

Clinical profile and epidemiology of gastric cancer patients



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ABSTRACT

Background: Gastric cancer remains a major global health concern, contributing significantly to cancer-related mortality. Its burden is particularly high in Asia, including India. **Aims and Objectives:** This retrospective study aimed to analyze the clinical characteristics, treatment outcomes, and survival patterns of patients with gastric cancer treated at the Regional Cancer Centre, Tirunelveli. **Materials and Methods:** This retrospective study included 114 patients with gastric cancer. Clinical data were collected from stored case records which contained detailed medical evaluations, including endoscopic biopsies, imaging studies, and histopathological analyses. Patients were treated with a combination of curative surgeries, neoadjuvant, adjuvant, and palliative chemotherapies based on the disease stage. Demographics, tumor location, histological subtypes, and treatment modalities were analyzed using descriptive statistical methods. **Results:** Most patients (33.44%) were aged - 50–59 years and 62.64% were male. The antrum was the most common tumor site (66%), and adenocarcinoma was the predominant histological type (92.40%). Most patients were diagnosed with advanced disease, with 39.60% in stage-induced vertical break and 18.48% in stage Isovaleric acidemia disease. Liver metastasis was the most frequent site of distant spread (48.88%). Regarding treatment, 48.40% of the patients received palliative chemotherapy, and 29.92% underwent radical surgery. Survival outcomes showed that 47.5% of patients with metastatic gastric cancer patients survived for 7–12 months, with 22.5% surviving beyond 13 months. **Conclusions:** The study underscores the late presentation of gastric cancer in this cohort and emphasizes the need for early detection and public awareness. Multidisciplinary management, including surgery, chemotherapy, and palliative care, is essential.

Key words: Gastric cancer; Adenocarcinoma; Epidemiology; Clinical profile; Treatment outcomes; Survival; Incidence

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INTRODUCTION

Gastric cancer is a highly lethal disease and currently ranks as the fifth leading cause of cancer-related deaths, with an estimated 660,175 deaths annually. Gastric cancer incidence, mortality, and 5-year prevalence are highest in Asia, followed by Europe, with lower rates in Latin America, Africa, North America, and Oceania. Incidence varies widely, from 35.5/100,000 in Mongolia to under 5/100,000 in the U.S., Mozambique, and Maldives. India reported 64,611 cases in 2022.¹ The age-adjusted incidence rate (ASR) also shows

significant regional variations. In India, the stomach cancer incidence is 21% in males and 14.8% in females, whereas in Nepal, it is 7.3% and 4.4%, respectively. Aizawl district has a notable ASR of 44.2 in males.²

Gastric cancer is a major concern globally. A systematic review identified 52 risk factors across nine categories, including older age, male sex, low socioeconomic status, poor diet, lifestyle habits, family history, *Helicobacter pylori* infection, prior gastric conditions, occupational exposures (cement, mineral dust, chrome), and ionizing radiation.³

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Stomach cancer is categorized into cardia stomach cancer, which develops in the upper part of the stomach, and non-cardia stomach cancer, which occurs in other regions of the stomach. These types differ in their epidemiological characteristics and underlying causes.⁴ Infection with *H. pylori* is the primary risk factor, contributing to nearly 89% of non-cardia gastric cancer cases. Dietary habits also play a crucial role, with excessive intake of salty and smoked foods increasing the risk, while a diet abundant in fresh fruits and vegetables offers a protective effect.⁵ In addition, both smoking and alcohol consumption have been consistently linked to an increased risk of gastric cancer.⁶

Gastric cancer patients often experience persistent abdominal pain, weight loss, bloating, nausea, and vomiting. Dysphagia suggests cardiac involvement, while gastrointestinal (GI) bleeding may result from tumor ulceration. Metastases commonly affect the liver, peritoneum, and lymph nodes, causing anorexia, jaundice, ascites, and hepatomegaly.⁷ Patients with suspected gastric cancer should undergo upper endoscopy for tissue diagnosis through biopsy. Endoscopic ultrasound aids in staging, and biopsy confirms metastatic sites. Contrast-enhanced computed tomography (CECT) is preferred for imaging, whereas positron emission tomography-CT and staging laparoscopy help assess resectability. Serum markers have limited diagnostic value, and paracentesis is needed for ascites.⁸

The treatment strategy for gastric cancer is determined by the precise pre-operative staging. Treatment options include endoscopic resection for superficial disease confined to the mucosa, upfront surgery with lymphadenectomy for early gastric cancer cases, and neoadjuvant or adjuvant chemotherapy for locally advanced cases. Radiation therapy or a combination approach is used for resectable tumors, while palliative systemic therapy is recommended for locally advanced, unresectable, or metastatic disease.⁸ Gastric cancer treatment has evolved with new immunotherapies and targeted therapies. Systemic chemotherapy remains the main approach for metastatic gastric cancer (mGC), with conventional chemotherapy providing a median overall survival of about 12 months.⁹ This retrospective study aimed to analyze the clinical characteristics, treatment outcomes, and survival patterns of patients with gastric cancer treated at the Regional Cancer Centre, Tirunelveli.

Aims and objectives

1. To analyze the clinical characteristics, treatment outcomes, and survival patterns of patients with gastric cancer treated at the Regional Cancer Centre, Tirunelveli.
2. To evaluate the impact of various treatment modalities, including surgeries, chemotherapy, and palliative care, on patient outcomes.

MATERIALS AND METHODS

This retrospective study reviewed data from 114 patients with gastric cancer who were treated at the Department of Medical Oncology, Regional Cancer Centre, Tirunelveli, Tamil Nadu, between January 2023 and December 2023.

Inclusion and exclusion criteria

Only patients with confirmed gastric carcinoma were included in this study. Patients with primary gastric lymphoma, gastrointestinal stromal tumors, and gastric melanoma were excluded from the study.

All patients underwent a comprehensive clinical evaluation, including medical history and investigations such as complete hemogram, liver function tests, serum urea, serum creatinine, upper GI endoscopy with guided biopsy, CECT of the whole abdomen and pelvis, chest X-ray, and histopathological analysis of biopsy specimens. The diagnosis was pathologically confirmed by histopathological analysis of either the resected specimen or endoscopic biopsy.

Clinical records were analyzed for demographic information, symptom duration, smoking history, histopathological details, imaging results, and clinical staging. Performance status was assessed using the Eastern Cooperative Oncology Group (ECOG) Scale.

The study measured variables such as age, sex, socioeconomic status, tumor location in the stomach, clinical presentation, histopathology, type of surgery performed, and patient outcomes. Data were analyzed using Microsoft Excel and presented as frequencies and percentages.

RESULTS

The study population consisted of 114 individuals, with the majority aged between 50 and 59 years (33.44%), followed by those aged 60–69 years (28.16%). Males accounted for 62.64% of the population, and females accounted for 36.54%. Most patients were manual laborers (36.96%) or housewives (35.20%). Regarding education, 55.44% had primary education, and 17.60% were illiterate.

Socioeconomically, 69.52% were in the upper-lower class and 84.48% lived in rural areas. Alcohol consumption was reported by 28.16% of patients, and 38.72% had a history of smoking. A family history of cancer was present in 7.04% of the cases. Comorbidities such as diabetes (22.88%), hypertension (13.20%), and various other conditions such as coronary artery disease, chronic obstructive pulmonary disease, and chronic kidney disease were observed in 19.36% of the population (Table 1).

Table 1: Demographic data

| Parameter | Count (n=114) | Percentage |
|-------------------------------|---------------|------------|
| Age (years) | | |
| 20–29 | 1 | 0.88 |
| 30–39 | 2 | 1.76 |
| 40–49 | 28 | 24.64 |
| 50–59 | 38 | 33.44 |
| 60–69 | 32 | 28.16 |
| >70 | 13 | 11.44 |
| Gender | | |
| Male | 72 | 62.64 |
| Female | 42 | 36.54 |
| Occupation | | |
| Farmers | 25 | 22 |
| Manual laborer | 42 | 36.96 |
| Housewife | 40 | 35.20 |
| Others | 7 | 6.16% |
| Education | | |
| Illiterate | 20 | 17.60 |
| Primary education | 63 | 55.44 |
| Secondary education | 27 | 23.76 |
| Graduate | 4 | 3.52% |
| Socioeconomic status | | |
| Upper-Lower | 79 | 69.52 |
| Lower-Middle | 30 | 26.40 |
| Upper-Middle | 5 | 4.40 |
| Residence | | |
| Rural | 96 | 84.48 |
| Urban | 18 | 15.84 |
| Alcohol | | |
| Alcoholic | 32 | 28.16 |
| Non-alcoholic | 82 | 72.16 |
| Smoking | | |
| Present | 44 | 38.72 |
| Absent | 70 | 61.60 |
| Family history | | |
| Present | 8 | 7.04 |
| Absent | 106 | 93.28 |
| Comorbidities | | |
| Diabetes mellitus | 26 | 22.88 |
| Hypertension | 15 | 13.20 |
| Other cancers | 2 | 1.76 |
| Others (CAD/COPD/PTB/CVA/CKD) | 22 | 19.36 |
| Nil | 54 | 47.52 |

CAD: Coronary artery disease, COPD: Chronic obstructive pulmonary disease, PTB: Pulmonary tuberculosis, CVA: Cerebrovascular accident, CKD: Chronic kidney disease

The clinical characteristics of 114 patients with gastric cancer revealed that the most common tumor site was the antrum (66%), followed by the body of the stomach (28.16%). The most common symptoms were abdominal pain (69.52%), nausea/vomiting (52.80%), and weight loss (24.64%). The predominant histopathological type was adenocarcinoma (92.40%). Most patients were diagnosed at advanced stages, with 39.60% in stage IVB and 18.48% in stage IVA. Metastases were primarily found in the liver (48.88%) and peritoneum/omentum (44.44%). Regarding performance status, 57.20% of the patients had an ECOG score of 1. The diagnosis was confirmed through image/endoscopy-guided fine needle

aspiration cytology/biopsy for all patients, with 73.04% also undergoing CECT as part of the evaluation.

Treatments included palliative chemotherapy (48.40%), radical surgery (29.92%), and neoadjuvant chemotherapy (17.60%). Survival time varied, with 47.5% surviving for 7–12 months. Regular follow-up was maintained by 71.28% of the patients, while 29.04% were lost to follow-up. At the time of reporting, 48.40% were still receiving treatment, 16.72% had completed the treatment, and 35.20% had died (Table 2).

The chemotherapy details showed that most patients (41) received 13–18 cycles of chemotherapy, while 37 patients received 4–6 cycles. In addition, 19 patients received 6–12 cycles, 17 received 1–3 cycles, and 16 patients were on metronomic therapy (Table 3).

DISCUSSION

Gastric cancer is one of the most prevalent and lethal cancers. It develops due to a combination of environmental influences and the buildup of specific genetic mutations. Detecting gastric cancer in its early stages is challenging, largely because of the delay between the start of tumor growth and the appearance of noticeable symptoms. Early signs are often non-specific, with many patients initially showing symptoms resembling benign peptic ulcer disease. As a result, a significant number of patients are diagnosed only when the cancer has already progressed to an advanced stage.¹⁰

In our study, most patients affected by gastric cancer were between 50 and 59 years of age (33.44%), followed by the 60–69 years age group (28.16%) and 40–49 years (24.64%). This is consistent with the study by Banik et al.¹¹ Our study revealed that a notable proportion of patients diagnosed with gastric cancer were men (62.64%). This observation is consistent with the results of various international studies by Ferlay et al., and Yaprak et al., which similarly indicated a higher prevalence of gastric cancer among males.^{12,13} Overall, the incidence of gastric cancer tends to be lower in females than in males. Our study also revealed that approximately 7.04% of patients had a family history of the disease, a finding consistent with another study.¹⁴

In our study, the most frequent symptom was epigastric pain, occurring in 69.52% of patients, either individually or together with vomiting and weight loss. This was followed by vomiting (52.80%), weight loss (24.64%), and anorexia (19.36%). Kabir et al., reported similar findings, with abdominal pain, vomiting, and weight loss as the primary symptoms of gastric carcinoma.¹⁵ A study by Saha et al.,

Table 2: Patient clinical characteristics

| Parameter | Count | Percentage |
|------------------------------------|-------|------------|
| Tumor site | | |
| GEJ | 4 | 3.52 |
| Body | 32 | 28.16 |
| Antrum | 75 | 66.00 |
| Linitis plastica | 3 | 2.64 |
| Symptoms/presentation | | |
| Anemia, anorexia, asthenia | 22 | 19.36 |
| Gastric outlet obstruction | 5 | 4.40 |
| GI bleeding | 5 | 4.40 |
| Pain | 79 | 69.52 |
| Abdominal lump | 6 | 5.28 |
| Weight loss | 28 | 24.64 |
| Nausea/Vomiting | 60 | 52.80 |
| Dysphagia | 9 | 7.92 |
| Histopathological type | | |
| Adenocarcinoma | 105 | 92.40 |
| Signet ring cell type | 8 | 7.92 |
| Stage | | |
| I | 3 | 2.64 |
| II | 11 | 9.68 |
| III | 34 | 29.92 |
| IVA | 21 | 18.48 |
| IVB | 45 | 39.60 |
| Metastases | | |
| Ascites/omentum/peritoneum | 20 | 44.44 |
| Lung | 4 | 8.88 |
| Liver | 22 | 48.88 |
| Ovary | 1 | 2.22 |
| Distant lymph node | 8 | 17.78 |
| Bone | 3 | 6.66 |
| ECOG PS | | |
| 1 | 65 | 57.20 |
| 2 | 47 | 41.36 |
| 3 or more | 2 | 1.76 |
| Diagnostic method | | |
| Image/endoscopy-guided FNAC/biopsy | 114 | 100 |
| Ascitic fluid cytology | 2 | 1.76 |
| CECT | 83 | 73.04 |
| MRI | 5 | 4.40 |
| PET-CT | 20 | 17.60 |
| Treatment | | |
| Neoadjuvant chemotherapy | 20 | 17.60 |
| Adjuvant chemotherapy | 34 | 29.92 |
| Palliative chemotherapy | 55 | 48.40 |
| Surgery | | |
| Radical | 34 | 29.92 |
| Palliative | 23 | 20.24 |
| Radiotherapy | 1 | 0.88 |
| Survival time (months) | | |
| 0–6 | 12 | 30 |
| 7–12 | 19 | 47.50 |
| 13–18 | 9 | 22.50 |
| Patient follow-up status | | |
| Regular follow-up | 81 | 71.28 |
| Lost to follow-up | 33 | 29.04 |
| Patient status | | |
| Alive | | |
| On treatment | 55 | 48.40 |
| Completed treatment | 19 | 16.72 |
| Dead | 40 | 35.20 |

CECT: Contrast-enhanced computed tomography, MRI: Magnetic resonance imaging, PET CT: Positron emission tomography-computed tomography, FNAC: Fine needle aspiration cytology, ECOG PS: Eastern cooperative oncology group, IVA: Isovaleric acidemia, IVB: Induced vertical break, GEJ: Gastro-oesophageal junction

showed patients from West Bengal also found abdominal pain to be the most common symptom, followed by indigestion, weight loss, anorexia, and nausea/vomiting.¹⁶

Research indicates that stomach cancer is more prevalent among individuals from lower socioeconomic groups, likely due to factors such as *H. pylori* infection, poor-quality drinking water, and unhygienic living conditions. Similarly, our study showed that 69.52% of the patients were from lower socioeconomic backgrounds. In addition, stomach cancer has been linked to smoking and alcohol consumption. A substantial proportion of patients came from lower socioeconomic groups, including laborers and farmers, reflecting the well-established global association between low socioeconomic status and an increased risk of gastric cancer. This association may be related to factors such as malnutrition and dietary practices. In addition, about 38.72% of the patients were smokers, and 28.16% had a history of alcohol use, both of which are known to significantly elevate the risk of developing gastric cancer.¹⁷

In our study, the antral region was the most frequent site of the primary tumor, accounting for 66% of cases, followed by the gastric body (28.16%). Similarly, a study conducted in West Bengal by Saha et al., found that the gastric antrum was the most common site for the primary tumor, representing 51% of cases, followed by the gastric body (18%).¹⁶ Barad et al., also supported these findings.¹⁸ Gastric cancer is most commonly diagnosed in symptomatic patients at advanced stages. In our study, 88% of patients had advanced disease, while 39.60% had metastatic disease, a finding consistent with other studies.¹⁹ This supports the notion that early-stage gastric cancer is often asymptomatic and rarely detected.

Our study found that the liver was the most common site of metastasis, occurring in 48.88% of patients, followed by the omentum and peritoneum (44.44%). This is in line with previous research, which consistently highlights the liver and peritoneum as the primary metastatic sites in patients with gastric cancer. In addition, our study identified ovarian metastasis in one female patient, a significant observation in terms of distant metastasis.²⁰

The recommended surgical treatment for patients with resectable proximal gastric carcinoma is total gastrectomy, while for those with distal gastric cancer, a distal gastrectomy is performed, both of which are considered curative procedures. In cases of mGC, palliative surgeries such as gastrojejunostomy or feeding jejunostomy may be performed to alleviate the symptoms. In our study, this approach was also adhered to, with 20.24% of patients undergoing palliative surgeries, including

Table 3: Chemotherapy details

| No. of chemotherapy cycle | 1–3 cycles | 4–6 cycles | 6–12 cycles | 13–18 cycles | On metronomic therapy |
|---------------------------|------------|------------|-------------|--------------|-----------------------|
| No. of patients | 17 | 37 | 19 | 41 | 16 |

either gastrojejunostomy or feeding jejunostomy, and 29.92% undergoing either total or distal gastrectomy.²¹ In a study of 114 patients with gastric cancer, 17.60% (20 patients) received neoadjuvant chemotherapy, 29.92% (34 patients) underwent adjuvant chemotherapy, and the majority (48.40%, 55 patients) were treated with palliative chemotherapy. These findings highlight the diverse treatment approaches based on the stage and progression of the disease.

In this study, 45 of 114 patients had mGC, of which 30% (12 patients) had a survival time of 0–6 months, 47.5% (19 patients) survived for 7–12 months, and 22.5% (9 patients) had a survival duration of 13–18 months. These results reflect the varied survival outcomes among patients, with nearly half surviving beyond 6 months. A study done by Hu et al., showed median survival time for patients with mGC is approximately 6.2 months which is consistent with our findings.²²

Limitations of the study

This study has limitations, including its retrospective design, which may result in incomplete data or missing follow-up. The relatively small sample size (114 patients) and single-center setting limit the generalizability of findings. Additionally, the focus on patients with advanced-stage gastric cancer may skew the outcomes toward late-stage disease characteristics. These factors necessitate cautious interpretation and underscore the need for larger, multicentric prospective studies to validate and expand on these findings.

CONCLUSION

Our study highlights the critical need to raise public awareness of the early symptoms of gastric cancer. They also emphasized the importance of establishing screening programs for the early detection of this disease. This highlights the crucial importance of early detection, accurate staging, and a multidisciplinary treatment approach in improving patient outcomes and increasing survival rates. It is also crucial to develop strategies that improve treatment delivery, ensure that patients complete their treatment, and promote regular follow-up through effective counseling, rehabilitation, and support systems. Although international studies indicate a decrease in gastric cancer incidence, further research focusing on South India is crucial to provide comprehensive data from this region.

ETHICAL APPROVAL

The study was approved by the Institutional Ethics Committee before initiation.

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