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Seroprevalence of *Helicobacter pylori* in Adult Patients with Gastric Symptoms Attending Public Health and Diagnostic Institute, Northwest University Kano, Nigeria

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Authors' contributions

This work was carried out in collaboration between all authors. Author FAU designed the study. Authors IB, BFS and YM performed the statistical analysis. Authors SAA and FAU wrote the protocol and wrote the first draft of the manuscript. Authors YM and FAU managed the analyses of the study. Authors IB, SAA and FAU managed the literature searches. All authors read and approved the final manuscript.

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ABSTRACT

Infection with *Helicobacter pylori* has been recognized as global problem due to its high prevalence across the world, predominantly in developing countries. The study aimed at determining the seroprevalence of *H. pylori* in adult patients with mean age 37.5 years (ranging from 18 – 57) presented with gastritis and other symptoms of peptic ulcer in Public health and diagnostic institute, Northwest University, Kano. A total of 419 patients (214 men and 178 women) were screened for *H. pylori* using rapid diagnostic test kit (Micropoint, China) according to manufacturer's instructions. A seropevalence of 69.0% was recorded with male having the highest prevalence of 74.3% and

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61.8% among female participants. Based on different age groups, 18-27 have the highest prevalence of 44.9% while 48-57 accounts for the least number of positive results (14.9%).
Conclusively, this study found a high seroprevalence of *H. pylori* among the study population. Therefore, advance antigen-based methods of *H. pylori* identification should be employed for effective diagnosis and management.

Keywords: H. pylori; gastritis; prevalence; peptic ulcers.

1. INTRODUCTION

H. pylori was identified as a gram negative bacteria that shows a biochemical feature of being urease, catalase, and oxidase positive and with the ability of catabolizing carbohydrate [1]. Initially called *Campylobacter pyloridis* then *Campylobacter pylori*, it is a curved, microphilic and motile organism that colonizes and grows in human epithelial tissue and mucus [2].

Globally the prevalence of *H. pylori* is higher in developing countries as compared to developed countries. In the most recent worldwide prevalence of *Helicobacter pylori*, it has been reported that it is highest in Africa (79.1%) followed by Latin America and the Caribbean with 63.4% [3]. In addition, the infection is usually acquired at an early age in developing countries [4], mostly associated with lower standard of hygiene [5,6]. This is contrary to European population where the infection is rarely seen early in life but increases to 10% between 18 and 30 years of age and 50% in those older than age 60 [7].

In some conditions, the colonization of this bacterium may cause ulceration of the environment it dwells [8]. *H. pylori* was recognized as the main etiological agents of gastritis in human beings and an essential factor in the pathogenesis of peptic ulcer [9]. Moreover, evidence has shown that the organism is also involved in the pathogenesis of gastric carcinoma [10] and MALT type gastric lymphoma [11]. Infections are usually acquired in early childhood in most of the countries [1]. Acquisition at an older age brings different gastric changes more likely to lead to duodenal ulcers [12]. Once acquired, *Helicobacter pylori* infection generally persists throughout life, unless treated by effective antimicrobial therapy [13].

Research showed that the microorganism is responsible for infection of upper gastrointestinal tract of more than 50% of the world's population, predominantly in developing countries, having more than 80% prevalence, due to low personal and environmental hygiene that results in acquiring the bacteria from food that has not been washed well or cooked properly or drinking unclean water [14,7,15]. Despite the fact that, many individuals who might be harboring the bacterium are asymptomatic and do not develop any clinically apparent disease. The ability to cause cancer depends on the bacterial strains that have the cytotoxin associated gene 'CagA', which codes for one of the major *Helicobacter pylori* virulence proteins [16].

Even with its high prevalence, the route of transmission of *H. pylori* is still not clear and it is difficult to point a single pathway through which this pathogen is transmitted. Some findings identified that housefly has the potential of mechanical transmission of the organism, this makes poor sanitation a potential source of spread of *H. pylori* [17]. Contact between two individuals is considered as one of the routes of transmission so as iatrogenic, in which tubes or endoscopes that have been in contact with gastric mucosa of one individual are used for another patient [18]. Another possible route of transmission is the fecal oral route [19,13].

Infection with the bacteria can be diagnosed by several techniques such as Gram-stained smears of biopsy specimen of the gastric mucosa, culture on Skirrow s medium; an invasive methods. It can also be diagnosed by non-invasive diagnostic tests such as detection of IgM antibodies in the patient's serum, urea breath test and detection of Helicobacter antigen in the stool for confirmation [20]. The present research presents seroprevalence of *H. pylori* in adult Patients with gastric symptoms attending Public Health and Diagnostic Institute, Northwest University Kano, Nigeria.

2. MATERIALS AND METHODS

2.1 Study Area

The study was conducted in Public Health and Diagnostic Institute, Northwest University, Kano.

2.2 Subjects

The study comprised of 419 patients with symptoms of gastritis and/or peptic ulcer attending Public Health and Diagnostic Institute, Northwest University Kano.

2.3 Inclusion and Exclusion Criteria

Patients of both sexes and ages between 18 and 57 presented with symptoms of gastritis and peptic ulcer make up the study population while patients with no such symptoms and below adult age group are excluded in the current research.

2.4 Specimen Collection

Blood samples were collected by standard venopuncture without undue pressure either on arm or the syringe and delivered into a plain container. It was allowed to clot for 30 minutes and spun at 3,000 rpm for 5minutes to obtain serum.

2.5 *H. pylori* Antibody Detection

Pouches containing the cassette were opened and with plastic pipettes in the kits, two drops of serum samples were added accordingly. The results were read and interpreted after 15 minutes according to manufacturer's instructions.

2.6 Data Collection and Analysis

All relevant information were derived from the patients' registration forms with the consents of the participants, data were analyzed using a standalone software, SPSS version 20.0.

3. RESULTS

A high prevalence of *H. pylori* was observed among the study population of 419 patients (57.5% and 42.5% males and females) with gastric symprtoms, tested for the presence of the antibodies to the pathogen.

4. DISCUSSION

Serological technique for diagnosis *H. pylori* is an inexpensive and widely available for the detection of antibodies specific to the pathogen [21] which remains an important risk factor for the development of gastric problems [22] and causing gastric inflammations in virtually all infected persons [6]. The study revealed 69.0% prevalence of *H. pylori* infection at Public Health and Diagnostic Institute, Northwest University, Kano. This high prevalence could be ascribed to lower standard of hygiene, as most of the study population have low to medium educational status. *H. pylori* infections are also closely tied to socioeconomic and cultural factors. It is worth mentioning that the population studied are basically from the neighboring districts that are said to have less awareness about the preventive measures and they may likely acquired the infection through drinking unclean water and/or consumption of contaminated vegetables improperly processed before eating. The prevalence in our finding is higher than that reported by Abdulhadi 2015 [23] in Kano (53%), Saidu et al. 2015, (54.8%) in Sokoto Metropolis [24] and Alo et al. 2013 (64.0%) [25]. Another study in South-Western Nigeria also found a prevalence of 68.7% and 26.2% for *H. pylori* antibody and HpSA antigen respectively among children in Lagos [26]. However it is lower than 90% prevalence reported in other developing countries like Bangladesh [21] and 74.8% in Ghana [27] as well as 73% prevalence among Iranian populations [28].

Although the role of gender as a risk factor for *H. pylori* infection is still debated. We found 74.3% as compared to 61.8% of the female participants, which is statistically significant ($P<0.05$). This may be as a result of difference in lifestyle, males stay outdoors more than females and are regularly exposed to contaminations more often than their counterparts, which bring the risk of infection. Other factors that may contribute to an increased risk of infection also include, smoking [29] and alcohol consumption [30], commonly a habit of males than of females. This difference in gender is also reported in some previously published studies [29]. However gender did not prove to be a significant factor for *H. pylori* infection in some other findings [31].

Distribution of the antibody positive subjects according to age groups revealed a prevalence among 18 – 27 age bracket and 47 – 57 age group accounting for the least prevalent participants. Incidence of *H. pylori* infection in developing world is higher which occurs at younger age, and infection rates increase drastically in adults [32]. The former group participants are known to engage more on outdoor social activities that predispose them to an increase risk of *H. pylori* infection. In addition, the lower prevalence reported in 48 – 57 age group may be due to fall in specific serologic

response among older individuals as a result of generalized decrease in immunity or related to eradication of the bacterium due to potentiation of immune response [23].

Table 1. Distribution of test subjects with gastric symptoms with respect to sex (n = 419)

Sex	No. of positive (%)	No. negative (%)	Total
Male	179 (74.3)	62 (29.0)	**241 (57.5)**
Female	110 (61.8)	68 (38.2)	**178 (42.5)**
Total	**289 (69.0)**	**130 (31.0)**	**419 (100)**

Table 2. Distribution of *H. pylori* antibody positive subjects based on age groups

Age group	Male (%)	Female (%)	Total (%)
18 – 27	68 (38.0)	62 (56.4)	130 (44.9)
28 – 37	37 (20.7)	23 (20.9)	60 (20.8)
38 – 47	45 (25.1)	11 (10.0)	56 (19.4)
48 – 57	29 (16.2)	14 (12.7)	43 (14.9)
Total	**179 (61.9)**	**110 (38.1)**	**289 (100)**

Furthermore, many findings reported a high prevalence even among children in developing countries, indicating an early acquisition of the infection [26;33]. A study conducted in Southern Iran found 82% of children aged nine months and 98% of two years old children were *H. pylori* infected [34], in another research involving prevalence and molecular typing of *H. pylori* isolate, [35] Gokben et al found 75.8% in children of 13 – 18 years of age.

5. CONCLUSION

In conclusion, a high prevalence of *H. pylori* (69%) was observed among the study population and this can be related to lack of knowledge about fecal-oral route of transmission; a major route of spread of *H. pylori* infection.

6. RECOMMENDATION

H. pylori serological screening should be encouraged in patients presented with gastritis and other symptoms of peptic ulcer.

Advance antigen-based methods such as stool test and polymerase chain reactions for identification of *H. pylori* should be employed in diagnosis and management of infection caused by the pathogen.

Improved environmental and personal hygiene should be advocated to reduce the risk of transmission of *H. pylori* and thereby mitigating the burden of the disease associated with the bacteria.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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