

Risk factors and incidence of *H.pylori* infection among the rural population undergoing gastrointestinal endoscopy in a tertiary care center of Wayanad.

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Abstract:

Background: Variation in prevalence of *H. pylori* infection observed in different geographic areas across time suggests that prevalence is influenced by living conditions too. Environmental factors play a role in the pattern of gastritis, most predominant being diet. This study was undertaken to analyze the various factors causing *H. pylori* infection and its rate.

Aims: To study the risk factors and incidence of *H. pylori* infection among rural population undergoing gastrointestinal endoscopy.

Settings and Design: This study is carried out in a tertiary care centre from May 2018 to November 2018

Methods and Materials:

Sample size: 150

Detection of *H. pylori* Infection :RAPID UREASE TEST

Statistical analysis : Fisher's exact test of independence was used.

Result: Out of the total 121 patients, 68 (56%) were positive for *H. pylori*. Among this only 9 belonged to the rural communities. Biopsy samples from 121 patients were obtained during the study period. Out of this, 49(72%) had Peptic ulcer disease (PUD) and 19(28%) had Non ulcer dyspepsia (NUD). Predominant symptoms included Pain abdomen, Heart burn and Burping .

Conclusions: Our study shows the prevalence of *H. pylori* among our sample population as high and that low income, family history of gastric cancer, symptoms of pain abdomen and flatulence/bloating were risk factors of *H. pylori* infection in this population. Smoking, alcoholism and a non- vegetarian diet were prominent in the total positive cases and also among the rural population. But a relation could not be established statistically.

Key-words: *H.pylori* ,Risk factors, endoscopy

Key Messages : This study shows that *H.pylori* infection is prevalent in rural areas of Wayanad and this might be related to the life style of people here. An active life style with proper diet might change the scenario. Early diagnosis and timely initiation of treatment can reduce the morbidity and mortality.

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I. Introduction

Helicobacter pylori has been identified as major cause of Peptic ulcer disease (PUD) and a risk factor for gastric cancer (GC) and mucosa-associated lymphoid tissue (MALT) lymphoma. *H.pylori* was tagged as type I carcinogen by International Agency for Research on Cancer IARC- WHO in 1994. The prevalence of *H.pylori* infection was more than fifty percent on a global scale and in India it was 80%. RUT is an expensive non- invasive technique that can be used in rural settings without creating a financial burden for the patient. It was well established that differential *cagA* and *vacA* genetic characteristics exist in *H.pylori* strains isolated from different geographical regions. Variation in prevalence of infection observed in different geographic areas and across time suggests that prevalence is influenced by living conditions, such as hygiene status and industrialization of society. Environmental factors play a role in the pattern of gastritis, most predominant being diet and this likely underlies the differences in the prevalence of *H. pylori* diseases in India. The environmental factors are likely responsible for the higher prevalence of duodenal ulcer in the south and for the wide range in the age-adjusted incidence rate of gastric cancer (range from 2 to 57 per 100,000). There is paucity of such data from this part of Kerala and therefore we have taken up this study to analyse the risk factors and prevalence of *H.pylori* among the people from rural areas of wayanad

AIM- To study the risk factors and incidence of *H. pylori* infection among the people belonging to the rural areas of Wayanad undergoing gastrointestinal endoscopy

OBJECTIVES:

- To study the incidence of *H. pylori* infection among the symptomatic rural area community attending the tertiary care center.
- Association of *H.Pylori* infection in patients with peptic ulcer disease(PUD), gastric cancer(GC) and non-ulcer dyspepsia(NUD)
- The distribution of different types of gastric cancer (GC) in *H.Pylori* infected patients

II. Materials And Methods:

Study Design: Prospective study

Study Location: The study was conducted from a tertiary care center in Wayanad

Study Duration: May 2018 to November 2018.

Sample size: 100 (50 samples from rural residents + 50 control subjects)

Inclusion criteria: All patients from rural background above 18 years of age subjected to gastrointestinal endoscopy in the tertiary care center within the study period of 6 months. 50 patients subjected to gastrointestinal endoscopy and from a non rural background during this study period but in whom *H.pylori* undetected will be considered as the control group

Exclusion criteria: Patients with present or past history of gastric surgery or long term therapy with non -steroidal anti-inflammatory drugs.

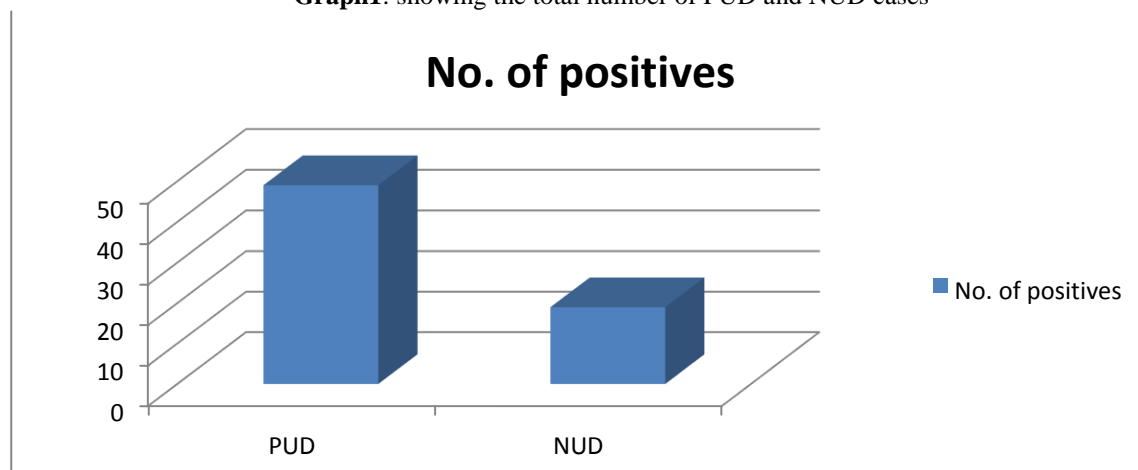
Procedure methodology: Questionnaires were distributed to the patient and rapid urease card test for *H. pylori* infection was performed. From those patients from whom biopsy samples were taken, classification was done into PUD, NUD and GC. Accordingly informed written consent was obtained from all the patients. Demographic details and clinical symptoms were noted. All participants were trained before they fulfilled the questionnaires. Collected information included sex, age, height, weight, individual education level, size of family, annual family income, marital status, self-reported socioeconomic group, food habits and smoking and drinking habits. Health status, medical history, and medications taken in the past 2 months (particularly the use of proton pump inhibitors and antibiotics) were also recorded.

RAPID UREASE TEST : Commercially available rapid urease card test was used(PYLO DRY from HALIFAX RESEARCH LABORATORY KOLKATA, INDIA).

III. Results

Out of the total 121 patients, 68 (56%) were positive for *H. pylori*. Among this only 9 belonged to the rural population. Biopsy samples from 121 patients were obtained during this study period from May 2018 to November 2018. Out of the 121 patients included in the study 49(72%) had Peptic ulcer disease (PUD) and 19(28%) had Non ulcer dyspepsia (NUD) and 0 patients were diagnosed with Gastric cancer. (Graph 1).

Graph1: showing the total number of PUD and NUD cases



Predominant symptoms included Pain abdomen, Heart burn and Burping (Table1 and Graph 2). The predominant symptoms seen in the patients from rural areas were pain abdomen and heart burn.(Table2,Graph3)

Table 1: showing Clinical manifestations of the patients

Clinical manifestation	Frequency	Percent
Pain abdomen	67	99%
Heart burn	60	88%
Burping	59	87%
Haematemesis	3	4%
Anorexia	6	9%
Dyspepsia	18	26%
Dysphagia	11	16%
Anemia	20	29%
Others	10	15%
Vomiting	52	76%
Hiccups	1	1%

Graph 2: showing clinical manifestations

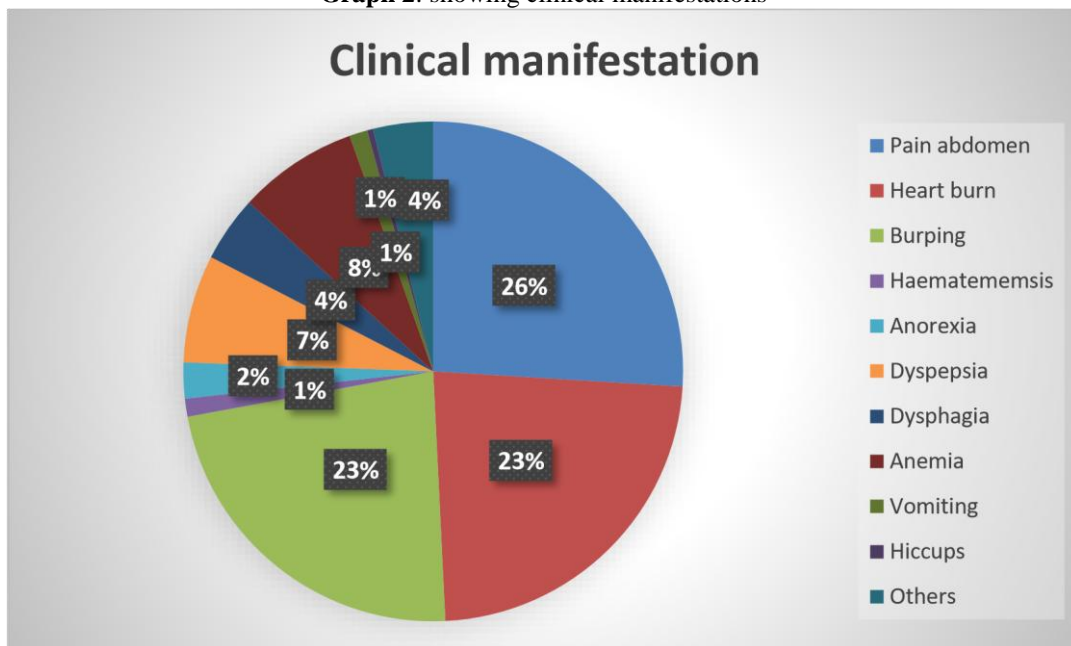
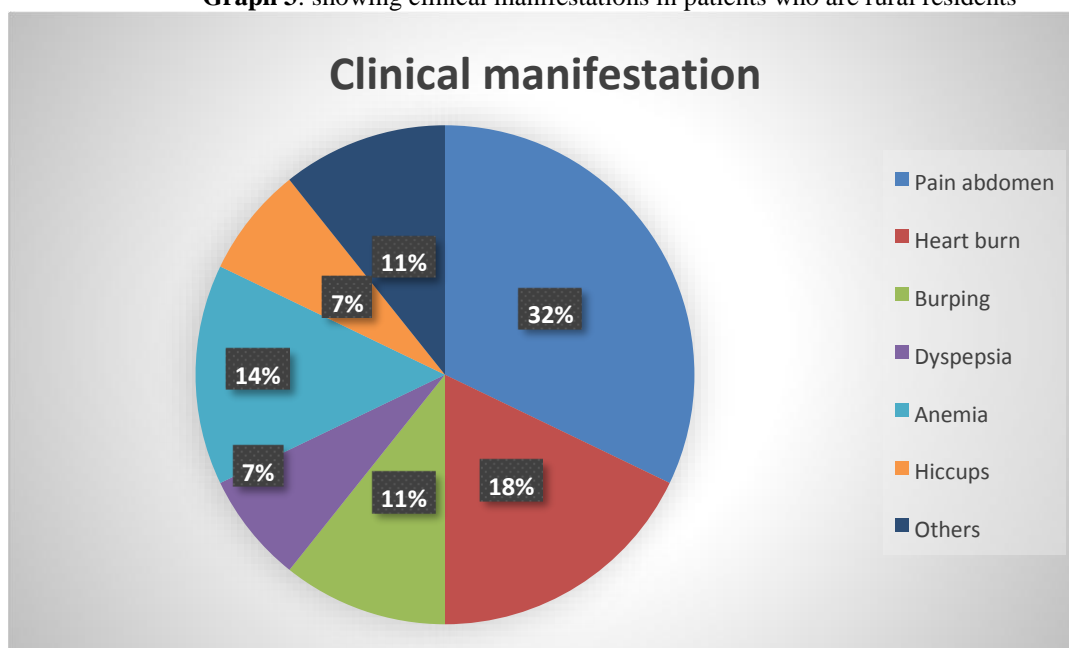


Table:2-showing Clinical manifestations of the positive patients who are rural residents

Clinical manifestation	Frequency	Percent
Pain abdomen	9	100%
Heart burn	5	56%
Burping	3	33%
Dyspepsia	2	22%
Anemia	4	44%
Others	3	33%
Hiccups	2	22%

Graph 3: showing clinical manifestations in patients who are rural residents



Out of the 68 *Helicobacter pylori* positive patients, majority of the patients were in the age group of 31-40. Among the rural residents, the majority of cases were in the same age group of 31-40. (Table 3,4 and graph 4,5) and with the mean age of (38.5) years. Out of 68 samples, 52 samples were collected from males and 16 samples were collected from females and the male : female ratio was 3.23:1.

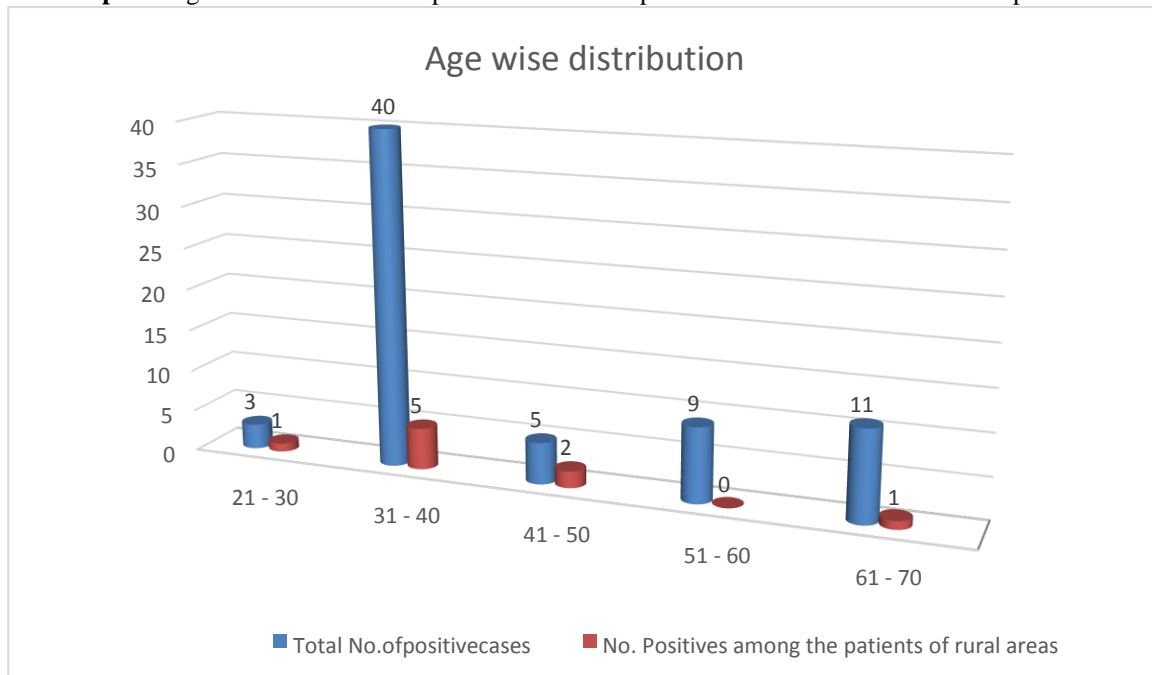
Table 3: Age wise and sex wise *H.pylori* positive cases

Age wise distribution of cases		Sex		Total
		Male	Female	
21-30	Frequency	3	0	3
	Percent	6	0	4
31-40	Frequency	36	4	40
	Percent	69	25	59
41-50	Frequency	3	2	5
	Percent	6	13	7
51-60	Frequency	2	7	9
	Percent	4	44	13
61-70	Frequency	8	3	11
	Percent	15	19	16

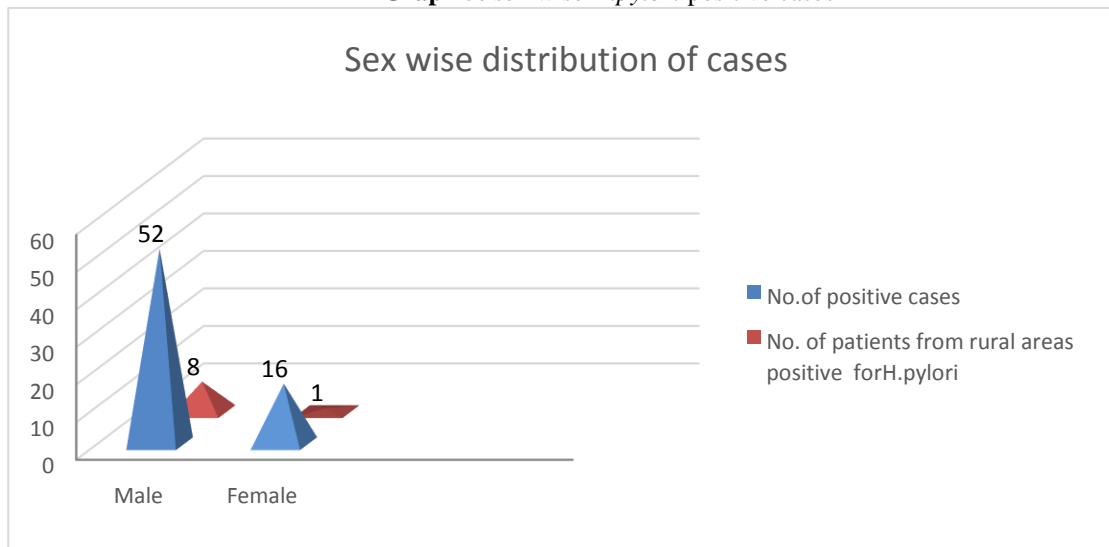
Table 4: Age wise and sex wise *H.pylori* positive cases among the rural residents.

Age wise distribution of cases		Sex		Total
		Male	Female	
21-30	Frequency	1	0	1
	Percent	13	0	11
31-40	Frequency	4	1	5
	Percent	50	100	56
41-50	Frequency	2	0	2
	Percent	25	0	22
51-60	Frequency	0	0	0
	Percent	0	0	0
61-70	Frequency	1	0	1
	Percent	13	0	11

Graph 4: Age wise distribution of positive cases both patients from rural areas and other positive cases



Graph 5: sex wise *H.pylori* positive cases



Out of the total 68 *Helicobacter pylori* positive patients, 49 were PUD patients. Majority of the patients were in the age group of 31-40 years and their mean age was 38.9 ± 11.2 years; (Table 5 and graph 5). Among the positive cases from rural population 6 were PUD cases and all were males.

Table 5: Age wise distribution of *H.pylori* Positive cases in PUD

Age group in years	No. of positive cases in PUD	Percentage
21-30	1	2%
31-40	33	67%
41-50	12	24%
51-60	0	0
61-70	3	6%
Total	49	100%

Graph 5: Sex wise distribution of total cases of PUD

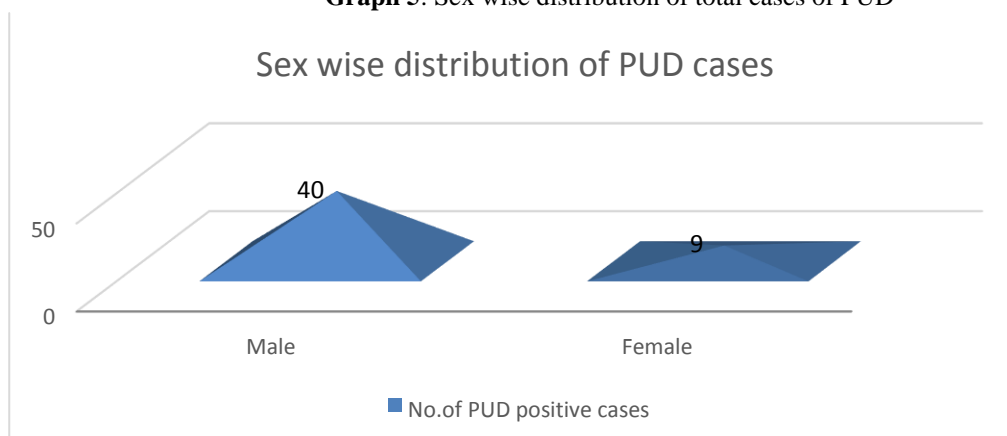


Table 6: Age wise distribution of *H.pylori* Positive cases from rural population with PUD

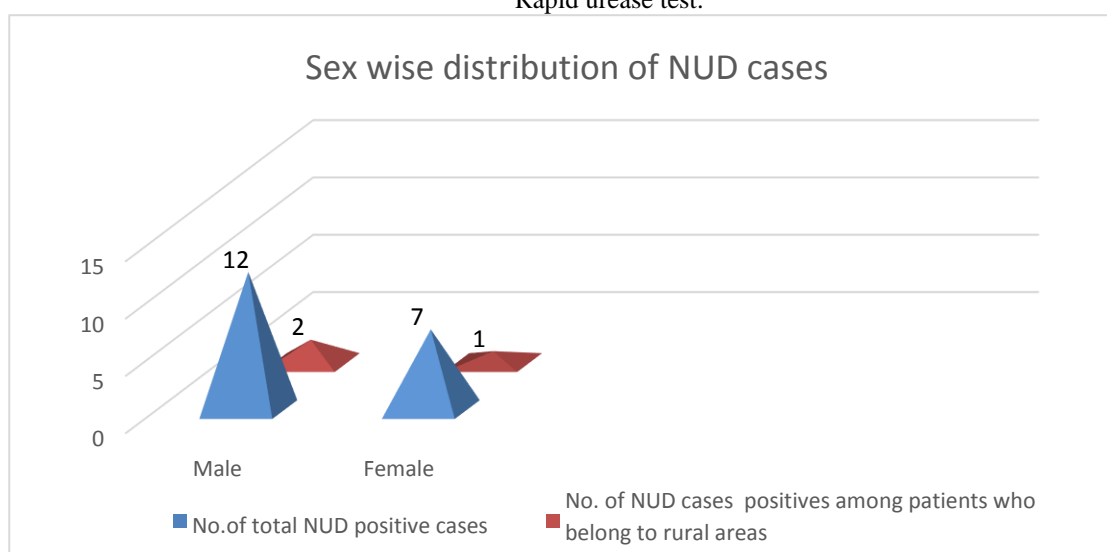
Age group in years	No. of positive cases in PUD	Percentage
21-30	0	0
31-40	4	67%
41-50	2	33%
51-60	0	0
61-70	0	0

Out of 19 NUD patients positive for *Helicobacter pylori*, majority of the patients were in the age group of 31-40 years and their mean age was 39.3 ± 13.3 years; 12 were males and 7 were females (Table 6 and graph 6) and of the 3 NUD cases from rural population, 2 were males and 1 female.

Table 7: Age wise distribution of *H.pylori* Positive cases in NUD

Age group in years	No. of positive cases in NUD	Percentage
21-30	1	5%
31-40	12	63%
41-50	3	16%
51-60	0	0
61-70	3	16%

Graph 6: Sex wise distribution of cases in NUD
Rapid urease test:



Rapid Urease test was positive in 68 (56%) out of 121 patients. RUT was positive in 49(86%) of PUD patients, 19 (40%) of NUD patients and 0 Gastric cancer Patients. (Table 8 and Graph 8).

Table 8: Results of RUT in gastroduodenal diseases

Gastroduodenal diseases	No. of cases	No. of positive cases <i>H.pylori</i>	Percentage
PUD	57	49	86%
NUD	56	19	40%
GC	8	0	0%

Graph 8: showing results of RUT

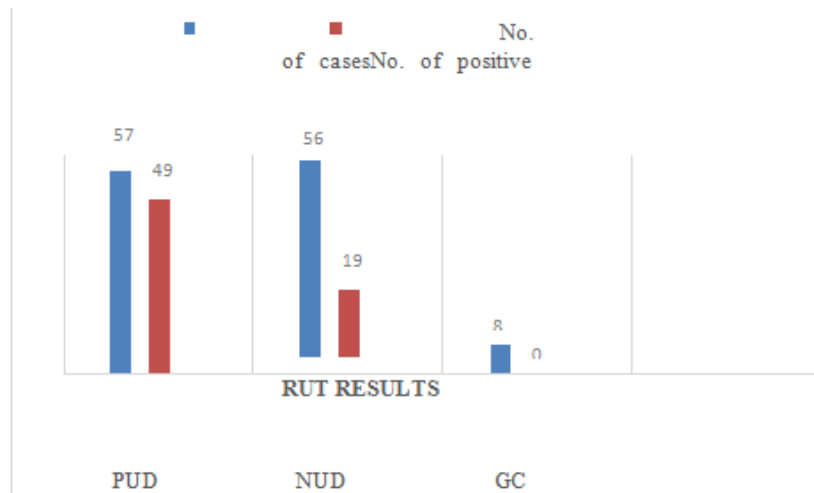


Image: 1-POSITIVE RUT



Image:2-NEGATIVE RUT



On analysis of the patient characteristics, it was found that a great majority of patients had the habit of consumption of non- vegetarian food items, spicy food, smoking and alcoholism. When we considered the patients who are rural residents a 100% *H. pylori* positivity was seen in patients with habits of smoking and alcoholism. But any of this could not be statistically proved as p value was less than 0.05 for all risk factors.

Table 9: showing patient characteristics

Participant characteristics	No. of total positives (N=68)	Percentage	No. of positives from rural population(N=9)	Percentage
Consumption of boiled / filtered drinking water	50	74%	0	0
Consumption of non- vegetarian food items	65	96%	9	100%
Consumption of spicy food	68	100%	9	100%
Consumption of alcohol	46	68%	9	100%
Smoking	48	71%	9	100%
Family history of gastric ulcer/ gastric cancer	16	24%	0	0

IV. Discussion

Table10: Age wise spit up of cases

Authors	21-30	31-40	41-50	51-60	61-70	70 and above	Mean age
Mustapha et al 2006 (S Mustapha, 2006)	21.8%	21.2%	24.9%	13.6%	8.2%	1.2%	38.7
Bojuwoye et al 2016 (Matthew O Bojuwoye, 2016)	13.5%	16.2%	19%	26.3%	14.9%	8.8%	49.5
Adlekha S et al 2013	58.6%	65.2%	61.1%	62.6%	58.5%	65.9%	-
Ana Elizabete Silva et al (2018)	11.1	19.5	23.9	21.9	21	-	47
Present study	2.94%	66.17%	22.05%	0%	8.82%	-	41.6

In the current study, maximum numbers of patients were in the age group of 31-40 years and mean age being 38.5 years. A study by Abebaw et al in 2014 (Wubejig Abebaw, 2014) and Mustapha et al in 2006 (S Mustapha, 2006) found more number of patients belonging to the age group of 31- 40 and 41-50 years respectively as given in the table No.10 . In contradiction Mustapha et al (S Mustapha, 2006) noted *H.pylori* infection in the age group of 60 – 69 years.

Majority of the PUD and NUD *H.pyori* positives by RUT and HPE were in the age group of 3140 years and GC in 51-60 years. However we did not find any statistical significance among the various age groups.

Table11: Gender wise break down of *H.pylori* infection

Studies	Male	Female	Ratio
Mustapha et al 2006 (S Mustapha, 2006)	51.8%	48.2%	1.07:1
Abebaw et al 2014 (Wubejig Abebaw, 2014)	77.8%	68.1%	1.14:1
Prasaad et al 2006 (Priavadhana RajanPrasaad, 2016)	55%	45%	1.22:1
Bojuwoye et al 2016 (Matthew O Bojuwoye, 2016)	46%	54%	0.85:1
Habib et al 2016 (Abdul MusaweerHabib, 2016)	61.8%	71.4%	0.86:1
Ana Elizabete Silva et al(2018)	34.3	65.7	0.52:1
Present study	76.4. %	23.6%	3.23:1

Of the 121 biopsy samples obtained in our study, males were predominating over females and was similar to previous studies done by Mustapha et al (S Mustapha, 2006), Abebaw et al (Wubejig Abebaw, 2014) and Prasaad et al (PriavadhanaRajanPrasaad, 2016) as given in the table (11). In divergence Bojuwoye et al (Matthew O Bojuwoye, 2016) and Habib et al (Abdul MusaweerHabib, 2016) noticed female predominance. The prevalence of *H.pylori* infection in our study was high in males compared to females by RUT male to female ratio was 3.2:1.

We studied various clinical manifestations described along with *H.pylori*infection in adults like pain abdomen, heart burn, burping, dyspepsia, anorexia, vomiting, anaemia, hematemesis and hiccups. The topmost recurring symptom in our study group was pain abdomen detected in 99% of study subjects followed by heart burn, burping, vomiting, dyspepsia and anemia. Akin to our study, Misra et al and Rajesh Kumar et al recorded pain abdomen as the predominating symptoms in 59% and 54% respectively (SurgCapt RN Misra, 2006), (Rajesh Kumar, 2006). In divergence, dyspepsia (67.4%) was the most common symptoms encountered by Srinivasan et al followed by pain abdomen (13.8%), heartburn (5.4%), hematemesis (4.4%), dysphagia (5.6%), anaemia (2.7%) and CLD (0.6%) (ShubaSrinivasan, 2016). Pain abdomen was the most common presenting symptom among the PUD, NUD and GC patients in our study.

Various diagnostic methods like invasive and non-invasive methods are available to diagnose *H.pylori* infection. In the present study, invasive method like RUT was being used to diagnose *H.pylori* infection.

Table12: Positivity rate of *H.pylori* infection by Rapid urease test

Authors	Percentage
Parimala et al 2014 (Parimala TV, 2014)	96.72%
Sahani et al 2015 (HarmeetSahni*, 2015)	48%
Calik et al 2016 (ZekiCalik, 2016)	87.6%
Aryee et al 2016 (N. A. Adu-Aryee, 2016)	51.3

Roy et al 2016 (Asitava Deb Roy, 2016)	66.6%
Mahmoud et al 2016 (HasanSedeek Mahmoud, 2016)	92.9%
Nevoa et al 2017 (Nevoa, et al., 2017)	17.6%
Amin TalebiBezminAbadi et al(2018)	85%
Present study	56%

An indirect method of testing *H.pylori* infection is RUT and is based on the availability of urease enzyme in or on the gastric mucosa. Unlike serology, RUT detects active infection (1). Our study accounts for about 56% positivity by rapid urease test which was in concordance to the studies by Calik et al in 2016 (ZekiCalik, 2016) and Roy et al 2016 (Asitava Deb Roy, 2016). Discordant results were seen in studies carried out by Sahani et al in 2015 (HarmeetSahni*, 2015), Roy et al in 2016 (Asitava Deb Roy, 2016) and Nevoa et al in 2017 (Nevoa, et al., 2017) as given in the table (12).

Of the 57 PUD cases in the present study, 49(86%) were positive for Rapid urease test. Divergent to our RUT result, in 2015, a study by Calik et al noticed 93.75% positivity of rapid urease test with ulcers diagnosed by endoscopy (ZekiCalik, 2016) .

In this study, NUD cases were considered as those patients who were presenting with dyspeptic symptoms and endoscopic findings were normal. Nineteen (40%) were positive by RUT among the 56 cases of non-ulcer dyspepsia in this study. In contradiction a study by Shrestha et al in 2016 acknowledged NUD as those cases that were negative for peptic ulcers and positive for gastritis and duodenitis based on endoscopy. In their study RUT were positive in 62% (127/205) of gastritis and 86.7% (13/15) of duodenitis (RishabShrestha, 2016).

V. Conclusion

Our study shows that the prevalence of *H. pylori* among our sample population as high and that low income, family history of gastric cancer, clinical symptoms of pain abdomen and flatulence/bloating were risk factors of *H. pylori* infection in this population. In our study, the presence of *Helicobacter pylori* infection was as high as 56% in all suspected cases of gastroduodenal diseases. All the age groups were almost equally infected with *H.pylori*, indicating infection was acquired earlier, as the age advances the infection in the patients leads to gastroduodenal diseases and finally to cancer. Therefore it is very important to identify *H.pylori* infection in the beginning and to treat them as early as possible. *H.pylori* was significantly associated with PUD (72%) and NUD (28%). In the present study treatment for *H.pylori* infection was successful in 92%. Smoking, alcoholism and consumption of non- vegetarian food items were the predominant risk factors observed in both categories of study population who were *H. pylori* positive. A longer duration large scale population study is required to establish the facts observed during this study.

When we consider the reality, there are many more patients with APD who may be colonized with *H.pylori*. These patients are at risk of developing PUD. Hence non-invasive techniques like urea breath test and PCR for *H.pylori* in the stool sample should be used in larger number of patients infected with *H.pylori* and if they are treated, it is possible to prevent many PUD and GC cases. In resource limited settings, RUT can be used as a key diagnostic technique.

VI. Summary

This study was aimed to study the incidence of *Helicobacter pylori* in the rural population of Wayanad, Kerala. Out of the 121 cases, 68 (56%) were positive for *H.pylori* . The current investigation was carried out in a tertiary care centre of Wayanad from July 2018 – September 2018.

All the samples were collected from the patients who underwent upper gastrointestinal endoscopy. Based on endoscopic findings the collected samples were classified as peptic ulcer disease, non-ulcer dyspepsia and gastric cancer.

In this study, 68 (56%) were positive for *H. pylori* and in this 49 (86%) had Peptic ulcer disease (PUD), 19 (40%) had Non ulcer dyspepsia (NUD) and 0 Gastric cancer cases. The predominant symptoms included pain abdomen and heart burn. Smoking, alcoholism and a non- vegetarian diet were prominent in the total *H. pylori* positive cases. But a relation could not be established statistically as the sample size was very small.

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