

# Frequency of helicobacter pylori infection in gross morphology of gastric carcinoma

## Abstract

**Objective:** To determine the frequency of *Helicobacter pylori* infection in gastric carcinoma patients attending a tertiary care hospital in Karachi.

**Study design:** Descriptive, cross sectional study

**Place & duration of study:** Department of Histopathology (DDRL) Dow Diagnostic & research lab, Dow University of Health Sciences (DUHS) from Feb 2015 to Sep 2015.

**Material & methods:** This study included 92 gastric tissues in which 79 were gastric carcinoma tissues and 13 were control samples taken from sleeve gastrectomy. Gastric Carcinoma tissues were divided into two subgroups dependent and non-dependent *helicobacter pylori*. For gross morphology of gastric carcinoma, the gross types were divided into four types, Fungating, Ulcerative, infiltrating and polypoid. SPSS was used to analyse data.

**Results:** Mean age of the sleeve gastrectomy sample was 46.9 years, 5 male and 8 female. In gastric carcinoma sample, the mean age of non-dependent *H. Pylori* gastric carcinoma was 53.8 years, 7 male, 01 female, mean age of dependent *H. pylori* gastric carcinoma was 53.1 years, 44 male, 28 female. For gross morphology of gastric carcinoma, the Fungating tumor was 25% in dependent *H. Pylori* gastric carcinoma and 6% in non-dependent gastric carcinoma. Ulcerated tumor, 56% in dependent *H. Pylori* gastric carcinoma and no cases in non-dependent *H. Pylori* gastric carcinoma. Invasive tumour, 13% in dependent *H. Pylori* while no cases were seen in non-dependent *H. Pylori*. No polypoid tumour was found in dependent as well as non-dependent *H. Pylori* gastric carcinoma.

**Conclusion:** *H. Pylori* is significantly present in gastric carcinoma lying in the age of 50-70 years. However, the presence of *H. Pylori* dependent carcinoma is high among male population. The Ulcerated type of gastric carcinoma was more common in dependent *H. Pylori* gastric carcinoma.

**Keywords:** *helicobacter pylori*, gastric carcinoma, sleeve gastrectomy

Volume 4 Issue 6 - 2016

Nazia Qamar,<sup>1</sup> Saleh Memon,<sup>2</sup> Qadir Bux,<sup>3</sup> Muhammad Faisal Fahim<sup>4</sup>

<sup>1</sup>Assistant Professor, Pathology, Al-Tibri Medical College, Isra University Karachi campus, Pakistan

<sup>2</sup>Professor of Pathology, Al-Tibri Medical College, Isra University Karachi campus, Pakistan

<sup>3</sup>Assistant Professor, Anatomy, Al-Tibri Medical College, Isra University Karachi campus, Pakistan

<sup>4</sup>Statistician, Quality Enhancement Cell & Research, Al-Tibri Medical College, Isra University Karachi campus, Pakistan

**Correspondence:** Muhammad Faisal Fahim, Department of Quality Enhancement cell & Research (QEC&R), Al-Tibri Medical College, Isra University Karachi campus, Old thana Malir, Gaddap Town, Karachi-Pakistan, Tel +92346-3160827, Email faisalfahim88@hotmail.com

## Introduction

Usually, gastric cancer prevalence and transience have fallen extremely over the past 70 years<sup>1</sup> but in spite of current decline gastric cancer are the 4<sup>th</sup> most frequent cancer and second principal cause of cancer related death worldwide.<sup>2,3</sup> According to annual cancer registry report of Shaukat khanum hospital, Lahore from Jan 2014 to Dec 2014, the data reported that Stomach Cancer is the 10<sup>th</sup> leading cause of death amongst all age group and both Genders. In adults > 18 years of age Gastric Cancer is the 8<sup>th</sup> most chief cause of cancer in Pakistan. In adult males gastric cancer is the 6<sup>th</sup> principal cause of cancer in Pakistan in spite of female adults it is not included in top 10 malignancies of Pakistan.<sup>4</sup> The distinct geographic disparity, time trends and the migratory effect on the gastric cancer incidence recommend that environmental or lifestyle factors are major contributors to the aetiology of disease.<sup>5</sup> The most important development in the field has been the identification of *helicobacter Pylori* as an important etiologic factor in gastric carcinoma because of its role in the

development of chronic gastritis.<sup>6-9</sup> *Helicobacter pylori* may generate an atmosphere which is highly positive to produce carcinogenesis and share with other life style and environmental exposures. There is evidence that consumption of salty foods and N-nitrosocompound and low intake of fresh fruits and vegetable augment the threat of gastric cancer. *Helicobacter pylori* gastritis support the growth of nitro sating bacteria which catalyze the production of carcinogenic N nitro so compound.<sup>10</sup> There is a high frequency of *helicobacter pylori* in the developing world where people have low socioeconomic status and live in a germ-infested environment.<sup>11</sup> Grossly, the carcinoma of stomach has wide distinction: 1) polypoid tumor (type I), 2) Fungating tumor (Type II), 3) Ulcerated tumor (Type III), 4) Deeply invasive tumor (Type IV) [2]. Fungating tumor grow mainly into lumen, plane, ulcerated and severely invasive tumor develop largely all the way through the wall of stomach.<sup>12,13</sup> The present study was designed to find out the frequency of *H. pylori* infection in gross morphology of gastric carcinoma according to age and gender and among Karachi population.

### Material & methods

This is a cross sectional study conducted in Dow Diagnostic and research Lab (DDRL) in collaboration with Al-Tibri medical college, Karachi from Feb 2015 to September 2015. Total of 92 gastric tissue samples were investigated along with Informed consent and Clinical bio data of patients. The study was approved by the Ethical committee of Dow University of health sciences (DUHS) and Isra University Hyderabad Sindh. Patients who had a history of gastrointestinal symptoms with clinical support of Gastric cancer were selected regardless of age and gender along with this for control samples, sleeve gastrectomy specimen were selected from the patient who had a history of obesity, regardless of age and gender. Biopsy samples were examined grossly and microscopically. Biopsy materials were fixed in 10% neutral buffered formalin, embedded in paraffin and 5µm sections were set for biopsy materials and they were cut to perform subsequent staining.<sup>14</sup> H&E, Giemsa Stain (for *H. Pylori*) were the staining techniques used for staining the slides for histopathological examinations. For Statistical analysis, Statistical package for social sciences (SPSS) version 20.0. All Categorical Variables were expressed in numbers and percentage while continuous variables were shown in Mean±SD.

### Results

In order to investigate the frequency of helicobacter pylori infection in gastric carcinoma. We were selected 92gastric tissue samples, of these 79% samples were from gastric carcinoma while total 13% were control samples. Overall the samples were divided into three groups. First was Control group, second was Non-dependent *H. Pylori* gastric carcinoma while third was dependent *H.Pylori* gastric carcinoma. Controls as well as gastric cancer samples were investigated for gender and age (Graph 1). In order to find out the type of disease in relation with age we found that the mean value of normal tissue is 46.9 ± 5.2 and it is discover among the range of 35- 54 years. As we compare this relation with non-dependent *H. Pylori* gastric carcinoma tissue we find the mean value is 53.8 ± 15.9 among the range of 30-76 years. Now we compare with another relationship that is dependent *H. pylori* gastric carcinoma tissue it revealed the mean value is 53.1±14.86 and it is find among range of 28-97 years. Total of 5 samples were from males and 8 samples were from females .The mean value of the male patient was (38%) and a mean value of the female patient was (62%) (Table1).

In non dependent *H. Pylori* gastric carcinoma, only 8 out of 79 samples were non dependent *H. Pylori* gastric carcinoma. Total of 7 samples were males and 1 from female. The mean value of the male patient was (88%) and the female was (13%) (Table 1). 71 out of 79 patients were dependent *H. Pylori* gastric carcinoma. Total of 44 patients were male and the mean value was (62%) and 28 patients were females and the mean value was 38% (Table 1). In the frequency of gross types of gastric carcinoma, we found only 16 large biopsy samples out of 79 samples, the rest of 63 samples were small biopsy samples. Therefore, gross morphological classification was possible only on these 16 samples. Bormann classification, is the most global classification used for categorize macroscopic appearance of gastric cancer .the samples were divided into two groups, Groups B and Groups C. The group B was not dependent *H. Pylori* gastric Carcinoma and Group C was dependent Helicobacter pylori gastric carcinoma.

In these groups. Fungating tumor was 25% in dependent *H. Pylori* gastric carcinoma and 6% was not dependent gastric carcinoma. The Ulcerated tumor was 56% in dependent *H. Pylori* gastric carcinoma and non significant in non dependent *H. Pylori* gastric carcinoma. The Invasive tumor was 13 % in dependent *H. Pylori* gastric carcinoma while non significant in non dependent *H. Pylori* gastric carcinoma. No Polypoid tumor was found in dependent as well as non dependent *H. Pylori* gastric carcinoma (Table 2, Graph 1&2, and Figure 1&2).

**Table 1** Relationship of gender and disease

Types of disease	Gender		Total
	Male	Female	
Normal	5	8	13
	38.50%	61.50%	100.00%
Non-dependent	7	1	8
	87.50%	12.50%	100.00%
Dependent	44	27	71
	62.00%	38.00%	100.00%
Total	12	9	21
	57.10%	42.90%	100.00%

**Table2** Frequency of gross types of stomach carcinoma (%age)

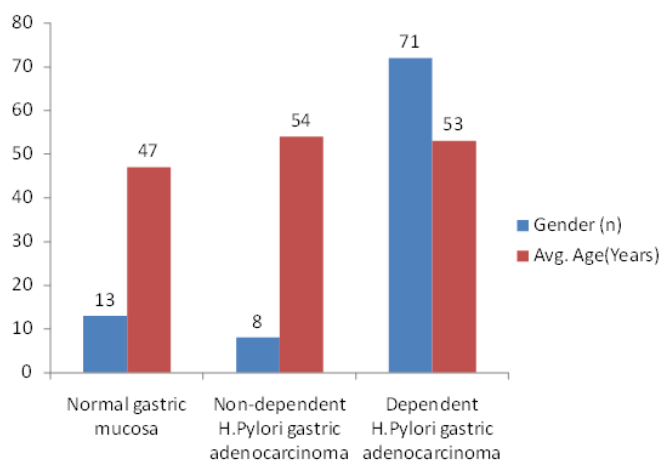
Gross types of stomach carcinomas	Group B non-dependent <i>H. pylori</i> gastric adenocarcinoma (%)	Group C dependent <i>H. pylori</i> gastric adenocarcinoma (%)
Fungating	6%	25%
Ulcerative	0%	56%
Infiltrating	0%	13%
Polypoid	0%	0%



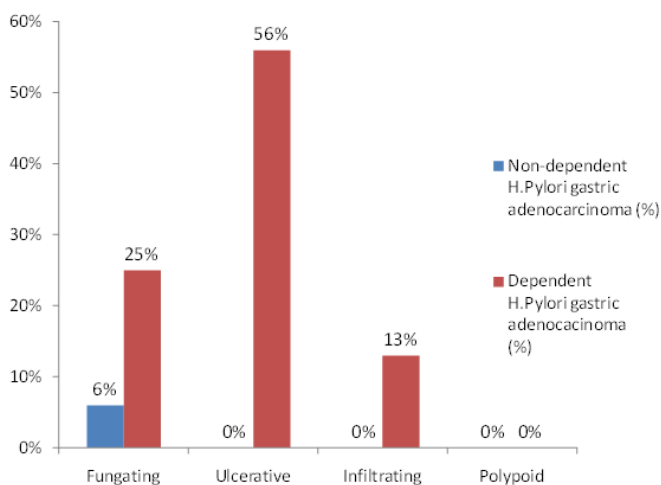
**Figure 1** Ulcerated type of adenocarcinoma of stomach with heap up margins.



**Figure 2** Infiltrative borders are present in the body of lesser curvature.



**Graph 1** Bar chart showing overall age and gender distribution of normal gastric mucosa and gastric adenocarcinoma.



**Graph 2** Bar Chart showing gross types of gastric adenocarcinoma.

## Discussion

Gastric Cancer is the 4<sup>th</sup> most frequently diagnosed cancer and it is the second most frequent cause of cancer related death worldwide.<sup>2,15</sup> Gastric Cancer in Karachi fall into the standard of a low risk developing country pattern, but increasing incidence has been reported recently.<sup>16</sup> Gastric carcinogenesis is a multifactorial process in which several factors are involved, some milieu lesions are also present, these lesions provide prospect to decrease the mortality rate of gastric carcinoma by earlier recognition of these lesions.<sup>17</sup> Helicobacter pylori is a gram negative bacterium currently colonize the human stomach and also have been the centre of basic biochemical and clinical research since its innovation.<sup>18</sup> This study addressed age and gender of patient as well as gross morphology of dependent and nondependent Helicobacter pylori in gastric carcinoma tissue as well as sleeve gastrectomy tissue, and according to our study, no significant difference noted between age of non dependent helicobacter pylori (54 years) and dependent helicobacter pylori (53 years) in gastric carcinoma. In other study conducted in Karachi, Pakistan, the mean age of dependent helicobacter pylori was found to be 49 years.<sup>19</sup> In a study from Mexico, gastric cancer has been observed in persons aged between 50-70 years.<sup>20</sup> Cancer research statistics UK from 2011-2013 reported that highest number of new cases of gastric adenocarcinoma was present in between the age of 50-70 years.<sup>21</sup> Our results coincide with other studies that reported the mean age of helicobacter pylori dependent gastric carcinoma was in between the range of (50-70 years). The reason for this non significant difference between the age of dependent and non dependent gastric carcinoma is there should be some other etiological factors in spite of H. Pylori infection in the pathogenesis of gastric carcinoma in the range of this age groups in our society like tobacco use, sedentary life style etc. However, in our control group the age was one decade earlier than the gastric carcinoma groups because the control was taken from sleeve gastrectomy and the procedure is done in younger generation especially in female population experienced obesity. Most studies reported that gastric cancer occurs most frequently in male population.<sup>22</sup> In our study, male predominance was found in both dependent and nondependent H. Pylori gastric carcinoma that was concurring with other studies. Previous study in Pakistan revealed that gastric cancer occurs most frequently among males that was 60% in both type of cancer.<sup>19</sup> In United States, an estimated 21, 320 cases of gastric cancer were reported and among these 13020 were males and 8300 were females and 10540 patient were die from this disease in 2012.<sup>23</sup> Another study conducted in USA reported that men are affected twice as compared to women from gastric carcinoma.<sup>24</sup> The reason for increase in frequency of gastric cancer among males in our society are possibly because of some etiological factors like life style factors like Pan tobacco use and smoking. Smoking is more prevalent in males. In this study we also found gross types of gastric carcinoma only in large biopsies which was less in number as compare to small biopsies. We found the prevalence rate of Ulcerative type was high that was 56% present in dependent H. Pylori gastric Carcinoma and Fungating type of tumor was 25% in dependent and 6% in non dependent gastric carcinoma, while invasive type was 13% in dependent H. Pylori gastric Carcinoma and Polypoid type was not found in our sample size. Our study regarding gross morphology of gastric carcinoma does not concur with other studies. In a previous study of USA report that the most common macroscopic type was a

Fungating tumor which was found to be 36% and ulcerated was 25% and infiltrating is 26% and polypoid was 7%.<sup>25</sup>

## Conclusion

Based on this study it is concluded that presence of Helicobacter pylori is significantly present in gastric carcinoma and it is considerably present between the ranges of 50-70 years while in sleeve gastrectomy the presence of helicobacter pylori is not very significant. However, the presence of H. Pylori dependent carcinoma is high among male population. Grossly, the Ulcerated type of gastric carcinoma is high among dependent H. Pylori gastric carcinoma.

## Acknowledgement

None.

## Conflict of interest

None.

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