

(Original Research Article)

## Correlating Upper GI Symptoms and Endoscopic Findings with H Pylori Positivity – A Rural Tertiary Care Perspective

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### Abstract

**Introduction:** *H pylori* infection is associated with wide spectrum of neoplastic and non-neoplastic lesions and commonly presents as dyspepsia. Upper gastrointestinal endoscopy not only helps to differentiate between organic and functional dyspepsia, but also helps in the diagnosis of *H pylori* infection. In this study we aim to assess the prevalence of helicobacter pylori associated gastrointestinal diseases using rapid urease test (RUT) in patients undergoing endoscopy with upper GI symptoms in rural Kerala.

**Materials and Methods:** This observational cross sectional descriptive study was done in the Department of Gastroenterology at DM Wayanad institute of medical sciences, which is a tertiary care setup in rural Kerala. 510 patients, who underwent gastrointestinal endoscopy for various upper GI symptoms were included in the study. After applying exclusion criteria, 479 patients with demographic details, upper GI symptoms list, endoscopic findings and *H pylori* results formed the crux of the study.

**Results:** Among 479 patients evaluated, males (58%) were predominant. 248 (51.7%) of the 479 patients were *H pylori* positive. Dyspepsia (66.5%) was the commonest symptom amongst the *H pylori* positive patients. Gastritis was the commonest endoscopic finding followed by esophagitis and duodenal ulcer both in the general study group and in the *H pylori* positive group. Amongst 8 patients with carcinoma of stomach, 7 patients were positive for *H pylori* infection and this association was statistically significant.

**Conclusion:** Dyspepsia as a symptom has great social and economic impact and is the commonest symptom presenting to the physician. Being a developing country with limited resources and its ever increasing elderly population and high prevalence of *H pylori* and dyspeptic symptoms, larger study to frame appropriate guidelines for endoscopy and empirical treatment of dyspepsia is desired.

**Keywords:** *H pylori*, upper gastrointestinal endoscopy, dyspepsia, rural Kerala.

## INTRODUCTION

The most common complaint of upper gastrointestinal disorders worldwide is dyspepsia, approximately 10-20% in the Asia Pacific region. It forms 1/3<sup>rd</sup> of individuals seeking healthcare and is relapsing, complicated and confusing. Dyspepsia is a poorly characterized syndrome, defined as chronic or recurrent central upper abdominal pain or discomfort, which can be attributed to the upper gastrointestinal tract. This can incorporate a variety of symptoms such as epigastric discomfort, early satiety, heart burn, upper abdominal fullness, early satiety, bloating, belching or nausea. Dyspepsia according to Rome III criteria should include 1 or more of the following 3 symptoms for 3 months within 6 months of symptoms initial onset: 1. Post prandial fullness, 2. Early satiety, and 3. Epigastric pain or burning. <sup>(1-4)</sup>

One of major causes of dyspepsia and its associated spectrum is the presence of helicobacter pylori (*H. pylori*) infection especially in patients younger than 50 years of age. Patient age and alarm features like age  $\geq$  50 years, family history of upper GI malignancy in a first degree relative, unintended weight loss, GI bleeding or iron deficiency anemia, dysphagia, odynophagia, persistent vomiting and abnormal imaging suggestive of organic disease are used to categorize patients with dyspepsia for endoscopy, as they may harbor significant pathology. <sup>(1)</sup> Since, the discovery of *H. pylori* as an important etiological agent in gastroduodenal disease, investigation for this organism during UGI endoscopy has become a standard clinical practice. Principally endoscopy is essential for classifying a patient's condition as functional or organic dyspepsia. One half of the world's population has *H. pylori* infection, with an estimated prevalence of more than 90% in developing countries <sup>(5,6)</sup> Dyspepsia has a significant impact on quality of life, and results in enormous societal costs, either due to direct medical costs for physician visits, diagnostic tests, medications, or indirect costs from absenteeism or

reduced productivity at work <sup>(8-9)</sup> *H. pylori* is a class 1 carcinogen and a known risk factor for active gastritis, peptic ulcers, mucosa-associated lymphoid tissue lymphoma, and gastric cancer and surprisingly could be protective against gastric esophageal reflux disease. <sup>(10,11)</sup>

With endoscopy, biopsy based tests like rapid urease testing (RUT), histopathology and even culture can be done. Histopathology after endoscopy is often considered the gold standard for diagnosis of helicobacter pylori, and this may not be readily available in all parts of the world especially in resource poor settings. In low-resource communities, considerations of precision and sensitivity may sometimes be traded against costs and the availability of resources. In regions of high *H. pylori* prevalence, treatment could be more practical than diagnostic tests. <sup>(12,13)</sup>

In this study we aim to assess the prevalence of helicobacter pylori associated gastrointestinal diseases using RUT in patients undergoing endoscopy with upper GI symptoms in rural Kerala.

## MATERIALS AND METHODS

This observational cross sectional descriptive study was done in the Department of Gastroenterology at DM Wayanad institute of medical sciences, which is a tertiary care setup in rural Kerala. 510 patients, who underwent gastrointestinal endoscopy for various upper GI symptoms were included in the study. The indications for subjecting the patients to the endoscopy procedure were as follows; patients who had complaints of dyspepsia, pain abdomen, heartburn, dysphagia, hematemesis and anemia. We included other symptoms like recurrent vomiting, belching, burping, epigastric pain and nausea under dyspepsia. Patients with esophageal varices, under 18 years, incomplete details, foreign body ingestion or those who refused consent were excluded from the study. The sex, age, symptoms, alarm symptoms, endoscopic findings, *H pylori* RUT and histological findings,

when necessary were recorded. A written consent was taken from all patients prior to the procedure. Patient endoscopy preparation involved 8 hrs of fasting. All patients underwent blood tests for HIV, HBs Ag and HCV prior to endoscopy. In conscious patients, a topical anesthetic xylocaine 5% was sprayed into the oropharynx to numb the gag reflex. Sedation with intravenous midazolam 0.1 mg/kg was used only in patients who requested for sedation. Endoscopic evaluation of patients was carried out using a Olympus fibre optic gastro-duodenoscope and standard procedures were followed. Instrument sterilization was done using a routine technique of cleaning the instrument with cetrimide, 70% alcohol, glutaraldehyde (Cidex®) and later running equipment in water for up to 15 minutes in between endoscopic sessions. Patients were placed in the left lateral decubitus position with pulse oximetry monitoring of their vital sign by a trained staff nurse. All anatomic regions of the oesophagus, stomach, first and second parts of the duodenum whenever possible were examined and endoscopic impressions noted.

The endoscopy procedure included, taking a biopsy sample, approximately 2-3mm size from the antral gastric mucosa. This sample was placed on yellow colored well containing urea and a pH indicator. The production of the urease enzyme by *H. pylori* results in the decomposition of urea into bicarbonate and ammonia which causes the pH to rise and the color of the dot to change from yellow to red or pink (Fig 1). Positive results were read within 5 to 30 min. Samples that were weakly positive took up to 1 h to develop and no color change at 1 h was regarded negative (Fig 2). Rapid urease test using commercially available RUT kit was used for detecting the presence of *H. pylori* infection on gastric mucosal biopsies.

Statistical analysis: The categorical variables were reported as number and percentages. Associations of categorical variables were examined using Pearson's chi-square test. A p value (significance) of <0.05 was deemed statistically significant. The statistical analysis was performed using SPSS 17.

## RESULTS

Amongst the 510 patients, 31 patients were excluded from the study due to presence of esophageal varices. The remaining 479 patients fulfilled the inclusion criteria and were included in the study. *H. pylori* testing was available in 477 patients as Rapid urease test was inconclusive in two cases (Table 1).

Of the 479 patients evaluated, males were 278 (58%) and females were 201 (42%). Dyspepsia (67.4%) was the most commonest symptoms altogether and it was the main presenting complaint amongst males (56.6%) and was more common in the fourth decade (Table 2). The second most common symptom was pain abdomen which accounted for 14.4% of all patients studied of which 56.5% were males and 43.3% were females (Table 1).

50.3% of males were smokers. 95.6% of the patients consumed non vegetarian diet with only 4.4% being vegetarian. 58.6% of the smokers were *H. pylori* positive. This correlation is probably not statistically significant. 248 (51.7%) of the 479 patients were found to be *H. pylori* positive (Table 3) Of the 323 patients with dyspepsia, 165(66.5%) were *H. pylori* positive. Of the 165 dyspeptic patients who were *H. pylori* positive, gastritis (69.1%) (Table 4 & 5) was the most common finding on endoscopy.

Overall, gastritis at 59.4% was the most common endoscopic finding in the study population (Table 4). 61.4% of males and 38.6% of females had gastritis. Esophagitis was seen in 5.2% followed by duodenal ulcer and gastroduodenitis which was seen in 3.1% of patients.

97(20.2%) of patients had normal endoscopy with no mucosal lesions and it was more common in the patients <20 years (Table 6). Some in this group had lax lower esophageal sphincter, however as the mucosa was normal, they were considered as normal. In the study 8 (1.6%) cases of CA stomach and 4 (0.8%) cases of ca esophagus with histopathology confirmation was noted. Almost all the lesions showed a male

preponderance except gastric ulcer which had equal numbers of male and female patients. Gastritis was present in 273 patients of which 156 (62.9%) were H pylori positive (Table 4 & 5). This was a statistically significant correlation between Gastritis and H pylori positivity ( $p=0.009$ ). Refer table 4. 97(20.2%) of patients had normal endoscopy with no mucosal lesions. Only 24 patients were H. pylori positive. The negative correlation between normal endoscopy and H pylori was statistically significant ( $p<0.001$ ). Of the 479 patients studied, 248 (51.7%) of patients were positive for H pylori of which 60% were males and 40% were females. Maximum no. of patients were between 30 and 70 years of age both amongst males and females (Table 5 & 6). Of the 8 patients with CA stomach, 7 patients were H pylori positive. The correlation between Ca stomach and H pylori was statistically significant ( $p=0.043$ ). 85.7% were males and 14.3% were females. This showed a significant male preponderance. All the patients with duodenal ulcer and gastroduodenitis . Both the lesions showed a male preponderance. 12 out of 25 of patients with reflux esophagitis were H pylori positive. 58.3% were males and 41.7% were females. As in the general population, patients with H pylori also showed a significant male preponderance with respect to almost all endoscopic lesions. The correlation between esophagitis and H pylori was not statistically significant ( $p=0.682$ ).

**Fig 1:** Rapid urease test positive



**Fig 2:** Rapid urease test negative



**Table 1:** Prevalence of symptoms in male and female

Cases	Total cases positive (out of 479)	Males (278)	Females (201)
Dyspepsia	323 (67.4%)	183 (65.8%)	140 (69.7%)
Pain abdomen	66 (13.8%)	36 (12.9%)	30 (14.9%)
Heart burn	26 (5.4%)	14 (5%)	12 (6%)
Hematemesis	21 (4.4%)	16 (5.8%)	5 (2.5%)
Dysphagia	27 (5.6%)	15 (5.4%)	12 (6%)
Anaemia	13 (2.7%)	11 (4%)	2 (1%)
CLD/ Portal hypertension	3 (0.6%)	3 (1.1%)	0
Total	479 (100%)	278 (100%)	201 (100%)

CLD – Chronic liver disease

**Table 2:** Age distribution of symptomatology

Symptoms	<20	20-29	30-39	40-49	50-59	>=60	Total
Dyspepsia	11 (73.3%)	39 (72.2%)	72 (75.8%)	72 (71.3%)	69 (71.1%)	60 (51.3%)	323 (67.4%)
Pain abdomen	1 (6.6%)	7 (13%)	10 (10.5%)	14 (13.9%)	10 (10.3%)	24 (20.5%)	66 (13.8%)
Heart burn	1 (6.7%)	2 (3.7%)	9 (9.5%)	5 (5%)	5 (5.2%)	4 (3.4%)	26 (5.4%)
Hematemesis	1 (6.7%)	0	0	4 (4%)	2 (2.1%)	14 (12%)	21 (4.4%)
Dysphagia	1 (6.7%)	6 (11.1%)	4 (4.2%)	2 (2%)	8 (8.2%)	6 (5.1%)	27 (5.6%)
Anaemia	0	0	0	3 (3%)	2 (2.1%)	8 (6.8%)	13 (2.7%)
CLD/ portal hypertension	0	0	0	1 (1%)	1 (1%)	1 (0.9%)	3 (0.6%)
Total	15 (100%)	54 (100%)	95 (100%)	101 (100%)	97 (100%)	117 (100%)	479(100%)

CLD – Chronic liver disease

**Table 3:** Correlation of symptoms with H pylori infection

Symptoms	Rapid Urease test (RUT)	Absent	Present	Pearson chi-square test (Asymp sig (2 sided))
Dyspepsia	RUT positive	83 (33.5%)	165 (66.5%)	0.565
	RUT negative	71 (31%)	158 (69.0%)	
Pain Abdomen	RUT positive	212 (85.5%)	36 (14.5%)	0.655
	RUT negative	199 (86.9%)	30 (13.1%)	
Heart burn	RUT positive	233 (94%)	15 (6%)	0.550
	RUT negative	218 (95.2%)	11(4.8%)	
Haematemesis	RUT positive	233 (94%)	15 (6%)	0.068
	RUT negative	223 (97.4%)	6 (2.6%)	
Dysphagia	RUT positive	238 (96%)	10 (4%)	0.218
	RUT negative	214 (93.4%)	15 (6.6%)	
Anemia	RUT positive	242 (97.6%)	6 (2.4%)	0.669
	RUT negative	222 (96.9%)	7 (3.1%)	
CLD/ Portal HTN	RUT positive	247 (99.6%)	1 (0.4%)	0.516
	RUT negative	227 (99.1%)	2 (0.9%)	

**Table 4:** Gender distribution of endoscopic findings

Endoscopy findings	Total cases positive (out of 479)	Males (278)	Females (201)
Ca stomach	8 (1.7%)	7 (2.5%)	1 (0.5%)
Ca esophagus	4 (0.8%)	3 (1.1%)	1 (0.5%)
Duodenal ulcer	15 (3.1%)	11 (4%)	4 (2%)
Gastric ulcer	6 (1.3%)	3 (1.1%)	3 (1.5%)
Esophagitis	25 (5.2%)	17 (6.1%)	8 (4%)
Esophageal candidiasis	9 (1.9%)	6 (2.2%)	3 (1.5%)
Esophageal ulcer	7 (1.5%)	4 (1.4%)	3 (1.5%)
Gastroduodenitis	15 (3.1%)	12 (4.3%)	3 (1.5%)
Normal	97 (20.3%)	35 (12.6%)	62 (30.8%)
Gastritis	273 (57%)	165 (59.4%)	108 (53.7%)
Miscellaneous	20 (4.2%)	15 (5.4%)	5 (2.5%)
Total	479 (100%)	278 (100%)	201 (100%)

**Table 5:** Correlation of esophagogastroduodenoscopy findings with H pylori

Endoscopic findings	Rapid urease test (RUT)	Absent	Present	Pearson chi-square test (Asymp sig (2 sided))
CA STOMACH	RUT positive	241 (97.2%)	7 (2.8%)	0.043
	RUT negative	228 (99.6%)	1 (0.4%)	
CA ESOPHAGUS	RUT positive	246 (99.2%)	2 (0.8%)	0.936
	RUT negative	227 (99.1%)	2 (0.9%)	
DUODENAL ULCER	RUT positive	233 (94%)	15 (6%)	0.000
	RUT negative	229 (100%)	0	
GASTRIC ULCER	RUT positive	243 (98%)	5 (2%)	0.122
	RUT negative	228 (99.6%)	1 (0.4%)	
ESOPHAGITIS	RUT positive	236 (95.2%)	12 (4.8%)	0.682
	RUT negative	216 (94.3%)	13 (5.7%)	
ESOPHAGEAL CANDIDIASIS	RUT positive	245 (98.8%)	3 (1.2%)	0.258
	RUT negative	223 (97.4%)	6 (2.6%)	
ESOPHAGEAL ULCER	RUT positive	245 (98.8%)	3 (1.2%)	0.626
	RUT negative	225 (98.3%)	4 (1.7%)	
GASTRODUODENITIS	RUT positive	233 (94%)	15 (6%)	0.000
	RUT negative	229 (100%)	0	
NORMAL	RUT positive	224 (90.3%)	24 (9.7%)	<0.001
	RUT negative	156 (68.1%)	73 (31.9%)	
GASTRITIS	RUT positive	92 (37.1%)	156 (62.9%)	0.009
	RUT negative	112 (48.9%)	117 (51.1%)	
MISCELLANEOUS	RUT positive	242 (97.6%)	6 (2.4%)	0.106
	RUT negative	217 (94.8%)	12 (5.2%)	

**Table 6:** Age distribution of endoscopic findings

Endoscopic findings	<20	20-29	30-39	40-49	50-59	>=60	Total
Ca stomach	0	0	0	2 (2%)	0	6 (5.1%)	8 (1.7%)
Ca esophagus	0	0	0	0	1 (1%)	3 (2.6%)	4 (0.8%)
Duodenal ulcer	2 (13.3%)	2 (3.7%)	3 (3.2%)	2 (2%)	1 (1%)	5 (4.3%)	15 (3.1%)
Gastric ulcer	0	0	1 (1.1%)	1 (1%)	1 (1%)	3 (2.6%)	6 (1.3%)
Esophagitis	1 (6.7%)	4 (7.4%)	7 (7.4%)	5 (5%)	5 (5.2%)	3 (2.6%)	25 (5.2%)
Esophageal candidiasis	0	0	1 (1.1%)	0	3 (3.1%)	5 (4.3%)	9 (1.9%)
Esophageal ulcer	0(0.0%)	0(0.0%)	2(2.1%)	1(1%)	0(0%)	4(3.4%)	7(1.5%)
Gastroduodenitis	1 (6.7%)	3 (5.6%)	2 (2.1%)	4 (4%)	3 (3.1%)	2 (1.7%)	15 (3.1%)
Normal	6 (40%)	14 (25.9%)	17 (17.9%)	23 (22.8%)	17 (17.5%)	20 (17.1%)	97 (20.3%)
Gastritis	5 (33.3%)	30 (55.6%)	60 (63.2%)	62 (61.4%)	60 (61.9%)	56 (47.9%)	273 (57%)
Miscellaneous	0	1 (1.9%)	2 (2.1%)	1 (1%)	6 (6.2%)	10 (8.5%)	20 (4.2%)
Total	15(100%)	54(100%)	95(100%)	101(100%)	97(100%)	117(100%)	479(100%)

**Table 7:** Various studies showing leading endoscopic findings and H pylori prevalence in dyspepsia

Study	Location	Sample size	Common endoscopy findings			H.pylori positive/prevalence
			Gastritis	Gastroesophageal reflux disease	Peptic ulcer disease	
Ayana SM et al <sup>(12)</sup>	Tanzania	130	Gastritis	Gastroesophageal reflux disease	Peptic ulcer disease	65% (RUT)
Adlekha S et al <sup>(19)</sup>	Kerala	530	Gastritis	Duodenitis	esophagitis	57.7% (RUT)
Jemilohun AC et al <sup>(20)</sup>	Nigeria	86	Gastritis	Duodenitis	Duodenogastric reflux	64% (RUT)
Mohammed MO <sup>(21)</sup>	Iraq	100	Antral gastritis	Duodenal ulcer	Atrophic gastritis	Specific data not available
Yuvraj NA <sup>(14)</sup>	Chennai, India	500	Gastritis	Esophagitis	Duodenal ulcer	Not done
Colmer gray IN <sup>(22)</sup>	Rural alberta, Canada	229	Gastritis	Normal	Peptic ulcer disease	12.4% (Histopathology)
Faintuch JJ et al <sup>(23)</sup>	Sao Paulo, Brazil	306	Gastritis	Reflux esophagitis	Normal	54% (RUT)
Khan N et al <sup>(15)</sup>	Peshawar, Pakistan	50	Normal	Esophagitis	Gastric ulcer	Not done
Ndraha S et al <sup>(18)</sup>	Jakarta, Indonesia	148	Gastritis	Gastric ulcer	Esophagitis	All cases negative on histopathology
Present study	Kerala, India (2016)	439	Gastritis	Normal	Esophagitis	51.7% (RUT)

## DISCUSSION

Dyspepsia is one the commonest symptom presenting to the medicine OPD and has great socio-economic impact. Upper GI symptoms like dyspepsia, heartburn, pain abdomen and hematemesis are some of the common complaints with which patients present to the medical OPD. It impairs the quality of life and adds to the financial burden due to repeated hospital visits and medications. The malignancy detection rate is 1.3% among dyspeptic Asian patients.<sup>(4)</sup>

Out of the 439 patients under study, males were predominant. Similar study in Peshawar, Pakistan, and Chennai, India, males composed 70% and 57% respectively of the endoscopic patients under study for dyspepsia.<sup>(14,15)</sup> In our study, dyspepsia was the commonest symptom (67.4%) followed by pain abdomen (13.8%). Dyspepsia and pain abdomen were more common in males, while other symptoms including anemia and hematemesis was also more common in males. Dyspeptic symptoms were more common in 31-40 years age group similar to other studies.<sup>(4)</sup>

Symptoms are not reliable enough to distinguish between functional and organic dyspepsia and is a challenge to the treating physician. Multiple tests like endoscopy, therapeutic trials, Hpylori testing, and upper GI radiography, are available for evaluation of dyspepsia, however, the first recommended choice is upper gastrointestinal endoscopy in a patient with dyspeptic symptoms.<sup>(4,16)</sup> The clinical guidelines of the American gastroenterological association recommends immediate endoscopy if alarm symptoms are present, or the patient is >55 years of age.<sup>(1,17)</sup> In Asia Pacific region, a cutoff of 45 years is recommended, however, India specific guidelines are not found.<sup>(18)</sup>

In our study, commonest endoscopic finding was gastritis. Multiple studies have shown similar findings. Gastritis was followed by normal endoscopic findings in our study. Few studies agree with normal findings as being common, however, other studies find esophagitis to be the

second most common findings in patients with dyspepsia.<sup>(12, 14, 15, 18, 20-23)</sup>

Helicobacter pylori is an important and a common bacterial pathogen infecting the upper GI tract and causes various symptoms due to inflammation of the GI tract. The prevalence of this infection varies worldwide being as low as completely negative to higher than 80 per cent among the population in developing countries.<sup>(18,24,25)</sup> There are often regional differences even with respect to the clinical manifestation of H pylori infection, ranging from iron deficiency anemia in childhood to gastric cancer in the elderly.<sup>(25)</sup> This varied spectrum of clinical symptoms and endoscopic findings is seen even in our study.

In a setting where access to upper GI endoscopy is difficult or unaffordable or if the prevalence is high, it is very important for clinicians to know common causes of dyspepsia and frequency of H. pylori infection to recommend empirical eradication can rather than do nothing at all.<sup>(7,12)</sup>

Studies have shown that dyspepsia (commonly caused by H.pylori followed by NSAID abuse) is a common upper GI indication for endoscopy.<sup>(12,14)</sup> Our study also shows that of all the patients undergoing UGI endoscopy, dyspepsia was the commonest symptom and more than 50% of patients were H pylori positive.

In Asia, the studies published over the last year showed high prevalence rates of H. pylori infection ranging from 54% to 76%.<sup>(26)</sup> Studies from India show that the prevalence of H pylori is as high as 80%.<sup>(25)</sup> However, a study from Kerala has showed a prevalence of 62%.<sup>(19)</sup> Our study showed a prevalence of 51.7% which is lower than most studies. This correlates with a study from Pune where the investigators found a prevalence of 51%.<sup>(27)</sup> The lower prevalence in our study could be because of prior Proton Pump Inhibitor (PPI) medication use, which are well known to be bacteriostatic and could lead to false negative H pylori test results. Hence, it is advisable to stop PPIs 2-4 weeks before endoscopy.<sup>(28,29)</sup> Although this is the recommendation, in practice this can sometimes be a practical

impossibility since symptomatic patients are not compliant with stopping treatment prior to endoscopy. Patients also self prescribe these drugs to reduce symptoms as has been observed in other studies.<sup>(13)</sup> Almost all our dyspeptic patients would have received empirical PPIs prior to endoscopy. When the patients don't respond to empirical therapy, they are subjected to endoscopy.

Studies have shown that, in adults there is no correlation between H pylori infection and the patient's age or gender.<sup>(30)</sup> Our study also showed that the prevalence was similar in patients between the ages of 30 and 70years. It was significantly low in the younger and older age groups.

Although histopathology is the gold standard for detection of H pylori, it has been seen that RUT is a highly specific, rapid and simple method with low cost. The time needed for obtaining the results ranges from few minutes to 24 hr, depending on the bacterial density in the biopsy and their urease activity. Commercial RUT kits have the sensitivity of 85-90% and specificity >95-100%.<sup>(29)</sup> Since commercially available RUT kits are cheaper than histopathology and also faster in terms of generating results, it is was the preferred method of diagnosis in our setting which caters to mainly middle and low socioeconomic strata of the population.

Although the number of patients with CA stomach was less in our study (8 pts.), 7 out of 8 patients were H pylori positive which showed a statistically significant correlation. Several studies have shown clearly that H. pylori infection significantly increases gastric cancer risk . Uemura et al. reported that gastric cancer developed in approximately 3% of H. pylori-infected patients, compared to the uninfected patients.<sup>(31,32)</sup> Malignancies in our study were seen in the elderly and we recommend that in elderly patients with dyspeptic symptoms, endoscopy should be mandatory.

Recent studies suggest that eradication rates achieved by first-line treatment with a proton pump inhibitor (PPI), clarithromycin, and amoxicillin have decreased to 70-85%. The most commonly used salvage regimen in patients with persistent H. pylori is bismuth quadruple therapy. Recent data suggest that the combination of a PPI, levofloxacin, and amoxicillin for 10 days is more effective and better tolerated than bismuth quadruple therapy for persistent H. pylori infection, though this needs to be studied further.<sup>(33)</sup>

## CONCLUSION

India with its ever increasing elderly population and high prevalence of H pylori and dyspeptic symptoms patients urgently needs guidelines for empiric H pylori treatment. Gastroenterologists are few in number and endoscopy is a costly and time consuming procedure and needs to be triaged based on age, significant and alarming symptoms. H pylori eradication should be high on the agenda as it is the commonest cause of dyspeptic symptoms which is causing huge socio-economic burden. The authors strongly urge for a larger study to frame appropriate guidelines for endoscopy and empirical treatment of dyspepsia.

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