Sero-Prevalence and Risk Factors for Helicobacter pylori Infection Among Individuals with and those Without Dyspepsia in Zaria, Northwestern Nigeria

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Abstract

Background: *Helicobacter pylori* infection is prevalent in African region especially in areas with low socioeconomic status. This study aimed to determine the prevalence and risk factors for *Helicobacter pylori* Infection among individuals with and those without dyspepsia

Materials and Methods: The study was cross sectional in which individuals with and those without dyspepsia were enrolled. The prevalence for *Helicobacter pylori* infection was determined by the screening of *Helicobacter pylori* immunoglobulin G and this was compared across variables of interest. IBM SPSS was used for the data analysis.

Results: Overall prevalence of *Helicobacter pylori* immunoglobulin G was 44 (37.9 %). There was no association between *H pylori* infection and dyspepsia (0.894). There was statistically significant association between residing in rural areas and acquiring of *Helicobacter pylori* infection ($P= 0.011$). Study participants from rural areas had significantly higher and lower pit latrines and water closet toilets respectively than the study participants who reside in urban areas ($P= 0.0001$).

Conclusion: Modest prevalence of *Helicobacter pylori* infection was observed and no association *between H pylori* infection and dyspepsia was observed. There is a need to take strategic measures towards improving level of socio-economic status of the rural areas so as to reduce the risk of contracting *Helicobacter pylori* infection in people living in rural areas

Keywords: Helicobacter, Dyspepsia, Immunoglobulin.

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Introduction

Helicobacter pylori (*H. pylori*) infection is one of the most common bacterial infections in humans. Helicobacter pylori colonizes gastric mucosa, however the organism may also colonize duodenum, and there will be infiltration of chronic inflammatory cells, as well as polymorphonuclear cells [1].

H pylori infection is an important cause of chronic gastritis, peptic ulcer disease and gastric carcinoma [2]. *H pylori* frequently causes chronic bacterial infection, infects more than half of the world's population and is more common in environments with low socio-economic status, therefore, developing countries are largely infected with *H pylori* [3] [4]. *H pylori* infection is contacted via fecal-oral and it can be identified in the serum, feces and saliva [3].

Dyspepsia is a collection of gastrointestinal symptoms which include nausea, vomiting, easy satiety, belching, bloating, and H pylori infection is a common cause [5]. Recurrent abdominal discomfort or pain are other presentations of dyspepsia.

Early detection of *H pylori* infection is critical for proper management so as to prevent the complications associated with *H pylori* infection [6], and there is

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therefore need to identify associated risk factors for contracting *H pylori* infection.

Serology is one of the methods for the diagnosis of H pylori infection, and demonstration of *H pylori* Immunoglobulin G (Ig G) in the individual's serum is evident that the individual had *H pylori* infection [3].

This study therefore aimed to determine the prevalence and the risk factors for *H pylori* infection among individuals with and those without dyspepsia.

Materials and Methods

The study was descriptive cross sectional conducted from May 2013 to January 2015, comprising of 116 study participants from communities (Sabbi village, Gamji village, Biye village, Samaru, Sabongari, Palladan, hikaji, Kwangila, Hanwa village and Hanwa GRA) around Zaria and patients attending Gastro Intestinal Clinic (GIT) at Ahmadu Bello University Teaching Hospital (ABUTH) Zaria.

Zaria is an ancient city in Kaduna State and is situated at Latitude 11° 25″ North and Longitude 4° 27 in North West Nigeria. The city is a cosmopolitan settlement housing several higher institutions and a citadel of learning as well as home to several health institutions, including the Ahmadu Bello University Teaching Hospital Zaria. The city is surrounded by several villages and suburbs where some of the participants were drawn

Inclusion criteria involved study participants who were 18-65 years old, patients who have sign and symptoms of dyspepsia. Additionally, study participants from the above-mentioned communities around Zaria who have no sign and symptoms of dyspepsia were also included into the study. Study participants who smoke cigarette were excluded from the study.

Ethical approval for the study was obtained from the Health Research Ethics Board (HREB) of ABUTH and written informed consent was obtained from the study participants. The study participants were selected by simple random sampling. Interviewer administered questionnaire technique was employed in obtaining information (such as age, types of toilet, occupation, amongst others) from the study participants.

After obtaining written informed consent from the study participants, three milliliters of blood was aseptically collected from each of them and the blood was received into clean plain sample bottles. After centrifugation at about 3000 rpm for 5 minutes, the serum was obtained

and stored at -20^{0}C until assayed. The serum of each of the study participants was screened for H pylori infection via the detection of *H pylori* Ig G, using Ig G ELISA (Enzyme Linked Immuno-Sorbent Assay) kit (Diagnostic Automated Inc., USA) by employing ELISA method following the manufacturer's instruction, the sensitivity and specificity of the kit was 98 % and 99 % respectively.

Results were presented in frequencies and percentages. The prevalence of H pylori infection was compared across variables of interest. IBM SPSS version 17 was used for the data analysis. Chi-square test was used for test of association, while level of significance was considered at p< 0.05.

Results

Socio-demographic characteristics

The study participants comprise of males 51 (44 %) and female 65 (56 %). The age of the study participants was 37 ± 13 (Mean ± SD) years. Urban and rural areas had 58 study participants each. Table 1 showed these results.

Table 1: Socio-demographic characteristics of the study participants

Variable	Frequency (%)	Urban n (%)	Rural n (%)
Sex			
Male	51 (43.97)		
Female	65 (56.03)		
Age (Mean ± SD)			
37 ± 13			
Location			
Urban	58 (50 %)		
Rural	58 (50 %)		
Occupation			
Student	18 (15.5 %)	16 (88.9)	2 (11.1)
Civil Servant	14 (12.1 %)	12 (86.7)	2 (14.3)
Business	18 (15.5 %)	12 (66.7)	6 (33.3)
Artisan	05 (4.3 %)	04 (80.0)	1 (20.0)
Farmer	26 (22.4 %)	0 (0.0)	26 (100)
Others	35 (30.2 %)	14 (40.0)	21(60.0)

Overall prevalence, association of sex and dyspepsia with *H pylori infection*

The overall sero-prevalence of *H pylori* Ig G was 44 (37.9 %). The prevalence of H pylori Ig G was numerically higher in males: 22 (43.1 %) than in females: 22 (33.8 %) (*P= 0.306*). There was no statistical association between *H pylori* Ig G and dyspepsia, though numerically higher among study participants who had dyspepsia (*P= 0.894*). Table 2 illustrates these results.

Table 2: Overall prevalence and comparison of *H pylori* Ig G by sex and dyspepsia

Variable	*H. pylori* Ig G n (%)	P-Value
Overall prevalence	44 (37.9)	
Sex		
Male (n=51)	22 (43.1)	
Female (n=65)	22 (33.8)	0.306
Dyspepsia		
Yes (n=65)	25 (38.5)	
No (n=51)	19 (37.3)	0.894

Effect of size of individuals and type of toilet in household on acquisition of *H pylori* infection.

The prevalence of *H pylori* Ig G was comparable with regard to the number of individuals in the household and type of toilet, even though numerically higher in the study participants who used pit latrines (*P= 0.265*; 0.243 respectively). Table 3 represents these results.

Table 3: Comparison of prevalence of *H pylori* Ig G based on the number of individuals in the

Variable	*H pylori* Ig G n (%)	P-value
Number of individuals in the household		
1-2 (n=4)	2 (50.0)	
3-4 (n=10)	3 (30.0)	
5-6 (n=20)	5 (25.5)	
7-8 (n=19)	6 (31.6)	
>8 (n=63)	28 (44.4)	0.265
Type of toilet		
Pit latrine (n=74)	31 (41.9)	
Water closet (n=42)	13 (31.0)	0.243

Type of toilet and prevalence of *H pylori* Ig G among study participants from urban and rural areas

Study participants from the rural areas had significantly higher and lower pit latrines and water closet toilets system: 57 (98.3 %), 1 (1.7 %) respectively compared to the study participants from urban areas: 17(29.3 %), 41(70.7%) respectively, (*P=0.0001*). The prevalence of *H pylori* Ig G was significantly higher among the study participants who reside in rural areas 30 (51.7 %)

compared to those who reside in urban areas 14 (24.1 %) (*P= 0.011*). Table 4 showed these results.

Table 4; Comparison of type of toilet and prevalence of *H pylori* Ig G among study participants from urban and rural areas.

Variable	Urban area (n=58)	Rural area (n=58)	P-value
Type of toilet			
Pit latrine n(%)	17(29.3)	57(98.3)	
Water closet n(%)	41(70.7)	1(1.7)	0.0001
***H pylori* Ig G n(%)**	14(24.1)	30(51.7)	0.011

Discussion

The prevalence of *H pylori* infection Ig G that was found in the current study (37.9 %), is lower than what was recorded (73.6 %) as the prevalence of *H pylori* infection among patients with non-ulcer dyspepsia in same study area [7], it is also lower compared to the studies done in Benin, Kenya and Zambia with prevalence rate of 75 %, 61 % and 81 % respectively [8] [9] [10]. However, this finding is comparable with what was documented in Delta, Nigeria [11], and it is also in agreement with results documented by She *et al*, in their study [12]. Most likely, the reason for observing difference from the study done by Ajiboye *et al* in same study area, could be due to involvement of individuals who have no sign and symptoms of dyspepsia in the current study. The prevalence of *H pylori* Ig G was comparable among Sex in the current study, and this is in agreement with what was recorded by Ajiboye *et al*, Omosor, *et al* and Agbor *et al*, in their studies [7] [11] [13]. However, Bello *et al*, documented an association between *H pylori* infection and male sex in their study in Kano [14]. In this study, *H pylori* infection was found not to have association with dyspepsia, though numerically higher among study participants with dyspepsia. On contrary, Shmuely *et al*, in their study observed an association between *H pylori* infection and dyspepsia [9].

There was no association between *H pylori* infection and type of toilet used by the respondents, though numerically higher among study participants who utilize

pit latrine. These results are closely related with what was documented by Ajiboye *et al*, in their study [7]. However, in a similarly related study, Lee *et al*, reported association between *H pylori* infection and usage of pit latrine [15]. It is expected to have high prevalence of *H pylori* infection among users of pit latrine, because the settings of pit latrine are not up to the standard and are more prone to be the source of *H pylori* infection than the water closet system toilets.

There was no association between *H pylori* infection and the number of individuals in the households. This observation is similar to what was documented by Aguemon *et al*, in their study [8] On contrary, Shmuely *et al*, observed association between family with larger size (greater than 7 siblings) and *H pylori* infection [9]. The reason for not obtaining association was that probably, few individuals live in the sleeping rooms in the current study.

The current study observed an association between *H pylori* infection and residing in rural areas. This observation is closely related with what Fernando *et al*, recorded in their study in Lusaka, Zambia [10]. This finding is also in agreement with the study done by Omosor et al, who observed an association between *H pylori* infection and geographical location [11].

The level of socio-economic status which is associated with *H pylori* infection is always low in rural areas. In the current study, indices that are indicator of higher or middle socio-economics status (such as civil servants, business and studentship) were observed to be higher in urban areas than in rural areas, and it was also observed that pit latrine toilets which are more prone to poor sanitary condition were more prevalent in rural areas than in urban areas. These points may explain why higher prevalence of *H. pylori* infection was observed among the study participants who reside in rural areas compared to study participants who reside in urban areas.

The limitations of the study were: the serological marker for *H pylori* infection investigated in the current study may not identify study participants with active *H pylori* infection. Secondly the minimum sample size could not be met.

In conclusion, modest prevalence of *H pylori* infection was observed in the current study and it was not associated with dyspepsia. There is a need to take strategic measures towards improving the level of socio-economic status in the rural areas so as to reduce the risk

of contracting *Helicobacter pylori* infection in people living in rural areas.

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