

# Prevalence of *Helicobacter pylori* and Endoscopic findings among dyspeptics in Kumasi, Ghana

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## Abstract

Background: Gastrointestinal conditions like dyspepsia has emerged as one of the non-communicable diseases (NCD) affecting adults in Ghana. The disease is associated with *Helicobacter pylori* (*H. pylori*) infection and has a number of causes which can be diagnosed endoscopically. The prevalence of *H. pylori* and endoscopic findings in Accra, Ghana have been reported. However, in other parts of the country they are not known. Aim: The study was conducted to determine the prevalence of *Helicobacter pylori* and endoscopic findings in patients with dyspepsia referred for endoscopy at Komfo Anokye Teaching Hospital (KATH), Kumasi. The relationships between *H. pylori* and the endoscopic findings were also determined. Methods: The Study was a hospital-based prospective cross sectional study of 300 patients aged fifteen (15) years and above with dyspepsia. Upper GI endoscopy was performed on each participant. Endoscopic findings and *H. pylori* test results were documented. Results: There were more females 176 (59.0%) than males and the mean age of the subjects was 42.7 years (SD 16.9). Using rapid urease test (RUT) 175 (58.72%) subjects tested positive for *H. pylori*. Endoscopy showed normal findings in more than half, 168 (56.0%), of the patients, The rest had a variety or combination of pathologies. The most common abnormal finding was gastritis, 60, (20.0%). Duodenal ulcer (DU) was present in 32 (10.6%) and oesophagitis in 16 (5.3%), 13 had gastric ulcer (GU) (4.3%), 7 (2.3%) of the patients had gastric carcinoma and one patient had an oesophageal carcinoma. Duodenal ulcer was the only endoscopic finding significantly associated with *H. pylori*, Odds Ratio 3.59, 95% CI 1.30-12.27;  $p=0.007$ . Conclusion: The prevalence of *H. pylori* infection using (RUT) in dyspeptics referred for endoscopy at the endoscopy unit in KATH was 58.72%. The majority of the dyspeptics (56%) had normal endoscopy. The commonest abnormal finding was gastritis. *H. pylori* was significantly associated with duodenal ulcer.

## Keywords

*Helicobacter Pylori*, Dyspepsia, Endoscopy

## 1. Introduction

Dyspepsia is defined as a chronic or recurrent pain or discomfort centered in the upper abdomen [1]. The prevalence of dyspepsia ranges from about 20-30% worldwide [2], and remains a common complaint in the healthy general population as well as among individuals seeking medical care [1]. Information on the prevalence of dyspepsia among

Ghanaians is not known. However data from the daily attendance book at the Out Patients Department of the Komfo Anokye Teaching Hospital (KATH) shows an average of 300 cases of dyspepsia every month (KATH Biostatistics unpublished) [3]. In western populations an organic cause: commonly gastroduodenal ulcer, gastroesophageal reflux disease (GERD) or gastric cancer is found in 40% of patients with dyspeptic symptoms[4,5]. In 50-60% of patients no cause

is apparent and the dyspepsia is classified as non ulcer dyspepsia (NUD) [6].

*Helicobacter pylori* (*H. pylori*) is one of the most important causes of a variety of gastroduodenal diseases including acute and chronic active gastritis, peptic ulcer diseases, gastric mucosa associated lymphoid tissue lymphoma and gastric malignancy[7–13]. A causal relationship between *H. pylori* and dyspepsia (NUD) however is still debated[14].

The discovery of *H. pylori* in the early 1980s revolutionised the management of many gastroduodenal diseases. Our understanding of *H. pylori* infection and its associated gastroduodenal diseases continues to evolve, with new indications for anti-*H. pylori* treatment being constantly added[15].

Dyspepsia and *H. pylori* infection are two important public health issues in the field of gastroenterology, generating high expenditure in diagnosis and treatment[14].

Infection with *H. pylori* occurs worldwide but the prevalence varies greatly among countries and even among population groups within the same country[16].

The prevalence of *H. pylori* colonization is about 30% in the United States and other developed countries as opposed to > 80% in many developing countries[17].

A retrospective and prospective audit of all upper gastrointestinal (GI) endoscopies performed in the Endoscopy Unit of the Korle-Bu Teaching Hospital in Accra, Ghana from January 1995 to December 2002 showed *H. pylori* Urease test was positive in 75% of all biopsy specimen[18].

The prevalence of *H. pylori* colonisation in other parts of the country is not known and there are no specific guidelines for the management of dyspepsia in Ghana. In this study determining the prevalence of *H. pylori* and describing the endoscopic findings in dyspeptics will contribute towards the development of guidelines for the management of dyspepsia in Kumasi which could serve as platform for developing national level guidelines.

The test-and-treat option is preferable in populations with a moderate to high prevalence of *H. pylori* infection ( $\geq 10\%$ )[19]

## 2. Materials and Methods

### 2.1. Ethical Approval

The study received Institutional Review Board approval from the Committee on Human Research, Publication and Ethics of Kwame Nkrumah University of Science and Technology School of Medical Sciences/Komfo Anokye Teaching Hospital, Kumasi, Ghana.

### 2.2. Study Design

The Study was a hospital-based prospective cross sectional study all patients with dyspepsia referred for endoscopy at the Endoscopy Unit of the Diagnostic Center at the Medicine Directorate, KATH Kumasi from January

2008 to June 2008.

All patients with dyspepsia referred for endoscopy at the diagnostic center were invited to participate in the study. Patients aged fifteen (15) years and above with dyspepsia with no serious co-morbid conditions e.g. cardio respiratory disease who consented to participate in the study were recruited. Only patients who had suffered dyspepsia for more than four weeks and who had not been on proton pump inhibitors (PPIs) and or antibiotics for two weeks prior to the endoscopy date were included in the study.

### 2.3. Data Collection

A researcher-administered questionnaire was used to collect data from each participant. The following were recorded for each participant: Gender, age, endoscopic findings and *H. pylori* rapid urease test (Hp RUT).

### 2.4. Helicobacter pylori detection

Upper GI endoscopy was performed on each participant using an Olympus GIF Q260 oesophagogastroduodenoscope after obtaining informed consent. Premedication was administered with intravenous midazolam 2.5-5mg and hyoscine butyl bromide (buscopan) 20mg. Examination of the oesophagus, stomach and duodenum was carried out on each patient. Biopsy samples were taken from the mucosa of antrum of the stomach for *H. pylori* rapid urease testing. Diagnosis of *H. pylori* infection was made if the rapid urease test was positive.

### 2.5. Statistical Analysis

All information from the questionnaire was entered into excel 2007 spread sheet and then exported to Stata Intercooled Version 8 statistical software for analysis.

The ages were summarized and presented as mean with its standard deviation.. Chi squared test was used to compare proportions in the analysis of categorical variables. Relationships between outcome and predictor variables were expressed as odd ratios with their 95% confidence intervals. For all analysis a p-value of less than 0.05 was considered to be statistically significant.

## 3. Results

Three hundred (300) patients were enrolled into the study. There were 176 (59.0%) females. The ages were between 15 – 87 years with the mean being 42.7 years (SD= 16.9).

Using rapid urease test 175 (58.72%) subjects tested positive for *H. pylori*.

Endoscopy showed normal findings in more than half of the patients 168 (56.0%)

The rest had a variety or combination of various pathologies.

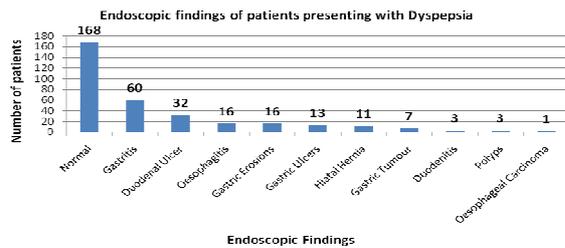


Figure 1. Endoscopic findings of patients.

The most common abnormal finding was gastritis 60 (20.0%).

Duodenal ulcer (DU) was present in 32 (10.6%) and oesophagitis in 16 (5.3%). Thirteen 13(4.3%) had gastric ulcer (GU), 7 (2.3%) of the patients had gastric carcinoma and one patient had an oesophageal carcinoma

Duodenal ulcer was the only endoscopic finding significantly associated with *H. pylori*, Odds Ratio 3.59, 95% CI 1.30-12.27;  $p=0.007$ . (Table 1.)

Table 1. Patients' endoscopic characteristics and *Helicobacter pylori* Test.

Endoscopic Characteristics	Helicobacter pylori Test		Odds ratio	95% CI	P-value	
	Positive	Negative				
Duodenal Ulcer	Present	27	5	3.59	1.30-12.27	0.007
	Absent	161	107	-		
Gastric Tumour	Present	3	4	0.44	0.06-2.65	0.273
	Absent	185	108	-		
Gastritis	Present	42	18	1.50	0.79-2.94	0.189
	Absent	146	94	-		
Gastric Ulcer	Present	9	4	1.36	0.37-6.17	0.617
	Absent	179	108	-		
Endoscopic Finding	Normal	100	68	0.74	0.44-1.21	0.204
	Abnormal	88	44	-		

## 4. Discussion

There were more females (59%) than males in this study. This distribution is similar to that reported in the study conducted by Nkrumah in Saudi Arabia[20]. There may have been more women in the study because relative to men, women are diagnosed more frequently with functional GI disorders which present as dyspepsia[21].

The mean age of the subjects was 42.7years (SD 16.9). This is similar to what Onyekwere et al found in a review of 170 cases in Lagos, where the majority of the patients were in the middle to elderly age with a peak in the 5th decade[22].

The number of subjects who tested positive for *H. pylori* by urease test was 175 (58.72%).

Because the study was conducted in a tertiary institution there may have been a selection bias.

Although patients were selected on the basis of those who had been off PPIs for two weeks, some may not have complied and so may have given a false negative result with the Hp RUT test. It is not unusual to find high prevalence of *H. pylori* in developing countries[23–25]. The *H. pylori* prevalence of 58.72% found in this study is lower than that found in earlier studies in Ghana. Using data obtained from the Korle Bu Teaching Hospital(KBTH) in Accra, Ghana, Baako et al found that 75.4% tested positive for *H. pylori* infection and the incidence peaked in the 5<sup>th</sup> decade[26]. Aduful et al also in KBTH found that the urease test was positive in 75% of all biopsy specimens[18]. This disparity in prevalence between our

study and earlier studies may be due to the increased use of antibiotics in recent times in the management of dyspepsia and also improved socioeconomic situations which is associated with lower *H. pylori* prevalence. In these areas of Ghana where higher prevalence have been noticed about a decade or two ago, there will be the need to conduct a similar study to re-define the prevalence.

Other studies in Africa found high *H. pylori* prevalence, Nduduba et al in a study in Nigeria found that 73% were positive for *H. pylori* either by CLO or histology and that the peak age was in the fourth decade[27]. Bakka et al Libya found *H. pylori* in 82% of 132 patients examined[28]. Ayoola et al found prevalence in Saudi Arabia to be 54.9% which was at the lower end of the range of (50–80%) found in Saudi Arabia[23].

In this study endoscopy showed normal findings in more than half of subjects (56%). According to the literature in 50-60% of patients no endoscopic cause is apparent and the dyspepsia is considered to be idiopathic (NUD)[6]. A normal endoscopy was showed to be the highest finding in other similar studies. Aduful et al[18] in Accra reported a normal endoscopy in 41% in patients with dyspepsia. In Zaria Northern Nigeria, Malu found normal endoscopy in 32.7%[29]. Bakka in Libya reported normal findings in 77% of subjects[28]. Abahussain et al [30] in Kuwait also reported normal endoscopy in only 32% but this was still the most common finding.

An organic cause, such as gastroduodenal ulcer, gastro-oesophageal reflux disease or gastric cancer is found in 40% of patients with dyspeptic symptoms[4,5]. Of the abnormal

findings, gastritis was the most frequent accounting for 20% of endoscopic findings. Duodenal ulcer and gastric tumour accounted for 10.6% and 2.3% respectively.

From the literature studies on NUD are mostly from the Western populations and research in this area is lacking in developing countries. There is a general agreement on the irrelevant role played by *H. pylori* in the pathophysiology of NUD. It was also shown in this study that the presence of *H. pylori* was not significantly associated with a normal endoscopic finding.

Gastritis was the commonest endoscopic pathology in this study (20%). Abahussain *et al* [30] in Kuwait also found normal endoscopy most common (32%) followed by gastritis 26%, duodenal ulcer 11.5% which were similar to the findings in this study. The commonest cause of gastritis is *H. pylori* infection[31]. However in this study the relationship between *H. pylori* and endoscopic gastritis was not significant ( $p=0.19$ ). With the high prevalence of gastritis in the patients presenting with dyspepsia further studies need to be done to find the significant associated factors.

Duodenal ulcer 32, (10.6%) was the next most common endoscopic finding after gastritis. However other results from the sub region showed duodenal ulcer to be the next after normal endoscopy: 41% in Accra[18], and 26.6% in Zaria[29]. *H. pylori* was found to be significantly associated with duodenal ulcer in this study (OR 3.59, 95% CI 1.30-12.27;  $p=0.007$ ) which is supported by the literature. The greater percentage of DU in Accra study could be attributed to a higher percentage of patients with *H. pylori* (75% in Accra compared with 58.72% in our study).

GERD is currently one of the most common health problems in the Western world. Endoscopy is normal in 40.5% of patients with GERD. However it can result in complications such as oesophagitis, oesophageal strictures, Barrett's oesophagus (BO) and oesophageal adenocarcinoma [32].

Sixteen (5.3%) of the patients in this study had oesophagitis which is quite close to the 7.5% found by Aduful *et al* in Accra[18]. None of our patients had oesophageal strictures or Barrett's and we found oesophageal carcinoma in only one patient.

Epidemiological data from the Indian subcontinent, Africa, South America, and the Middle East on GERD are sparse. A limited number of studies have elucidated ethnic differences in GERD in multiracial populations and African Americans and Asians appear to be at a lower risk for the development of complicated GERD including BO[33]. This finding of only 5.3% of our patients having oesophagitis and only one patient with oesophageal carcinoma agrees with the finding of lower development of complications of GERD in African Americans. Whether the pathophysiology of GERD differs among different populations remains to be answered satisfactorily. It appears that most of the factors involved in the pathogenesis of GERD, as described in western populations, are present for example in Asians but on a lower scale [33].

Gastric cancer was present in only 7(2.3%) of the

patients in this study. In Nigeria Nduduba *et al*[27] diagnosed gastric carcinoma in 6.2% of their patients. Kidd *et al* [34] conducted a retrospective literature review of all the data published on *H. pylori* in Africa in order to test whether the prevalence of diseases associated with this organism differs from that in developed nations and found the prevalence of gastric cancer to be (3.4%) and of *H. pylori* to be 72% with no correlation between the two[34]. In this study also, there was no significant association between *H. pylori* presence and gastric tumour.

The difference in incidences of gastric cancer and the relationship with *H. pylori* prevalence may be due to the following. Certain populations with high incidences of *Helicobacter pylori* infection, such as those in East Asian countries, have high incidences of gastric cancer, while other highly infected populations, such as those in Africa and South Asia, do not. The various rates of gastric cancer associated with different geographic areas could be explained, at least in part, by the differences in the genotypes of *H. pylori* *cagA* and *vacA*. Populations expressing a high incidence of gastric cancer are mostly identical with regions where East Asian type *CagA* is predominant. In contrast, incidence of gastric cancer is low in Africa, South Asia, and Europe, where strains typically possess Western type *CagA*. Within East Asia, strains from northern parts, where the incidence of gastric cancer is high, predominantly possess the *vacA* m1 genotype, whereas the m2 genotype is predominant in southern parts where the gastric cancer incidence is low<sup>35</sup>. Further studies need to be done to ascertain which strains of *H. pylori* occur in Ghana. Gastric ulcer (GU) was present in 13 patients (4.3%) of whom 9(70%) had *H. pylori*.

## 5. Conclusion

In conclusion, the prevalence of *H. pylori* infection in dyspeptics referred for endoscopy at the endoscopy unit in KATH was 58.72% using RUT. This study has shown that the prevalence is lower than was previously reported in Accra, Ghana. It is still therefore important to test and treat *H. pylori* among Ghanaians with dyspepsia.

The majority of the dyspeptics (56%) had normal endoscopy. The commonest abnormal finding was gastritis. With the high prevalence of endoscopic gastritis and the lack of a significant relationship with *H. pylori* in the patients presenting with dyspepsia further studies are needed to determine the significant associated factors.

*H. pylori* was significantly associated with duodenal ulcer. In view of the significant association and undoubted benefit of *H. pylori* eradication in preventing relapse after treatment for DU, eradication therapy should be a comprehensive part of DU treatment even in centers where *H. pylori* testing is not available.

## Competing Interests

The authors declare that they have no competing interests.

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