Section: Oncology

Original Research Article

SOCIO-DEMOGRAPHIC CHARACTERISTICS OF GASTRIC CANCER PATIENTS AT A TERTIARY CANCER CENTRE IN NORTHEAST INDIA

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ABSTRACT

Background: Stomach cancer is a major health challenge globally, with particularly high incidence rates in Northeast India. Tobacco use, a significant risk factor, contributes to cancer progression through genetic and oxidative damage. This study examines the socio-demographic profiles, lifestyle factors, and clinical outcomes of stomach cancer patients, focusing on the role of tobacco use and highlighting barriers to timely diagnosis and treatment in this region.

Materials and Methods: A retrospective study was conducted at the State Cancer Institute, Gauhati Medical College, analyzing data from 70 stomach cancer patients recorded in the Hospital-Based Cancer Registry for 2022. Detailed socio-demographic and clinical information was extracted, including tobacco use patterns, disease stages, and treatment modalities. Statistical tools were used to assess associations between risk factors and disease progression.

Results: The cohort comprised 57.1% males and 42.9% females, predominantly from economically disadvantaged backgrounds. Smokeless tobacco use was reported in 38.6% of cases, while 31.4% engaged in smoking. Most patients (45.7%) were diagnosed at stage IV, with adenocarcinoma as the dominant histological type (88.6%). A notable 37.1% of patients refused treatment, citing socio-economic constraints. Mortality rates were high, with 62.9% of patients deceased at the time of follow-up.

Conclusion: Tobacco use is a critical determinant of stomach cancer incidence and progression in Northeast India, compounded by socio-economic disparities and late-stage diagnoses. Urgent public health interventions are needed to reduce tobacco consumption, improve early detection, and enhance access to treatment. This study provides valuable insights for shaping targeted cancer control policies in the region.

Keywords: Gastric cancer, Tobacco consumption, Socioeconomic factor, Northeast India, Late-stage diagnosis.

INTRODUCTION

Usage of tobacco (consuming raw or smoking) is one of several risk factors that has been universally acknowledged as having a significant impact on the development of multiple cancers, including stomach cancer.[1] The carcinogenic substances found in tobacco have been connected to oxidative stress, genetic alterations, and DNA damage, which can start and encourage the formation of malignant cells.[2] This study focuses on stomach cancer, one of the most prevalent cancers at the cancer institute, aiming to understand the effects of tobacco use on the body and its potential contribution to cancer development. Additionally, the research examines the socioeconomic status of patients to gain insights into

their coping mechanisms, financial burdens associated with treatment, and utilization of available hospital facilities. By collecting in-depth data of 70 cancer patients, this study seeks to bridge existing gaps by collecting significant insights into their experiences and perspectives related to tobacco smoking and cancer progression.

This study also explores the mediating effects of socioeconomic factors on the relationship between tobacco use and cancer incidence, particularly within the context of its deep-rooted historical, social, and cultural significance in Assamese society.[3] Tobacco consumption manifests in various forms, including snuffing, chewing, and smoking. Traditionally, Assamese healers have utilized tobacco as a medicinal plant, employing it to treat ailments such as headaches, toothaches, and insect bites due to its perceived therapeutic properties.[4] Consequently, tobacco-based remedies have been an integral part of the local medical system for many years.

Literature review

According to Phukan et al.(2005) Smoking tobacco products has a strong link to stomach cancer. In terms of culture and ethnicity, the Mizo people are unique from the other Indian tribes and communities. Because of their unusual smoking habits, usage of various tobacco products, and high stomach cancer prevalence.[5]

According to J. D. Sharma et al., (2018) The north-eastern region of India has the highest incidence and death rates of cancer. In comparison to the national (India) and international scenarios, several specific forms of cancer, notably malignancies of the gall bladder, stomach, oesophageal, mouth, and hypopharynx, have the highest incidence and death in these locations.[6]

According to Genetic Polymorphism of Glutathione S-transferases M1 and T1, Tobacco Habits and Risk of Stomach Cancer in Mizoram, India, (2012) Smoking tobacco was discovered to be a significant risk factor for Mizoram's high prevalence of stomach cancer. Compared to other tobacco-related behaviours, meiziol (local cigarette) smoking was a more significant risk factor. Consuming cigarettes, tuibur (water mixed with tobacco smoke), and betel nuts together raised the risk of stomach cancer.[7]

According to Bhagabaty et al., (2015) The situation is made worse by the societal acceptability of tobacco usage. In this region of the nation, tobacco is used in many forms; it is smoked, chewed, and even used as a traditional drink called tibur. India as a whole has a very high prevalence of tobacco usage, but the North East part of the country highlights the urgency of the need to take action committed to our area's successful tobacco control.[8]

According to Nandakumar et al. (2005) India is a large country with a diversified population that practises many different cultures, food customs, and lifestyles. The socioeconomic position of the urban and rural inhabitants differs, as do their lifestyles and environments. In order to develop aetiological hypotheses, research on regional differences in cancer risk should be very fruitful.[9]

According to Kalita et al., (2021) An estimated 40,000 new cases of cancer are anticipated to be identified there each year, making it the region in India with the highest incidence, death, and survival rates nationwide. The rise in cancer-related mortality in North-eastern India is primarily attributable to barriers to accessing facilities for cancer diagnosis and treatment, socioeconomic conditions, a lack of awareness, taboos, and misconceptions, as well as significant variations in cancer diagnosis and treatment across the eight states (regions) in the region.[10] There are several ways in which access to cancer detection and treatment is unequal in India. Lack of appropriate cancer care and treatment in Northeast India has an impact on the success of the therapy and survivability rates in the area.

MATERIALS AND METHODS

A retrospective study was conducted at State cancer Institute, Gauhati Medical College with approval from the Institutional Ethical Committee. Data extraction was done from the hospital-based cancer registry. Seventy patients diagnosed with stomach cancer during the period of 2022 were randomly selected by simple random sampling and included in this study.

The detailed data extracted encompassed a range of socio-demographic details, including age, gender, occupation, educational level, and socioeconomic status. Information on deleterious habits such as smoking, tobacco and alcohol consumption was also meticulously recorded. In-depth details of the patients' disease status were gathered, including tumour stage at diagnosis, histopathological findings, and presence of metastasis. Additionally, the data comprised treatment modalities undertaken, such as surgery, chemotherapy, and radiotherapy. This comprehensive dataset provided a robust foundation for analyzing the epidemiological and clinical characteristics of stomach cancer within this patient cohort.

RESULTS

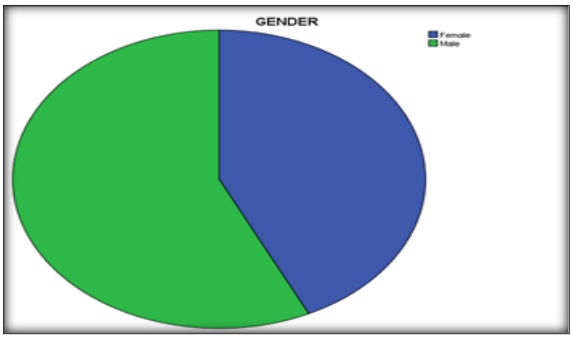

Figure 1: Distribution of gastric cancer patients by gender

The data shows that out of a total of 70 cancer patients in the study, 30 are female and 40 are male. This means females make up 42.9% of the population, while males account for 57.1%. These findings indicate a higher representation of males compared to females within the observed group. Together, these numbers comprise the entire study population, which totals 70 individuals, representing 100%.

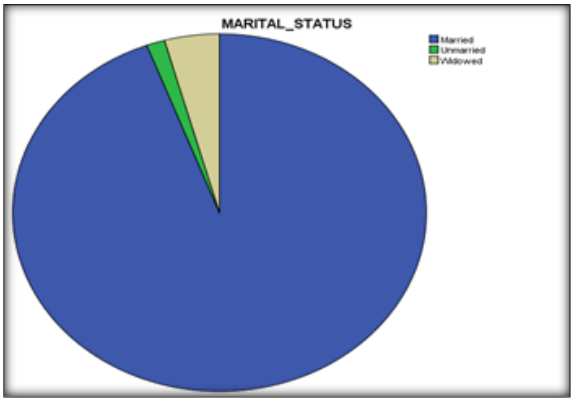

Figure 2: Marital status distribution of gastric cancer patients

Among the 70 cancer patients observed in this study, the majority are married, totalling 66 individuals or 94.3% of the population. In contrast, only one individual is unmarried, representing 1.4% of the group, and three individuals are widowed, comprising 4.3%. These findings highlight that the marital status of this population is overwhelmingly characterized by marriage, with very few individuals categorized as unmarried or widowed. The total population under study is 70, representing 100%.

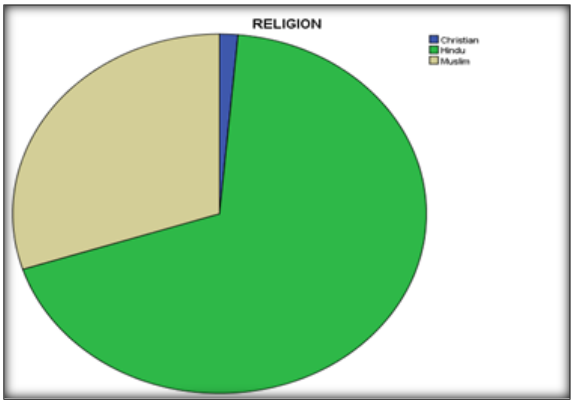

Figure 3: Religious affiliation among gastric cancer patients

In the observed population of 70 cancer patients, the majority identify as Hindu, accounting for 48 individuals or 68.6% of the group. Muslims represent the second-largest group, with 21 individuals comprising 30.0% of the population. Only one individual identifies as Christian, making up 1.4% of the total. These findings indicate a predominance of Hindus within this population, followed by a notable minority of Muslims and a very small representation of Christians. The total population consists of 70 individuals, representing 100%.

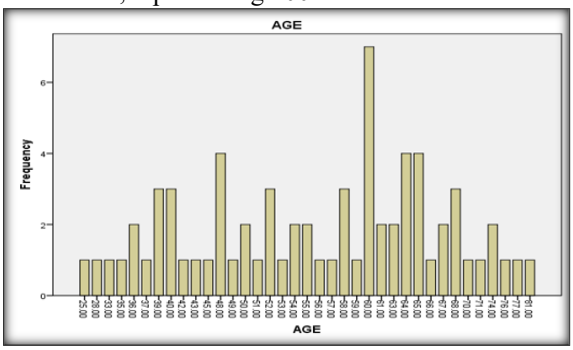

Figure 4: Age-wise distribution of gastric cancer patients

The age distribution of cancer patients in this dataset provides the following key findings:

- Age Range: Patients span an age range of 25 to 81 years, with a median age falling in the early 60s.
- Peak Age Group: The 60-64 age group exhibits the highest frequency, comprising 17.1% of the total sample.
- Older Age Group: A considerable proportion of patients, 29.2%, fall within the broader 60-70 age range, indicating a higher prevalence or detection rate of cancer among older adults.
- Young Adults: Patients aged 25-39 years are underrepresented, suggesting that cancer diagnoses are relatively uncommon in this younger demographic.

These findings indicate that cancer primarily affects individuals in their 60s and 70s, with a marked decrease in cases among younger age groups. This distribution aligns with the established understanding that cancer risk increases with age.

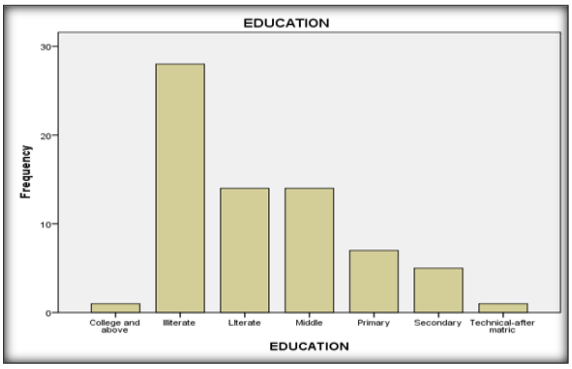

Figure 5: Educational level distribution of gastric cancer patients

The data indicates significant variation in educational attainment among the 70 cancer patients. The majority, 28 individuals (40.0%), are illiterate. Fourteen individuals each (20.0%) are literate without formal education and those who have completed middle school. Seven patients (10.0%) have primary education, and five (7.1%) have secondary education. Only two individuals have

higher education: one with a college degree (1.4%) and another with technical education after matriculation (1.4%). This distribution suggests that a significant portion of the cancer patient population has low educational attainment, with the largest group being illiterate. There is a smaller proportion of individuals with middle and higher education levels. The total number of individuals sums up to 70, accounting for 100% of the population under study.

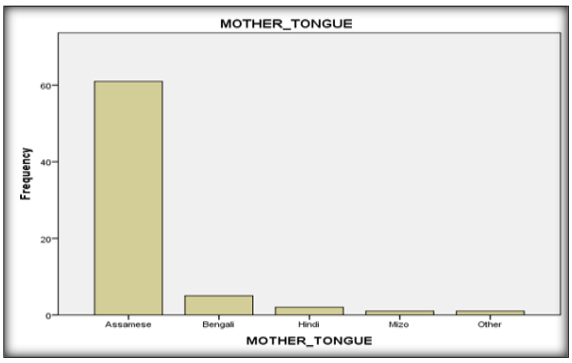

Figure 6: Distribution of patients by language

The linguistic profile of the 70 cancer patients reveals a predominance of Assamese speakers, who comprise 87.1% of the population, reflecting a strong regional concentration. Bengali is the second most common mother tongue, spoken by 7.1% of individuals, followed by Hindi at 2.9%. Mizo and other languages are each represented by 1.4% of the population, indicating minimal linguistic diversity within the group. The total population consists of 70 individuals, accounting for 100%.

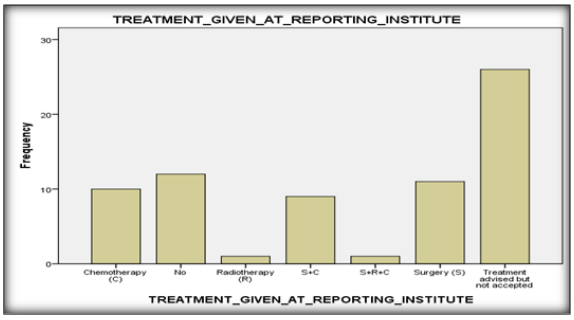

Figure 7: Treatment modalities undertaken by gastric cancer patients

The table outlines the distribution of treatments received by 70 patients at a reporting institute. A notable finding is that 37.1% (n=26) of patients declined the recommended treatment. Among those who opted for therapy, 15.7% (n=11) underwent surgery alone, while 14.3% (n=10) received chemotherapy as a standalone treatment. A combination of surgery and chemotherapy was administered to 12.9% (n=9) of patients. Radiotherapy was the least utilized approach, provided either as a monotherapy (1.4%, n=1) or combined with surgery and chemotherapy (1.4%, n=1). Additionally, 17.1% (n=12) of patients did not receive any treatment. These findings highlight a significant trend of treatment refusal and underscore the predominant reliance on surgical and chemotherapeutic interventions among patients who pursued therapy.

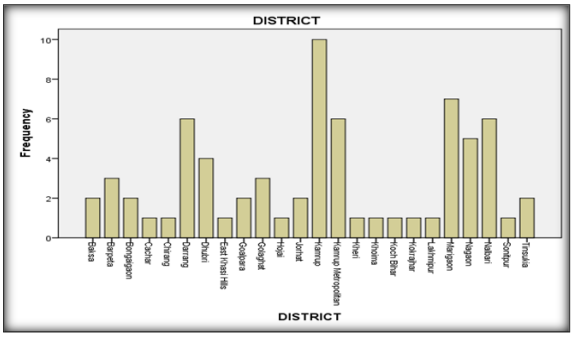

Figure 8: District-wise distribution of gastric cancer cases

The table shows that most cases are concentrated in Kamrup (14.3%), Morigaon (10.0%), and Kamrup Metropolitan (8.6%). Several districts, like Cachar and Chirang, have much lower frequencies (1.4%), suggesting unequal distribution of cases across the regions.

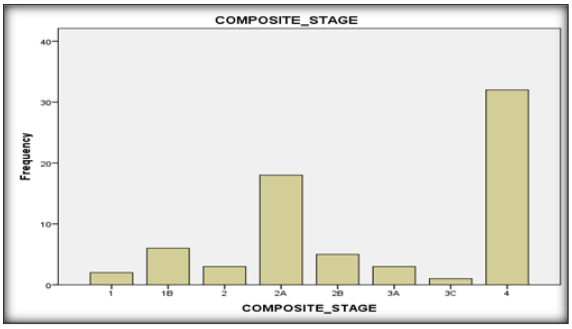

Figure 9: Distribution of gastric cancer cases by stage at diagnosis

The table classifies 70 stomach cancer cases by stage at diagnosis. A substantial proportion, 45.7%, were identified at stage 4, indicating that late-stage diagnosis is prevalent. Stage 2A comprises 25.7% of cases, while smaller percentages are observed for stages 1, 1B, and 3A, at 2.9%, 8.6%, and 4.3%, respectively. Stages 2, 2B, and 3C collectively account for a minimal share of the cases. These findings suggest that the majority of patients are diagnosed at advanced stages, with early-stage detection being relatively uncommon.

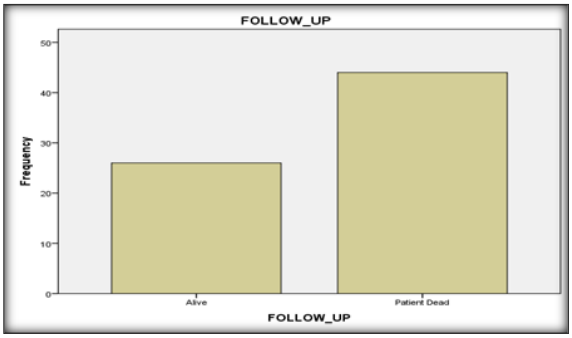

Figure 10: Follow-up survival status of gastric cancer patients

The follow-up data outlines the survival status of 70 stomach cancer patients. At the time of follow-up, 37.1% (26 patients) were alive, while 62.9% (44 patients) had succumbed to the disease. These findings reflect a higher mortality rate, underscoring the severity and progression of stomach cancer in this patient cohort.

Table 1: Primary Site

	Frequency	Percent
ANTRUM OF STOMACH	12	17.1
BODY OF STOMACH	38	54.3
FUNDUS OF STOMACH	2	2.9
GASTRIC ANTRUM	5	7.2
LESSER CURVATURE OF STOMACH, NOS	3	4.3
PYLORIC ANTRUM	10	14.3
Total	70	100.0

The table summarizes the distribution of stomach cancer cases by primary site among 70 patients. The body of the stomach is the most common site, accounting for 54.3% of cases. This is followed by the antrum at 17.1% and the pyloric antrum at 14.3%. Less frequently affected sites include the gastric antrum (7.2%), the lesser curvature of the stomach (4.3%), and the fundus (2.9%). These results indicate that stomach cancer predominantly originates in the body of the stomach, with fewer cases involving other regions.

Table 2: Primary Site's Morphology

	Frequency	Percent
ADENOCARCINOMA	62	88.6
MUCINOUS ADENOCARCINOMA	2	2.8
SIGNET RING CELL CARCINOMA	6	8.6
Total	70	100.0

The table outlines the distribution of stomach cancer morphologies among 70 patients. Adenocarcinoma is the most prevalent type, comprising 88.6% of cases. Signet ring cell carcinoma is observed in 8.6% of patients, while mucinous adenocarcinoma is uncommon, accounting for 2.8% of cases. These findings indicate that adenocarcinoma is the dominant morphological type in this patient population.

Table 3: Cultural Group

	Frequency	Percent
Ahom	2	2.9
Boro	2	2.9
Mishing	1	1.4
Mizo	1	1.4
Nepalese	1	1.4
Rajbongshi	1	1.4
Brahmin	3	4.3
Jogi	3	4.3
Kalita	14	20.0
Kayastha	10	14.3
Koibarta	8	11.4
Marwari	1	1.4
Tea tribe	1	1.4
Others	22	31.4
Total	70	100.0

The table illustrates the cultural group distribution among 70 stomach cancer patients. The "Others" category is the largest, encompassing 31.4% of cases, reflecting a variety of less represented groups. The Kalita group accounts for 20.0% of cases, indicating a notable presence. The Kayastha group constitutes 14.3%, while the Koibarta group represents 11.4%. Smaller proportions are seen in the Brahmin and Jogi

groups, each contributing 4.3% of the total. The Ahom and Boro groups are less represented, each at 2.9%, while the Mishing, Mizo, Nepalese, Rajbongshi, Marwari, and Tea Tribe groups have minimal representation, each making up 1.4% of cases. This distribution underscores the diverse cultural composition of the patient cohort, with certain groups more prominently affected than others.

Table 4: Clinical Extent of Disease Before Treatment (CEDBT)

	Frequency	Percent
Direct Extension	12	17.1
Direct Extension with Regional Nodes	19	27.1
Distant Metastasis	26	37.1
Localised	6	8.6
Too Advanced	7	10.0
Total	70	100.0

The table details the clinical extent of disease before treatment (CEDBT) in a cohort of 70 stomach cancer patients. The largest group, comprising 37.1%, presented with distant metastasis, indicating disease spread beyond the primary site. Cases with direct extension involving regional lymph nodes accounted for 27.1%, while 17.1% had direct extension without nodal involvement. Localized disease, restricted to the primary site, was observed in 8.6% of patients. Additionally, 10.0% of cases were deemed too advanced for precise categorization. These findings highlight that a significant proportion of patients were diagnosed at an advanced stage of disease progression.

Table 5: Food Habits

SMOKED	**Frequency**	**Percent**
Cigaratte / Beedi Smoking	22	31.4
SMOKELESS		
Tobacco/Betel nut/Gutkha/Pan-masala/Misheri/Snuff	27	38.6
Alcohol Consumption	21	30
Total	70	100.0

The table summarizes the food and substance use patterns among 70 stomach cancer patients. The most frequently reported habit was the use of smokeless tobacco products, including betel nut, gutkha, pan-masala, misheri, and snuff, observed in 38.6% of patients. Cigarette or beedi smoking was noted in 31.4% of cases, while alcohol consumption was reported by 30% of the cohort. These findings indicate a high prevalence of tobacco-related practices, encompassing both smoked and smokeless forms, among the patient population.

DISCUSSION AND CONCLUSION

This study aims to enhance current knowledge regarding the relationship between tobacco use and cancer development, with a particular focus on stomach cancer, while also considering the socioeconomic status of the patients.[5] By examining the experiences and perspectives of cancer patients with a history of tobacco use, the study seeks to offer valuable insights into the potential impact of tobacco consumption on the development of stomach cancer. Data were collected through in-depth interviews and a comprehensive questionnaire, gathering detailed information on the participants' tobacco use habits and their perceptions of the link between tobacco consumption and cancer.

The results of this study underscore the significant association between tobacco use and the incidence of stomach cancer. Through detailed qualitative interviews and comprehensive questionnaires, the research has provided invaluable insights into the experiences and perspectives of patients with a history of tobacco consumption. The data reveal crucial patterns in tobacco use, including the duration, frequency, and types of products used, along with other relevant lifestyle factors. These findings contribute substantially to the understanding of the role of tobacco in the etiology of stomach cancer.

Importantly, this study highlights the necessity for targeted public health interventions aimed at reducing tobacco use. By identifying specific risk factors and elucidating the pathways through which tobacco contributes to stomach cancer development, the research informs the design and implementation of effective cancer prevention programs. The compelling testimonials from patients emphasize the urgent need for educational initiatives that raise awareness about the dangers of tobacco consumption. Consequently, this study not only advances the scientific knowledge in the field but also serves as a crucial foundation for developing strategies to decrease the incidence of stomach cancer and improve overall public health outcomes.

The implications of these results for public health programs and cancer prevention measures are substantial. The findings from this study can inform targeted educational initiatives that emphasize the specific risks of tobacco use related to stomach cancer.[6] Additionally, the shared experiences of patients may serve as powerful testimonials to raise

public awareness about the adverse effects of tobacco consumption on stomach cancer development.

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