

## Frequency of Helicobacter Pylori in Patient with Stomach Cancer

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### Abstract

### Original Research Article

**Background:** Helicobacter pylori (H. pylori) infection is the important cause of chronic gastritis which results in atrophy and metaplasia of the underlying mucosa. Both these conditions are known to be associated with an increased risk of gastric carcinoma. The role of H. pylori infection in the pathogenesis of gastric cancer is an important but unresolved issue. **Aim of the study:** The aim of this study was to assess the frequency of H. pylori inpatient with stomach cancer. **Methods:** This was a cross-sectional study conducted in the Department of General Surgery in Bangabandhu Sheikh Mujib Medical University (BSMMU), Dhaka from October 2019 to September 2020. The data regarding clinical and surgical profiles was recorded. Serum IgG, endoscopic biopsy, or campylobacter-like organism test (CLO) was performed for diagnosis of H. pylori. All the information is recorded in the data collection sheet. Data were processed and analyzed by SPSS and Microsoft excel. **Results:** The study demonstrates that a maximum number of patients (42.6%) were between 51-60-year age group; the mean age of the patient was 49.35±11.7 years. Out of 100 patients, 76.4% were male and 23.6% were female. The male and female ratio was 3.25:1. The differentiation and classification of gastric cancer were assessed according to Lauren's classification. Tumors of the intestinal type constituted 42(61.7%) of the tumors and diffuse was noted in 26(38.3%) of the tumors. The prevalence of H. pylori infection was 47(69.1%). The prevalence was significantly higher in intestinal than in diffuse-type carcinoma. The difference was statistically significant (P<0.05). **Conclusion:** The present study concluded that the prevalence of H. pylori infection is 69.1% in patients with carcinoma stomach. Prevalence of intestinal-type carcinoma stomach is more than diffuse type. There was an important difference in H. pylori prevalence between the intestinal and diffuse types of gastric cancer. Control of H. pylori infection by means of eradication is likely to have immense potential in stomach cancer prevention.

**Key word:** Pylori infection, Cancer, Prevalence, Gastric, Carcinoma, Stomach, Intestinal.

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## INTRODUCTION

Helicobacter pylori are a gastric pathogen that colonizes approximately 50% of the world's population [1]. H. pylori infection causes chronic inflammation. It significantly increases the risk of developing duodenal and gastric ulcers and cancer diseases. Infection with H. pylori is the strongest known risk factor for gastric cancer, which is the second leading cause of cancer-related deaths worldwide [1, 2]. Stomach cancer is a major health problem in many countries. For formulating effective preventive strategies, understanding the current burden of stomach cancer and the differential trends across various locations is

essential. A systematic analysis for the Global Burden of Disease Study 2017 [3] reported that more than 1.22 million incident cases of stomach cancer occurred worldwide, and nearly 865 000 people (848 000–885 000) died of stomach cancer, contributing to 19.1 million (18.7-19.6) DALYs [4]. H. pylori are the main risk factor in the association between gastric ulcer and gastric cancer. Many factors other than H. pylori have been implicated in the incidence of gastric cancer [5]. H. pylori infection, low socioeconomic status, and dietary factors are risk factors that are exclusive for non-cardia gastric cancer while Risk factors associated exclusively with cardia gastric cancer include obesity

and GERD [6]. *H. pylori* are a gram-negative bacillus that colonizes the stomach and maybe the most common chronic bacterial infection worldwide. *H. pylori* infection typically has a high prevalence in countries with high gastric cancer rates. The decline in *H. pylori* prevalence in developed countries parallels the decreasing incidence of gastric cancer [7]. The association between chronic *H. pylori* infection and the development of gastric cancer is well established [8]. Randomized prospective studies demonstrated that eradication significantly reduced the presence of premalignant lesions, providing additional evidence that this organism has an effect on the early stages of gastric carcinogenesis [1]. Rates of colonization vary considerably, with higher rates present in developing countries than in developed areas, though *H. pylori* infection can be found in all regions of the world. Most infections in childhood via the fecal-oral or oral-oral mode of transmission are thought to be acquired [1]. The variable outcomes of *H. pylori* infection which ultimately influence the interactions between pathogen and host likely depend on factors such as strain-specific bacterial constituents, inflammatory responses governed by host genetic diversity, or environmental influences. Therefore, the aim of this study was to evaluate the prevalence of *Helicobacter Pylori* inpatient with stomach cancer at the tertiary care hospital of Bangladesh.

## OBJECTIVES

### General Objective

- To assess the association of *H. pylori* in patient with carcinoma stomach.

### Specific objectives

- To assess the presence of IgG antibody for *H. pylori* in patients of carcinoma stomach.
- To assess the positivity of *Campylobacter* like organism test in patients with carcinoma stomach.

## MATERIALS AND METHODS

This was a cross-sectional study. Conducted in the Department of General Surgery, Bangabandhu Sheikh Mujib Medical University from October 2019 to September 2020. All diagnosed adult stomach carcinoma patients both male and female attended the department of General Surgery, OPD BSMMU were enrolled after fulfillment of selection criteria. A total of 68 samples were enrolled for the study. Consecutive sampling techniques were followed. Patients below 18 years and previous gastric surgery patients were excluded from the study. In all patient's diagnoses of carcinoma, the stomach has been confirmed preoperatively by upper GIT endoscopy, a biopsy from the suspected lesion followed by histopathology. Endoscopic biopsies were taken after a thorough upper gastrointestinal examination. Presence of *H. pylori*. The *H. pylori* infection status was assessed by the urease rapid test. *H. pylori* IgG antibody in plasma was measured by an enzyme-linked immunosorbent assay (ELISA), using the commercially available kit. Prevalence of *H. pylori* was noted. Prior to the commencement of this study, the research protocol has been approved by the Institutional Review Board (IRB) of Bangabandhu Sheikh Mujib Medical University. According to Helsinki Declaration for Medical Research involving Human Subjects 1964, all the patients were informed about the study design, the underlying hypothesis, and the right for the participants to withdraw themselves from the projects at any time, for any reason, what so ever which did not hamper the standard duty of care anyway. After compilation, the data have been presented in the form of tables, figures, and graphs, as necessary. Statistical analysis of the results has been done by using computer-based statistical software SPSS version 21.0. Results have been expressed as mean  $\pm$  SD and compared by Unpaired t-test, Fisher's Exact test, and chi-square test. A 'P value of  $<0.05$  has been considered significant.

## RESULTS

**Table-1: Age distribution of the patients (N=68)**

Age (years)	Frequency (n)	Percentage (%)	Mean $\pm$ SD
$\leq 40$ yrs.	4	5.9	49.35 $\pm$ 11.7
41-50 yrs.	18	26.5	
51-60 yrs.	29	42.6	
61-70 yrs.	17	25.0	

Table 1 showed age distribution of patients. Study demonstrates that maximum number of patients 29(42.6%) were between 51-60 year's age group

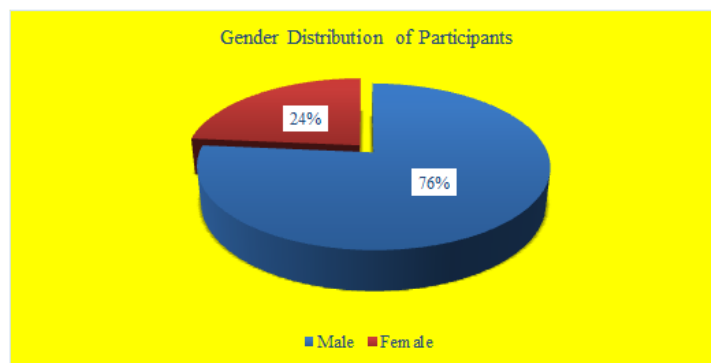
followed by 18(26.4%) age group of 41-50 years. Mean age of the patient was 49.35  $\pm$  11.7 years.

**Table-2: Gender distribution of study population (N=68)**

Gender	Frequency (n)	Percentage (%)
Male	52	76.4
Female	16	23.6

Table 2 showed gender distribution of the patients. Out of 68 patients 52(76.4%) were male and

16(23.6%) were female. Male and female ratio was 3.25:1.



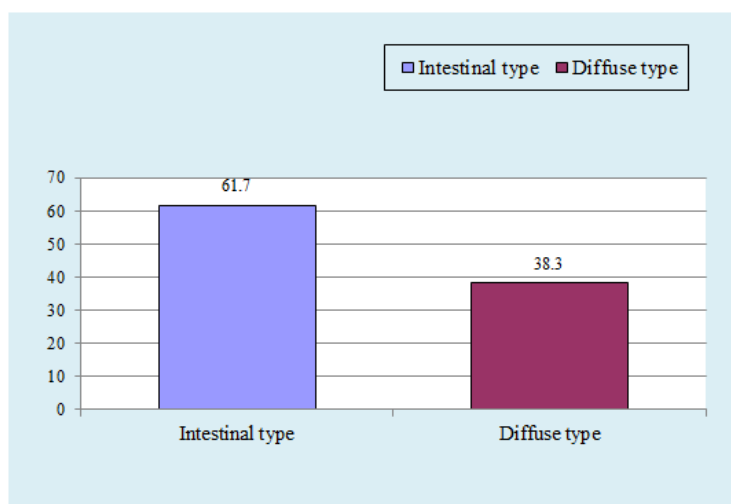
**Fig-I: Participants Gender Distribution**

**Table-3: Clinical manifestation of respondents (N=68)**

Clinical manifestation	Frequency (n)	Percentage (%)
Dyspepsia	68	100.0
Epigastric burning sensation	68	100.0
Abdominal discomfort	36	52.9
Weakness or fatigue	35	51.5
Loss of appetite	27	39.7
Bloating of stomach after meals	24	35.3
Nausea or vomiting	22	32.4
Abdominal distention	17	25.0
Weight loss	15	22.0

Table 3 showed clinical manifestation of respondents. The most common signs were dyspepsia and epigastric burning sensation; both were 68(100%) & abdominal discomfort (100%). Other common clinical manifestations were abdominal discomfort

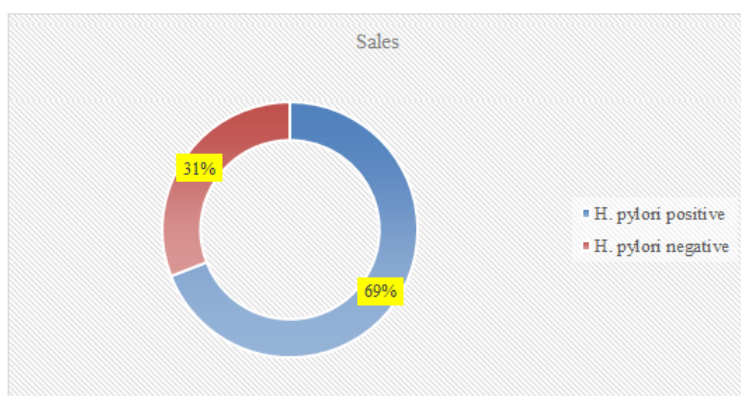
36(52.9%), weakness or fatigue 35(51.4%), loss of appetite 27(39.7%), bloating of stomach after meals 24(35.2%), nausea or vomiting 24(32.4%), abdominal distention 17(25.0%) and finally weight loss 15(22.0%).



**Fig-II: Histologic types of gastric carcinoma (N=68)**

Figure II showed the histologic types of gastric carcinoma. The differentiation and classification of gastric cancer was assessed according to Lauren's

classification. Tumors of the intestinal type constituted 42(61.7%) of the tumors and diffuse was noted in 26(38.3%) of the tumors.



**Fig-III: Association of H. pylori in patients with gastric cancer (N=68)**

Figure III showed the overall prevalence of H. pylori infection was 47(69%).

**Table-4: Frequency of H. pylori infection with respect to types of gastric cancer (N = 68)**

Variables	H. pylori infection		p value*
	Positive (n=47)	Negative (n=21)	
Types of cancer			
Intestinal type	36(85.7)	6(14.2)	<0.001*
Diffuse type	11(42.3)	15(57.6)	

\*\*Chi square test was done to measure the level of significance

Table shows the frequency of H. pylori infection with respect to types of gastric cancer. In univariate analyses, the frequency was significantly higher in intestinal than in diffuse-type carcinoma. The difference was statistically significant ( $p < 0.05$ ).

## DISCUSSION

This cross-sectional study was conducted in the Department of General Surgery, Bangabandhu Sheikh Mujib Medical University, Dhaka, Bangladesh to evaluate the prevalence of Helicobacter pylori inpatient with stomach cancer. A total of 68 patients were included. The study demonstrates that a maximum number of patients (42.6%) were between 51-60 year's age group, the mean age of the patient was  $49.35 \pm 11.7$  years. Out of 100 cases, 76.4% were male and 23.6% were female. The male and female ratio was 3.25:1. Regarding the baseline characteristics, the mean age of this study population was lower as compared with Abdikarim *et al.* (2015)<sup>9</sup> where the mean age of the study population was 61.5 years and 62 years respectively. Reasons for lower mean age in this study may be explained by geographical variation, genetic cause, and maybe food habit. In Pakistan, Afridi, and associates [10] found that the mean age of stomach cancer is similar to our study which was  $48.6 \pm 4.47$  years. Stomach cancer occurred at a disproportionately high rate among males as compared with females which are similar to a study done by Marek *et al.* [11]. Again Chinese Researchers Lei Yang and associates [12] state that male, the female ratio was 2.4:1. We found a male predominance of stomach carcinoma may be due to female sex hormones playing a protective role in H. pylori-associated gastric cancer. both  $17\beta$ -estradiol and

tamoxifen decrease gastric cancer by decreasing neutrophilic infiltration, attenuating the chronic inflammatory response, and decreasing oncogenic signaling. These highly interrelated mechanisms result in the reduction of neutrophilic infiltrate by CXCL1 (belongs to the  $\alpha$ -subgroup of chemokines.), which reduces the exposure of the stomach to oxidative stress, a cause of DNA mutagenesis, which in turn decreases pro-inflammatory cellular infiltrates and delays the progression of gastric cancer [13]. We found intestinal type of tumors is more than diffuse-type which is similar to previous studies. Chaoqun Han and associates [14] found in their study 70.3% tumors were intestinal type & 29.7% tumors were diffuse type. A Korean study also found 56.7% of tumors were intestinal, 34.3% were diffuse and 9% were mixed.<sup>15</sup> Intestinal type was significantly predominant may be due to Helicobacter pylori infection as it colonizes in stomach mucosa and triggers the progressive sequences of gastric lesions from chronic gastritis, gastric atrophy, intestinal metaplasia, dysplasia, and finally gastric carcinogenesis. The prevalence of H. pylori infection was 47(69.1%). In univariate analyses, the prevalence was significantly higher among patients with advanced age and male subjects. The mean age was  $56.8 \pm 11.3$  years in patients with positive H. pylori infection and  $42.0 \pm 11.2$  years in patients with negative H. pylori infection. Similarly, the prevalence was significantly higher in intestinal than in diffuse-type carcinoma. The difference was statistically significant ( $p < 0.05$ ). In our study the presence of H. pylori in tumor tissue with intestinal-type gastric adenocarcinoma was more prevalent than in the diffuse-type, and the difference was significant which is similar to Irami Araújo-Filho *et*

*al.*, [16] but Our results are in contradiction to the works published by other authors Craanen *et al.*, [17] where *H. pylori* infection was found in 63.6% of patients with intestinal-type early gastric cancer and in 54.5% of patients with diffuse-type early gastric cancer. Results were heterogeneous.

## LIMITATIONS OF THE STUDY

Data has been collected from a single institution, of small sample size with short study period.

## CONCLUSION AND RECOMENDATION

The present study concluded that the prevalence of *H. pylori* infection is 69.1% in patients with carcinoma stomach. There was an important difference in *H. pylori* prevalence between the intestinal and diffuse types of gastric cancer. In the global prevention and treatment of gastric cancer, significant global strides have been made. Nevertheless, the neoplasm remains the most commonly diagnosed. While *H. pylori* infection is the most established risk factor, eradicating the bacterium is pivotal for the prevention of cancer. In addition, changes in dietary habits and lifestyle could reduce the incidence of stomach cancer, especially in high prevalence areas. Control of *H. pylori* infection by means of eradication is likely to have immense potential in stomach cancer prevention.

## CONFLICTS OF INTEREST

There is no potential conflict of interest relevant to this research.

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