ORIGINAL ARTICLE

THE PREVALENCE OF HELICOBACTER PYLORI INFECTION IN PATIENTS UNDERGOING OESOPHAGO-GASTRO-DUODENOSCOPY IN PERAK, MALAYSIA.

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Abstract

Helicobacter pylori has been established as the pathogen responsible for various upper gastrointestinal conditions ranging from peptic ulcer disease to malignancies such as gastric adenocarcinoma and mucosa associated lymphoid tissue lymphoma. In this study the prevalence of this organism among patients undergoing oesophago-gastro-duodenoscopy as outpatients was investigated utilizing the rapid urease test of endoscopic gastric biopsies. Out of 278 respondents, we discovered that the prevalence was 40.3% with a slight female preponderance. Ethnic differences were also noted with a much higher (>40%) percentage of Indians and Chinese testing positive for the organism compared with the Malays (23.8%). A larger proportion of the respondents who had the organism were found to have positive OGDS findings compared with those who did not have the organism.

Introduction

Helicobacter pylori was first discovered in 1983 by Warren JR, & Marshall BJ.[1] About half the world's population is infected by this bacterium but the distribution of the infection across the world is not even.[2] Reports show that the prevalence rates are higher in the less developed countries in Asia, Africa and South America; whereas the more developed countries in Europe and North America have lower prevalence.[3] *H. pylori* was cultured in 1983 and since then it has been recognized as the main cause of chronic gastritis, peptic ulcer disease, gastric adenocarcinoma and gastric mucosa associated lymphoid tissue (MALT) lymphoma.[4] Ever since this great discovery was made, new diagnostic tests have been developed and a proper eradication strategy was formulated. This discovery has led to the change in mindset of clinicians dealing with patients with dyspepsia. So many thousands of unwarranted elective operations such as vagotomy and gastric drainage procedures, and gastric resections for peptic ulcers have been avoided and this has mitigated the sufferings of millions of people all over the world. However surgical intervention is still needed in dealing with the complication of peptic ulcers.

In 1982, Marshal and Warren were able to culture these organisms and identified *Helicobacter pylori* as the cause of 95% of duodenal ulcers and about 70% of gastric ulcers. *H. pylori* bacteria are transmitted by the faecal-oral route, usually in childhood.[5,6] The prevalence of infection is inversely related to the quality of households and public sanitation, and entire families becoming infected are not uncommon. The first report of *H. pylori* in Malaysia was in 1986.[7] The prevalence of this infection was reported to be declining in a study that looked at the prevalence of this infection in Malaysia at 2 time periods over a 10 year interval. The prevalence dropped from 51.7% in 1989/90 to 30.3% in 1999/2000.[8] Hassan, et al. reported a high seroprevalence of exposure to *H. pylori* among the indigenous communities living in the periphery of Crocker Range, Sabah in East Malaysia.[9] However, a serological survey by Ayub and Raj reported a low prevalence rate seen in Malays (4.2%) among blood donors and (4.8%) in people attending health clinics in Kelantan, West Malaysia. [10] Developing countries generally have higher rates of *H. pylori* carriage than those found in developed countries.

Goh found that the prevalence of *H. pylori* infection was 91% in duodenal ulcer and 74% in those with gastric ulcers.[11] *H. pylori* infection if not identified and treated adequately can lead to morbidity. Serious complications of peptic ulcer e.g. perforation, peritonitis and haemorrhage may even lead to mortality. The clinical importance of this organism is its close association with peptic ulcer disease and gastric cancer. Although most individuals infected by *H. pylori* will not experience any symptoms clinically, it is estimated that 10-20% of the infected individuals will develop gastric and duodenal ulcers.[4,12] In addition, those infected carry a 1-2% lifetime risk of developing gastric cancer and 1% risk of gastric MALT lymphoma4. Furthermore its eradication leads to the cure of peptic ulcers, and prevents the development of gastric cancer in the individuals who have not developed pre-cancerous lesions.[13-17]

Eradication of *H.pylori* infection is of paramount importance as there is a definite relation between chronic *H. pylori* infection to adenocarcinoma of the stomach, particularly the cagA genetic type (cagA pathogenecity island). The study was to determine the prevalence of *H. pylori* infection amongst patients who undergo Oesophago-gastro-duodenoscopy (OGDS) in Hospital Raja Peramaisuri Bainun, Ipoh and Hospital Sungai Siput, Perak, Malaysia by performing endoscopic biopsy and rapid urease test.

Materials and Methods

The study was a prospective study that was conducted for a period of 12 months commencing

from 1st June 2009 to 31st July 2010. The respondents were selected from those who have been referred for OGDS in the above mentioned two hospitals as day care patients. Informed consent was obtained from every single respondent. The total number of patients undergoing OGDS in these two hospitals is around 500-600 per year. OGDS is performed almost daily in Hospital Raja Paramaisuri Bainun, Ipoh, five days a week and twice a month in hospital Sungai Siput by the specialists of the hospitals and the surgeons of Universiti Kuala Lumpur Royal College of Medicine Perak. The total number of respondents in our study was 278.

The patients' data including name, age sex, ethnicity and presenting complaints such as epigastric pain, vomiting, haematemesis or malena was recorded.in the questionare. Inclusion criteria was all those below the age of 80 yrs and exclusion criteria are those patients with severe co-morbidities and complications of peptic ulcers e.g. perforation and haemorrhage. Upper gastrointestinal (GI) endoscopy aims at detecting any evidence of acute or chronic oesophagitis, gastro-oesophageal reflux disease (GERD), gastritis, peptic ulcers, and tumours in the oesophagus and stomach. However, this study was mainly to identify the presence of *H. pylori* infection in this selected group of patients. The upper GI endoscopies were performed by the surgeons of Hospital Raja Paramaisuri Bainun, Ipoh and the two of the researchers from UniKL Royal College of Medicine Perak. In Hospital Sungai Siput, OGDS was being performed once in two weeks. Biopsies of the stomach were performed and tested for urease production.

Prior written permission was obtained from the Directors of Hospital Raja Permaisuri Bainun, Ipoh and Hospital Sungei Siput before the commencement of the study. Written permission was also obtained from the head of the Department of Sugery Hospital Raja Permaisuri Bainun, Ipoh who was also a co-researcher. The necessary permission was sought for and obtained from the ethical committee of the Ipoh hospital. Registration of the project was also done with the National Medical Research Register, Ministry of Health, Malaysia.

Discussion

The prevalence rates of *H. pylori* infection varies globally, from continent to continent, country to country and even to different communities within any country. The differences in exposure rate reflects socioeconomic factors including large families and crowded living conditions. People living in over-crowded living conditions with poor sanitation have a higher incidence of *H. pylori* infection.[18] Ethnicity may contribute independently but there are limited epidemiological data from South East Asia regarding this issue. Mazlam reported a study in Malaysia that 56% of Indian, 45% of Chinese and only 11% of Malays gastroscoped with non-ulcer dyspepsia were infected.[19] In a study from Singapore, Indian Asians had a higher prevalence of antibodies to *H. pylori* than either Chinese or Malay. The incidence is certainly less in western world where living conditions are better and people have higher economic status and better sanitation.

The transmission is through oral ingestion, mainly within families in early childhood and has been documented by vomitus, saliva, faeces or possibly also through water sources in developing countries.[5,6] To colonize the stomach, *H. pylori* must survive the highly acidic environment in the lumen and burrow into the mucous to reach its niche, close to the epithelial cell layer.[20] It survives in the acid environment by producing urease, which converts urea to ammonia and thereby generating localized areas of neutralization.[21] The bacterium also produces a host of other virulence factors: adhesions, vacuolating cytotoxin A, proteases, phospholipases and the microorganism's cytotoxin-associated gene pathogenecity island. Not only do these enhance its survival, it also produces an increased inflammatory response and damages the epithelium.[22]

The clinical importance of this organism is its close association with peptic ulcer disease and gastric cancer. Although most individuals infected by *H. pylori* will not experience any

symptoms clinically, it is estimated that 10-20% of the infected individuals will develop gastric and duodenal ulcers.[4,12] Those infected carry a 1-2% lifetime risk of developing gastric cancer and 1% risk of gastric MALT lymphoma4. Furthermore its eradication leads to the cure of peptic ulcers, and prevents the development of gastric cancer in the individuals who have not developed cancer precursor lesions.[13-17]

If symptomatic, the patients usually present with dyspepsia and other symptoms typically associated with peptic ulcer disease.[23] Very often, there are no other symptoms but an additional history of: abdominal mass, early satiety, protracted vomiting, jaundice and a family history of gastric cancer, may indicate the development of gastric cancer. The diagnosis of *H. pylori* infection is made via invasive and non invasive testing. It can be tested non-invasively with a blood antibody test, stool antigen test, or with the carbon urea breath test.[24] However, the most reliable test is by means of an endoscopic biopsy with a rapid urease test, histological examination and microbial culture.[25]

The standard treatment to eradicate the infection is the one week proton pump inhibitor-based triple therapy (with clarithromycin and either amoxicillin or metronidazole).[26] The eradication therapy has radically changed the treatment of peptic ulcers and has made cure possible without surgery.[15,27] However, there are an increasing number of individuals who harbour antibiotic resistant strains of the bacterium.[28] This often resulted in initial treatment failure, necessitating additional therapy or alternate strategies, such as the quadruple therapy (bismuth colloid is added).[24,29,30,31] In addition, research in the area of developing a vaccine to prevent against *H. pylori* infection is currently ongoing.[32,33]

Eradication of *H. pylori* infection is being carried out by using one proton pump inhibitor and two antibiotics as per the Ministry of Health guidelines: viz. Amoxicillin 1g.b.i.d, Clarythromycein 500mgs b.i.d.,and Pantoprazole 40mgs b.i.d. for one week(7days). Gastic ulcers are bipsied to identify early dysplastic changes and followed up by regular OGDS till the ulcers heal.

Conclusion

In our prospective study for one year by performing endoscopic biopsy and rapid urease test, we found that the prevalence rate in our set up is fairly high (40.3%). The ethnic distribution shows that the highest number of positive cases was seen among the Indians followed by the Chinese, and the Malays seem to have a much lower rate. The highest incidences were between the ages of 41 to 80 years with a slight female preponderance. Out of 278 respondents none of the patients had any evidence of adenocarcinoma of the stomach or MALT lymphoma. Majority of the patients had antral gastritis, corpus gastritis, duodenitis and peptic ulcers. All patients with gastric ulcers were biopsied but no case of carcinoma of the stomach was detected. All those patients who had positive urease test were treated by the triple regime as per the Ministry of Health guidelines; two antibiotics and one proton pump inhibitor (Amoxicillin 1g BID, Clarithromycin 500mg BID and Pantoprazole 40 mg BID) . The duration of treatment is for one week. Our policy is to identify those patients who are harbouring the infection and eradicate it in those who are symptomatic. OGDS is performed for all the patients who have symptoms of dyspepsia, peptic ulcers, upper gastrointestinal bleeding and suspected malignancy.

Acknowledgment

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Results:

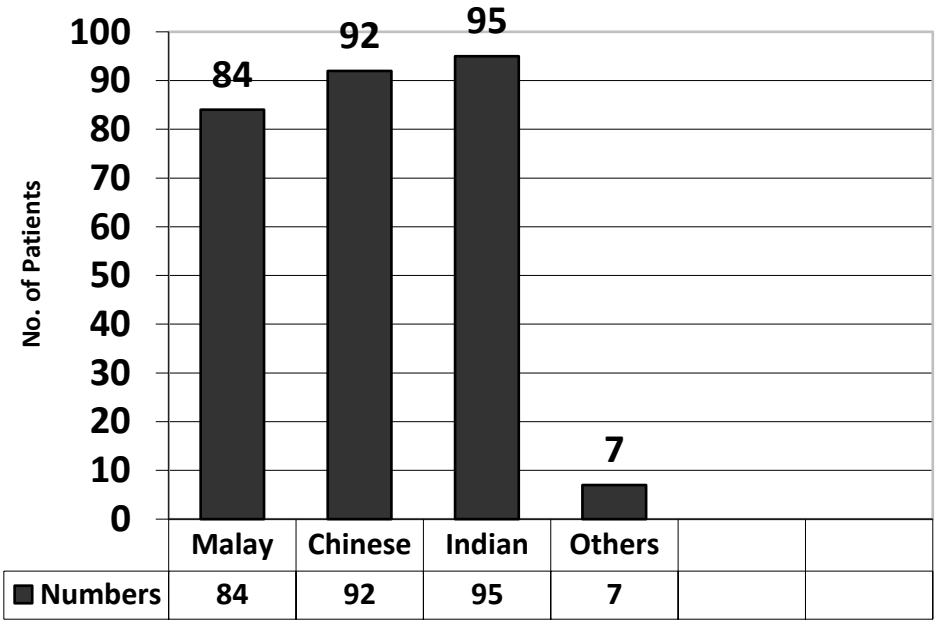


Figure 1. Ethnic Distribution

Out of the 278 respondents, there were 30.2% Malays, 33.1% Chinese, 34.2% Indians and 2.5% others.

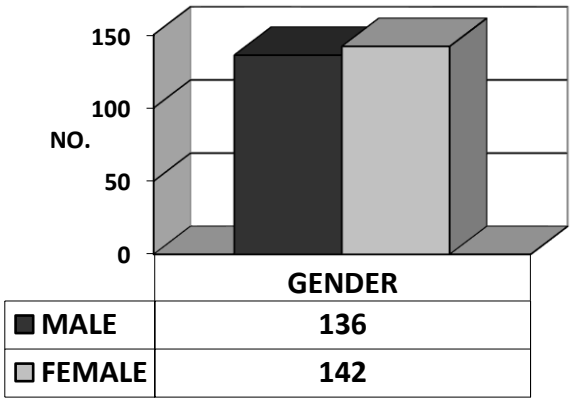


Figure 2. Gender Distribution

The gender distribution was fairly even with 49% male and 51% female respondents.

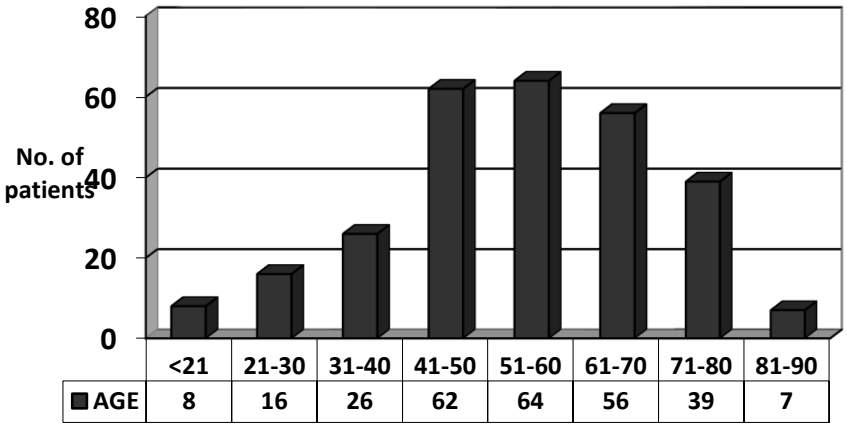


Figure 3. Age Distribution

The ages of the respondents ranged from 19 to 85 years with the peak age group of 51-60 years (23%) and gradually decreasing numbers in the younger and older age groups.

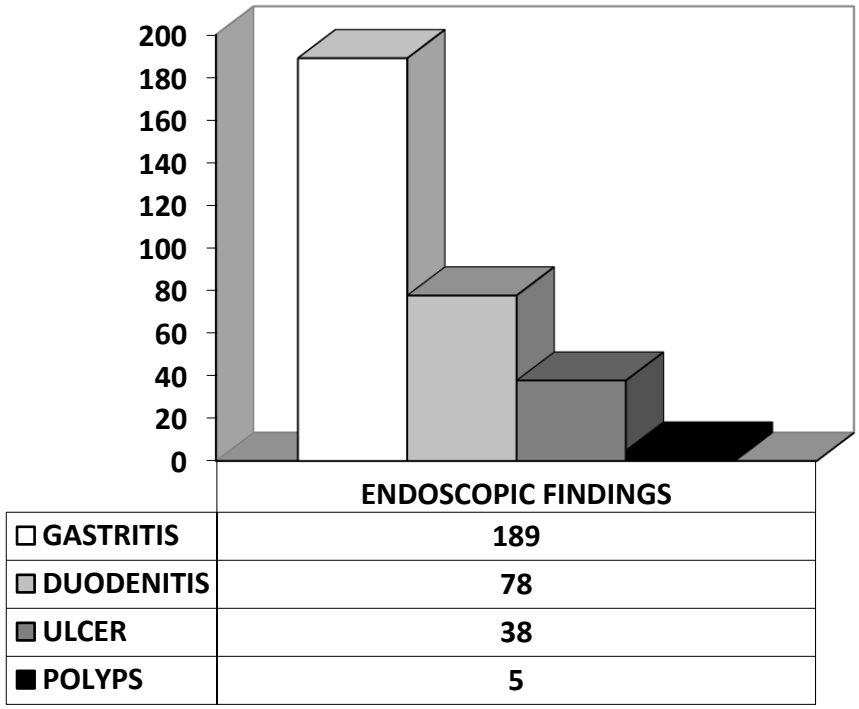


Figure 4. Endoscopic findings

The majority of the patients was found to have gastritis (68.0%), followed by lesser numbers with duodenitis (28.1%), ulcers (13.7%) and polyps (1.8%). Some patients had more than one endoscopic finding and 54 patients (19.4%) had normal OGDS findings.

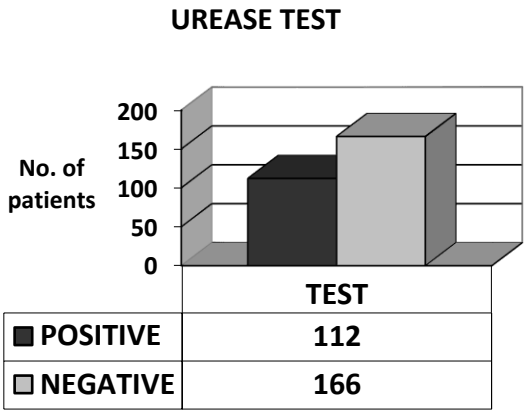


Figure 5. Urease test results

112 of the respondents (40.3%) were found to have a positive urease test result.

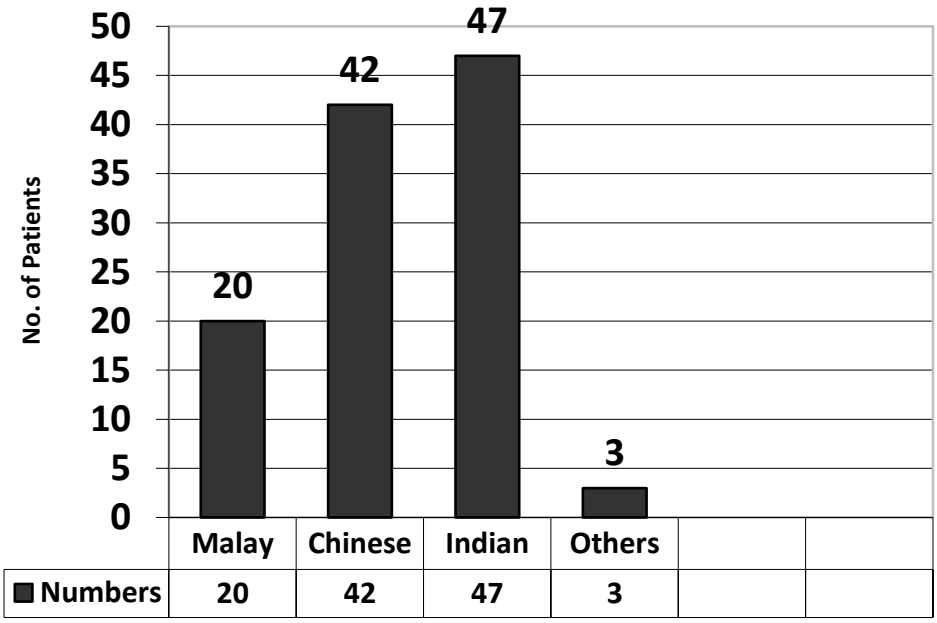


Figure 6. Ethnic Distribution of patients with a positive urease test result

Comparing with the overall distribution of the respondents, we found that the ethnic distribution of those with a positive urease test result is different with a much lower percentage of Malays (23.8%) with a positive test result compared with the other 3 ethnic groups: Chinese (45.7%), Indian (49.5%) and others (42.9%).

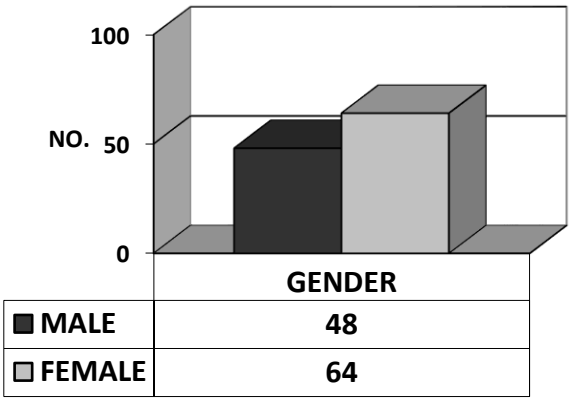


Figure 7. Gender Distribution (Positive urease test)

It is also noted that more female patients were tested positive with the urease test (45.1% of all female respondents) as compared with the male patients (35.3% of all male respondents).

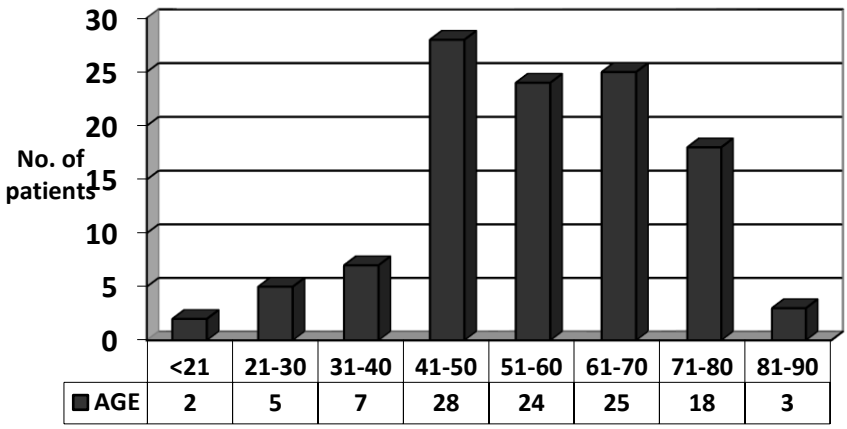


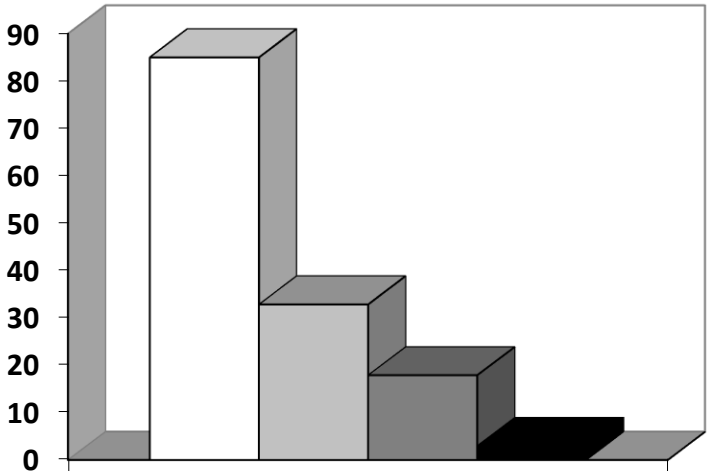
Figure 8. Age Distribution (Positive urease test)

There were fewer patients with a positive urease test among the younger age groups (<21 to the 31-40 age groups) in comparison with the total number of respondents that underwent OGDS.

Age (years)	Number of patients		Percentage of patients with a positive test (%)
	Number of patients with a positive test	Total number of respondents	
<21	2	8	25
21-30	5	16	31.3
31-40	7	26	26.9
41-50	28	62	45.2
51-60	24	64	37.5
61-70	25	56	44.6
71-80	18	39	46.2
81-90	3	7	42.9

Most of the older age groups recorded a more than 40% positive test result except for the 51-60 years group (the group with the largest number of respondents).

Endoscopic Findings (Positive urease test)



	ENDOSCOPIC FINDINGS
GASTRITIS	85
DUODENITIS	33
ULCER	18
POLYPS	3

Endoscopic Findings	Number of patients		Percentage of patients with a positive test (%)
	Positive urease test	Overall	
Gastritis	85	189	45.0
Duodenitis	33	78	42.3
Ulcer	18	38	47.4
Polyps	3	5	60.0
Normal OGDS	12	54	22.2

Only 22.2% of the respondents with a normal OGDS finding were tested positive whereas more than 40% of all the patients with positive findings were tested positive.

The percentage of patients with positive OGDS findings among those with a positive urease test (100 out of 112 patients; 89.3%) was higher than those with a negative test (124 out of 166 patients; 74.7%).

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