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Original Research Article

Profile and burden of cancers in Assam: an insight from Assam Cancer Care Foundation hospitals

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ABSTRACT

Background: The North-Eastern region of India, particularly Assam, reports among the highest cancer incidence and mortality rates in the country. To address this growing burden, the Assam Cancer Care Foundation (ACCF) was established through a partnership between Tata trusts and the government of Assam, implementing a Distributed cancer care model across the state. This study examines the cancer burden, patterns, and trends among patients attending ACCF hospitals.
Methods: Patient data, including demographic characteristics, clinical profile, and diagnosis, were extracted from the Medical records department (MRD) module of the Hospital management information system (HMIS). Data from May 2022 to September 2024 were cleaned, compiled in Microsoft excel, and analyzed to identify key trends and cancer patterns.
Results: Most patients were above 50 years of age. More than 95% reported a history of addiction, highlighting the widespread prevalence of tobacco and alcohol use. Oral cavity, breast, esophageal, and lower Gastrointestinal (GI) cancers were the most common cancer sites among patients attending ACCF hospitals. Among males, oral cavity, esophageal, upper GI, and lower GI cancers predominated, whereas breast, gallbladder, and lower GI cancers were the leading malignancies among females.
Conclusions: Oral cavity, breast, esophageal, and lower GI cancers constitute the major cancer burden in Assam. The predominance of cancers associated with tobacco and alcohol use, coupled with the high prevalence of addiction and older age among patients, underscores the need for strengthened prevention, early detection, and control strategies.

Keywords: Assam cancer care foundation, Cancer burden, Site of cancer, Addiction history

INTRODUCTION

The existing evidence highlights the significant burden of Non-communicable diseases (NCDs), particularly cancer, in India, with North Eastern states like Assam experiencing higher incidences and mortality rates.[1] Additionally, Assam faces several challenges in delivering affordable and equitable cancer care, mainly due to its difficult terrain and resource constraints.[2] Globally, NCDs account for 71% of total deaths, while in India, NCDs are estimated to account for 63% of all deaths.[3] Cancer is one of the leading causes of NCD-related deaths in India, contributing to 9% of all deaths.[4] In 2020, about 14 lakhs (1.4 million) cases of cancer were detected in India. The most common cancers among males are lung, mouth, stomach, and esophagus, while breast and cervix uteri cancers are the most common among females.[1] Assam, a northeastern state in India, experiences higher cancer incidences and mortality rates compared to the national average. The incidence of cancer in Assam is 90.2 per 1 lakh population, while the national average is 81.2 per lakh population. The

projected cancer cases in Northeast for 2020 were estimated to be 50,317.[1] Delivering affordable and equitable cancer care is one of Assam's greatest public health challenges due to its difficult terrain and a population of 30.12 million.[2] The state faces shortfalls in Sub-centers (21%), Primary health centers (1%), and Community health centers (28%), which affects healthcare accessibility. Access to healthcare facilities in rural Assam is hindered by unavailability of roads. Approximately 15% of subcenters and 3.1% of Primary health centres are challenging to access due to this issue. Moreover, 16.8% of Sub-centres and 31.7% of Primary health centres are located beyond 3 km and 10 km of villages, respectively.[5] In response to these challenges, Tata trusts, in collaboration with the government of Assam, established Assam cancer care foundation (ACCF) and developed the Distributed cancer care model to provide standardized and affordable cancer care closer to patients' homes. The aim is to reduce cancer mortality in Assam by one-third within ten years, making cancer treatment more accessible and affordable for the population. The model focuses on prevention, early detection, and timely treatment, addressing the financial burden on patients and their families. This paper focuses on cancer burden and its types and trends of cancer patients visiting ACCF hospitals in Assam.

METHODS

This is a descriptive cross-sectional study, describing the pattern of cancers and risk profile of the patients visiting ACCF hospitals. As a first step, all the patients whoever visit ACCF hospitals are registered in Hospital Management information system (HMIS) module and demographic details are captured. Further details regarding clinical profile and diagnosis are captured in Medical records department (MRD) module. All data are extracted in excel and further cleaned and analyzed to generate insights.

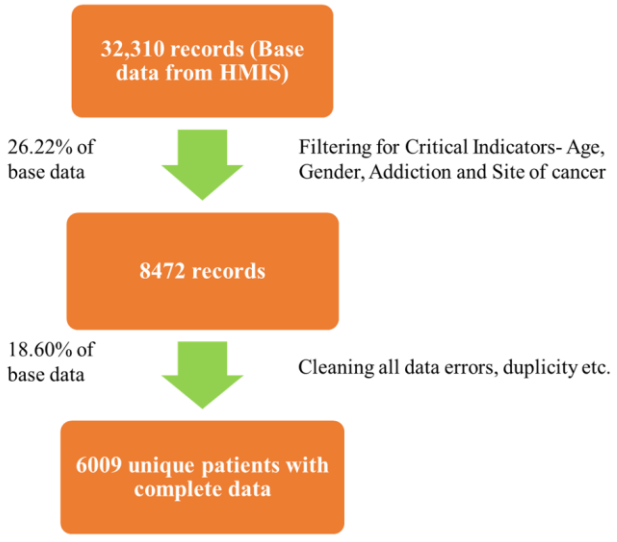

Figure 1: Process of data cleaning.

Data analysis

All patient data are exported and analyzed in excel from May 2022 to September 2024. Descriptive statistics were used and reported through percentages and proportions. This Dataset consists of data from seven different cancer care hospitals, namely Darrang, Dibrugarh, Barpeta, Kokrajhar, Lakhimpur, Tezpur and Jorhat. Among these, Jorhat is relatively the largest set with 2107 entries whereas Barpeta is the smallest with only 44 entries. Each of these towns have been analysed using four critical indicators: age of patient, gender of patient, patient's history of addiction, and site-wise distribution. Figure 1 describes the process of data cleaning.

Ethical considerations

All patients have consented to use their data for research purpose. All ACCF ethics committee approved the study with letter no. ACCF/IEC/2024-25/03.

RESULTS

The database has been analysed for five critical indicators of anatomical site of cancer, gender, age, addiction and cancer incidence. The database is cleaned and reviewed to have these all four critical indicators. A total of 6,009 patients found to have all these four critical indicators.

Site wise distribution of cases

The most common sites that are subject to cancer in this dataset are the oral cavity (20.67%), the esophagus (9.30%), lower GI (8.07%), gall bladder (7.96%), most of them a direct of the patients' history of addiction.

Among males, leading cancers sites were oral cavity (30.43%), esophagus (10.07%), upper GI (8.86%) and lower GI (8%), and oropharynx (8.29%). While in females, breast cancer was found to be highest (35.17%), followed by gall bladder (12.11%), lower GI (10.46%) and esophagus (8.40%).

Gender wise distribution

The database Jorhat and Tezpur, the two biggest datasets showed a close to equal distribution of the male and female population. Barring Kokrajhar, all other centres showed a larger proportion of male population than female population by a large margin. Kokrajhar alone had a larger female population, although only marginally. Out of 6009 cases, 2657 female (44.21%) and 3352 males (55.79%). Few of the cancers found to have more gender predisposition. Males showed a higher occurrence of cancers of the hypopharynx (95.95%), larynx (88.42%), lung (84.25%), oropharynx (82.33%), oral cavity (78.93%), and upper gastrointestinal tract (71.26%) compared to females.

Table 1: Anatomical site wise distribution of cancers.

Anatomical site of cancers	Male (n=2805) N (%)	Female (n=2428) N (%)	Total (n=5233) N (%)
Oral cavity	854 (30.43)	228 (9.39)	1082 (20.67)
Breast	56 (2.00)	854 (35.17)	910 (17.39)
Esophagus	283 (10.07)	204 (8.40)	487 (9.30)
Lower GI	168 (8.00)	254 (10.46)	422 (8.07)
Gall bladder	122 (4.36)	294 (12.11)	416 (7.96)
Upper GI	248 (8.86)	100 (4.12)	348 (6.65)
Middle thoracic	165 (5.93)	120 (4.94)	285 (5.44)
Oropharynx	233 (8.29)	50 (2.06)	283 (5.40)
Lower thoracic	100 (3.57)	120 (4.94)	220 (4.21)
Larynx	168 (6.00)	22 (0.91)	190 (3.64)
Hypopharynx	142 (5.07)	6 (0.25)	148 (2.83)
Upper thoracic	110 (3.93)	30 (1.24)	140 (2.68)
Lung cancer	107(3.86)	20(0.82)	127(2.42)
Cervical cancer	0 (0.00)	116 (4.78)	116 (2.22)
Unknown primary	49 (1.79)	10 (0.41)	59 (1.13)

Table 2: Gender wise distribution of cancers.

Anatomical site of cancers	Oral cavity	Breast	Esophagus	Lower GI	Gall bladder	Upper GI	Middle thoracic	Oropharynx	Lower thoracic	Larynx	Hypopharynx	Upper thoracic	Lung cancer	Cervix	Unknown primary
Male (n=2805) N (%)	854 (78.93)	56 (6.15)	283 (58.11)	168 (39.81)	122 (29.33)	248 (71.26)	165 (57.89)	233 (82.33)	100 (45.45)	168 (88.42)	142 (95.95)	110 (78.57)	107 (84.25)	0	49 (83.05)
Female (n=2428) N (%)	228 (21.07)	854 (93.85)	204 (41.89)	254 (60.19)	294 (70.67)	100 (28.74)	120 (42.11)	50 (17.67)	120 (54.55)	22 (11.58)	6 (4.05)	30 (21.43)	20 (15.75)	116 (100)	10 (16.95)
Total (n=5233) N (%)	1082 (100)	910 (100)	487 (100)	422 (100)	416 (100)	348 (100)	285 (100)	283 (100)	220 (100)	190 (100)	148 (100)	140 (100)	127 (100)	116 (100)	59(100)

Conversely, females exhibited a higher occurrence of breast (93.85%) and gall bladder (70.67%) cancers. Below table depicts the gender distribution of different cancers.

Age wise distribution of cancer cases across all 7 hospitals

Considering that one of our critical indicators is age, all the patients are 20 years of age or older. Most patients lie between the 50 to 60 years age range. Close to 69.79% of patients were more than 50 years age, with lowest in the 20-30 years of age group.

Distribution as per addiction history of the patients

The prevalent addictive substances in these towns are Tobacco, Tambul (areca nuts), and alcohol. Many a times patients have more than one addiction. Combined Tambul (areca nuts) and alcohol addiction are found to be highest with 31.89% among patients who visited ACCF hospitals. This is followed by Tambul i.e. arena nuts alone with 25.87%. The below table 2 depicts distribution of cases as per their addiction habits.

Table 3: Age wise distribution of cancer cases.

Age category (years)	Male (n=3352) N (%)	Female (n=2657) N (%)	Total (n=6009) N (%)
20-30	40 (1.19)	80 (3.01)	120 (2.00)
31-40	148 (4.41)	228 (8.58)	376 (6.25)
41-50	476 (14.19)	843 (31.75)	1319 (21.95)
51-60	1191 (35.54)	810 (30.47)	2001 (33.30)
61-70	981 (29.28)	518 (19.49)	1499 (24.95)
>70	516 (15.38)	178 (6.70)	694 (11.54)

Table 4: Distribution of cases as per addiction habits (n=6008).

Addictions	N (%)
Tambul and tobacco	1916 (31.89)
Tambul	1555 (25.87)
Tobacco	1152 (19.17)
Tambul, tobacco and alcohol	598 (9.95)
Tobacco and alcohol	270 (4.49)
Tambul and alcohol	151 (2.52)
Alcohol	102 (1.70)
No addiction	264 (4.40)

Cancer incidence

During the study period, 32,310 new cancer cases visited across all ACCF hospitals. Considering the population of assam is 31.2 million, we found incidence of new cancers yearly is 103.55 per 1 lakh population.[2] This is found to be much higher than recorded national and state incidence rate of 81.2 and 90.2 respectively.[6] Assam has only three population-based cancer registries, which give data restricted to the district only, hence statewide incidence is not available.[1]

DISCUSSION

The present study described the cancer profile of patients visited in ACCF hospitals across 7 locations covering more than 90% of the population in Assam as part of its catchment area. The study also describes the pattern of cancers detected in Assam. The present study identified oral, breast, esophageal, and lower Gastrointestinal (GI) cancers as the leading sites among patients visiting ACCF hospitals. Among males, oral, esophageal, upper GI, and lower GI malignancies were predominant, whereas in females, breast, gallbladder, and lower GI cancers constituted the leading sites.

The intake of extremely spicy foods, betel quid, hot drinks, and diets high in chili and leftover meals are positively correlated with an increased risk of esophageal cancer.[7] In a similar vein, the consumption of smoked meats has been associated with nasopharyngeal carcinoma, particularly prevalent in the North Eastern area of India.[8] Additionally, infection with the Epstein–Barr virus (EBV) has been recognized as a contributing factor to nasopharyngeal carcinoma, especially in North-East India.[9] The causes of gallbladder carcinoma have been linked to environmental and dietary factors, which include exposure to pesticides, aromatic hydrocarbons, nitrosamines, nitrates, nitrites, and heavy metals such as iron, lead, and cadmium found in the Brahmaputra, Ganga, and Pachin rivers, as well as in groundwater in specific regions.[10-12] The possible adulteration of edible mustard oil, commonly used in eastern and North Eastern India, has also been cited as a potential contributor.[13] A high incidence of stomach cancer in Mizoram has been linked to unique regional dietary habits such as the consumption of sa-um (fermented pork fat), smoked, dried, and salted meat and fish, and the use of soda (alkali) as a food additive.[14,15]

Our findings demonstrated notable gender-based variations in cancer distribution. Cancers of the oral cavity, oropharynx, hypopharynx, larynx, and lungs exhibited male predominance, which aligns with findings from the NCRP and other national data sources.[16,17] Conversely, gallbladder cancer showed a clear female predominance, consistent with the comprehensive review by Kumar et al, which reported elevated incidence rates among women, particularly in Assam.[18] Likewise, breast cancer emerged as the leading malignancy among females, corroborating evidence from national and international studies.[19,20] The age distribution of cancer cases in this study revealed that a majority of patients were above 50 years, consistent with previous reports indicating a higher cancer incidence in older populations.[21] Prolonged exposure to carcinogenic agents over time is considered a primary cause for this trend.[22] The gender distribution in our study (44% males and 56%

females) was slightly lower than the NFHS-5 census ratio of 982 females per 1,000 males in Assam.[23]

A concerning finding of this study was that over 95% of patients reported a history of addiction, primarily tobacco and alcohol use. The association between these habits and increased risks of cardiovascular disease and cancer has been well documented.[24] The Global adult tobacco survey (GATS) reported a high burden of tobacco consumption in Assam, with an average age of initiation of smoking around 15 years.[25] Consistent with this evidence, our study found that approximately 90% of oral cancer cases were attributable to tobacco use. In India, oral cancer affects about 20 per 100,000 population, accounting for nearly 30% of all cancers nationally.[26]

Limitations

This study is subject to several limitations. Being a hospital-based descriptive analysis, the findings may not represent the true population-level cancer burden in Assam. The retrospective use of routine medical record data may be affected by missing information, reporting errors, and variations in data quality. Additionally, the study lacks detailed risk-factor information and does not permit causal inference. Therefore, the findings should be interpreted as indicative of cancer patterns among patients accessing ACCF facilities rather than the entire population of Assam.

CONCLUSION

Overall, oral, breast, esophagus and lower GI cancers are detected as leading sites of cancers across the patients visiting ACCF hospitals. In male, oral, esophagus and upper GI and lower GI are the most common sites of cancers detected in males, while in females, breast, gall blader and lower GI found to be the leading cancers. Most of the patients found to be more than 50 years of age and prevalence of addiction is quite high. Cancer incidence also found to be higher than national average. Focused activity of cancer preventive activities is need of the hour and detailed research regarding the underlying cause is warranted.

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Conflict of interest: None declared
Ethical approval: The study was approved by the Institutional Ethics Committee (ACCF/IEC/2024-25/03)

REFERENCES

1. ICMR-National Centre for Disease Informatics and Research. Profile of Cancer and Related Health Indicators in the North East Region of India. Bengaluru: ICMR-NCDIR, 2021. Available at: https://ncdirindia.org/All_Reports/NorthEast2021/Default.aspx?. Accessed on 07 March 2026.
2. Office of the Registrar General and Census Commissioner, India. Census of India 2011: Primary Census Abstract—Population Size and Decadal Change. New Delhi: Ministry of Home Affairs, Government of India, 2013. Available at: https://censusindia.gov.in/nada/index.php/catalog/43333/study-description?. Accessed on 07 March 2026.
3. International Agency for Research on Cancer. Cancer Today: Estimated number of deaths in 2020, all cancers, both sexes, all ages. Lyon (France): World Health Organization, 2020. Available at: https://gco.iarc.who.int/today/en/dataviz/pie?group_cancers=1&group_populations=0&key=total&mode=population&multiple_cancers=1&options_indicator=%5Bobject+Object%5D_%5Bobject+Object%5D_%5Bobject+Object%5D_%5Bobject+Object%5D&reset=1&sexes=1&types=2. Accessed on 07 April 2026.
4. Mathur P, Sathishkumar K, Chaturvedi M, Das P, Sudarshan KL, Santhappan S, et al. ICMR-NCDIR-NCRP Investigator Group. Cancer statistics, 2020: Report from National Cancer Registry Programme, India. JCO Glob Oncol. 2020;6:1063-75.
5. Bajpai V. The challenges confronting public hospitals in India, their origins, and possible solutions. Adv Public Health. 2014;2014:898502.
6. Dhillon PK, Mathur P, Nandakumar A, Fitzmaurice C, Kumar GA, Mehrotra R, et al. The burden of cancers and their variations across the states of India: The Global Burden of Disease Study 1990–2016. Lancet Oncol. 2018;19(10):1289-306.
7. Phukan RK, Ali MS, Chetia CK, Mahanta J. Betel nut and tobacco chewing: potential risk factors of cancer of oesophagus in Assam, India. Br J Cancer. 2001;85(5):661-7.
8. Chelleng PK, Narain K, Das HK, Chetia M, Mahanta J. Risk factors for cancer nasopharynx: A case-control study from Nagaland, India. Natl Med J India. 2000;13(1):6-8.
9. Anil Singh S, Ghosh S. Association of Epstein Barr virus and lifestyle on nasopharyngeal cancer risk among the ethnic population of northeast India. Sci Technol J. 2014;2:95-102.
10. Sharma TD. Study on dietary and environmental risk factors for nasopharyngeal cancer in Manipur. Int J Health Sci Res. 2011;1:8-14.
11. Chakraborty P, Sakthivel S, Kumar B, Kumar S, Mishra M, Verma VK, et al. Spatial distribution of persistent organic pollutants in the surface water of River Brahmaputra and River Ganga in India. Rev Environ Health. 2014;29:45-8.
12. Haloi N, Sarma HP. Heavy metal contaminations in the groundwater of Brahmaputra flood plain:An assessment of water quality in Barpeta District, Assam (India). Environ Monit Assess. 2012;184:6229-37.
13. Hussain MF, Ahmad I, Konhauser KO. Major ion and heavy metal chemistry of Pachin river (Itanagar) - levels and sources. J Environ Sci Eng. 2006;48:27-34.

14. Dixit R, Srivastava P, Basu S, Srivastava P, Mishra PK, Shukla VK. Association of mustard oil as cooking media with carcinoma of the gallbladder J Gastrointest Cancer. 2013;44:177-81.
15. Phukan RK, Narain K, Zomawia E, Hazarika NC, Mahanta J. Dietary habits and stomach cancer in Mizoram. India J Gastroenterol. 2006;41:418-24.
16. Bagal S, Budukh A, Thakur JS, Dora T, Qayyumi B, Khanna D. Head and neck cancer burden in India: an analysis from population-based registries. Indian J Cancer. 2023;60(1):45-52.
17. Noronha V, Dikshit R, Raut N, Joshi A, Pramesh CS, George K, et al. Epidemiology of lung cancer in India: focus on the differences between non-smokers and smokers. Lung India. 2016;33(2):143-9.
18. Kumar A, Kumar A, Singh R, Singh S, Kapoor R, Kumar M. Gallbladder cancer: progress and prospects in the Indian subcontinent. J Surg Oncol. 2024;129(5):652-61.
19. Mehrotra R, Yadav K, Bhatla N. Breast cancer in India: present scenario and the way forward. World J Clin Oncol. 2022;13(3):209-18.
20. Bray F, Laversanne M, Weiderpass E, Soerjomataram I. Global cancer statistics 2022: GLOBOCAN estimates of incidence and mortality worldwide for 36 cancers in 185 countries. CA Cancer J Clin. 2024;74(3):229-63.
21. Cinar D, Tas D. Cancer in the elderly. North Clin Istanb. 2015;2(1):73-80.
22. Carpenter DO, Bushkin-Bedient S. Exposure to chemicals and radiation during childhood and risk for cancer later in life. J Adolesc Health. 2013;52(5):S21-9.
23. International Institute for Population Sciences (IIPS) and ICF. National Family Health Survey (NFHS-5), 2019–21: State fact sheet, Assam. Mumbai: IIPS, 2021. Available at: http://rchiips.org/nfhs/factsheet_NFHS-5.shtml. Accessed on 07 April 2026.
24. Ohlrogge AH, Frost L, Schnabel RB. Harmful Impact of Tobacco Smoking and Alcohol Consumption on the Atrial Myocardium. Cells. 2022;11(16):2576.
25. Tata Institute of Social Sciences (TISS), Mumbai; Ministry of Health and Family Welfare, Government of India. Global Adult Tobacco Survey (GATS 2), India 2016–17: National report. Mumbai: International Institute for Population Sciences (IIPS), 2017. Available at: https://ntcp.mohfw.gov.in/assets/document/surveys-reports-publications/Global-Adult-Tobacco-Survey-Second-Round-India-2016-2017.pdf. Accessed on 07 April 2026.
26. Asmin PK, Nusrath F, Divakar DD. Occurrence and Distribution of Cancers with Emphasis Upon Oral Cancers in Registered Oncology Institutes of South India - A Retrospective Study. Indian J Community Med. 2024;49(1):120-30.

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