Prevalence of *Helicobacter Pylori* Infection among Patients of Functional Dyspepsia in A Tertiary Level Hospital in Bangladesh

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ABSTRACT

The prevalence of Helicobacter pylori infection in Asian population is higher than that of the Western population. A cross-sectional, observational study was conducted in the Department of Gastroenterology, Sher-E-Bangla Medical College Hospital, Barishal, Bangladesh, between September 2021 and March 2022, to determine frequency of Helicobacter pylori infection among patients suffering from functional dyspepsia. A total of 100 patients of functional dyspepsia were selected based on inclusion and exclusion criteria for this study. Patients having functional dyspepsia were included as per Rome IV criteria. Patients were excluded if any of the following is observed: overlapping symptoms e.g., predominant reflux and IBS, significant comorbidities, severe psychiatric disease, pregnancy, previous gastric surgery, having contraindication to undergo endoscopic procedure, alcohol and other substance abusers, patients taking anti-ulcerant and triple therapy within the last one and half month. Endoscopic examination of the upper gastrointestinal tract and Campylobacter-like organism (CLO) tests were done. Descriptive statistics was used for the interpretation of the findings. In our study patients, male-female ratio of 1.08:1.0. The mean age of the patients was 35.37±10.13 years, while the mean age of the H. pylori positive population was 33.76±09.04 years. Postprandial burning was the most common symptom found in 78% of cases. Based on CLO test, H. pylori infection was found in 39% cases of functional dyspepsia patients. Male (42.3%) and female (35.4%) were almost equally affected (p>0.05). 43.6% of CLO test positive patients were in the 26–35 years age-group, followed by 36–45 years age-group (28.2%), 18–25 years age-group (17.9%), and >45 years age-group (10.3%), i.e., young and middle aged patients were found more infected (p<0.05).

Keywords: Helicobacter pylori, functional dyspepsia, endoscopy of upper GIT

INTRODUCTION

Dyspepsia is a common health problem throughout the world affecting 25-40% of general population and it reduces the quality of life with emotional distress and impaired vitality.[1] Prevalence of dyspepsia is 8-41% in Bangladesh.[2] Endoscopic evaluation of

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dyspepsia reported more than 70% cases as functional dyspepsia, less than 10% peptic ulcers and less than 1% having gastroesophageal malignancy.[3] Functional dyspepsia is characterized by chronic dyspeptic symptoms in the absence of organic, systemic or metabolic condition. The prevalence of functional dyspepsia in the general population of Bangladesh is 8.3%[2] and approximately 8-23% in Asian population[4]. Functional dyspepsia is the commonest form of dyspepsia and overall 70-80% cases of dyspepsia have no significant findings on endoscopy.[5] The exact etiology of functional dyspepsia (FD) is unknown. Gastric acid hypersecretion, gastroduodenal motility disorders,

disturbances of visceral perception and *Helicobacter pylori* infection are implicated as risk factors.[6]

Helicobacter pylori infection is an important public health problem which is present in about 50% of the global population.[7] *H. pylori* infection can remain asymptomatic in the stomach throughout life.[8] It is the main cause of peptic ulcer disease, and it can also cause gastritis and stomach cancer.[9] *H. pylori* is biochemically characterized as positive for catalase, oxidase, and urease. Urease metabolizes urea into ammonia and carbon dioxide, and it contributes to the neutralization of gastric acid.[10] In addition, urease is strongly immunogenic and chemotactic for phagocytes.[11] *H. pylori* infection is present in 30–60% of patients with functional dyspepsia in western countries.[12] *H. pylori* infection was found 67.3% in India, 65% in Iran, 56.1% in Japan and 45% in Italy among the functional dyspepsia patients.[13] A significant number of cases (86%) responded to *H. pylori* eradication treatment suggesting the role of *H. pylori* in FD. Thus, testing and treating *H. pylori* can be beneficial in cases of functional dyspepsia. Evidence showed that 60% cases were found positive for *H. pylori* by rapid urease test, which suggested that *H. pylori* infection constitutes a significant subset of functional dyspepsia patients. In that study, epigastric pain was significantly associated with *H. pylori* infection.[14] Evidence showed that symptoms were improved in 140 of 192 (73%) patients who became *H. pylori* negative compared to 112 of 249 (45%) of those remaining H. pylori positive. Symptom improvement was more pronounced in patients whom *H. pylori* was eradicated.[15]

Helicobacter pylori infection detection methods are either invasive or noninvasive. Invasive methods need gastric tissue or mucus for histopathologic examination (HE), Campylobacter-like organism (CLO) test and classical culture (CC). Noninvasive methods need blood, 13C-urea breath test and the stool antigen test.[16] Culture of *H. pylori* from gastric biopsies is the most specific and sensitive. However, culture of *H. pylori* requires specific agar and special atmospheric conditions, which hinder its routine use as a diagnostic method. Nonetheless, histopathologic detection of *H. pylori* in samples obtained from the stomach, corpus, and antrum has been reported to be a more sensitive method than the Campylobacter-like organism (CLO) test and culture.[17] Histopathologic detection requires expert pathologists and standard culture examination of the samples. Serological tests relying on antibody detection have 85% sensitivity and 80% specificity but are considered insufficient for follow-up of the treatment.[18] CLO test is a rapid test for detection of *H. pylori* by presence of urease in or on the gastric mucosa (which is also known as rapid urease test). CLO test is economical, fast, and more than 90% specific. The CLO slide contains an agar gel, which contains urea and an indicator usually phenol. If the urease enzyme of H. pylori is present in an inserted tissue sample, degradation of urea to ammonia and carbon dioxide (CO_2) raises the pH. Consequently, the gel reacts and the specimen color changes from yellow (negative) to red (positive).[19] The aim of this study was to assess prevalence of *Helicobacter pylori* infection in functional dyspepsia, to determine proportion of organic and functional dyspepsia in patients in a tertiary level hospital in Bangladesh.

METHODS

This cross-sectional, observational study was done in the Department of Gastroenterology of Sher-E-Bangla Medical College Hospital, Barisal, Bangladesh, from September 2021 to March 2022. Consecutive patients of 18 to 55 years of age attending the outpatient department (OPD) and diagnosed as functional dyspepsia by Rome IV criteria (clinical)[5] were enrolled. Patients were excluded if any of the following is observed: overlapping symptoms e.g., predominant reflux and IBS, significant comorbidities, severe psychiatric disease, pregnancy, previous gastric surgery, having contraindication to undergo endoscopic procedure, alcohol and other substance abusers, patients taking anti-ulcerant and triple therapy within the last one and half month. A total of 100 patients with functional dyspepsia were finally enrolled by using purposive sampling. The case record form was filled up by clinical examination, from the case record, endoscopic report, relevant imaging and blood report. Endoscopic examination of the upper gastrointestinal tract was performed by using Olympus CV-150 video processor and CLV-150 light source as paired with GIF-H150 gastroscope (made in Japan), followed by a Campylobacter-like organism (CLO) test (also known as rapid urease test) was done using *H. Pylori t*est kit named 'PYLO DRY' (Helifax Research Laboratory, India). Based on endoscopic criteria, two categories were done: a) functional dyspepsia, i.e., subjects with normal endoscopic findings; and b) organic dyspepsia, i.e.,

subjects with erosion and peptic ulcer and other organic findings.[20-23]

The clinical data was recorded on a data collection sheet and stored in the computer using MS-Excel. After necessary corrections, data were transferred in the Statistical Package for Social Sciences (SPSS) version 26.0 for Windows for analysis. The descriptive data was expressed as frequency and percentage. Chi-square test was used for comparative analysis. A p-value <0.05 was considered as significant.

This research was approved by the Ethical Review Committee of Sher-E-Bangla Medical College, Barishal, Bangladesh (SBMC/Bari/2021/427).

RESULTS

Our study included 100 patients with functional dyspepsia. There was a slight male predominance with 52 males and 48 females (male-female ratio was 1.08:1). The mean age of the study population was 35.37±10.132 years (age range was 18 to 55 years). The mean age of the *H. pylori* positive population was 33.76±09.04 years. The majority of the patients (30%) were between 36 and 45 years of age. Table-I shows post prandial fullness was found in 76% patients, females have more symptom than males (p<0.05). 74% of the patients had bothersome early satiety, male and female are affected equally (p>0.05). Epigastric pain was present in 67% of the patients, as 73% of male and 60% of female had the symptom (p>0.05). Epigastric burning was present in 78% of the patients; 80% of male and 78% of female had epigastric burning and the difference was not statistically significant (p>0.05). Table-II shows that 39% of our study patients were infected by *H. pylori*. Male (42.3%) and female (35.4%) patients were almost equally affected (p>0.05). Table-III shows that the highest number of CLO test positive patients (43.6%) were in the 26–35 years age-group, followed by 36–45 years of age group (28.2%), 18–25 years age-group (17.9%), and only 10.3% were in >45 years age-group. The difference was statistically significant (p<0.05).

Table-I: *Distribution of the presenting symptoms of the patients (N=100)*

Symptoms	Category	Sex		Total	χ^2, p-value
		Male(n=52)	Female(n=48)		
Post prandial fullness	Yes	35(67.3%)	41(85.4%)	76(76.0%)	4.5, 0.03[S]
	No	17(32.7%)	7(14.6%)	24(24.0%)	
Early satiety	Yes	37(71.2%)	37(77.1%)	74(74.0%)	0.46. 0.5[NS]
	No	15(28.8%)	11(22.9%)	26(26.0%)	
Epigastric pain	Yes	38(73.1%)	29(60.4%)	67(67.0%)	1.81, 0.18[NS]
	No	14(26.9%)	19(39.6%)	33(33.0%)	
Epigastric burning	Yes	42(80.8%)	36(75.0%)	78(78.0%)	0.48, 0.49[NS]
	No	10(19.2%)	12(25.0%)	22(22.0%)	

p-value reached from Chi-square test; S=significant, NS=not significant.

Table-II: *Campylobacter-like organism (CLO) test results among male and female patients (N=100)*

Urease test	Sex		Total	χ^2, p-value
	Male(n=52)	Female(n=48)		
Positive	22 (42.3%)	17 (35.4%)	39 (39.0%)	0.50, 0.50[NS]
Negative	30 (57.7%)	31 (64.6%)	61 (61.0%)	
Total	52 (100.0%)	48 (100.0%)	100 (100.0%)	

p-value reached from Chi-square test; NS=not significant.

Table-III: *Campylobacter-like organism (CLO) test results by age group (N=100)*

Age group (in years)	CLO Urease test		Total	χ^2, p-value
	Negative Frequency (Percentage)	Positive Frequency (Percentage)		
18-25	16 (26.2)	7 (17.9)	23 (23.0)	8.9, 0.03[S]
26-35	11 (18.0)	17 (43.6)	28 (28.0)	
36-45	19 (31.1)	11 (28.2)	30 (30.0)	
>45	15 (24.6)	4 (10.3)	19 (19.9)	
Total	61 (100.0)	39 (100.0)	100 (100.0)	

p-value reached from Chi-square test; S=significant.

DISCUSSION

Among 100 patients, 52 were male (52%) and 48 were female (48%) and functional dyspepsia was found to be more prevalent in male patients though statistically not significant. Overall functional disorder is more prominent in females, but different studies indicate that functional dyspepsia is more common in male in comparison to female. This study is in agreement with the results of the studies done in Japan (58.8% were males and 42% were females) and Malaysia (61% were males and 39% were females).[21,22] On the other hand, the results of the present study disagreed with results of the study done in Afghanistan (males 46% and females 54%).[24] The differences may be due to lack of access to healthcare for females. Moreover, a population-based study from Asia showed that the frequency of functional dyspepsia was not related to gender among different Asian countries.[25]

The mean age of functional dyspepsia patients was 35.3±10.13 years, mean age of *Helicobacter pylori* infected individual was 33.6±09.04 years. The majority of functional dyspepsia patients (30%) belong to the age group of 36 to 45 years. As age advanced, the percentage of patients with functional dyspepsia also decreased. A previous study from Pakistan also found majority FD patients were in the group of 30-39 years with a mean age 41.74±08.63 years.[21] A few studies have noted the peak prevalence of FD in older adults.[25] On the other hand, persons in higher age group have disproportionate percentage of *H. pylori* positivity and may not complain of symptoms because of increased threshold of pain perceptions.[26]

In the current study, bothersome postprandial burning was the most common presenting symptom seen in 78% of cases, followed by postprandial fullness in 76% of cases, bothersome early satiety in 74% and bothersome epigastric pain in 68% cases. There was a statistically significant difference between male and female patients in the symptom of post-prandial fullness. Females were more complaining of this symptom than males (p=0.03). The occurrence of other symptoms in both male and female patients with functional dyspepsia was near equally common. Similar data were observed from another previous study, where almost all patients with functional dyspepsia complained of both epigastric pain (84%) and postprandial fullness (93%).[27] In contrast, a previous study in symptomatic patients of functional dyspepsia with gastrointestinal symptoms found postprandial fullness and/or early satiation was 67.5%, whereas 48.2% had epigastric pain and 15.8% had both meal-related symptoms and epigastric pain.[28] Our result also matches with that of another previous study, where 80%-90% dyspeptic subjects have associated postprandial epigastric pain, bothersome postprandial fullness, early satiety.[29] Most of the patients present with overlapping or multiple symptoms. Overlapping postprandial pain and postprandial fullness were reported by the majority (89%) of patients, while severe pain and discomfort were observed in 52.4% and 75% of patients.[27]

The prevalence of *H. pylori* infection in patients with functional dyspepsia was 39% which was diagnosed by urease based CLO test kits. This principal finding was followed by additional statistical analyses done aiming to establish whether certain factors (i.e. age, and gender) were significantly related to the prevalence of *Helicobacter pylori* infection with functional dyspepsia. The study did not expect such

effects to occur; the purpose of these additional analyses was mainly exploratory. No significant gender variation was observed in CLO tests results in the present study (p>0.05). There was an almost equal incidence of CLO test positive in male and female patients (42.3% and 35.4% respectively). Among CLO test positive patients, 43.6% were in the 26–35 years age-group, followed by 36–45 years age-group (28.2%), 18–25 years age-group (17.9%), and >45 years age-group (10.3%). Significant relationship of prevalence of *H. pylori* infection with different age groups were observed in our study, as middle aged patients were more infected (p<0.05). In our study, prevalence of *H. pylori* infection among patients of functional dyspepsia was 39%. This result is more or less similar to that of several studies done in Malaysia (34%)[22], Italy (35%),[27] and Japan (41.2%).[21] These differences are most likely associated with the testing methods, socioeconomic status of study population, and geographical variation in the prevalence of infection.[4] Low prevalence was found in a study conducted in Korea,[30] as they found 31.2% *H. pylori* infected cases in functional dyspepsia patients. However, it is still difficult to establish an association between *H. pylori* and functional dyspepsia symptoms. As this bacterium is highly prevalent in our country and involved in several digestive diseases (including substantial subset of functional dyspepsia), it was justified to conduct CLO tests during endoscopy to diagnose functional dyspepsia and eradicate it after diagnosis.

Limitations of the present study were: i) being a single-center study may affect the generalizability of the study findings to the entire population of Bangladesh; ii) small sample size (studying with a larger sample size may provide more information); and iii) cross-sectional nature of the study makes it difficult to find out causality.

CONCLUSION

According to our data, *H. pylori* infection was identified in 39% of functional dyspepsia patients, which was more common among middle-aged adults in Bangladesh. No difference was observed between males and females. However, larger scale, multicenter studies are warranted to justify our prevalence and its relationship to the cause of the disease.

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