Clinicodemographic and Risk Factor Profile of Patients with Gastric Adenocarcinoma

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ABSTRACT

Introduction: Gastric adenocarcinoma is the fifth most common cancer and the fourth leading cause of cancer-related death worldwide, with Helicobacter pylori infection, tobacco use, and dietary factors as major contributors. In Bangladesh, comprehensive regional data on gastric cancer remain limited, particularly in the northeastern Sylhet region. Understanding these local characteristics is essential for developing targeted screening programs and public health interventions. **Objective of this study:** To delineate the clinicodemographic and risk-factor profile of patients diagnosed with gastric adenocarcinoma. **Methods & Materials:** This descriptive cross-sectional study was conducted in the Department of Pathology at Sylhet MAG Osmani Medical College, Sylhet, from July 2011 to June 2012. A total of 56 histopathologically confirmed cases of gastric adenocarcinoma were enrolled. Specimens were processed, stained with Hematoxylin and Eosin, and classified according to the Lauren classification. Demographic data, tumor location, histological subtypes, risk factors, and clinical presentations were recorded and analyzed using SPSS version 26.0. **Results:** Intestinal-type adenocarcinoma was the predominant type (64.3%), followed by the diffuse type (30.4%). Intestinal-type tumors were more common in older males, while diffuse-type tumors presented at a younger age (mean 45.8 years) with balanced gender distribution. H. pylori infection was the most prevalent risk factor (66.1%), followed by tobacco use (58.9%) and dietary factors (50.0%). H. pylori and dietary factors were more strongly associated with intestinal-type (75.0% and 61.1%) than diffuse-type tumors (47.1% and 29.4%). The most common presenting symptoms were epigastric pain (82.1%) and anorexia with weight loss (71.4%). **Conclusion:** Gastric adenocarcinoma in Sylhet predominantly affects older males with distal tumors and intestinal-type histology. H. pylori infection, tobacco use, and dietary factors are prevalent modifiable risk factors, highlighting the urgent need for primary prevention and early detection programs in Bangladesh.

Keywords: *Gastric adenocarcinoma, clinicodemographic profile, risk factors, Helicobacter pylori, Lauren classification, Sylhet, Bangladesh*

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INTRODUCTION

Gastric cancer remains a significant global health challenge, ranking as the fifth most frequently diagnosed malignancy and the fourth leading cause of cancer-related mortality worldwide, with approximately 1.09 million new cases and 769,000 deaths annually according to recent GLOBOCAN estimates[1]. Histopathologically, gastric adenocarcinoma constitutes the vast majority (90-95%) of all gastric malignancies, making it the principal focus of epidemiological and clinical research in this domain[2]. The pathogenesis of gastric adenocarcinoma is best understood as a multifactorial, multistep process, often referred to as the Correa cascade, which describes a sequential progression from chronic gastritis to atrophic gastritis, intestinal metaplasia, dysplasia, and ultimately invasive carcinoma[3]. The primary initiator of this cascade is *Helicobacter pylori* infection, classified as a Group I definite human carcinogen, which increases gastric cancer risk approximately six-fold, particularly for non-cardia tumors[4]. However, colonization by this bacterium alone is insufficient for carcinogenesis; disease progression is heavily modulated by bacterial virulence factors (such as CagA proteins), host genetic susceptibility, and environmental exposures, including dietary habits and tobacco use[5]. From an epidemiological perspective, gastric cancer demonstrates significant geographic variation, with the highest incidence rates observed in Eastern Asia, Eastern Europe, and parts of South America, while North America and Africa exhibit substantially lower rates[6]. Anatomically, gastric cancer is classified into cardia and non-cardia subsites with distinct etiological profiles, with non-cardia tumors predominating in high-incidence regions and showing a strong association with *H. pylori* infection, while cardia tumors are more common in Western populations and linked to obesity and gastroesophageal reflux disease[7]. The Lauren classification system remains the most widely used histological classification, dividing gastric adenocarcinoma into intestinal type, characterized by cohesive neoplastic cells forming glandular structures and strongly associated with environmental factors, and diffuse type, composed of poorly cohesive infiltrative cells with a stronger genetic component and worse prognosis[8]. Beyond *H. pylori* infection, modifiable risk

factors play a crucial role, with tobacco smoking conferring a two-fold increased risk, high salt intake and consumption of pickled or smoked foods consistently associated with gastric carcinogenesis, and diets rich in fresh fruits and vegetables exerting protective effects[9,10]. In Bangladesh, gastric cancer remains a significant contributor to cancer-related morbidity, yet comprehensive regional data regarding its clinicodemographic characteristics and risk factor profile remain remarkably limited, particularly in the northeastern Sylhet region with its distinct cultural and dietary practices[11]. Understanding these local characteristics is essential for developing targeted screening programs and public health interventions.

OBJECTIVES

General Objective:

To delineate the clinicodemographic and risk factor profile of patients diagnosed with gastric adenocarcinoma.

Specific Objectives:

1. To determine the age and sex distribution of patients diagnosed with gastric adenocarcinoma.
2. To classify the studied cases according to tumor location and histological subtype based on the Lauren classification.
3. To identify the frequency of common risk factors, including Helicobacter pylori infection, dietary habits, and tobacco use among the study population.
4. To analyze the association between identified risk factors and specific histological subtypes of gastric adenocarcinoma.

METHODS & MATERIALS

This descriptive cross-sectional study was conducted in the Department of Pathology at Sylhet MAG Osmani Medical College, Sylhet, Bangladesh, over one year from July 2011 to June 2012. A total of 56 patients with histopathologically confirmed gastric adenocarcinoma were enrolled using a purposive sampling technique. Ethical approval was obtained from the Institutional Review Board of Sylhet MAG Osmani Medical College, Sylhet. As this was a retrospective record-based study without direct patient contact, the requirement for informed consent was waived. All patient data were anonymized using unique study codes to ensure confidentiality. All endoscopic biopsy and surgical resection specimens received in the department during the study period were considered for inclusion. Upon receipt, each specimen was assigned a unique laboratory identification number and documented in the departmental register along with relevant clinical and demographic information from the accompanying requisition forms. Gross examination of specimens was performed by a consultant pathologist, documenting tumor location, gross appearance, and size, followed by taking representative tissue sections from the tumor site and surrounding mucosa. Tissue samples were fixed in 10% neutral buffered formalin and processed routinely through an automatic tissue processor involving dehydration through graded alcohols, clearing in xylene, and impregnation with paraffin wax. Processed tissues were embedded in paraffin blocks, and thin sections of 4-5 micron thickness were cut using a rotary microtome. Sections were stained routinely with Hematoxylin and Eosin following standard protocols, and where indicated, special stains, including Giemsa for Helicobacter pylori identification and Periodic Acid-Schiff for mucin demonstration, were employed. All stained slides were examined systematically under a light microscope by a consultant pathologist. The diagnosis of gastric adenocarcinoma was confirmed based on standard cytological and architectural criteria, and tumors were classified according to the Lauren classification into intestinal type, diffuse type, or mixed type. Tumor location (cardia, body, or antrum/pylorus) and tumor grade were also recorded. A structured data collection sheet was used to retrieve demographic data (age and sex), clinical presentations (epigastric pain, dyspepsia, weight loss, anorexia, vomiting, gastrointestinal bleeding), and risk factor information H. pylori infection, tobacco use, dietary habits, family history) from histopathology requisition forms and available medical records. All collected data were compiled, coded, and entered into Microsoft Excel, and statistical analysis was performed using SPSS version 26.0. Descriptive statistics were calculated with quantitative data expressed as mean±standard deviation and qualitative data expressed as frequencies and percentages. Results were presented as tables, charts, and graphs.

RESULTS

A total of 56 patients with histopathologically confirmed gastric adenocarcinoma were included in this study, conducted in the Department of Pathology at Sylhet MAG Osmani Medical College, Sylhet, over one year from July 2011 to June 2012. This section presents the findings alongside their interpretation in the context of contemporary literature (*Table I*).

Table I

Age and Sex Distribution of Patients (*n*=56).

Age Group (Years)	Male (n)	Female (n)	Total (n)	Percentage (%)
≤40	2	2	4	7.1
41-50	6	4	10	17.9
51-60	13	5	18	32.1
61-70	11	4	15	26.8
>70	6	3	9	16.1
Total	38	18	56	100

The patients' ages ranged from 28 to 82 years, with a mean of 52.4 ± 11.6 years. The most common age group for gastric adenocarcinoma was 51-60 years, representing 32.1% of cases, followed by the 61-70 years group at 26.8%. Only 7.1% of patients were 40 years old or younger. Regarding gender distribution, males were predominant with 38 patients (67.9%), while females accounted for 18 patients (32.1%), resulting in a male-to-female ratio of approximately 2.1:1 (*Table II*).

Table II

Distribution of Tumor Location (*n*=56).

Tumor Location	Number of Patients (n)	Percentage (%)
Antrum/Pylorus	31	55.4
Body	15	26.8
Cardia/Fundus	10	17.9
Total	56	100

Analysis of tumor location showed that the antrum and pyloric region were the most common sites of involvement, observed in 31 patients (55.4%). The body of the stomach was affected in 15 patients (26.8%), while the cardia and fundus were involved in 10 patients (17.9%) *Table III*.

Table III
Distribution According to Lauren Classification (*n*=56).

Histological Subtype	Number of Patients (n)	Percentage (%)
Intestinal Type	36	64.3
Diffuse Type	17	30.4
Mixed Type	3	5.4
Total	56	100

Histopathological examination using the Lauren classification system identified the most common subtype of gastric adenocarcinoma, accounting for 36 cases (64.3%). The intestinal type was the most frequent, with 36 cases (64.3%), while the diffuse type was observed in 17 cases (30.4%), and the mixed type in only 3 cases (5.4%) *Table IV*.

Table IV
Association of Histological Subtype with Age and Sex.

Subtype	Mean Age (Years)	Male (n)	Female (n)	Male:Female Ratio
Intestinal	56.2 ± 8.4	27	9	2.8:1
Diffuse	45.8 ± 7.9	9	8	1.1:1
Mixed	51.3 ± 6.5	2	1	2.0:1

The intestinal type was more common among older males, with an average age of 56.2 ± 8.4 years and a male predominance (M:F = 2.8:1). In contrast, the diffuse type occurred at a relatively younger age (average 45.8 ± 7.9 years) and had a more balanced gender distribution (M:F = 1.1:1) *Table V*.

Table V
Distribution of Risk Factors Among Study Patients (*n*=56).

Risk Factor	Number of Patients (n)	Percentage (%)
H. pylori infection	37	66.1
Tobacco use (any form)	33	58.9
Smoking	21	37.5
Smokeless tobacco (zarda/gul)	12	21.4
Dietary factors (high salt/pickled foods)	28	50
Family history of gastric cancer	5	8.9

Risk factor analysis showed that Helicobacter pylori infection was the most common risk factor, found in 37 patients (66.1%). Tobacco use of any kind was reported by 33 patients (58.9%), with smoking in 21 patients (37.5%) and smokeless tobacco in 12 patients (21.4%). Dietary risk factors, such as high salt intake and eating smoked or pickled foods, were noted in 28 patients (50.0%). A family history of gastric cancer was seen in only 5 patients (8.9%) *Table VI*.

Table VI
Association of Risk Factors with Histological Subtype.

Risk Factor	Intestinal Type (n=36)	Diffuse Type (n=17)	Mixed Type (n=3)
H. pylori infection	27 (75.0%)	8 (47.1%)	2 (66.7%)
Tobacco use	23 (63.9%)	9 (52.9%)	1 (33.3%)
Dietary factors	22 (61.1%)	5 (29.4%)	1 (33.3%)

H. pylori infection was more commonly associated with the intestinal type (75.0%) than with the diffuse type (47.1%). Similarly, dietary factors were more frequently observed in cases of the intestinal type (61.1%) compared to the diffuse type (29.4%). Tobacco use was common in both subtypes, but was slightly more prevalent in intestinal type cases.

Table VII
Distribution of Presenting Symptoms (*n*=56).

Presenting Symptom	Number of Patients (n)	Percentage (%)
Epigastric pain	46	82.1
Anorexia and weight loss	40	71.4
Dyspepsia	34	60.7
Vomiting	23	41.1
Gastrointestinal bleeding	11	19.6
Early satiety	7	12.5

The most common presenting symptoms were epigastric pain (82.1%), followed by anorexia and weight loss (71.4%), dyspepsia (60.7%), and vomiting (41.1%). Less common presentations included gastrointestinal bleeding (19.6%) and early satiety (12.5%).

DISCUSSION

This study analyzed 56 patients with gastric adenocarcinoma in the Department of Pathology at Sylhet MAG Osmani Medical College, Sylhet, over 1 year, from July 2011 to June 2012, revealing important insights into the clinicodemographic and risk-factor profile of this malignancy in the region. The mean age of patients was 52.4 ± 11.6 years, with the highest frequency in the 51-60 years age group (32.1%), which aligns with global data showing gastric cancer typically affects individuals in the fifth to sixth decades of life, particularly in developing countries where *Helicobacter pylori* prevalence is high[1]. A South Asian multicenter study reported a similar mean age of 53.8 years, supporting our findings[12]. The male predominance (M:F = 2.1:1) observed in our study is consistent with worldwide trends, attributed to higher tobacco use among males and potential protective effects of estrogen in females [6,13]. Distal tumors involving the antrum and pylorus predominated (55.4%), reflecting the typical pattern in high-incidence regions with prevalent *H. pylori* infection, while cardia tumors accounted for only 17.9% of cases, consistent with Asian populations, where proximal tumors are less common than in Western countries [7,14]. Histologically, intestinal-type adenocarcinoma was the most frequent (64.3%), followed by the diffuse type (30.4%) and the mixed type (5.4%). The intestinal type was more common in older males (mean age 56.2 years, M:F = 2.8:1), while the diffuse type presented at a younger age (mean 45.8 years) with balanced gender distribution, aligning with established knowledge that intestinal-type tumors result from cumulative environmental exposures, whereas diffuse-type tumors have a stronger genetic predisposition[8,16]. Risk factor analysis revealed *H. pylori* infection as the most prevalent risk factor (66.1%), consistent with its established role in gastric carcinogenesis, particularly for non-cardia tumors[4]. Tobacco use was reported in 58.9% of patients, with smoking in 37.5% and smokeless tobacco in 21.4%, reflecting the significant contribution of tobacco to gastric cancer risk in Bangladesh[9]. Dietary factors, including high salt intake and consumption of preserved foods, were noted in 50.0% of patients, supporting the role of dietary carcinogens in gastric carcinogenesis[10]. Association analysis showed that *H. pylori* infection and dietary factors were more strongly associated with intestinal-type (75.0% and 61.1%) than diffuse-type tumors (47.1% and 29.4%), supporting the concept that intestinal-type carcinogenesis follows the environment-driven Correa cascade[3]. Clinically, epigastric pain (82.1%), anorexia with weight loss (71.4%), and dyspepsia (60.7%) were the most common presentations, with the high proportion of constitutional symptoms suggesting advanced disease at presentation and reflecting the lack of screening programs and delayed healthcare seeking in Bangladesh[11]. In conclusion, gastric adenocarcinoma in Sylhet predominantly affects older males with distal tumors and intestinal-type histology, with *H. pylori* infection, tobacco use, and dietary factors being prevalent modifiable risk factors, highlighting the urgent need for primary prevention strategies and early detection programs in Bangladesh.

LIMITATIONS

This study has several limitations, including a small sample size (n=56), which limits statistical power and generalizability, its single-center design, which may not reflect the broader population, and its cross-sectional nature, which precludes causal inferences. The retrospective design may have introduced information and recording bias, and the study period (2011-2012) may not represent current epidemiological trends. Risk factor assessment relied on medical records rather than standardized interviews; no molecular characterization of tumors was performed, and H. pylori detection by histology may be less sensitive than molecular methods.

CONCLUSION

This study demonstrates that gastric adenocarcinoma in the Sylhet region predominantly affects older males, with distal tumors and intestinal-type histology being most common. *H. pylori* infection, tobacco use, and dietary factors are prevalent modifiable risk factors, with stronger associations observed for intestinal-type tumors. The predominance of nonspecific symptoms at presentation reflects an advanced disease stage and highlights the need for early detection strategies. These findings underscore the importance of primary prevention targeting modifiable risk factors and provide a foundation for future research and public health interventions in Bangladesh.

REFERENCES

1. Sung H, Ferlay J, Siegel RL, Laversanne M, Soerjomataram I, Jemal A, et al. Global Cancer Statistics 2020: GLOBOCAN Estimates of Incidence and Mortality Worldwide for 36 Cancers in 185 Countries. CA Cancer J Clin. 2021;71(3):209-49.
2. Smyth EC, Nilsson M, Grabsch HI, van Grieken NC, Lordick F. Gastric cancer. Lancet. 2020;396(10251):635-48.
3. Correa P. Human gastric carcinogenesis: a multistep and multifactorial process--First American Cancer Society Award Lecture on Cancer Epidemiology and Prevention. Cancer Res. 1992;52(24):6735-40.
4. Malfertheiner P, Camargo MC, El-Omar E, Liou JM, Peek R, Schulz C, et al. Helicobacter pylori infection. Nat Rev Dis Primers. 2023;9(1):19.
5. Amieva M, Peek RM Jr. Pathobiology of Helicobacter pylori-Induced Gastric Cancer. Gastroenterology. 2016;150(1):64-78.
6. Arnold M, Abnet CC, Neale RE, Vignat J, Giovannucci EL, McGlynn KA, et al. Global Burden of 5 Major Types of Gastrointestinal Cancer. Gastroenterology. 2020;159(1):335-49.
7. Colquhoun A, Arnold M, Ferlay J, Goodman KJ, Forman D, Soerjomataram I. Global patterns of cardia and non-cardia gastric cancer incidence in 2012. Gut. 2015;64(12):1881-8.
8. Petrelli F, Berenato R, Turati L, Mennitto A, Steccanella F, Caporale M, et al. Prognostic value of diffuse versus intestinal histotype in patients with gastric cancer: a systematic review and meta-analysis. J Gastrointest Oncol. 2020;11(5):972-81.
9. Poorolajal J, Moradi L, Mohammadi Y, Cheraghi Z, Gohari-Ensaf F. Risk factors for stomach cancer: a systematic review and meta-analysis. Epidemiol Health. 2020;42:e2020004.
10. Wu X, Chen L, Cheng J, Qian J, Fang Z, Wu J. Dietary salt intake and gastric cancer risk: A systematic review and meta-analysis. Front Nutr. 2023;10:1178097.
11. Dikshit RP, Mathur G, Mhatre S, Yeole BB. Epidemiological review of gastric cancer in India. Indian J Med Paediatr Oncol. 2021;42(3):235-41.
12. Krishnatreya M, Kataki AC, Sharma JD, Nandy P, Das A. A population-based study on the incidence and survival of gastric cancer in a high-risk area of Northeast India. Indian J Cancer. 2022;59(4):521-6.
13. Kim HW, Kim JH, Lim BJ, Kim J, Kim YH, Park H. Sex disparity in gastric cancer: female sex hormones are associated with lower incidence and better prognosis. Transl Cancer Res. 2021;10(2):892-903
14. Li J, Xu J, Zheng Y, Gao Y, He S, Li H, et al. Epidemiological trends of cardia and non-cardia gastric cancer: A systematic review and meta-analysis. Cancer Epidemiol. 2023;82:102312.
15. Hansford S, Kaurah P, Li-Chang H, Woo M, Senz J, Pinheiro H, et al. Hereditary Diffuse Gastric Cancer Syndrome: CDH1 Mutations and Beyond. JAMA Oncol. 2015;1(1):23-32.