Prevalence of *Helicobacter Pylori* Among Patients Attending General Hospital Potiskum, Yobe State

[1]Ahmed Idriss Jajere, [1]Mainasara Fatima and [2]Ibrahim Bukar Mele

[1]Department of Biological Sciences, Federal University Gashua, Nigeria

Department of Public Administration, The Federal Polytechnic Damaturu, Yobe State

ABSTRACT

Helicobacter pylori, also known as *H. pylori*, is a rod-shaped, gram-negative, microaerophilic bacterium that is 4 m in length and 0.5–1 m in width. that are impacted by gastroenteropathies. The Federal University of Gashua's Department of Biology was the site of the study. The purpose of the study was to find out how common *Helicobacter pylori* was among the patients at General Hospital Potiskum in Yobe State. 200 blood samples from patients at General Hospital Potiskum, Yobe State, whose ages ranged from 10 to 89 years old (80 males and 120 females), were collected using a multistage sampling approach. A fast diagnostic test strip was used to look inside them. The study employed a given interview-administered questionnaire to gather data on age, gender, and socioeconomic position. Additionally, factors related with the infection were identified. According to our research, the age group of 40–49 years and females (51.96%) had the highest prevalence of *H. pylori* infection (92.86%), although the age groups of 30-39 and 20–29 years also had significant prevalences (90.70%) and (90.67%), respectively. In conclusion, patients at General Hospital Potiskum in Yobe State, especially those from lower socioeconomic backgrounds, have a significant frequency of *H. pylori* infection. More research is required to determine how *H. pylori* affects patients in the long run.

Keywords: Prevalence, *Helicobacter pylori*, infection, Potiskum

1.0 INTRODUCTION

Helicobacter pylori, often known as H. pylori, is a spiral or rod-shaped, Gram-negative, microaerophilic bacterium that has dimensions of 2–4 µm in length and 0.5–1 µm in width (Kuster and Malfertheine, 2012). Gram-negative *Helicobacter pylori* is one of the most common human pathogens, accounting for over 4.4 billion (~59%) of all infections worldwide. It was the first bacterial carcinogen to be scientifically recognised (Hooi et al., 2017). The organism that is present in the stomachs of roughly 50% of people worldwide (Malfertheiner and Mooley, 2012) appears as normal flora in the majority of people who appear to be in good health. In the meanwhile, clinical H. pylori infection is widespread, particularly in poor nations where the infection is typically acquired in childhood and symptoms appear in maturity (CDC, 2016).

The methods used to diagnose H. pylori can be broadly divided into two categories: non-invasive methods (such as urea breath tests and serology) and invasive methods (such as histology and culture biopsy) (Kuster, and Fasner, 2015). even if it might be challenging to determine the exact age of incidence in young children. This virus can persist in the stomach mucosa for a considerable amount of time despite the strong innate and adaptive immune responses that humans have to it (Abadi, 2017). Chronic stomach infections are caused by *Helicobacter pylori*, which is thought to infect at least half of the world's population (Hooi *et al.*, 2017).Compared to other Gram-negative bacterial pathogens in the stomach, *H. pylori* has a greater capacity for survival and chronic infection (Testerman and Morris, 2014). The gastric mucosa near the underlying epithelial cells is frequently where H. pylori is found in the stomach tissue (Ebrahimpour *et al.*, 2014). In order to survive the acidic conditions of the gastric lumen, the bacterium must first colonise the gastric mucus. It can do this by expressing the urease enzyme, which is necessary for motility, and by changing the morphology of its cells to effectively pass through the gastric mucosal barrier and reach the underlying epithelial cells. Numerous bacterial virulence factors, including host factors (host gene polymorphism) at the epithelium, environmental factors, and cytotoxic-associated gene A (CagA) and vacuolating cytotoxin (VacA) would increase the colonisation of H. pylori and susceptibility to the associated diseases (Dunne *et al.*, 2014). A recent meta-analysis on the global prevalence of *H. pylori* infection has shown an overall prevalence of 44.3%, and estimated prevalence are as high as 89.7% in Nigeria and as low as 10.0% in Indonesia and 8.9% in Yemen (zamani, 2018).

Helicobacter pylori is among the most common infection in humans and has been recognized as a major cause of gastroduodenal disease. There is increase evidence that H. pylori infection is acquired in early childhood and infect more people in developing countries than industrialized countries. H. pylori is found in almost 50% of the global population. Helicobacter pylori is among the most common infection in humans and has been recognized as a major cause of gastroduodenal disease. *H. pylori* is found in almost 50% of the global population.

2.0 MATERIALS AND METHODS

2.1 Study area

This study was carry-out in General Hospital Potiskum Local Government Area of Yobe

State at department of medical laboratory, microbiology unit. Potiskum is located between latitude 1142'050.80"N and longitude 1104'51.89" E northeast of Nigeria, it's the largest city in Yobe state and originally the town has about three major tribes which include; Ngizim, Bolawa, Fulani and Hausa. It's on A3 highway. It has a sahel vegetation and the av

region of Nigeria (Ejeh and ikpe 2022). Potiskum has approximate 591410 (2006) population. It's one of densely populated town comprising of farmers, civil servant, politician, business men and student. The average annual highest temperature in 39.8°C (103.6°F) and lowest of 12.5°C (54.5°F), and the 31st December is the coldest day on average (Ejeh

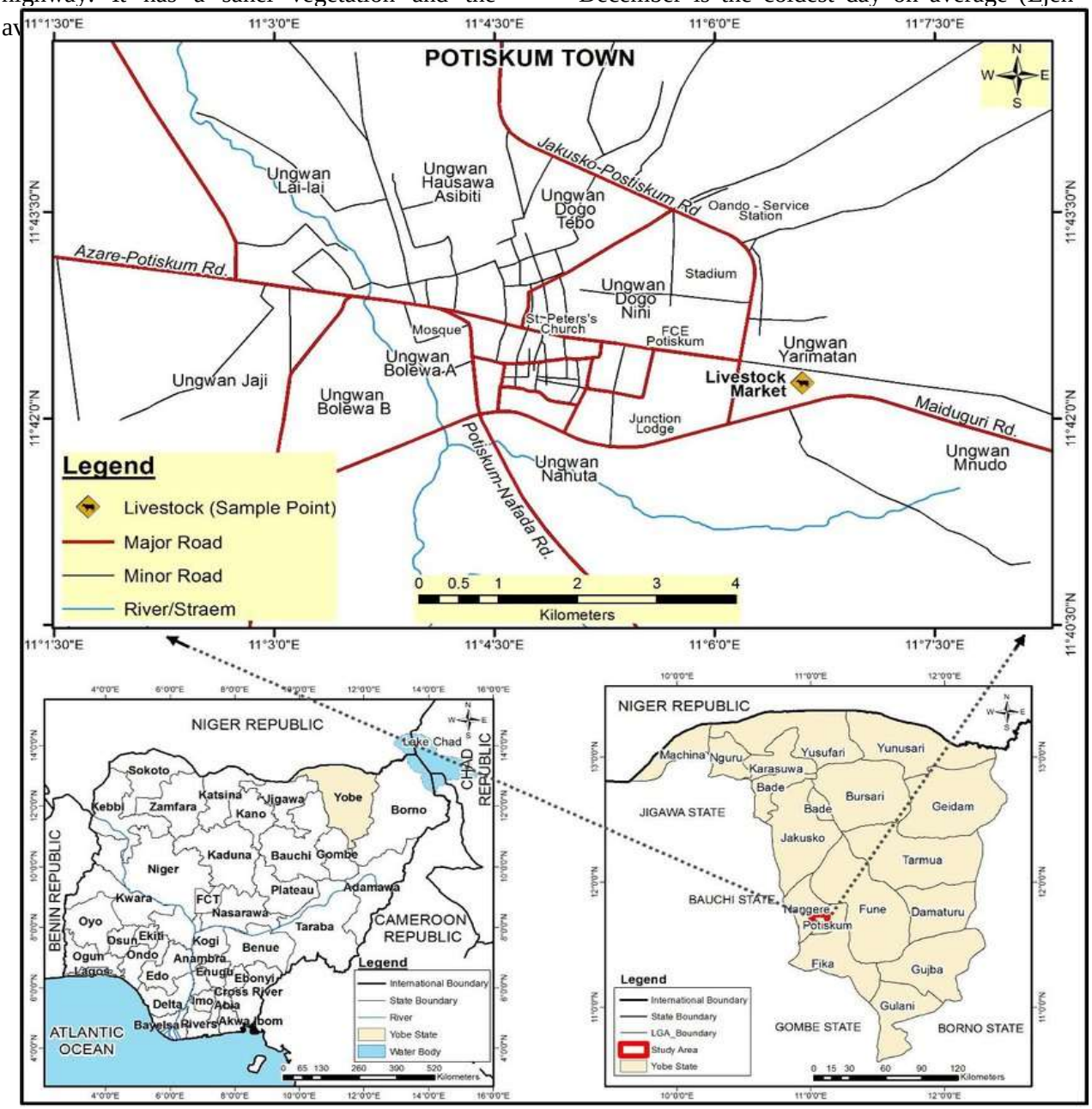

Figure 3.1: Map Potiskum, Yobe State Nigeria

2.2 Study design

The study was a descriptive cross-sectional study.

2.3 Study population

The study population consisted of male and female patients aged between 10-89 years in General Hospital Potiskum, LGA of Yobe State.

2.4 Sample size determination

Sample Size Calculation: The sample size (n) was estimated using the formula: $n = (1.96)^2 pq/d^2$

Where;

n = required sample size,

p = proportion of the population having H. pylori infection from previous study,

q = 1 - p and

d = the degree of precision

For the calculation, a 95% confidence interval, a p value of 0.865, i.e., a prevalence rate of 86.5% was reported by (Ejiludeet al., 2000) and margin of error (d) set at 0.05 was used to determine the minimum sample size required. To minimize errors arising from the likelihood of non-compliance, 10% of tuuguiuubfqahe sample size was added giving a final sample size of 200.

2.5 Experimental design

This is descriptive cross sectional study to determine the prevalence of Helicobacter pylori infection. A total of 200 samples of blood specimens randomly from interested 200 infected patient (80 males and 120 females), age range from 10-80 years old was obtained from Potiskum local government area of Yobe state. The samples were collected for period of 12 weeks from April to June 2023.

2.6 Ethical clearance

Ethical approval was obtained from ministry of health, Yobe state in accordance with Helsinki declaration. This is a code of ethics on human experimental draft by the World Medical Association in 1964. And also permission was obtained from the patient participants prior to the commencement of the study.

2.7 Administration of questionnaire

The socio-demographic data were collected by structured questionnaire. These include their sex, age, and socio-economic status.

9.8 Sample collection

The blood sample was collected by vein puncture into clean Vacutainer tube as follows; A clear vein was determined, then the tourniquet was tied on above arm, the area was disinfected by 70% alcohol and then 2ml of blood was drawn into EDTA container, the blood was centrifuged at 3000rpm for 2 minute. The plasma was separated using pasture pipette.

2.9 Detection of *H. pylori*

About one to two drops of plasma was added to the sample well marked "S" and allowed for about 30 seconds for the specimen to be absorbed totally. The dropper was held vertically and three of buffer solution (approximately 100 µl) were transferred to the test well in the test strip strong positive results may be observed in 2-3 minutes. Weak positive results may take a longer time, up to 7 minutes. For the whole blood test, a slight hemolysis

might be observed, but it does not interfere with the results.

2.10 Interpretation of the Test:

Negative test result: Only one red coloured band (Control Line) appeared across the whit Negative test result: Only one red coloured band (Control Line) appeared across the white central area of the reaction strip. *H. pylori* antibodies are absent or below the level of detection.

Positive test result: In addition to the red band, a distinguishable pink-red band (Test Line) also appeared across the white central zone of the reaction strip. The intensity of the band was variable depending on the antigen concentration in the specimen. Any pink-red line, even very weak, was considered as a positive result. Any line or colour appearing after 5 minutes was of no diagnostic value. A positive test line indicates that there are detectable H. pylori antibodies in the specimen.

Invalid test result: the red band (Control Line) is absent, with or without a visually detectable pink-red band (Test Line).

2.11 Statistical Analysis

The data was analysed using Statistical Package for Social Science (SPSS) version 20 (SPSS Inc., Chicago, IL, United States). Differences in socio-financial aspects in each gathering were investigated to look at the relationship of factors, for example, age, sex, for H. pylori infection using Pearson relationship correlation. P-value < 0.05 was considered to be significant.

3.0 RESULT

4.1 Distribution of patients tested positive for *Helicobacter pylori* infection in General Hospital Potiskum, Yobe State

Table 1: shows the distribution of patients tested for *Helicobacter pylori* infection in General hospital Potiskum, Yobe State. The results shows that 175 (87.5%) of the 200 were tested positive for *H. pylori.*

Table 1: Percentage of patients tested positive for *Helicobacter pylori* infection in General Hospital Potiskum, Yobe State

No. of Patients Tested	No. (%)Positive
200	175 (87.5)

NS $P > 0.05 x^2 = 0.43$

4.2 Distributionof patients tested positive for *Helicobacter pylori* in relation to gender in General Hospital Potiskum, Yobe State.

Table 2: shows the sex distribution of patients tested for *H. pylori* infection in General hospital Potiskum, Yobe State. The results shows that 65 (81.25%) of the 80 males were tested positive and 110 (91.60%) of the 120 females were tested positive for *H. pylori.*

Table 2: percentage of *Helicobacter pylori* positive in relation to gender among patients attending General Hospital Potiskum, Yobe State

Sex	**No. of patients Tested**	**No. (%) Positive**
Male	80	65 (81.25)
Female	120	110 (91.60)
Total	200	175 (87.5)

NS $P > 0.05 x^2 = 0.35$

4.3 Age group distribution of patients tested positive for *Helicobacter Pylori* in General Hospital Potiskum, Yobe State.

Table 3: Shows the age group distribution of patients tested for *Helicibacter pylori* infection in General hospital Potiskum, Yobe State. The results shows that 28 (43.75%) aged group 9-10 tested positive for *Helicobacter pylori*, 68 (90.66%) aged group 20-29 were tested positive for *Helicobacter pylori*, 39 (90.69%) aged group 30-39 tested positive for *H. pylori*, 26 (92.85%) aged group 40-49 were tested positive for *H. pylori*, 10 (76.92%) aged group 50-59 were tested positive for *H. pylori*, 5 (71.42%) aged group 60-69 were tested positive for *H. pylori* 2 (66.66%) aged group 70-79 were tested positive for *Helicobacter pylori* 1 (100%) aged group 80-89 were tested positive for *H. pylori.*

Table 3: Age group percentage of patients tested positive for *helicobacter pylori* in General Hospital Potiskum, Yobe State

Age Group	No. of Patients Tested	No. (%) Positive
10 - 19	64	28 (43.75)
20 - 29	75	68 (90.66)
30 - 39	43	39 (90.69)
40 - 49	28	26 (92.85)
50 - 59	13	10 (76.92)
60 - 69	7	5 (71.42)
70 - 79	3	2 (66.66)
80 - 89	1	1 (100)
Total	200	175 (87.5)

NS $P > 0.05 x^2 = 0.43$

4.4 Distribution of *Helicobacter pylori* infection in relation to socio-economic status in General Hospital Potiskum, Yobe state

Table 4: Shows the socio-economic status distribution of patients tested for *H. pylori* infection in General Hospital Potiskum, Yobe State. The result shows that 106 (96.36%) of the 110 for low socio-economic status were tested positive, 59 (98.33%) of 60 for middle socio-economic status were tested positive, 10 (33.33%) of 10 for high socio-economic status.

Table 4: percentage of *helicobacter pylori* infection in relation to socio-economic status among patients attending General Hospital Potiskum, Yobe state

Socio economic Status	No. of Patients Tested	No. (%) Positive
Low	110	106 (96.36)
Middle	60	59 (98.33)
High	30	10 (33.33)
Total	200	175 (87.5)

NS $P > 0.05 x^2 = 0.60$

4.5 Distribution of patients tested positive for *helicobacter pylori* infection in relation to education status in General Hospital Potiskum, Yobe State

Table 5: Shows the education status distribution of patients tested for *Helicobacter pylori* infection in General Hospital Potiskum Yobe State. The result shows that 47(90.38%) of the 52 for primary students tested positive, 32(84.21%) of the 38 for secondary students were tested positive, 41(95.24%) of the 43 for tertiary students were tested positive and 55(82.5%) of the 67 were tested positive for none student.

Table 4.5 percentage of *Helicobacter pylori* infection in relation to education status in General Hospital Potiskum, Yobe State

Education Status	No. of Patients Tested	No. (%) Positive
Primary	52	47(90.38)
Secondary	38	32(84.21)
Tertiary	43	41(95.24)
None	67	55(82.0)
Total	200	175(87.5)

NS P > $0.05x^2 = 0.38$

4.6 Distribution of patients tested positive for *Helicobacter pylori* infection in relation to marital status in General Hospital Potiskum, Yobe State

Table 6: Shows the marital status distribution of patients tested for *Helicobacter pylori* infection in General Hospital Potiskum, Yobe State. The result shows that 25(62.50%) of the 40 for single tested positive, 63(90.0%) of the 70 for married were tested positive, 29(96.6%) of the 30 for Divorced were tested positive and 58(96.67%) of the 60 were tested positive for widow.

Table 4.6 percentage of *Helicobacter pylori* infection in relation to marital status in General Hospital Potiskum, Yobe State

Marital Status	No. of Patients Tested	No. (%) Positive
Single	40	25(62.5)
Married	70	63(90.0)
Divorced	30	29(96.60)
Widow	60	58(96.67)
Total	200	175(87.5)

NS P > $0.05x^2 = 0.40$

4.7 Distribution of patients tested positive for *Helicobacter pylori* infection in relation to location in General Hospital Potiskum, Yobe State

Table 7: Shows the location distribution of patients tested for *helicobacter pylori* infection in General Hospital Potiskum, Yobe State. The result shows that 13(86.67%) of the 15 for Nahuta were tested positive, 24(82.70%) of the 29 for Lowcost were tested positive, 31(96.87%) of the 32 for Rigan fulani were tested positive, 9(90.0%) of the 10 for T- junction were tested positive, 22(84.61%) of the 26 for Afghanistan were tested positive, 18(81.81%) of the 22 for Roseline were tested positive, 34(94.4%) of the 36 for Travellers were tested positive, 11(91.67%) of the 12 for Old Army Barrack were tested positive, 3(60.0%) of the 5 for Dogon Zare were tested positive, 10(76.92%) of the 13 for savannah were tested positive.

Table 4.7 Percentage of *Helicobacter pylori* infection in relation to location in General Hospital Potjskum, Yobe State

Location	No. of Patients Tested	No. (%) Positive
Nahuta	15	13(86.67)
Lowcost	29	24(82.70)
Rugan Fulani	32	31(96.87)
T. Junction	10	9(90.0)
Afghanistan	26	22(84.61)
Roseline	22	18(81.81)
Travelers	36	34(94.44)
Old Army Barracks	12	11(91.67)
Dogon Zare	5	3(60.0)
Savannah	13	10(76.92)
Total	200	175(87.50)

Significant $P < 0.05 x^2 = 0.02$

4.1 Discussion

Infection with *Helicobacter pylori* has posed a serious threat to the world, especially to African nations. Given that it is linked to major health problems such as chronic gastritis, duodenal and gastric ulcers, gastric cancer, and other extra-gastric diseases, it is extremely important for public health. Approximately half of the world's population is currently afflicted by this illness (Pelayo et al., 2018). The purpose of this study was to ascertain the *Helicobacter pylori* prevalence among patients receiving care at Potiskum General Hospital. This study's 87.5 percent prevalence of *H. pylori* infection is more than that of previous research in Nigeria that used a serological approach and found a 5.5% seroprevalence of *H. pylori* infection in female students (Kumurya, 2015).

The result of our study showed that prevalence of *H. pylori* infection is high (87.5%) among the population studied, and this may constitute a major public health threat to the entire people of Yobe State, and by inference to the population in Nigeria and other countries, especially in Africa.

Our study's findings on the prevalence of *H. pylori* infection surpass those of earlier research conducted throughout Nigeria. For example, *H. pylori* prevalence rates have been reported by Aje et al. (2010), Rahul et al. (2013), and Jemilohun and Oluwasola (2010) in southwest Nigeria; Olokoba et al. (2013) in north central Nigeria reported 93.6% prevalence by serology and 80.0% by histology among Nigerians with dyspepsia; Smith et al. (2019) in south-south and south-west Nigeria reported 68.4% among patients with type 2 diabetes mellitus; and Bello (2018) in north-west Nigeria among subjects with low socioeconomic status. In other African nations, the rates recorded by Laure et al. (2018) from Cameroun were 64.39%, Walker et al. (2014) for Rwanda was 75.0%, and Kimang'a et al. (2010) in Kenya reported 73.3% in children and 54.8% in adults among patients who presented with dyspepsia. Elsewhere, (Rahul et *al.*, 2013) reported 51.0% in Pune, Marashtra, India. The wide range reported in the different

studies including ours, may partly be due to differences in the method used for *H. pylori* detection, geographical locations,which could reflect environmental and personal hygiene levels, ethnicity, socio-economic factors and age of participants studied (Hooi *et al.*, 2017).

Nevertheless, *H. pylori i*nfection rate in our study is higher than the rates in some other studies in Nigeria such as (Gide *et al.*, 2019) who reported 51.9% in Damaturu metropolitan, Yobe State, northeast Nigeria, and (Nwachukwu *et al.*, 2019) who reported 52.0% in Nnewi, Anambra State, south-south Nigeria, and even much higher than other studies that reported low *H. pylori* infection of 14.2% (Awuku *et al., 2017*) 36.3% (Daniyan,2020), 36.8% (Gemechu and Ezigbo, 2016) and 39.7% (Gide *et al.*, 2019).

The high prevalence rate reported in our study was significantly associated with low social class status, drinking of unclean water, living in crowded rooms, consumption of food from food vendors, family history of ulcer, eating raw vegetables and unwashed fruits, illiteracy, unemployment, age group 40-49 years as well as non-regular hand-washing habit before meal. Our findings agree with previous reports (Bello, 2018), which underscore the need to improve socio-economic conditions and sanitary standards as well as educational standards of the populace, since low sero-prevalence of *H. pylori* is known to occur in communities with good living conditions and hygienic standards. In Russia for instance, within a period of ten years (1995-2005), it was observed that the prevalence of *H. pylori* infection reduced remarkably due to better standards of living (Tkachenko *et al.*, 2017). In China, prevalence of *H. pylori* drastically reduced as a result of increase in economic growth and improvement in environmental and hygienic conditions (Nagy *et al.*, 2016).

In our study prevalence of *H. pylori* infection was highest among the age group 40-49 years (34.0%), but also high in the age groups 30-39 and 20-29 years with 19.5% and 13.0% respectively. This agrees with the study by (Gemechu *et al.*, 2018). Who reported highest sero-prevalence of *H. pylori* in the 43-50 years age-group among symptomatic patients attending Jasmin Internal Medicine and Paediatrics Specialized Private clinic in Addis Ababa, Ethiopia. However, (Smith *et al.*, 2019) reported highest prevalence among age group 50-59 years. It is known that most people are infected with *H. pylori* in their early years and this tends to persist throughout the life time, nevertheless, the time of infection may not be known.

In our study shows the prevalence of *H. pylori* is high among female than male. This finding is comparable to earlier report from, (Jadda *et al.*, 2018) and (Saidu *et al.,* 2015) in their individual studies reported 78.9% and 56.8% prevalence rates of *H. pylori* infection among students of Sultan Abdurrahaman School of Health Technology Gwadabawa and adults in Sokoto Metropolis, respectively. They observed a higher frequency of infection in females compared to males and an even higher frequency in the study.

4.2 Conclusion

Our study shows that *H. pylori* infection is common in General hospital Potiskum, Yobe State, with high sero-prevalence of 13.0% among the study population, age group 20-29 years being mostly affected, and significantly higher prevalence in population with peptic ulcer disease. Factors such as illiteracy, unemployment, drinking of unclean water, consumption of food from food vendors, living

in crowded rooms, family history of ulcer, low social class, eating raw vegetables and unwashed fruits, and non-regular hand washing habits were significantly associated with high sero-prevalence of *H. pylori*. There is need for comprehensive including public health education campaign to create awareness of factors associated with *H. pylori* infections, and government at all levels should enforce policy against filthy environments, discourage indiscriminate and open defaecaction, and provide safe drinking water for the population.

4.3 Recommendation

i. Further research is needed to study the effectiveness of Immunochromatography test diagnosis of *H. pylori.*

1. The use of rapid diagnostic techniques should be employed to detect and identify the *H. pylori* in the study area.
2. Hygienic water supply may help with reducing the spread of the infectous as revealed by past investigations that water from running metropolitan, underground sources just as hand-borrowed wells have been the repositories of *H. pylori*.
3. Other research is needed to study the antimicrobial susceptibility of *H. pylori* infection, in order to identify which antimicrobial agent is more efficacious for the treatment of *H. pylori* in the study area.

Mass awareness of personal hygiene should be created via the media (Radio, Tv, Billboard, Newspapers).

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APPENDIX

YOBE STATE GOVERNMENT OF NIGERIA
MINISTRY OF HEALTH & HUMAN SERVICES

OFFICE ADDRESS:-
Near Yobe State
Specialist Hospital,
Along Gujba Road, Bye-pass
P.M.B. 1047 Damaturu, Yobe State.

Our Ref: MOH/GEN/747/Vol. 1

Date: 17th July, 2023

Fatima Ibrahim Mainasara.
Department of Biological Science,
Federal University, Gashua.

RE; 'PREVALENCE OF HELICOBACTER PYLORI AMONG PATIENT ATTENDING GENERAL HOSPITAL POTISKUM YOBE STATE'.

Further to your application seeking for ethical clearance dated 10th July, 2023 in respect of the above study/protocol title as above. The Yobe State Health Research Ethics Committee (YOHREC) has reviewed your proposal accordingly.

2. Therefore I am directed on behalf of the committee to grant you Expedited approval to commence your research. You should share with us a soft and hard copy of the results of your findings. The soft copy should be email to: yobehrec@gmail.com

3. The committee requires you to comply with all institutional guidelines, rules and regulations.

4. No. changes are permitted in the research without prior approval by the committee, the committee reserves the right to visit research site with or without research's prior notice.

Dr. Musa Sarki
DPRS/HREC Chairman
08032847914
Sarkimusa900@gmail.com

Figure 1: Ethical approval letter.