parasites in humans is a widespread health issue, particularly in developing countries. *H. pylori* infection often leads to various gastrointestinal problems. Both groups of pathogens share the same risk factors and play a crucial role in gastrointestinal disorders in individuals affected by these co-infections. It is expected to have co-infection of *Helicobacter pylori* with intestinal parasites as they have similar modes of transmission and thrive in similar environmental conditions. Common risk factors include contaminated water sources, defecation in the soil, and poor personal hygiene (Awuku et al., 2017).

Co-infection of *H. pylori* and intestinal parasitic infections (IPIs) can significantly impact the modulation of the host immune responses. *H. pylori* infection can provoke Th1 immune responses by inducing cytokines, such as IFN-γ and IL-12 (Larussa et al., 2015).

According to a study by David et al. (2006), the production of urease by *H. pylori* helps these intestinal parasites cross the stomach more quickly. *H. pylori* infection can cause an increase in proinflammatory cytokines, such as IL-2 and IFN-γ, which can lead to changes in the gastric environment and reduced acid production (Padol & Hunt 2004).

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The study aims to assess the prevalence of *H. pylori* and intestinal parasites co-infection in pregnant women attending the antenatal clinic at Niger Delta University Teaching Hospital Okolobiri, Yenagoa, Bayelsa State.

MATERIALS AND METHODS

Study Design

The study was conducted between February and May 2023 amongst pregnant women attending an antenatal clinic at the Niger Delta University Teaching Hospital in Okolobiri in Kolokuma/Opokuma Local Government Area.

Ethical Clearance

Ethical clearance was obtained from the Ethical Committee of the Niger Delta University Teaching Hospital, Okolobiri, Yenagoa Local Government Area, Bayelsa State, and oral consent was received from each pregnant woman before they participated in the study. Participants at the antenatal clinic were provided with comprehensive details regarding the study.

Sample Size

Using Taro Yamane's method for sample size calculation, fifty stool and blood samples were collected from the participants in the study. Samples were collected after participants agreed to partake in the study. Each participant was provided with a labelled stool container (transparent and clean) and was instructed to collect a faecal sample.

Sample Analysis

H. pylori Antibody Rapid Test

The *H. pylori* antigen rapid test cassette is a qualitative, lateral flow immune assay detecting *H. pylori* antigen in human serum. In this test, the membrane is pre-coated with anti-*H. pylori* antibodies on the test line region or the test. During testing, the specimen reacts with the particles coated with *H. pylori* antibodies. The mixture migrates upward on the membrane by capillary action to react with anti-*H. pylori* antibodies on the membrane and generate a coloured line. The presence of this coloured line in the test region indicates a positive result. At the same time, its absence indicates a negative result.

Stool Examination

Every stool sample was examined to detect the intestinal parasite by wet preparation, saturated sodium chloride floatation and formal ether concentration. If one detection method was positive, the sample was counted as positive for intestinal parasites, even if other ways were negative.

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Statistical Analysis

Statistical analysis was performed using SPSS version 20.0. The Chi-square method was used to compare variables. P values < 0.05 were considered statistically significant.

RESULT

Of the 50 pregnant women, 17 tested positive for *H. pylori*, indicating that 34% of the case group was infected. The highest occurrence rates were reported among the 18-25 (4%) and 26-30 (7%) age groups, while the 31-45 age group had the lowest prevalence rate at 2%. However, this difference was not statistically significant (p = 0.641).

Table 1: Occurrence of *H. pylori* among pregnant women

Age group	No examined	Number of positive
18-25	15	4
26-30	10	7
31-35	8	2
36-40	7	2
41-45	10	2
Total	50	17

Table 2 shows that 20% of the 50 pregnant women tested were infected with gastrointestinal parasites. The highest prevalence rates were observed in the age groups of 26-30 with 4 positive cases and 18-25 with 3 positive cases, while the lowest rate (1%) was found in the age group of 31-45. This difference among the age groups was statistically significant (P=0.013).

Table 2: Prevalence of gastrointestinal parasites among pregnant women

Age group (year)	No. Examined cases	No. of positive case
18-25	15	3
26-30	10	4
31-35	8	1
36-40	7	1
41-45	10	1
Total	50	10

Among the group of 50 women, 6 were found to have *Entamoeba histolytica*, 3 had *Ascaris lumbricoides* infection, and a single pregnant woman was diagnosed with *Trichuris trichuria* infection.

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DISCUSSION

In many low-income settings, individuals are often infected with multiple microorganisms. These infections are spread due to poor socioeconomic conditions and personal hygiene, particularly in tropical and rural areas. *H. pylori* and intestinal parasitic infections are common health problems that can cause severe complications among pregnant women, such as iron deficiency anaemia, hyperemesis gravidarum, miscarriage, gastritis, and duodenal ulcers. These complications can also lead to maternal morbidity and mortality. Improving maternal health has been a global health priority for many years due to high maternal mortality rates worldwide (Bongaaarts et al., 2016).

Co-infection of *H. pylori* with intestinal parasites is common because they share the same modes of infection and environmental conditions. Risk factors contributing to this include contaminated water supplies, defecation in soil and poor personal hygiene. The urease production by *H. pylori* makes it easier for these intestinal parasites to cross the stomach. *H. pylori* causes increased production of proinflammatory cytokines such as IL-2 and IFN-γ. This leads to changes in the gastric environment and reduced acid production. As a result, infection of the stomach by other organisms becomes much easier. This decrease in gastric acid secretion happens when *H. pylori* is present in the corpus region of the stomach (Abd et al., 2021; Awuku et al., 2017; Hernández et al., 2019; Sitotaw et al., 2019; David et al., 2006; Padol & Hunt, 2004; Hosni et al., 2012; Windle et al., 2007).

According to the data obtained from this study, the prevalence of *H. pylori* in the population under consideration is 34%, which is similar to the result (33%) obtained in Italy (Pomar et al., 2020) and lower than the prevalence (54.7%) observed in Southern Ethiopia (Abdella et al., 2020) and 70.2% in Uganda (Baingana et al., 2020). The prevalence from this study was also higher than that observed at Gandhi Memorial Hospital Addis Ababa (24.7%) (Akalu et al., 2020).

A recent review has revealed a high prevalence of intestinal parasites among pregnant women across the globe, especially in low- and middle-income countries. The review identified three helminth infections (hookworm, *Ascaris lumbricoides*, and *Trichuris trichiura*) and three protozoan infections (*Blastocystis* sp, *Entamoeba histolytica*/dispar, and *Giardia* sp) as the most common intestinal protozoa found in pregnant women (Taghipour et al., 2021).

According to our research, 20% of the population we studied had intestinal parasites. *E. histolytica* was the most common type of protozoa present, while *A. lumbricoides* and *T. trichuria* were the most common forms of helminth infections. Our findings were higher than the recorded rates (14.3%) in Kasoa, Southern Ghana (Abaka-Yawson et al., 2020) and almost the same (27.32%) in Ethiopia (Animaw et al., 2021). Hookworm was the most widespread type of intestinal parasite found in these locations, followed by *A. lumbricoides*. In a different study conducted in Sao Tome, 58.2% of the population under study was found to have intestinal parasites, with *A. lumbricoides* being the most predominant species, followed by *T. trichiura* (Vasconcelos et al., 2022).

The highest infection rates of intestinal parasites and *H. pylori* infection were reported in the 18-25 age group ((Table 1 and Table 2). In pregnancy, age and parity have been studied as possible risk factors for common parasitosis. Ascariasis in pregnancy is found most commonly in women between 20–29 years of age, and the prevalence increases with parity. Hookworm

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infection is more common in younger pregnant women under 29 years of age, and the prevalence declines from primigravida to second gravida before rising again for multigravidae. Research has also linked primigravida to increased protozoan-only infections (Mohan et al., 2020).

Pregnancy is associated with complex immunological changes known to increase susceptibility to infections. The initial response to helminth invasion in pregnancy is predominantly cellular, activating eosinophils, basophils and mast cells. Pregnancy is known to cause a depression of cell-mediated immunity while humoral immunity is maintained. These physiological changes adapt the woman to accept the fetal graft, and while these primarily occur at the maternal-foetal interface, they affect the maternal immune system. Consequently, pregnancy increases susceptibility to parasitic infections (Adegnika et al., 2007).

Parasites live by depriving the host of nutrients, and some may interfere with the absorption of these nutrients. Their presence may, therefore, precipitate deficiencies of these nutrients. This may mean that the woman suffers more adverse effects from a relatively smaller parasite burden while pregnant. A nutritionally deprived state may, furthermore, cause reduced immunity with the potential to further worsen a parasitic infection (Mohan et al., 2020).

Our findings disagree with the findings of Fadul et al. (2016), who reported the highest occurrence rate (50%) in the age group >66 years old. However, our findings agree with the previous research work of David Ishaleku (2010), which showed that the prevalence of *H. pylori* rose to the peak of 85.7% at the age of 18-40 years and dropped at the age of 41-50 years to 28.6% in Nasarawa State University, Keffi, Nigeria. Co-infection between *H. pylori* and intestinal parasites in pregnant women is a significant public health concern because of its maternal and child health.

Our study provides additional information about the prevalence of *H. pylori* and intestinal parasitic infection, which is vital for understanding the future burden. The research shows the need for *H. pylori* and intestinal parasite screening in pregnant women to enhance antenatal care for both mother and child. Therefore, we recommend that pregnant women undergo this screening routinely.

CONCLUSION

In conclusion, this study's prevalence of *H. pylori* is 17%, and intestinal parasites is 20%. The study also found intestinal parasites common in patients with *H. pylori*. We also observed a significant relationship between women infected with *H. pylori* and intestinal parasite infection in the 18-25 and 26-30 age groups. Helminth infections can have worse outcomes in pregnant women because of the combined effects of pregnancy and helminth infections on the immune system. As a result, pregnant women with helminth infections have a higher risk of contracting infectious diseases like malaria, measles, influenza, and toxoplasmosis. Further investigation is required to understand the observed relationship in more detail and to provide explanations. In addition to investigating *H. pylori*, screening for intestinal infection is recommended to manage women during pregnancy successfully.

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