Prevalence of *Helicobacter pylori* in Nigeria (2010-2023)

Mohammed O. A.*
Department of Microbiology, Edwin Clark University, Delta State, Nigeria.
* Corresponding author: ayus5love@yahoo.co.uk

Abstract: *Helicobacter pylori* the aetiologic agent of peptic ulcer, also associated with gastritis and gastric mucosa-associated lymphoid tissue lymphoma, has been reported to be prevalent in some developing countries. Taking into consideration its mode of transmission which is faecal oral, it is important for developing countries to be alert on the nation's own prevalence, as a high rate could facilitate increase in transmission which would be detrimental to public health. This review, analyzes on available related research published online between 2010-2023, to identify the prevalence rate of *H. pylori* in Nigeria. The research papers collected for this review represented the North, South, East and West regions of Nigeria. Thus, showing a representative overview of prevalence rates of *H. pylori* in Nigeria. The range identified was 20%-80% prevalence rate, with most over 50% and the highest percentage prevalence of *H. pylori,* reported in the Northern region of Nigeria. Risk factors observed included among others, overcrowding, low socioeconomic class, water sources and toilet facility. Therefore taking into consideration the economic status of Nigeria, the risk factors and prevalence showed that a large proportion of Nigerians are at risk and may not have the facilities required to prevent this infection. As a result, it may be futile to limit the *H. pylori* prevalence management to personal efforts of individuals, rather more governmental and non-governmental groups should be set up and financed to aid the control of the spread of *H. pylori* infection.
Key word: *H. pylori*, prevalence rate

INTRODUCTION

Nigeria, a country in West Africa with 356,700sq miles and a population count of over 216 million people (National bureau of statistics, 2022). Though a developing country in many areas, its microbial prevalence and distribution is still in need of more studies compared to developed countries. Such studies would aid the general health and wellbeing of Nigerians as well as alert health practitioners to the microbial status of their environment.

Helicobacter pylori is a Gram-negative microaerophilic bacterium which has been identified to be a cause of peptic ulcer, associated with gastritis and gastric mucosa-associated lymphoid tissue lymphoma (Forman *et al*, 1990, Morris *et al*, 1991). Other diseases have been associated to *H. pylori* infection, a 2007 study, evaluated the prevalence of *H. pylori* infection in 80 patients with diabetics mellitus and its correlation to diabetic vascular complication. It was reported that diabetic patients are at risk of being infected with *H. pylori* and its infection could associated with the development of microvascular and macrovascular complications in Diabetic mellitus cases (Hamed et al, 2007)

This pathogenic bacterium has been isolated in different areas in Nigeria. A 2017 global review of *H. pylori* prevalence, identified that though more than half the world's population is infected, Africa has the highest pooled *H. pylori* prevalence and a high prevalence of 87.7% was observed in Nigeria (Hooi *et al*, 2017). Also some features of these bacteria aiding colonization in the gastric epithelium are: the polar-sheathed flagella, mobility, chemotaxis, its shape, adherence and persistence, (Sabbagh *et al*, 2019). Diagnostic test is dependent on clinical condition, and other factors like cost and sensitivity. There are invasive and non invasive diagnostic tests, with the invasive tests including rapid urease test, endoscopy with biopsies of gastric tissues for histology. While non invasive test include fecal antigen test and urea breath test (Sabbagh *et al*, 2019) though there is an array of methodology to diagnose *H. pylori* infection, the gold standard for detecting *H. pylori* was reported to be undetermined (Sabbagh *et al*, 2019). Due to the high continental prevalence of *H. pylori* and its adverse health complications, it is important to understand its prevalence in Nigeria and factors that has been observed to be associated with its incidence. This review

itemises the previous research that has identified *H. pylori* as a pathogen amongst the Nigerian population, its prevalence per region and shows the risk factors and circumstances associated with this pathogen in Nigeria.

MATERIALS AND METHODS

The review was done using search engines such as Google, Scopus, Google Scholar and searching words such as *Helicobacter pylori* and Nigeria. Research articles found were scrutinised and findings were reflected in this article.

RESULTS AND DISCUSSION

This review, identified research from different regions in Nigeria collating findings for the prevalence of *H. pylori.*

Western region

A study on *H. pylori* was done at the University college Hospital Ibadan Nigeria, which is a hospital reported to serve as a referral centre for a substantial part of south western region of Nigeria. The study was aimed at detecting the prevalence of *H. pylori* among dyspeptic patients and its association with gastroduodenal pathologies using gastric biopsy histology and rapid urease test. It involved 86 adult patients with dyspeptic symptoms undergoing endoscopy (Jemilohun *et al.*, 2010). *Helicobacter pylori* was observed in 64% of patients and gastritis was observed in 60.5% of the sample population. The study also emphasized that serious gastroduodenal pathologies such as gastric cancer were low in prevalence (14%) irrespective of the high prevalence of *H. pylori.* It was also observed that 63.5% of endoscopic gastritis had *H. pylori* infection (Jemilohun, *et al*, 2010).

Harrison *et al.* (2017) also detected *H. pylori* in 577 samples obtained from hospitals in 3 south west states inclusive of Lagos and one northern state in Nigeria. Urease blood test (UBT) was carried out, as well as *H. pylori* isolation. The highest UBT positive patients were observed to be females, but more *H. pylori* isolates were obtained from males. With respect to age there was a continuous increase of *H. pylori* positive samples with increasing age from age 10 up until age 60 after which, a gradual decrease was observed. Age groups 0-10, 91-100 and 100 -110 were observed to be *H. pylori* negative, which could be because sample size was less than 3. In total, 35% were positive to UBT and about 48% were negative the others were on borderline or not recorded. Lagos was observed to have the highest UBT positive and *H. pylori* isolated (Harrison *et al.,* 2017). The *H. pylori* prevalence in healthy children residing in Lagos was observed to be 63.6%. The study also reported a significantly high risk of *H. pylori* infection amongst the low socio economy class, thus affecting children in such areas (Senbanjo *et al.,* 2014). No significant protective effect against *H. pylori* was observed in breast feeding in this research. But, it was observed that increase in the duration of breast feeding reaching 17 months resulted to a decrease in the prevalence of *H. pylori* infection (Senbanjo *et al.,* 2014). Thus, indicating a dose response protective effect of IgA antibodies in breast milk, but it needed to be confirmed with a larger sample size (community based). *H. pylori* infection was three and a half times more prevalent with children with recurrent abdominal pain (RAP) than those without RAP (Senbanjo *et al.*, 2014). An institutional based, cross-sectional study was conducted amongst 2 randomly selected secondary schools at Ikeja LGA, Lagos. Out of 100 participants 59% prevalence rate of *H. pylori* was observed and majority was over the age of 15 years. The study did not detect an association between drinking water sources, defecation, hand washing with *H. pylori* prevalence (Mynepalli *et al*., 2014).

South region

Furthermore, the seroprevalence of *H. pylori* infection in the south-south region of Nigeria (Delta State) was determined among asymptomatic subjects and shown to be 52.5%. No significant difference in prevalence amongst different age groups and between gender was observed. However, *H. pylori* was observed to be associated with

geographical region, people located at Delta state central were observed to be at higher risk. This link to geographical location was stated that it could reflect differences in social/hygiene factors and environmental factors (Omosor *et al.*, 2017). Mbang *et al.* (2019) determined the prevalence of *H. pylori* infection amongst dyspepsia patients in Calabar. The study involved 115 patients of which 42.6% was positive for *H. pylori* infection, which is slightly lower than the global prevalence. The study deduced that gradual urbanization with access to portable water may be linked to the relative lower prevalence of *H. pylori* when compared to some other regions of the country. This study, contrary to others also found a higher prevalence of *H. pylori* in patients with tertiary level of education, though not statistically significant. No gender predilection was observed, sibling number also did not contribute to *H. pylori* prevalence. Higher trend of *H. pylori* infection was observed in this study in 4th and 5th decade of life supporting other studies in this review (Mbang *et al.*, 2019)

Seroepidemiology of *H. pylori* infection among children seen in a tertiary hospital in Uyo, southern Nigeria was observed to be 30.9%. It also detected the early acquisition of *H. pylori* as 13% of infants less than one year old were observed to be seropositive, lowest age prevalence was observed in ages 11-15 years and the highest in ages 6.0 -10 years thus contrasting with other research that have shown increasing prevalence with increase in age. Taking into consideration that this study was majorly on children, thus prevalence in Uyo adults was not reflected. No gender difference was observed in the seroprevalence in this study. Seroprevalence was observed to be higher within the lower social class. Household with 10-12 members had almost twice the prevalence rate compared to households of 1-3 members. *Helicobacter pylori* was also strongly associated with domestic water supply, type convenience used in the home and waste disposal method. Borehole and well water as drinking water sources were more linked to *H. pylori* prevalence compared to pipe borne water. The use of pit latrine and open system of waste disposal also was associated to high *H. pylori* level compared to water system. Number of siblings had no significant effect on prevalence rates associating it with the effect of number of persons already discussed, suggests that other factors of close family contact and not necessarily sleeping together maybe responsible for the association of high prevalence of this infection with high household population (Etukudo *et al.*, 2012).

A 2022 report recorded a 55% prevalence rate of *H. pylori* in Rivers State University Teaching Hospital Port Harcourt. It was a hospital based study consisting of 242 participants who were patients with presumptive gastritis (Agi *et al.*, 2022).

The prevalence of *H. pylori* amongst 115 dyspepsia patients in Calabar was also studied and result showed that 42.6% of the participants were positive for *H. pylori* and borderline result was observed in 6.1% of patients, no disparity was observed with gender in this study (Mbang *et al.*, 2019)

Eastern region

Ezugwu and Chukwubuike (2014), reported on the epidemiology of *H. pylori* infection among dyspepsia patients in south-eastern Nigeria. The faecal samples were collected from dyspepsia patients in densely populated areas of five states within the south east zone of Nigeria. Approximately 76% were positive of the total population (643 patients) sampled for the presence of *H. pylori*. The research further detected that age groups over 40 years had the highest frequency of isolates. Gender, population density, water sources, toilet facility and educational level were also factors analysed to detect their influence on the spread of *H. pylori* (Ezugwu and Chukwubuike, 2014). The research identified that *H. pylori*, was more prevalent amongst those in an overcrowded environment, those that used stream water and those with water closet toilet as well as patients with low level of education (Ezugwu and Chukwubuike, 2014).Thus, depicting that prevalence of *H. pylori* is

facilitated by old age and poor living conditions and personal hygiene which could be reflected in lack of hand washing, lack of regular toilet cleaning, use of water without boiling. Though, this could be as a result of lack of knowledge as those with only a primary education showed higher *H. pylori* isolation rates (Ezugwu and Chukwubuike, 2014). The high prevalence of *H. pylori* observed in the study is a cause of concern; however, the study was majorly on dyspepsia patients. However, the epidemiological factors concerned could as well be the living conditions of asymptomatic individuals. As a result, educating the lower social class of proper disposal of human waste could help control the spread of *H. pylori,* as well as digging of wells far away from pit toilets and septic tanks to avoid contamination of water sources. These recommendations made by the authors, could aid reduce the spread of *H. pylori* even in asymptomatic individuals.

The seroprevalence of *H. pylori* infection was determined in Owerri amongst children. The study population was a hundred and twenty children aged 6 months to 15 years studied from March to June 2016. Questionnaire was used to document the sociodemographic data, while *H. pylori* infection was detected using a rapid test kit. Findings showed *H. pylori* prevalence at 20.0%, increase in prevalence was also observed with increasing age with highest observed between the age 10-15 years age group (P=0.001). Low socio economic class (SEC) was also observed to be significant risk factor in the prevalence of *H. pylori* infection (Emerenini *et al.,* 2021). Another study at Owerri was conducted to determine the epidemiology and risk factors for acquisition of *H. pylori* among 384 participants, symptomatic and asymptomatic for peptic ulcer. For the purpose of providing baseline data and creating awareness for effective management and prevention of infection caused by this pathogen. Both faecal and blood samples were collected to detect the presence of ulcer and *H. pylori* infection respectively, a questionnaire was used to document sociodemographic characteristics of each participants. Findings showed seroprevalence of *H. pylori* infection and ulcer prevalence over 70% age groups between 41-50 had 100% *H. pylori* prevalence. Smoking and gender were not observed to be significantly associated seroprevalence of *H. pylori* (Okoroiwu *et al*., 2022)

Peptic ulcerative individuals in Nnewi were examined for seropositivity to *H. pylori* and Prevalence rate for *H. pylori* was determined to be 51.4% (Chukuma *et al*., 2020).

North region

More research on *H. pylori* prevalence was carried out in Kano, Nigeria (Bello *et al.*, 2018). It was observed that *H. pylori* prevalence was very high (over 80%) and an increased prevalence was observed more in male subjects. People at risk of this infection were majorly those whose water source is from the wells and ponds and those from a lower social class. Cigarette smoking and multiple occupants per room (over 3) were also stated to be factors strongly associated to *H. pylori* infection (Bello *et al.*, 2018).

Further research was also carried out in the Northern Nigeria, but specifically on University students. The sample population were undergraduate students from Nassarawa State University Keffi (Ishaleku and Ihiabe, 2010). The *H. pylori* seropositive samples were observed in 54% of the population. A significantly higher prevalence rate was observed more in females. Students aged between 31- 40 were reported to have higher seroprevalence of about 86%, which was reported to be a major concern as it could enhance transmission due to the high interpersonal social activities usually associated with this age group (Ishaleku and Ihiabe, 2010).

Mustapha *et al.* (2011) also determined the prevalence *H. pylori* infection among dyspeptic patients at a tertiary hospital in Northern Nigeria which was observed to be 77.1%. In addition, 125 dyspepsia patients were examined at Maiduguri teaching hospital, for *H. pylori* infection using

different methods. Histological samples showed 80% *H. pylori* prevalence while, serological test showed 93.6% prevalence (Olokoba *et al*., 2013).

CONCLUSION

This review was aimed at knowing the present spread of *H. pylori* in Nigeria between 2010 – 2023 by pulling all the research done at different geographical regions of Nigeria. Research observed that *H. pylori* prevalence has been observed in the North, South, West and East of Nigeria at a range of 20%-80%with most over 50%. The highest prevalence was observed in the northern region. This prevalence rate should be a major concern to public health management irrespective of the health status of the research participants. The rate of *H. pylori* prevalence at the reported level puts the general public at risk due to the mode of transmission of *H. pylori* which is faecal oral. Thus, lack of amenities facilitating hygiene and programmes educating the public its risk factors would result in an increase of the spread of this infection caused by bacterium. Senbanjo *et al.* (2014) reported that there is a high risk of *H. pylori* infection amongst the low economy class. Taken, into consideration that about half the Nigerian population are at the poverty line, it means that a large proportion of the Nigerian population is at risk. Thus, it is a public health problem and should be addressed at governmental levels and by non-governmental groups, not left for individuals. Nigerian population at the poverty line, despite the enlightment may not have the means required to avoid environmental factors like overcrowding, drinking good water, even maintaining good personal hygiene due to cost. As basic as using good water source is, this review has shown that a proportion of research participants use wells and ponds as their water sources which was observed to be linked to *H. pylori* prevalence. Thus, it may be futile to limit the *H. pylori* prevalence management to personal efforts of individuals, rather more governmental groups should be set up and financed to aid the control of the spread of *H. pylori* infection.

Furthermore, a virtual repository for the nation should be made available and health institutions should be mandated to submit monthly data on infections detected during diagnosis. This would aid identify potential epidemic cases and facilitate early prevention.

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