

A study on the prevalence of helicobacter pylori infection by rapid urease test in patients undergoing upper gastro intestinal endoscopy for dyspepsia in a tertiary care hospital of Southern Bihar

Sushil Kumar R Singh¹, Abhishek Kamendu², Amit Kishor^{3*}

¹ PG Resident, Department of General Medicine, Narayan Medical College and Hospital, Sasaram, Bihar, India

² Associate Professor, Department of General Medicine, Narayan Medical College and Hospital, Sasaram, Bihar, India

³ Assistant Professor, Department of General Medicine, Narayan Medical College and Hospital, Sasaram, Bihar, India

Received: 19-06-2020 / Revised: 23-07-2020 / Accepted: 28-07-2020

Abstract

Background: The epidemiology of H.pylori is poorly understood and it is a major health issue in developing countries such as India. There is a high incidence of morbidity and mortality due to complications of H.pylori infection. Prevalence of H.pylori differs from country to country, as well as from region to region in the same country. **Methods:** This observational study was carried out in an outpatient department in a tertiary care hospital of Southern Bihar, and included 163 patients who presented with dyspepsia and fulfilled the criteria of the study and were willing to undergo upper gastrointestinal endoscopy. **Result:** There is a high prevalence of H.pylori in southern Bihar with significant incidence in the male population and most commonly associated with dyspeptic symptoms. Increased incidence of gastritis was found in RUT positive patients on endoscopic examination.

Keywords: H.pylori, Dyspepsia, Rapid urease test(RUT), Upper gastrointestinal endoscopy (UGIE).

This is an Open Access article that uses a fund-ing model which does not charge readers or their institutions for access and distributed under the terms of the Creative Commons Attribution License (<http://creativecommons.org/licenses/by/4.0>) and the Budapest Open Access Initiative (<http://www.budapestopenaccessinitiative.org/read>), which permit unrestricted use, distribution, and reproduction in any medium, provided the original work is properly credited.

Introduction

The first isolation of *Helicobacter pylori* in 1982 by Marshall and Warren had ushered in a new era in the field of gastric microbiology[1]. By 1984, it had become clear that *H. pylori* infection was strongly associated with the presence of inflammation in the gastric mucosa (chronic superficial gastritis), and especially with polymorphonuclear cell infiltration (chronic active gastritis)[1]. *H. pylori* organisms are spiral, microaerophilic, gram-negative bacteria which demonstrate blunt rounded ends in gastric biopsy specimens.

*Correspondence

Dr. Amit Kishor

Assistant. Professor, Department of General Medicine, Narayan Medical College and Hospital, Sasaram, Bihar, India.

H. pylori are approx. 2.5 to 5.0 µm long and 0.5 to 1.0 µm wide; and there are four to six unipolar sheathed flagella, which are essential for motility of H.pylori[1]. *Helicobacter pylori* is found in half the population of the world. Its prevalence has been found to be highly variable in relation to geography, ethnicity, age, and socioeconomic factors with high prevalence in developing countries and lower in the developed world. There may be similarly wide variations in the prevalence between more affluent urban populations and rural populations[2]. Transmission of *Helicobacter pylori* is largely by the oral-oral or fecal-oral routes[3,5]. A lack of proper sanitation, unavailability of safe drinking water, and lack of other basic hygiene, as well as poor diets and overcrowding, this all factors plays important role in determining the overall prevalence of infection[2]. Most cases of gastric cancers are sporadic and is etiologically related with *H. pylori* infection[4]. Gastric cancer remains a global

health problem and is the third leading cause of cancer-related death worldwide[4].

Upper gastrointestinal endoscopy is usually performed to diagnose *H. pylori* and its associated disease which are strongly related to gastroduodenal diseases including chronic active gastritis, peptic ulcer diseases, atrophic gastritis, mucosa associated lymphoid tissue (MALT) lymphoma and noncardia gastric cancer[5,6]. Endoscopy is also routinely used procedure to obtain specimens, usually gastric mucosa for biopsy, for further studies or other invasive studies, including rapid urease test, histology, molecular studies and

culture[6,7]. Antrum is a preferential biopsy site for detecting *H. pylori* infection in most circumstances [6]. Currently, the diagnosis of *H. pylori* infection is carried out by both invasive (for example: endoscopy and endoscopic biopsy for histopathology, culture, and rapid urease test) and non-invasive (for example: urea breath tests, stool antigen test, and serological tests) methods. Rapid urease test (RUT) is one of the most useful invasive test for the diagnosis of *H. pylori* because it is inexpensive, easy to perform and gives quick results with sensitivity of >98% and specificity of 99% [2,6]

Table 1: Tests for H.Pylori Infection[2]

Tests with endoscopy	Rapid urease test (RUT)
	Histology
	Culture
	Fluorescence in situ hybridization (FISH)
	Molecular approach: polymerase chain reaction (PCR)
Tests without endoscopy	Stool antigen test (SAT)
	Whole blood serology
	C ¹³ urea breath test

Upper gastrointestinal endoscopy provides the most sensitive and specific approach for examining the upper GI tract. In addition to direct visualization of the mucosa, endoscopy facilitates photographic documentation of a mucosal defect and tissue biopsy to rule out malignancy or *H. pylori* [8]. Dyspepsia is a symptom which originates in the gastroduodenal region, with individuals suffering from dyspepsia may experience postprandial fullness, early satiety, bloating, belching and anorexia, and predominantly complain of epigastric burning or pain[9].

Aims and objectives

- To determine the prevalence of *Helicobacter pylori* infection by Rapid Urease Test in patients undergoing Upper Gastro Intestinal Endoscopy for Dyspepsia.
- Relationship of *Helicobacter pylori* infection with different upper gastro intestinal disorders.

Materials and methods

In this observational study conducted on 163 patients at a Tertiary care hospital in Southern Bihar, patients presenting at Out-patient department who presented with complaints of dyspepsia and above the age of 18 years underwent Upper gastro intestinal endoscopy after taking informed consent from each patient. All patients with significant co-morbid conditions (CKD,

Malignancy, Severe Anemia, CLD, CCF) and with recent history of use of NSAIDs, PPI, Bismuth Compounds in past 1 month, all such patients were excluded out of this study. Diagnosis of *Helicobacter Pylori* infection was determined with the help of Rapid Urease Test (RUT) and endoscopic evidence of presence of any abnormalities of the gastric mucosa such as inflammation, ulcer, atrophy, etc. was recorded and if present biopsy specimen was taken and sent for histopathological study.

Results

During the study period a total of 163 patients underwent diagnostic upper gastrointestinal endoscopy who fulfilled the study criteria, which consisted of 114 male and 49 female patients, in this a total of 106 patients (65.0%) were found to be positive for *H. pylori* by RUT which included 68 male (64.15%) and 38 female (35.84%) patients. Likewise a total of 57 patients (35.0%) were found to be negative for *H. pylori* by RUT; which included 46 male (80.7%) and 11 female (19.3%) patients, the calculated p value is 0.027; which is statistically significant as depicted in Figure 1 and Table 2. The male to female ratio was found to be 2.3:1 and the mean age of the patient was found to be 40 years. The overall incidence of *H. pylori* was found to be 65% in the study conducted as been depicted in Figure 2.

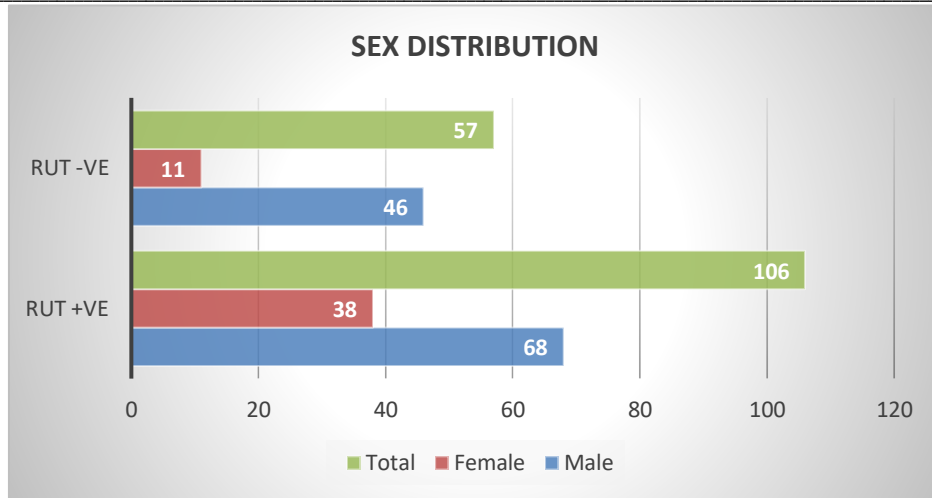


Fig 1: Sex distribution
Chi square: 4.829, p: 0.027

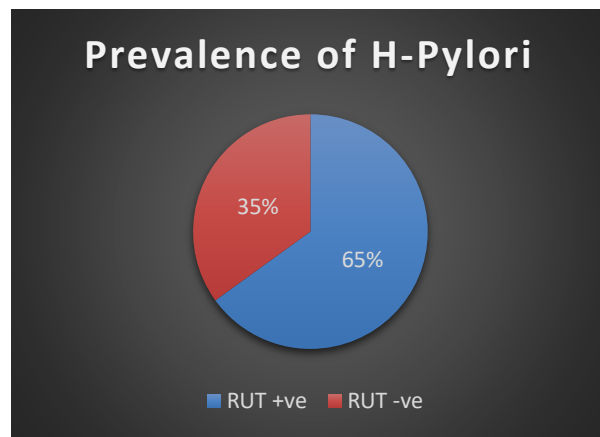


Fig 2: Prevalence of H-Pylori

Sex Distribution

Table 2:Sex distribution

H. Pylori	Male	Female	Total
RUT +Ve	68 (64.15%)	38(35.85%)	106 (65%)
RUT -Ve	46 (80.7%)	11(19.3%)	57 (35%)
TOTAL	114(70%)	49(30%)	163

Chi square: 4.829, p: 0.027

There was high incidence of H-pylori infection in dyspeptic patients was found to be in the age group of 20-30 years of age with almost similar incidence as well in the age group of 31- 40 and 41-50 years of age

group, with decreasing incidence of H.pylori in the age group of above 50 years of age, indicating decrease trend of incidence of H.pylori as age progresses, and is found to be statistically significant with p value of

0.0242 as depicted in Table 3 and Figure 3. Endoscopic findings as shown in Figure 4 and Table 4, revealed incidence of gastritis in 42 (79.25%) of patients who tested RUT +ve and only 11 (20.75%) patients in RUT -ve. There was high incidence of antral ulcer 5 (62.5%) patients and in 3(37.5%) patients of RUT -ve patients. There was increased incidence of Duodenal ulcer 12(80.0%) patients who tested RUT +ve as only 3

(20.0%) patients in RUT -ve patients. Growth was found equally in 4 (50.0%) patients in RUT +ve patients and 4 (50.0%) patients in RUT -ve patients. The incidence of non-ulcer dyspepsia was 43(54.43%) patients in RUT +ve patients and 36(45.57%) patients in the RUT-ve group. The findings were found to statistically significant with p value of 0.02762.

Table 3:Age Distribution

Age group	<i>H.pylori</i>		Total
	Rut +ve	Rut -ve	
20-30	34(72.34%)	13 (27.66%)	47
31-40	28 (71.8%)	11 (28.2%)	39
41-50	25 (73.53%)	9 (26.47%)	34
51-60	10(45.45%)	12 (54.55%)	22
61-70	9(42.86%)	12 (57.14%)	21
Total	106	57	163

Chi square: 11.216, p: 0.0242

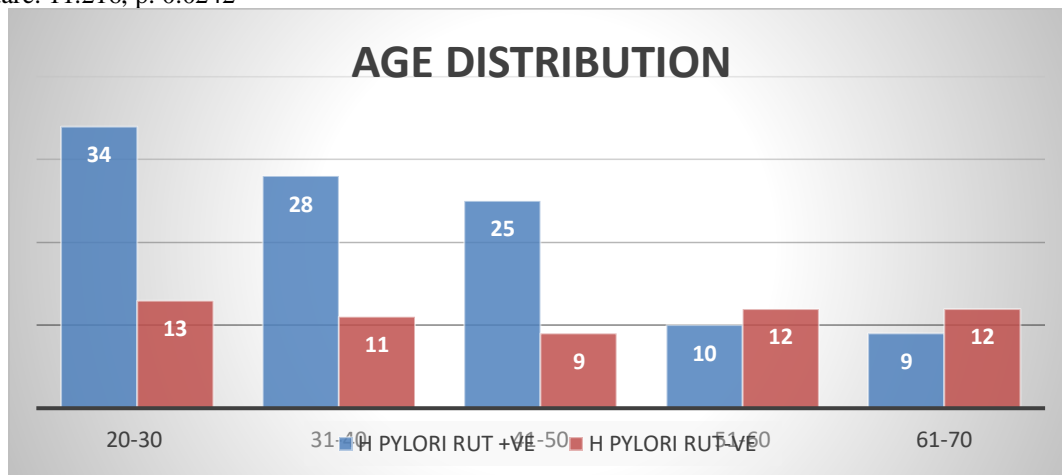


Fig 3: Age Distribution

Endoscopic findings

Table 4:Endoscopic findings

Endoscopic findings	<i>H.pylori</i>		Total
	Rut +ve	Rut -ve	
Gastritis	42 (79.25%)	11 (20.75%)	53
Antral ulcer	5 (62.5%)	3 (37.5%)	8
Duodenal ulcer	12 (80.0%)	3 (20.0%)	15
Growth	4 (50.0%)	4 (50.0%)	8
Nud	43 (54.43%)	36 (45.57%)	79
Total	106	57	163

Chi square, 10.908, p: 0.02762

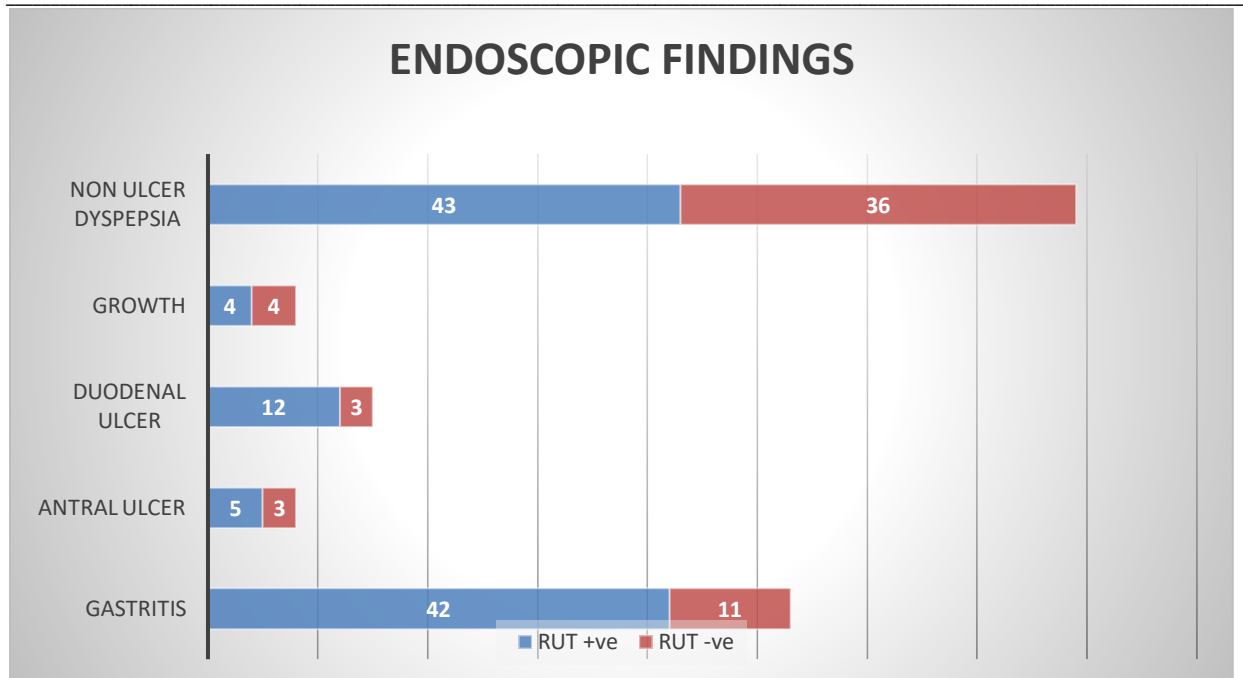


Fig 4: Endoscopic Findings

Chi square:10.908, p: 0.02762

Discussion

Helicobacter pylori has been found in the stomach of humans in all over the world[1]. Also it is one of the most common cause that causes dyspepsia and which leads to Gastritis, Peptic ulcer Disease, Malignant growth, etc. A wide body of evidence has now indicated that once acquired, H.pylori persists usually for life unless it is been eradicated by antimicrobial therapy¹ and also its eradication reduces the prevalence of gastric carcinoma[3]. H.pylori infection is dependent upon many variables such as age, sex, socioeconomic status, dietary habits, hygiene conditions, overcrowding, genetic and immunologic factors, etc[2,14]. In a developing country like India where the resources are limited and limited access to upper gastrointestinal endoscopy for evaluation of such patients with dyspepsia being one of the most common frequent complaint it is important to know the prevalence of H.pylori infection in such patients using endoscopy and RUT.

In this present study, we found a higher seroprevalence of H.pylori with a prevalence of 65% in concordance with the studies done by Puneet Kumar Agarwal et al[12], S Adlekha et al.[13], AmolRajendra Samarth et al.[14]; with a higher incidence in the male gender which is in concordance with the study done by Dr.

Moxda S et al.[10], but in contrast to other studies by Puneet Kumar Agarwal et al[12], S Adlekha et al [13].Which did not show significant difference in incidence with gender. In this study age distribution of H.pylori infection showed increased incidence in the age group of 20-50 years of age with a decreasing trend in incidence after the age of 50 years, in concordance with the studies done by Dr. Moxda S et al[10], Bandana Thakuria et al.[11], AmolRajendra Samarth et al.[14] and is found to be in contrast to the study done by Puneet Kumar Agarwal et al.[12] which did not show any trend in increase or decrease of incidence with age and according to the study by S Adlekha et al[13] which showed higher incidence in the age group of 80-90 years of age.

The prevalence of H.pylori and its associated complaints of dyspepsia is found to have a higher incidence as in concordance with the studies done by Dr. Moxda S et al[10], Puneet Kumar Agarwal et al[12] S Adlekha et al.[13]. Endoscopic findings showed higher incidence of gastritis in H.pylori infected individuals which is in concordance with the other studies done by Dr. Moxda S et al[10], Puneet Kumar Agarwal et al[12], S Adlekha et al.[13], AmolRajendra Samarth et al[14]

Conclusions

Helicobacter Pylori infection is frequently associated with complaints of dyspepsia, the prevalence of *H.pylori* is more in the male population as compared to the female population with the prevalence found to be more in the age group of 18-50 years of age. Endoscopic findings depict that it is most frequently associated with complications including gastritis which is the most common presentation followed by peptic ulcer disease involving the duodenum preferably. Non ulcer dyspepsia is also a frequent finding on endoscopy in RUT +ve patients.

References

1. Bruce E. Dunn, Hartley Cohen, And Martin J. Blaser; *Clinical Microbiology Reviews*,1997; 0893:720–741.
2. H.Hunt, Chair (Canada); S.D. Xiao (China); F. Megraud (France); et.al, *Helicobacter Pylori* in Developing Countries.World Gastroenterology Organisation Global Guideline,JGastrointestin Liver Dis; September 2011;20(3):299-304.
3. JiroWatari, Nancy Chen, Peter S Amenta; *Helicobacter pylori* associated chronic gastritis, clinical syndromes, precancerous lesions, and pathogenesis of gastric cancer development. *World J Gastroenterol*. 2014; 20 (18):5461.
4. Maya Balakrishnan, Rollin George, Ashish Sharma, and David Y. Graham; *Changing Trends in Stomach Cancer Throughout the World*; *Curr Gastroenterol Rep*. 2017 Aug; 19(8): 36.
5. Ansari S, Yamaoka Y. Current understanding and management of *Helicobacter pylori* infection: an updated appraisal. *F1000Res*. 2018;7:F1000 Faculty Rev-721.
6. Yao-Kuang Wang, Fu-Chen Kuo, Chung-Jung Liu, et.al; *Diagnosis of Helicobacter pylori* infection: Current options and Developments; *World J Gastroenterol*. 2015; 21(40): 11221–11235.
7. S Diaconu, A Predescu, A Moldoveanu, et.al; *Helicobacter pylori* infection: old and new; *J Med Life*. 2017; 10(2): 112–117.
8. John Del Valle, *Peptic Ulcer Disease and Related Disorders*, Chapter 317,Harrison's Principles of Internal Medicine, 20th Textbook Edition, pg 2228.
9. William L. Hasler , *Nausea, Vomiting, and Indigestion*, Chapter 41,Harrison's Principles of Internal Medicine, 20th Textbook Edition, pg 253.
10. Dr. Moxda S. Patel, Dr. Alpa A. Shah, Dr. Himanshu P. Patel, Dr. Deepak S. Joshi. Study of Incidence of *Helicobacter* Organisms in Cases of Gastritis. *Gujarat Medical Journal* 2013; 68(2):1.
11. Thakuria B, Barkataki D, Hazarika NK et. al. A study on the seroprevalence of *helicobacter pylori* in patients with gastrointestinal diseases attending a tertiary care center. *Int J Health Sci Res*. 2015; 5(7):133-139.
12. Puneet Kumar Agarwal, MayankBadkur, Richa Agarwal, and SeemaPatel. Prevalence of *Helicobacter pylori* infection in upper gastrointestinal tract disorders (dyspepsia) patients visiting outpatient department of a hospital of North India. *J Family Med Prim Care*. 2018 May-Jun; 7(3): 577–580.
13. S Adlekha, T Chadha, P Krishnan, and B Sumangala; Prevalence of *Helicobacter Pylori* Infection Among Patients Undergoing Upper Gastrointestinal Endoscopy in a Medical College Hospital in Kerala, India. *Ann Med Health Sci Res*. 2013 Oct-Dec; 3(4): 559–563.
14. Amol Rajendra Samarth, BhumitRamjibhai Patel. Prevalence of oral *Helicobacter pylori* infection in dyspeptic patients with gastric *Helicobacter pylori* infection. *JMSCR* 2017; 5(9); 28129-28134.

Source of Support:Nil

Conflict of Interest: Nil