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Prevalence of *Helicobater pylori* Among Suspected Ulcer Patients Attending General Hospital Wukari, Taraba State

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Abstract

H. pylori are microaerophilic organism and a Gram negative bacterium which is found in the alimentary canal. It causes chronic gastritis and gastric ulcers. It is also linked to the development of duodenal ulcers and stomach cancer, conditions that were not previously believed to have a microbial cause. These study aim to determine the prevalence of *Helicobacter pylori* infection among suspected peptic ulcer patients attending General Hospital Wukari, Nigeria. A total of one hundred (100) blood samples were collected from consenting patient attending General Hospital, Wukari. Demographic information such as age and sex of each participant was obtained. Blood samples were collected by venipuncture. 5mL of blood was collected from each patient into well labelled ethylene diamine tetraacetic acid (EDTA) vacutainer tube. The Rapid Test kit was used for the qualitative detection of *H. pylori* surface antigen in serum/plasma. It utilises a combination of monoclonal and polyclonal antibodies to selectively detect elevated levels of *H. pylori* in serum/plasma. Consenting patients who participated in the study were between the age ranges of 1 to 95 years. Total prevalence of *H. pylori* was observed is 66%. The male gender was more infected with *H. pylori* infection 71.9% than the female

counterparts with 58.13%. Out of the total patients 66% of the study patients tested positive for *H. pylori*. Among them, 60% were male and 40% were female. The age breakdown showed most patients were between 16-35 years old. It shows that the prevalence of *H. pylori* infection by sex among outpatient which 60% of the patients were male while 40% were female. With this the prevalence of *H. pylori* infection among patients attending General Hospital Wukari is 66%. Despite the high prevalence of *H. pylori* infection among the study subjects, these infections are threats to the human health. Hence, strategies should be adopted to help combat and control these infections and their spread within the population.

Keywords: General hospital, *Helicobater pylori*, Prevalence, Ulcer, Wukari

INTRODUCTION

Helicobacter pylori are spiral-shaped or coccoid Gram-negative bacterium is the most Common infectious agent of gastric diseases worldwide [1]. *H. pylori* infect 30–70% of the world's population being one of the leading causes of gastrointestinal diseases producing functional dyspepsia, acute and chronic gastritis, and peptic ulcer in up to 20% of infected cases [2]. *H. pylori* are a resilient Gram-negative, microaerophilic *bacillus* which resides in the acidic milieu of the human stomach [3]. It has a unique spiral shape and multiple unipolar flagella which enable it to traverse the course of the mucous layer of the gastric epithelium, where it remains protected from the low gastric pH [4]. *H. pylori* are the single bacterium classified as a group I carcinogen by the World Health Organization (WHO).

The *H. Pylori* infection is typically acquired in early childhood, either by fecal-oral or oral-oral route, or in the absence of effective treatment, it lasts a lifetime [5]. This indicates a strong adaptation to the biological niche represented by the mucous layer covering the gastric epithelial cells. The resistance mechanism of *H. Pylori* within the low pH environment of the stomach is particularly complex, involves the expression of several genes considered key pathogenic factors (as CagA, VacA, BabA, urease, etc.) and determines several particularities in the currently employed therapies, such as simultaneous administration of several active molecules (typically at least two antibiotics and a proton pump inhibitor) and long-term treatments(lasting at least 2 weeks) [6].

Helicobacter pylori colonize various regions of the upper digestive system, mainly the stomach and duodenum, causing stomach and duodenal ulcers and certain stomach cancers. The

infection is today surprisingly common, and the bacteria are believed to colonize more than half of the world's population [7]. Robin Warren and Barry Marshall brought to the attention of the world the role of *H. pylori* in the pathogenesis of peptic ulcer disease (PUD) over a decade ago [4]. Since then, several studies have been done worldwide and even in Nigeria regarding this pathogen, however there is paucity of data regarding this infection in Calabar, Southern Nigeria. *H. pylori* further control the acidic environment of the stomach by producing copious amounts of urease, an enzyme that hydrolyses urea to alkaline ammonia and carbon dioxide. The production of urease is the principle behind the urea breath test and rapid urea biopsy tests for the detection of *H. pylori* infection [8].

Helicobacter pylori infection is prevalent worldwide involving more than half of the world populace. The prevalence rate is influenced by age, geographic, ethnic, and socioeconomic factors [9]. Recent trends suggest a decrease in the incidence of *H. pylori* in the western world, but an increasing prevalence and reportedly common globally the childhood infections in developing countries [10]. These Nigerian studies showed a steady decline in *H. pylori* prevalence over the past decade. Socioeconomic differences among the populations studied may be contributory to the variations in *H. pylori* prevalence. Poor sanitary methods, lack of potable water as well as overcrowding and poor dietary habits have been linked to the transmission of *H. pylori* usually through the oral or faeco oral routes [4] and person to person transmission through either the oral-oral or fecal-oral route is most likely [11]. The infection has a high morbidity but low mortality rate and 'cure' can be achieved with appropriate antibiotic regimen. The prevalence increases generally with age, but decreases have also been noted in narrow age ranges in childhood [12]. Consistent with these transmission routes, the bacteria have been isolated from feces, saliva and dental plaque of some of the infected persons.

In Nigeria and other developing countries, *H. pylori* infection is a public health issue and the high prevalence of the infection means that public health interventions may be required. Therapeutic vaccination may become the only strategy that will make a decisive difference in the prevalence and incidence of *H. pylori* infection throughout the world. Various diagnostic tests for *H. pylori* have been developed, and these are endoscopic (invasive) and non endoscopic (noninvasive) tests. An endoscopic test uses endoscopic biopsy samples for histology, culture, *Campylobacter*-like organism urease test, molecular approach (polymerase chain reaction), and fluorescence in-situ hybridization, with >90% sensitivity and specificity. The non-endoscopic tests include 13^0C and 14^0C urea breath test,

immunoglobulin G and M serology, stool antigen test, saliva antibody test, and urinary antibody test. These have variable sensitivity and specificity but are generally below that of endoscopic (invasive) tests [13]. Therefore, information from this study will provide base line data on the prevalence of *H. pylori* infection among suspected peptic ulcer patients attending General Hospital Wukari, which brings to the aim of this study was to determine the prevalence of *H. pylori* among patients who were seen suspected with upper gastro-intestinal disease peptic ulcer attending General Hospital Wukari, Taraba State, Nigeria.

MATERIALS AND METHODS

Study area

This study was carried out in the Department of Microbiology, Federal University Wukari, Taraba State, Nigeria. The study area, is one of the most populated and important towns in Taraba State, Nigeria [14]. Wukari metropolis is a large town which is the Headquarter of Wukari Local Government Area of Taraba State. Geographically, Wukari is one of the 16 local Government areas of Taraba state and lies between latitude 7.53' 43'N, longitude 9.47' 59'E with a population ranging from 5,000 to 10,000, the location of Wukari in the times comprehensive atlas of the World is plate 86F [15]. It has an area of 4,308 km^2. The Jukuns are the dominant ethnic group in the town, which is widely recognized as the administrative center of the Kwararafa Kingdom. Farming, fishing, and animal rearing are the main jobs held by residents of the Wukari local government region [14].

Ethical Approval

Ethical approval was obtained from the hospital management. The purpose and procedure of the study was explained to the volunteers, parents or caregivers and their consent was obtained prior to sample collection.

Collection of Sample

A total of one hundred (100) blood samples were collected from consenting patient attending General Hospital, Wukari, Taraba State. Demographic information such as age and sex of each participant was obtained. Blood samples were collected by venipuncture. 5mL of blood was collected from each patient into well labelled ethylene diamine tetraacetic acid (EDTA) vacutainer tube. Soft tubing tourniquet was tied around the upper arm of the subject to enable the index finger fill a suitable vein. The puncture site was then

cleansed with methylated spirit and venipuncture made with the aid of a sized needle attached to a 5mL syringe. The tourniquet was released and the needle removed immediately after collecting sufficient blood.

Helicobacter pylori **Detection**

The Rapid Test kit was used for the qualitative detection of *H. pylori* surface antigen in serum/plasma. It utilises a combination of monoclonal and polyclonal antibodies to selectively detect elevated levels of *H. pylori* in serum/plasma. The test was carried out and interpreted according to the manufacturer's instructions. Two (2) drops of plasma was dropped on the strip with a disposable pipette with one drop of buffer. The device was laid on a clean, dry, non-absorbent surface on the workbench. The result was read in ten minutes.

Helicobacter pylori **Profile Test**

Plasma sample were analyzed for the presence of *H. pylori* surface antigen (*H. pylori* Ag) using Rapid Test Cassette. All the kit components and specimens were kept at room temperature prior to testing. Plasma was separated from the blood which showed no sign of haemolysis. The test cassette was removed from the foil pouch, placed on a clean and level surface, and labeled approprately. Holding the dropper vertically, a drop of plasma was dispensed into each sample well of the test cassette respectively with an addition of buffer to aid it running. The results were read within 15 to 20 minutes according to manufacturer's instruction.

Interpretation of Results

For *H. pylori* Ag

Negative: One coloured line appears in the control line (C) and no apparent coloured line appears in the test region (T).

Positive: Two distinct coloured lines appear, one at the control region (C), the other at the test region (T).

Invalid: Control line fails to appear.

Data Analysis

The prevalence of *H. pylori* infection was calculated by using participants with positive sample as numerator and the total number of participant as denominator. The data obtained from this study were presented using descriptive statistics.

RESULTS

Analysis of result

A total number of one hundred patients participated in this study and their ages ranged between 1-95 years. Observed from the 100 participants, 57 (57%) were male while 43 (43%) were female (table 1).

Table 2 shows the prevalence of *H. pylori* among the study patients. Sixty-six (66%) patients were *H. pylori* positive which from the 66 *H. pylori* positive patients, 41 (60%) were male while 25 (40%) were female. Furthermore, 9 of the *H. pylori* positive patients were within 1-15 years, 21 of *H. pylori* positive patients were within 16-25 years, 19 of the *H. pylori* positive patients were within 26-35 years, 9 of the *H. pylori* positive patients were within 36-45 years, 3 of the *H. pylori* positive patients were between 46 - 65 while 2 of *H. pylori* positive patients were between 66-75 years of age.

Table 3 shows the prevalence of *H. pylori* infection by sex among outpatient which 57 (60%) of the patients were male while 25 (40%) were female. In this table the prevalence of *H. pylori* infection among patients attending General Hospital Wukari is 66 (66%).

Table 1: Distribution of patients by age and sex

Age (years)	Male	Female	Total
1 – 15	8	5	13(13%)
16 – 25	23	14	37(37%)
26 – 35	11	13	24(24%)
36 – 45	7	5	12(12%)
46 – 55	3	2	5(5%)
56 – 65	3	3	6(6%)
66 – 75	2	0	2(2%)
76 – 85	0	0	0(0%)
86 – 95	0	1	1(1%)
Total	57	43	100(100%)

Table 2: Prevalence of *H. pylori* infection based on sex and age among patients

Age(years)	Male (n = 57)		Female (n = 43)		Total (n = 100)	
	Examined	Infected	Examined	Infected	Examined	Infected
1 – 15	8	5	5	4	13	9
16 – 25	23	15	14	6	37	21
26 – 35	11	10	13	9	24	19
36 – 45	7	5	5	4	12	9
46 – 55	3	2	2	1	5	3
56 – 65	3	2	3	1	6	3
66 – 70	2	2	0	0	2	2
76 – 85	0	0	0	0	0	0
86 – 95	0	0	1	0	1	0
Total	57	41	43	25	100	66(66%)

Table 3: Prevalence of *H. pylori* infection based on sex

Sex	No. of positive (%)	N0. of negative (%)	Total
Male	41(71.9)	17(29.8)	58
Female	25(58.1)	17(39.5)	42
Total	66(66)	34(34)	100

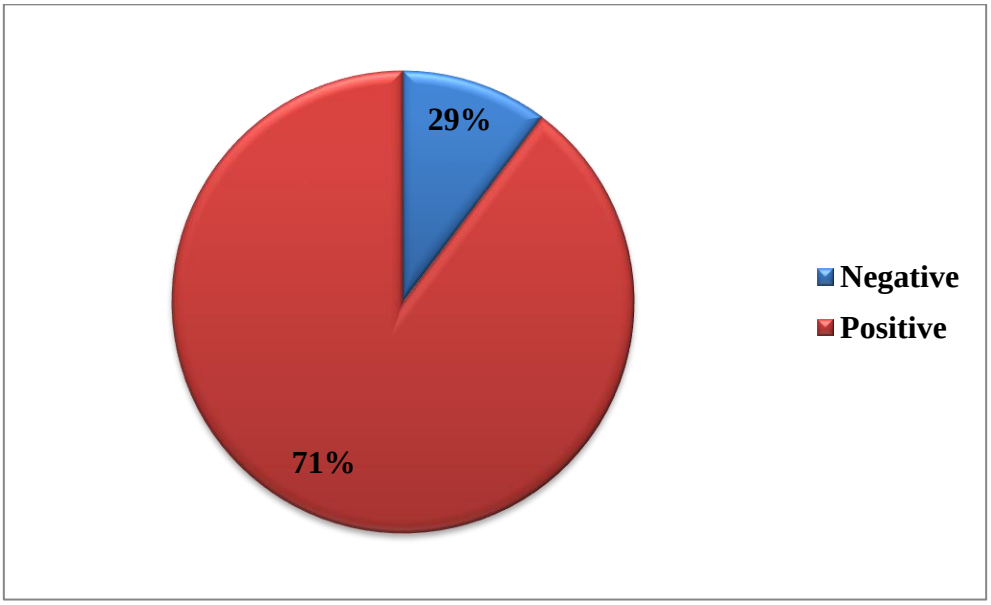

Figure 1: Pie chart showing the prevalence of *H. pylori* among male participants.

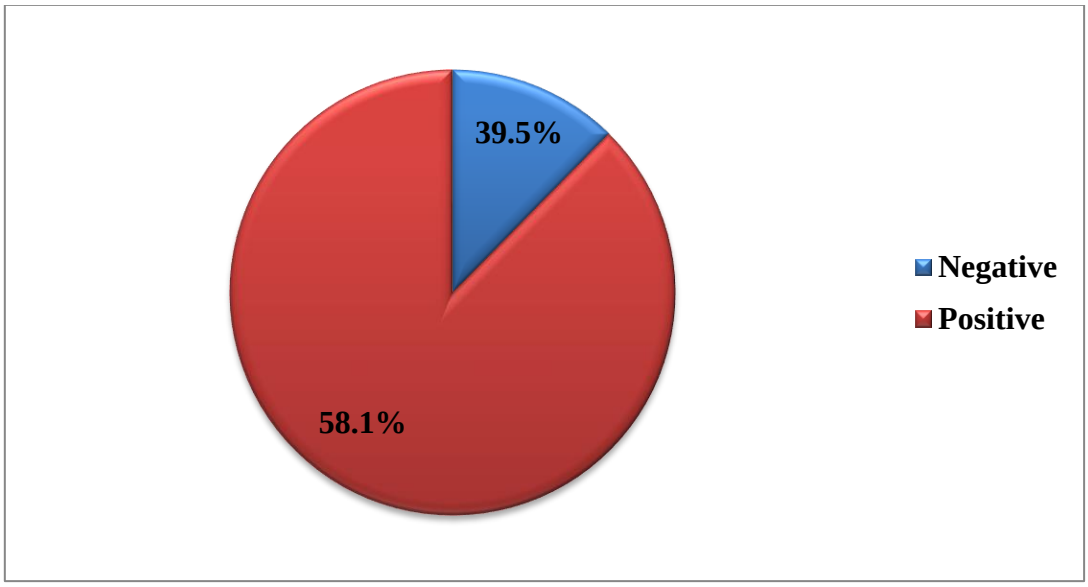

Figure 2: Pie chart showing the prevalence of *H. pylori* infection among female patient

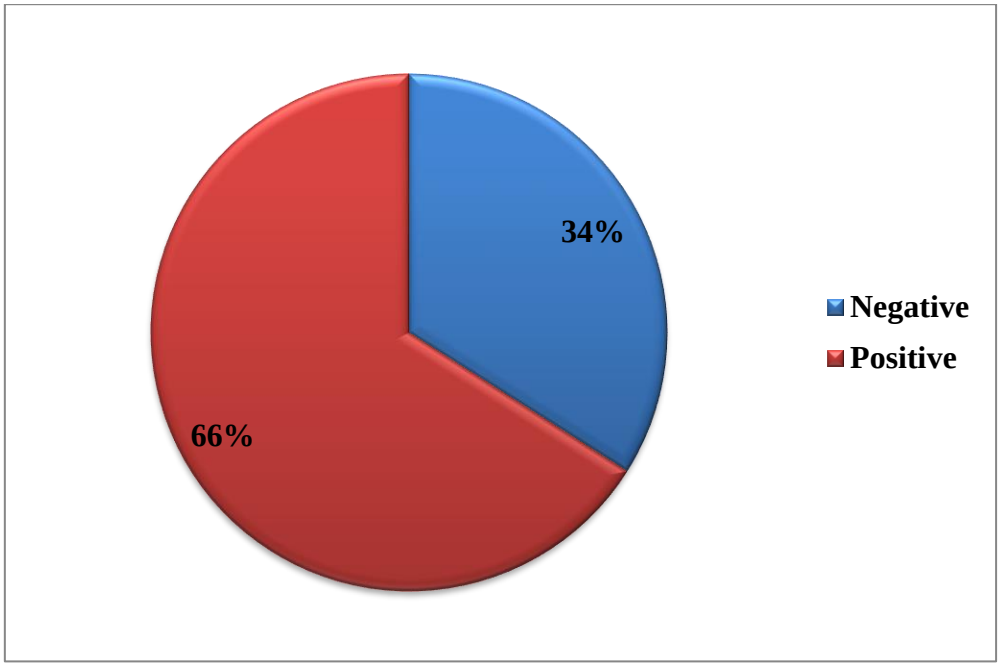

Figure 3: Pie chart showing the overall prevalence of *H. pylori* infection among the study participant.

DISCUSSION

The results of this study determine the prevalence of *H. pylori* infection in patients with peptic ulcers who were attending General Hospital Wukari Taraba State was 66%. This study favourably compares the finding with a study conducted by Ishaleku and Ihiabe, [16] and Oti *et al.* [17] in Keffi, Nasarawa State, North Central Nigeria, reported high prevalence (56.3%) and (56.3%). Whilst also, the study of Olufemi *et al.* [18] in Lagos, South-West Nigeria revealed a high prevalence rate of (68.7%). In Uyo, Akwa Ibom State, similar findings of 30.9% prevalence of *H. pylori* infection were reported by Etukudo *et al.* [19]. However the figures obtain in this study is higher than 60% from Wukari and 68% reported by Olufemi *et al.* [18] this shows that there has been and upward trend in the prevalence of *H. pylori* infection mainly due to lack of treatment, or low or no public awareness, physical hygiene practices and poor public health care practices.

This study has also established that, the occurrences of *H. pylori* infection among the various age groups was high, at forty-one percent (41%) in male and lower at twenty-five percent (25%) in female. From this study, majority of the participants found positive for *H. pylori* were between the age group of 16 to 25 years were the prevalence rate is (37%) and the 85 to 90 were the prevalence rate is (1%). This could have been attributed to fact that, *H. pylori* is acquired during young age as normal flora but in absence of treatment, the infection would persist throughout life time and manifest later in life. Kooffreh-Ada *et al.* [20] reported a moderate (42.1%) prevalence of *H. pylori* infection among dyspeptic patients in Calabar, Cross River State and in a study conducted on patients presenting with gastric symptom in Kano, Northwest, Nigeria, reported a markedly high infection rate (96%). In a similar study conducted in Aba, Abia State, South East, Nigeria, by Ibebuike *et al.* [21] he reported a relatively high (60.63%) and low (39.37%) prevalence of *H. pylori* infection among bleeding and non-bleeding peptic ulcer with poor personal hygiene and low standard of living attributed to observed prevalence. The main risk factors for the infection vary from population to population by countries. The outcome of the study was similar to the results of other studies done in most other developing countries.

CONCLUSION

Helicobater pylori are diseases of immense public health significance, especially in the tropics and subtropical regions where these diseases are endemic. This study established that the prevalence of *H.* pylori among the patients with gastritis and gastric ulcers attending General Hospital Wukari Taraba State was at 66%. The participants with the age group between 16-25 years had the highest prevalence of *H. pylori* infection at 37% and the lowest prevalence was found in the age group between 85 years and 95years (1%). The occurrence of the *H. pylori* infection in various age groups was also found to be high in the ages between 20years to 40 years. However, *H. pylori* can be of more harm than good to the patient. From this study, the prevalence of *H. pylori* is 66% in which prevalence rate in male is (71.9%) and in female is (58%). Although this prevalence seems high, they are of significant proportion in Wukari. Hence, it becomes pertinent to routinely screen *H. pylori* infection among patients to prevent the transmission of disease from person to person.

Recommendations

This study recommends that the national and county governments should improve on the supply of clean, treated water among the individuals in their residential areas and also look up on other environmental sanitation which would generally help in the reduction of *H. pylori* infection among the community. Similarly, those diagnosed and found positive for the infection, should be treated on time and be followed up so as to curb the disease transmission.

There should be frequent testing for *H. Pylori* of individuals which should be done routinely. This will allow for better and promptly management of those found positive so as to avoid transmission of the infection from one person to another.

Recommendations for further studies

This study also recommends that more research studies on *H. pylori* should be done and they should incorporate the aspects of drug resistance. This is because very minimal research studies on drug resistance of *H. pylori* have been done, while there is an emergent of the diseases associated with the bacterial infection even after treatment.

This study also recommends that more research studies on *Helicobacter* species should be done which should involve molecular characterization of bacterial genome. This will enable complete understanding of the gene involved in various mutations.

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