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ORIGINAL ARTICLE

Rate of active *Helicobacter pylori* infection among symptomatic patients of Pakistan

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Abstract

Only few epidemiological studies have examined the rate of active *H. pylori* infection in the symptomatic population in Pakistan. This retrospective study presents the laboratory data collected during the past 13 years (2002 to 2015) from 2315 symptomatic patients referred to the BreathMAT Lab, Nuclear Medicine, Oncology and Radiotherapy Institute, Islamabad for the diagnosis of active *H. pylori* infection using the ^{13}C Urea Breath Test. Rate of infection and its association with gender and age were evaluated. The overall rate of active *H. pylori* infection was 49.5% and there was no association of this rate of infection with gender. An increase in rate of infection was observed with increasing age with significant difference ($p < 0.05$). The patients that tested negative for this infection might be having symptoms due to stress and indiscriminate use of non-steroidal anti-inflammatory drugs (NSAIDs) in this community. The fact that half of the symptomatic patients were negative needs to be highlighted and further suggests that symptomatic patients should be tested by the ^{13}C UBT before prescribing antibiotic treatment for *H. pylori* eradication. In addition, there is a need to educate this community about the harmful and side effects of self medication and overuse of NSAIDs.

Keywords: H. pylori, ^{13}C UBT, rate, gender, age

INTRODUCTION

Helicobacter (*H.*) *pylori* infects the gastric mucosa of humans and has an important role in the development of gastrointestinal diseases from chronic gastritis to gastric carcinoma.[1] The rate of *H.* infection varies widely between countries and these percentages are higher in developing countries including Pakistan, where this infection is common with > 70% of infection rate.[2]

The *H. pylori*'s key role in the pathogenesis of gastrointestinal diseases emphasizes the importance of detection of infection caused by this bacterium. Several methods have been used to detect this bacterium after the discovery of organism in 1982. These methods are either invasive, which require biopsy through endoscopy i.e., rapid urease test, culture, histology and polymerase chain reaction on biopsy or not truly noninvasive such as serology or noninvasive including stool antigen test and ^{13}C urea breath test (^{13}C UBT). Among all the tests used for the diagnosis of *H. pylori* infection, ^{13}C UBT is a more specific and sensitive test[3] with the benefit of evaluating the gastric mucosa as a whole and is a highly reliable test for screening and epidemiological purposes.[4] Therefore, the purpose of this report is to show the rate of active *H. pylori* infection using ^{13}C UBT in a large number of symptomatic patients in Pakistan. Furthermore, we also analyzed the association of rate of *H. pylori* infection with age and gender.

MATERIALS AND METHODS

The dyspeptic patients (having symptoms of abdominal pain, acid reflux, diarrhoea, vomiting, and bloating) were referred by physicians from all over the Pakistan to the BreathMAT Lab, Nuclear Medicine, Oncology and Radiotherapy Institute (NORI), Islamabad for the diagnosis of active *H. pylori* infection from July 2002 to June 2015. Patients who were using proton pump inhibitors or histamine antagonist or antibiotics for at least

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4 weeks prior to the ^{13}C UBT were excluded. Data related to age and gender were noted from each patient at the time of test.

The breath test was performed on 2315 symptomatic patients using ^{13}C Urea (99.9% atom). The breath samples were analyzed for $^{13}CO_2/^{12}CO_2$ ratio on BreathMAT Plus Mass Spectrometer (Thermo, Finnigan, Germany) at BreathMAT Lab, NORI or on Delta V Plus Mass Spectrometer (Thermo Scientific, USA) at Delta V Mass Spectrometer Lab, Pakistan Institute of Nuclear Science and Technology (PINSTECH), Islamabad. Patients with a change of more than 3% in delta ^{13}C value over baseline were considered positive for active *H. pylori* infection. The excess delta $^{13}CO_2$ excretion or ^{13}C UBT values are expressed as mean with a range.

Pearson's chi square test and Spearman's rank correlation were used to test significance between active *H. pylori* infection and study variables including age and gender. Statistical analysis was performed using the SPSS 20.0 statistical software program (SPSS Inc, Chicago, USA). All *p* values were two sided and less than 0.05 was considered as a significant at 95% confidence interval (CI).

Clearance to conduct this study was granted by the Ethical Review Committee of the PINSTECH, Islamabad.

RESULTS

The overall rate of active *H. pylori* infection among symptomatic patients was 49.5% (1147/2315) using the ^{13}C UBT at BreathMAT Lab, NORI, Islamabad. The rate of infection over the period of 13 years was 64.7-49.0% from 2002-2015 (Fig. 1). The *H. pylori* infected patients had symptoms of abdominal pain (76.0%), acid reflux (59.9%), diarrhea (31.0%), vomiting (50.9%) and bloating (56.1%). There was non-significant difference between *H. pylori* infection and gender ($p = 0.124$, $\rho = 0.032$, OR = 1.137, 95% CI = 0.965-1.340) with relatively high infection rate in male patients (51.0%, 658/1291) as compared to female patients (47.2%, 489/1024).

The overall *H. pylori* infectivity was found in the age range 3 to 90 years with a mean age of 36.73 ± 15.95 (males: 3-90 years, 37.87 ± 15.67 and females: 3-85 years, 37.48 ± 15.77). Further, we categorized all the study patients into three age groups to calculate the rate of infection for each specific group. The highest rate of infection in these patients was observed in age group 45+ (380/716, 53.1%) and lowest was found in age group 3-18 (120/266, 45.1%) with significant difference ($p < 0.05$). Each age group was further divided on the basis of gender and it was observed that the rate of infection was similar in age groups: 3-18 years (45.8% vs. 44.4%) and 45+ years (53.7% vs. 52.3%) whereas male patients in 19-44 age group had a relatively high rate of active *H. pylori* infection than female patients (50.5% vs. 45.9%), (Table 1).

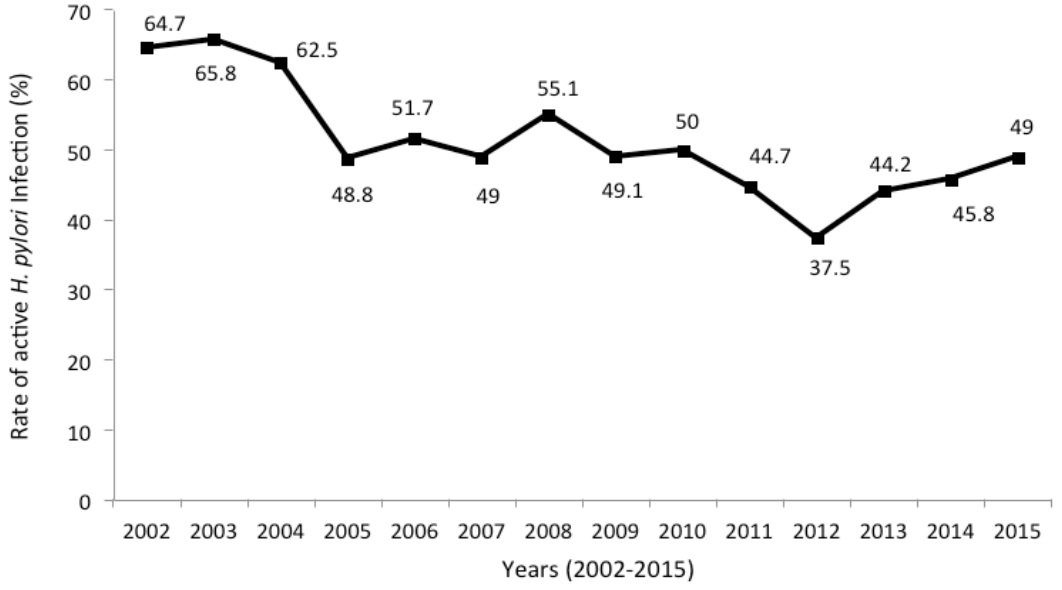

FIG. 1: Year wise distribution of rate of active *H. pylori* infection from 2002-2015

TABLE 1: Rates of active *H. pylori* infection among symptomatic patients with respect to gender and age

Age (years)	Total patients	Status of active *H. pylori* infection % (n)
Overall		
3-18	266	45.1 (120)
19-44	1333	48.5 (647)
45+	716	53.1 (380)
Male		
3-18	142	45.8 (65)
19-44	754	50.5 (381)
45+	395	53.7 (212)
Female		
3-18	124	44.4 (55)
19-44	579	45.9 (266)
45+	321	52.3 (168)

DISCUSSION

The difference in the rate of *H. pylori* infection between diverse populations in the world[5] suggests that different parameters such as socio-economics/demographics of patients and environmental conditions play an important role in the acquisition of *H. pylori* infection. The percentage of active *H. pylori* infection in the present study from the Northern region of Pakistan is in accordance with our previous investigation conducted on dyspeptic patients in the Southern region of Pakistan (Karachi), that showed 45.0% of prevalence.[6] Whereas, in another previous study, we reported a high rate of active *H. pylori* infection (74.4%) in asymptomatic subjects in a rural area of Islamabad.[7] A lower rate of *H. pylori* infection in symptomatic patients as compared with normal asymptomatic population is suggestive of other factors sharing equal weightage with *H. pylori* in causing dyspeptic symptoms. The probable other factors, as suggested by Levenstein *et al*[8], could be stress, socio-economic status, smoking and indiscriminate use of non-steroidal anti-inflammatory drugs (NSAIDs) by symptomatic patients specially in this community. These factors might be the cause of dyspeptic symptoms among half of these patients and not the presence of active *H. pylori* infection.

Gastroenterologists of this community have the view that there is no need for detection of *H. pylori* including ^{13}C UBT as our population already has a high infection rate (personal comment). In this study only half of the symptomatic patients were positive for active *H. pylori* infection. This warrants patients presenting with gastric symptoms be tested with ^{13}C UBT before prescribing any antibiotics as half of them do not have this infection, meaning that their symptoms are due to some other factors.

There are a number of studies reporting higher rate of *H. pylori* infection either in males or females but it is generally concluded (including this report) that there is no association between the rate of *H. pylori* infection and gender.[9] There was an increase in the rate of active *H. pylori* infection with increasing age with significant difference in this study and this may be due to weakened immune responses in elderly as compared with children who are better able to spontaneously eradicate this pathogen with a stronger immune response. Other reasons could be the more exposure of aged patients to the *H. pylori* in their lives as compared to children. The trend of active *H. pylori* infection among age groups in the current study almost matches what we reported earlier for asymptomatic subjects: lower (71.1%) in children than adults (81.0%).[7]

Conclusion

This study highlights the use of non-invasive testing including ^{13}C UBT for the assessment of *H. pylori* infection followed by treatment of this infection[3]; thus avoiding the cost, inconvenience and discomfort of endoscopy. This report also stresses the need for successful eradication of *H. pylori* from the stomachs of symptomatic patients of this region to reduce the incidence of gastric pathologies including

gastric cancer. Additionally, there is also a need to discourage the self-medicating practice and misuse of NSAIDs by symptomatic patients in this community.

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