SAS Journal of Surgery
Abbreviated Key Title: SAS J Surg
ISSN 2454-5104
Journal homepage: https://www.saspublishers.com

OPEN ACCESS

Surgery

Evaluation of Risk Factors Associated with the Development of Gastric Malignancy

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DOI: https://doi.org/10.36347/sasjs.2025.v11i05.038 | **Received:** 15.04.2025 | **Accepted:** 22.05.2025 | **Published:** 29.05.2025

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Abstract **Original Research Article**

Background: Gastric cancer is a common and deadly malignancy. Its development involves multiple factors, including dietary habits, genetic predisposition, and infections such as Helicobacter pylori. Understanding these contributors is crucial for prevention and treatment strategies. ***Objective:*** To evaluate the risk factors associated with the development of gastric malignancy. ***Methods:*** This descriptive case series study was conducted across all three surgical units of the general surgery ward at Shaheed Ziaur Rahman Medical College Hospital, Bogura, Bangladesh, from July 2010 to December 2011. A total of 75 consecutive cases of gastric malignancy were included, with consecutive exhaustive sampling used for selection. The study received approval from the hospital's ethical committee. Data were analyzed using MS Office and statistical tools. ***Results:*** This study of 75 gastric cancer patients revealed that 68% were males aged 50-60 years, with 54.7% from low socioeconomic backgrounds. Blood group A predominated (52%), and 81% were smokers. Adenocarcinoma comprised 92% of cases. Alarmingly, 80% presented with inoperable disease, while only 20% underwent curative resection. Common symptoms included weight loss (68%), anorexia (84%), and abdominal pain (73.3%). These findings highlight late diagnosis patterns and significant risk factors in our population. ***Conclusion:*** In conclusion, this study suggests that age, sex, occupation, economic status, blood group, and smoking habits may significantly contribute to the risk of gastric malignancy in our population. However, a nationwide, large-scale study is necessary to validate these findings and establish definitive associations.

Keywords: Adenocarcinoma, Anorexia, Gastric malignancy, Jaundice, Pain, Vomiting.

INTRODUCTION

Gastric cancer continues to be a major global health concern, ranking as the fifth most commonly diagnosed cancer and the fourth leading cause of cancer-related deaths worldwide. Recent estimates indicate there are over 1 million new cases and approximately 769,000 deaths annually from this disease [1]. The incidence of gastric cancer shows remarkable geographical variation, with the highest rates observed in Eastern Asia (particularly China, Japan, and Korea), Eastern Europe, and parts of South America [2,3]. While developed nations have seen declining rates, attributed to better food preservation, reduced Helicobacter pylori infections, and improved diagnostics [4], low- and middle-income countries like Bangladesh face persistent challenges due to late detection and limited treatment options [5]. The development of gastric cancer involves multiple interacting factors. Chronic infection with Helicobacter pylori, classified as a Group 1 carcinogen by the World Health Organization, is a well-documented risk factor that can lead to chronic gastritis and subsequent malignant changes [6,7]. Dietary patterns significantly influence risk, with high consumption of salted, smoked, and pickled foods increasing susceptibility, while diets rich in fresh fruits and vegetables appear protective [8,9]. Lifestyle factors, including tobacco use and alcohol consumption, have been consistently associated with elevated risk, particularly for non-cardia gastric tumors [10]. Genetic factors contribute to gastric cancer susceptibility, with about 5-10% of cases showing familial clustering. Hereditary diffuse gastric cancer syndrome, linked to

CDH1 gene mutations, represents one such inherited form [11]. Blood group antigens, especially type A, may influence risk through effects on mucosal protection and immune function [12]. Socioeconomic status emerges as another important determinant, with lower income and education levels correlating with increased risk, likely due to poorer nutrition and limited healthcare access [13]. In Bangladesh, where gastric cancer is often diagnosed at advanced stages, understanding local risk patterns is crucial for developing effective prevention strategies [14]. However, most existing research comes from high-income countries, leaving significant gaps in knowledge about risk factors in Bangladeshi populations [15]. This study examines risk factors for gastric malignancy in a Bangladeshi population, with particular attention to demographic characteristics, lifestyle factors, and clinical variables. By identifying high-risk groups, we aim to inform targeted screening approaches and prevention policies appropriate for resource-limited settings.

METHODOLOGY

This descriptive case series study was conducted across all three surgical units of Shaheed Ziaur Rahman Medical College Hospital, Bogura, Bangladesh, from July 2010 to December 2011. We enrolled 75 consecutive gastric malignancy cases using consecutive exhaustive sampling. Ethical approval was obtained from the hospital's committee, and informed consent (both verbal and written) was secured from all participants. Diagnosis was confirmed through a comprehensive evaluation including medical history, clinical examination, and diagnostic tests. Tissue diagnosis was obtained either endoscopically or during laparotomy, with histopathological confirmation. We collected data on age, sex, socioeconomic status, blood group, and smoking history. Inclusion criteria comprised: [1] gastric malignancy regardless of age/sex, and [2] histopathologically confirmed cases. We excluded patients with non-gastric primary malignancies and those refusing histopathological confirmation. Data analysis was performed using Microsoft Office tools. The study aimed to evaluate demographic and clinical characteristics of gastric cancer patients in this regional population.

RESULT

The study included 75 gastric cancer patients aged 41-80 years, with the majority (68%) between 50-60 years. Male predominance was observed (68% vs 32% female). Blood group distribution showed: A (52%), B (28%), AB (14.7%), and O (5.3%). Socioeconomic analysis revealed 54.7% belonged to lower-lower class, 30.7% upper-lower class, and 14.7% lower-middle class. Occupational distribution indicated farmers comprised the largest group (50.7%), followed by day laborers (28%). Histopathological examination identified adenocarcinoma in 92% of cases, with rare variants including adenosquamous carcinoma (6.7%) and primary lymphoma (1.3%). Clinical presentations included: abdominal pain (73.3%), anorexia (84%), nausea (79%), vomiting (62.7%), weakness (96%), weight loss (68%), and early satiety (81%). Physical examination findings showed anemia in 96% of patients, jaundice (22.7%), dehydration (30.7%), ascites (28%), and Virchow's gland (8%). Diagnostic procedures included endoscopy with biopsy (66.7%), laparotomy with biopsy (33.3%), and ultrasonography (100%). CT scans were performed in 58.7% for staging. Tumor locations were: cardia (8%), body (12%), and antrum/pylorus (80%). Smoking history revealed 81% smokers and 7% heavy smokers. Surgical management was possible in only 20% of cases (15 patients), with curative gastrectomy performed. The remaining 80% (60 patients) were inoperable, with 64% receiving palliative gastrojejunostomy.

Table 1: Demographic characteristics (N=75)

Characteristics	n	%
Age		
41-50	10	13.3%
51-60	42	56.0%
61-70	18	24.0%
71-80	5	6.7%
Gender		
Male	51	68.0%
Female	24	32.0%
Blood group		
A	39	52.0%
B	21	28.0%
AB	11	14.7%
O	4	5.3%

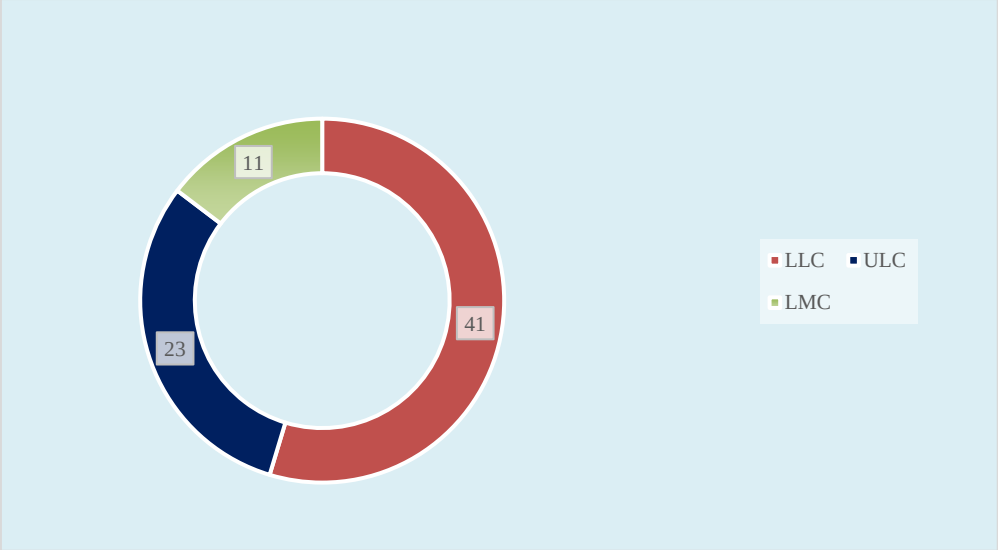

Figure I: Ring chart showed socio-economic condition of the patient (N=75)

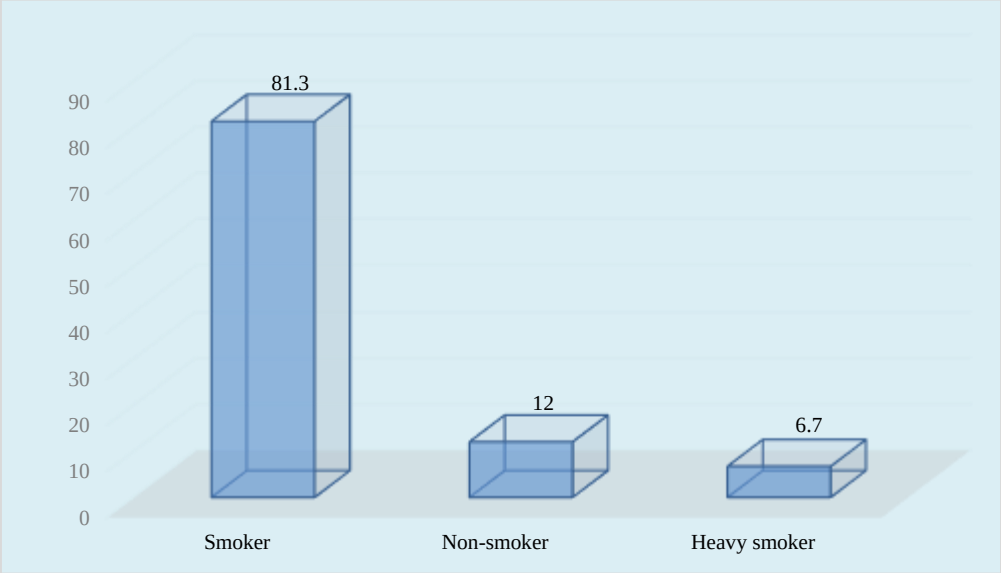

Figure II: Column chart showed smoking habit of the patient (N=75)

Table 2: Occupational distribution (N=75)

Occupation	n	%
Farmers	38	50.7%
Day labourers	21	28.0%
Driver	5	6.7%
Shopkeepers	5	6.7%
House wives	4	5.3%
Sales man	1	1.3%
Service holder	1	1.3%

Table 3: Histopathological diagnosis of gastric malignancy (N=75)

Histopathological types	n	%
Adenocarcinoma	69	92.0%
Adenosquamous carcinoma	5	6.7%
Primary Lymphoma	1	1.3%

Table 4: Clinical findings (N=75)

Findings	n	%
Symptoms		
Pain	48	64.0%
Vomiting	47	62.7%
Anorexia	63	84.0%
Nausea	54	72.0%
Weakness	72	96.0%
Early satiety	57	76.0%
Significant weight loss	51	68.0%
Sign		
Anaemia	64	85.3%
Jaundice	17	22.7%
Dehydration	23	30.7%
Electrolyte imbalance	11	14.7%
Ascites	31	41.3%
Virchow's gland positive	6	8.0%
Sister Joseph Mary nodule	0	0.0%
Succussion splash positive	22	29.3%
Lump in the epigastrium	17	22.7%

Table 5: Findings of investigations (N=75)

Investigations	n	%
Name of investigation		
Endoscopy of the upper GIT	50	66.7%
Biopsy taken with an Endoscopic Procedure	50	66.7%
Biopsy taken during laparotomy	25	33.3%
USG of the whole abdomen	75	100.0%
CT scan of the whole abdomen	44	58.7%
Site of lesion		
Cardiac end/esophagogastric junction	4	5.3%
Body of stomach	6	8.0%
Antrum & pylorus	40	53.3%

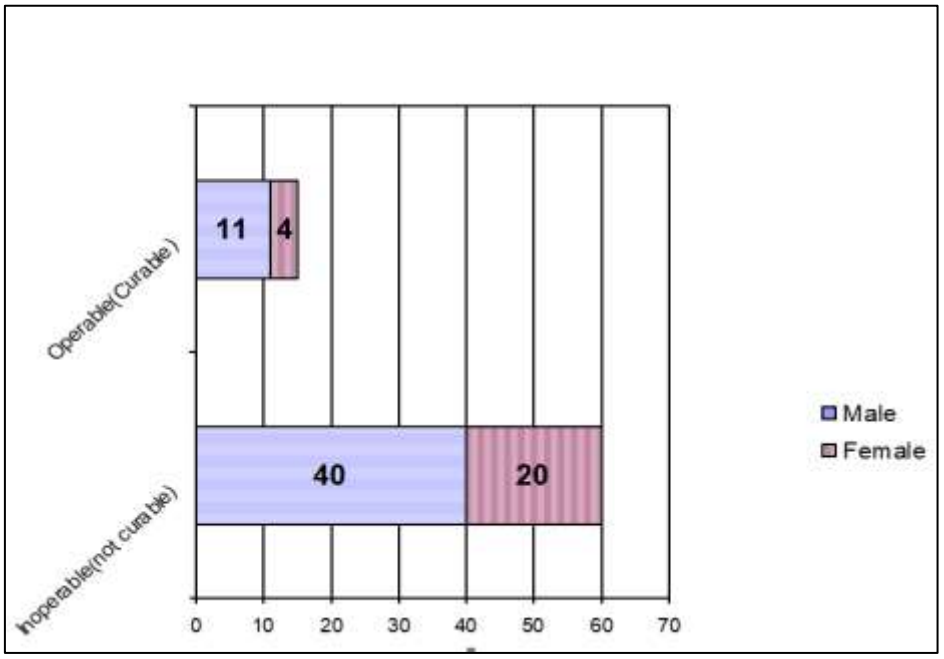

Figure III: Operability and non-operability of the patients (N=75)

Table 6: Curative, palliative operations, and non-operated cases (N=75)

Variables	n	%	Remarks
Total operation	60	80.0%	Both curative and palliative
Curative operation	15	20.0%	Total/Lower radical gastrectomy
Palliative operation	48	64.0%	Gastrojejunostomy.
Not operated	12	16.0%	Due to a lack of fitness, consent & other causes.

DISCUSSION

Here is the revised discussion section without subheadings or bold symbols, with citations starting from [16]. The findings of this study contribute valuable insights into the epidemiological and clinical characteristics of gastric cancer in a Bangladeshi population. The observed age distribution, with most patients between 50-60 years, aligns with regional studies showing gastric cancer predominantly affects older adults in South Asia [16]. The male predominance (68%) in our study is consistent with global patterns where gastric cancer incidence is consistently higher in males, possibly due to gender differences in exposure to risk factors such as smoking and occupational hazards [17]. A particularly concerning finding was the strong association with lower socioeconomic status, with over 85% of patients belonging to lower socioeconomic classes. This correlation has been well-documented in other developing nations and likely reflects multiple factors including poor nutrition, limited healthcare access, and higher prevalence of Helicobacter pylori infection in impoverished communities [18]. The occupational distribution, showing high rates among farmers and day laborers, suggests potential environmental and occupational exposures that warrant further investigation in this population [19]. The blood group distribution in our patients, with blood group A being most prevalent (52%), supports existing evidence suggesting a possible genetic predisposition associated with ABO blood antigens [20]. The overwhelming predominance of adenocarcinoma (92%) matches global histopathological patterns, while the rare variants observed (adenosquamous carcinoma and primary lymphoma) occur at frequencies similar to those reported in other populations [21]. Clinical presentation patterns in our study were concerning, with most patients reporting nonspecific but persistent symptoms including anorexia (84%), weight loss (68%), and early satiety (81%). The high proportion of inoperable cases (80%) at diagnosis reflects the advanced stage at presentation, a common challenge in low-resource settings where diagnostic delays are frequent [22]. The nearly universal presence of anemia (96%) among patients further emphasizes the chronic nature and late detection of disease in this population. The strong association with smoking (81% of patients) reinforces the established link between tobacco use and gastric cancer risk, particularly for non-cardia tumors [23]. This finding highlights an important modifiable risk factor that could be targeted through public health interventions. The diagnostic challenges are evident in our results, with only two-thirds of patients undergoing endoscopic biopsy and slightly more than half receiving CT staging. The low rate of curative resection (20%) and high proportion requiring palliative procedures (64%) reflect the advanced disease stage at presentation and underscore the need for earlier detection strategies [24]. These findings have important implications for gastric cancer management in Bangladesh. First, they highlight the need for improved diagnostic capabilities to enable earlier detection. Second, they identify specific high-risk populations (lower socioeconomic groups, smokers, certain occupational groups) that could benefit from targeted screening. Third, they emphasize the importance of public education about early warning signs of gastric cancer. Finally, they point to the need for further research into region-specific risk factors, including dietary patterns, environmental exposures, and Helicobacter pylori prevalence [25].

LIMITATIONS OF THE STUDY

This study had several limitations: a small sample size, a single-center design limiting generalizability, potential recall bias in risk factor assessment, and a lack of Helicobacter pylori testing. Additionally, the cross-sectional nature prevented evaluation of causal relationships between identified risk factors and gastric cancer development.

CONCLUSION

Gastric cancer remains prevalent in Bangladesh, particularly affecting underprivileged males (51-60 years) with blood group A, smoking history, and low socioeconomic status. Most patients present at advanced stages with poor outcomes. Key risk factors include age, sex, occupation, economic status, blood group, and smoking. While this study identifies important associations, nationwide research is needed to confirm findings. Early detection programs based on risk factor identification could significantly improve gastric cancer management globally.

RECOMMENDATIONS

To reduce the gastric cancer burden in Bangladesh, we recommend: (1) targeted screening for high-risk groups (smokers, blood group A, low-income males aged 50+), (2) public awareness campaigns on early symptoms, and (3) improved diagnostic infrastructure. Nationwide studies should validate these findings to guide national cancer control strategies.

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