

High Prevalence and Knowledge-Practice Gap of Helicobacter pylori Infection among Medical Laboratory Science Students in Sokoto, Nigeria

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Abstract:

Background: *Helicobacter pylori* (*H.pylori*) is a globally prevalent gastric pathogen and a class I carcinogen. It is one of the high-prevalence bacterial infections in low and medium-resource settings; however, data from asymptomatic young adults, particularly health-science students in Nigeria, are sparse. This study assessed the prevalence, associated knowledge, attitudes, and practices (KAP) regarding *H. pylori* infection among students at the School of Medical Laboratory Science, Usmanu Danfodiyo University Teaching Hospital (UDUTH), Sokoto, Nigeria.

Methods: A cross-sectional study involving 120 students (at the 200–500 level) was conducted. A well-structured interviewer-administered questionnaire was used to collect socio-demographic and KAP data. *H. pylori* infection status was determined serologically using a rapid immunoassay test strip.

Results: The overall seroprevalence of *H. pylori* was 80.8% (97/120). While 90% of respondents had heard of *H. pylori*, only 5.8% knew that not sharing utensils was a preventive measure against it. The majority of students (about 95%) who participated in this study reported sharing food and utensils, 89.2% used sachet water as their primary drinking source, and 92.5% frequently skipped meals. **Conclusion:** An alarmingly high prevalence of *H. pylori* infection was found among medical laboratory students, coupled with a critical knowledge-practice gap. Despite being health-science trainees, students engaged in high-risk behaviours that facilitate transmission.

Keywords: *Helicobacter pylori*, Prevalence, Seroprevalence, gastric pathogen, Knowledge-Practice Gap

Introduction

Helicobacter pylori (*H. pylori*) is a gram-negative, spiral-shaped bacterium that colonizes the human gastric mucosa. It is one of the most common chronic infections globally caused by bacteria, with an estimated prevalence exceeding 50% worldwide (Hooi et al., 2017; Kamogawa-Schifter et al., 2018). *H. pylori* remains one of the most prevalent chronic bacterial infections, with a global distribution that is highly heterogeneous, and a prevalence exceeding 70% in many developing regions of Africa, Asia, and Latin America, compared to less than 40% in developed nations (Su 2017; Hooi et al., 2017; Mentis et al., 2019). The burden of the Infection, however, is disproportionately high in low- and middle-income countries (LMICs), particularly in Africa and Asia, where prevalence often exceeds 70% (Mentis et al., 2019). The disparity can be widely attributed to socioeconomic factors, including poor sanitation, overcrowding, and limited access to clean water (Mentis et al., 2019; Khalifa et al., 2023). Nigeria, particularly its northern region, bears a high burden of infection, with prevalence rates mostly ranging from 60% to 80% (Jidda et al., 2018; Adeniyi et al., 2021).

H. pylori infection is a major cause of chronic gastritis, peptic ulcer disease (PUD), gastric mucosa-associated lymphoid tissue (MALT) lymphoma, and gastric adenocarcinoma, leading the World Health Organization to classify it as a class I carcinogen (WHO, 2020a; Momon & Sawan 2025). Most of the *H.pylori* infections are acquired during childhood and persist asymptotically for decades, turning infected individuals into reservoirs for ongoing transmission (Nguyen et al., 2023). While hospital-based studies on symptomatic patients are common in Nigeria, data on asymptomatic young adult populations, especially those in tertiary education, are limited. Health-science students, despite their academic exposure to microbiology, may still be at significant risk due to early-life acquisition and enduring socio-cultural practices. Furthermore, their knowledge may not translate to preventive behaviours.

The primary mode of transmission is person-to-person, predominantly via fecal-oral and oral-oral routes, facilitated by close contact and contaminated environments (Costa et al., 2024). The bacterial infection is typically acquired in early childhood, and without treatment, persists for life, establishing a lifelong risk for sequelae such as peptic ulcer disease and gastric cancer (Nguyen et al., 2023; WHO, 2020a).

The Nigerian Context and the Focus on Symptomatic Populations

In Nigeria, epidemiological studies have revealed significant regional variation, with northern states such as Sokoto reporting some of the highest prevalence rates, which often range between 60% and 80% in studied groups (Jidda et al., 2018; Umar et al., 2018). A substantial portion of existing research is hospital-based, focusing on patients presenting with dyspeptic symptoms to gastroenterology clinics (Adeniyi et al., 2021; Okeke et al., 2020). While these studies provide critical data on the clinical burden, they introduce a selection bias by overlooking the asymptomatic reservoir within the general community. This gap limits more comprehensive understanding of the true population prevalence and the dynamics of transmission outside clinical settings.

Knowledge, Attitudes, and Practices (KAP) in High-Prevalence Settings

A separate but related body of literature examines the KAP related to *H. pylori* in endemic regions. Significant gaps in knowledge regarding *H. pylori*'s transmission routes and prevention strategies have been frequently identified in numerous studies conducted among various populations, including patients and community members (Garg & Bhatia, 2019). While individuals may often recognize *H. pylori* as a pathogen, the level of awareness of specific preventive measures, such as avoiding shared utensils or ensuring water safety, is often low (Miftahussurur et al., 2019). Furthermore, cultural and socioeconomic factors often hinder the adoption of recommended practices even when the knowledge is adequate, leading to a persistent knowledge-practice gap as reported by numerous studies (Shrestha et al., 2024).

Health Science Students: A Critical but Understudied Cohort

Students in health sciences represent a unique and critical cohort, particularly those in medical laboratory science. Despite the possession of formal education in microbiology and pathogen transmission, they operate in environments (educational and clinical) with potential exposure risks (Oghagbon 2009; Miftahussurur et al., 2019). Concurrently, they are often young adults coming from the broader community, often reflecting its prevalence and social practices. Despite their dual position as future healthcare professionals and members of a high-prevalence demographic, there is a paucity of targeted research investigating *H. pylori* prevalence and associated KAP within this group in Nigeria. Existing KAP studies rarely integrate biomarker-based prevalence data, with the same student population, making it difficult to correlate infection status with knowledge and behavior.

The current literature establishes the high endemicity of *H. pylori* in Northern Nigeria and highlights general KAP deficiencies. However, a clear research gap exists in the simultaneous assessment of seroprevalence and KAP among asymptomatic, young adult populations, especially those within health training institutions in this region. Previous studies in Sokoto have focused on symptomatic patients or general community surveys (Jidda et al., 2018; Umar et al., 2018), but none have specifically targeted medical laboratory science students. This cohort group's infection status, coupled with an evaluation of how their academic knowledge translates into preventive practices, remains an unexplored field. Filling this unexplored gap is essential for two reasons: first, to quantify the burden in an asymptomatic, future healthcare worker population; and second, to identify specific knowledge-practice disconnects that can inform targeted educational interventions within academic health institutions. This study, therefore, aims to bridge this gap by determining the seroprevalence of *H. pylori* and evaluating the associated KAP among students at the School of Medical Laboratory Science, UDUTH, Sokoto. These findings will provide crucial data for informing institutional health policies and targeted interventions within this key demographic.

Materials and Methods

2.1 Study Design, Area, and Population

A cross-sectional study was conducted between [Months, Year] at the School of Medical Laboratory Science, UDUTH, Sokoto, Nigeria. The study population comprised registered undergraduate students from levels 200 to 500.

Sample Size and Sampling Technique

The sample size was calculated as 113 using Fisher's formula, assuming a prevalence (p) of 8% (Nguyen et al., 2023), a 95% confidence level, and a 5% margin of error. A total of 120 students were eventually enrolled via simple random sampling.

Inclusion and Exclusion Criteria

Apparently, healthy students from levels 200–500 were included. Students with current peptic ulcer symptoms, those on antibiotics, proton pump inhibitors, or anti-ulcer medications within the preceding month were excluded.

Data and Sample Collection

Ethical approval was obtained from the UDUTH Ethics Committee, and verbal informed consent was secured from each participant. A pre-tested, structured interviewer-administered questionnaire was used to collect data on socio-demographics, knowledge, attitudes, and practices. Subsequently, 3ml of venous blood was collected from each participant.

Laboratory Analysis

Serum was separated and analyzed for *H. pylori* IgG antibodies using a rapid lateral flow immunochromatographic test strip (Medlife®), following the manufacturer's instructions. The test principle is based on the binding of anti-*H. pylori* antibodies in serum to antigens coated on a test line. A positive result was indicated by the appearance of both test (T) and control (C) lines.

Data Analysis

Data were analyzed using SPSS version 27. Descriptive statistics were presented as frequencies and percentages. The Chi-square test was used to assess associations between categorical variables. A p-value < 0.05 was considered statistically significant.

Result

Socio-demographic Characteristics and Seroprevalence

The mean age of participants was 22.5 ± 2.1 years. The overall seroprevalence of *H. pylori* infection was 80.8% (97/120) (Table 1).

Table 1: Seroprevalence of *H. pylori* among participants (N=120)

Positive	97	80.8
Negative	23	19.2
Total	120	100.0

Knowledge of H. pylori Infection

General awareness of the participants was high, with 90% (108/120) of students reporting they knew what *H. pylori* is. However, only 5.8% (7/120) of them knew that not sharing food and utensils helps prevent infection, while 90.8% (109/120) were aware that a clean water supply is preventive against infection. Knowledge showed no significant association with level of study or age group ($p > 0.05$) (Tables 2 & 3).

Attitudes and Practices

Most respondents (94.2%, 113/120) believed *H. pylori* infection could cause serious health issues. Nevertheless, 95% (114/120) reported sharing food and utensils, 92.5% (111/120) frequently skipped meals, and only 10.8% (13/120) lived in crowded environments. These attitudes and practices were not significantly associated with academic level or age ($p > 0.05$) (Tables 4 & 5).

Risk Factor Practices

The majority of the respondents used sachet water (89.2%, 107/120) and cook their meals (95.8%, 115/120). Although frequent consumption of spicy food was common (85.8%, 103/120), among them, while eating at restaurants was less frequent (10%, 12/120). Eating in restaurant showed a significant association with academic level ($p=0.031$) (Table 6). No other significant associations were found between risk practices and age group ($p > 0.05$) (Table 7).

Discussion:

The current study reveals an alarmingly high seroprevalence (80.8%) of *H. pylori* infection among medical laboratory science students in Sokoto, Northwestern Nigeria. This rate aligns with the high prevalences reported in northern Nigeria and other parts of sub-Saharan Africa (Adeniyi et al., 2021; Jidda et al., 2018; Hooi et al., 2017). This finding emphasizes that even among young, educated adults in a health-training institution, the burden of this infection remains substantial, likely reflecting early childhood acquisition and persistent environmental risk factors (Nguyen et al., 2023).

Notably, the prevalence did not vary significantly with academic level or age, suggesting that exposure and infection were established prior to gaining admission into tertiary schools. This pattern reinforces the concept of *H. pylori* as an infection of childhood that persists without treatment (Mentis et al., 2019).

A critical finding is the stark disconnect between knowledge and practice. While 90% of students were aware of *H. pylori*, practical knowledge of prevention was poor; only 5.8% of the participants identified that avoiding utensil sharing as a preventive measure. This theoretical-practical gap manifested in behaviour: 95% shared food and utensils, a known risk factor for oral-oral transmission (Costa et al., 2024). This indicates that biomedical curriculum knowledge does not automatically translate into preventive health behaviours, a challenge noted in other similar settings (Miftahussurur et al., 2019).

The widespread use of sachet water (89.2%), though perceived as safe, poses a potential risk if quality is compromised, representing a possible fecal-oral transmission route. The high frequency of meal skipping, while not a direct cause of infection, may exacerbate gastritis symptoms, potentially masking underlying *H. pylori* pathology.

The limitations of this study include the use of serology, which cannot differentiate between active and past infection, potentially overestimating active prevalence. Furthermore, the cross-sectional design limits causal inference regarding risk factors.

In Conclusion, the present study documents a very high seroprevalence of *H. pylori* infection among medical laboratory science students in Sokoto, Nigeria. A significant gap exists between high general awareness and the application of preventive knowledge, as evidenced by prevalent high-risk practices. These findings highlight that academic training alone is insufficient to change deep-seated behaviours that facilitate transmission.

Recommendations

1. The school curriculum should integrate targeted, behaviour-focused health education on *H. pylori* transmission and prevention.

2. University authorities should ensure a reliable supply of clean water and promote good hygiene practices in hostels and cafeterias.
3. Consideration should be given to instituting voluntary screening and treatment programs for students, given the high prevalence.
4. Further research employing tests for active infection (e.g., stool antigen test) is recommended to better define the burden of current infection.

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