Pattern and Distribution of Cancers in a Rural Tertiary Care Centre of Faridabad, India: A Six-Year Retrspective Study (2020-2025)

Dr. Punyatoya Bej[1], Ketan Krishnan[2], Kunal Hooda[3], Apurav Rana[4], Adaa Bhat[5], Mehshid Farooq[6]
[1]*Professor, Department of Community Medicine, Al Falah School of Medical Sciences and Research Centre, Al Falah University, Faridabad, India*
[2,5] *3rd Year MBBS Student, Al Falah School of Medical Sciences and Research Centre, Al Falah University, Faridabad, India*
[3,4] *1st Year MBBS Student, Al Falah School of Medical Sciences and Research Centre, Al Falah University, Faridabad, India*
[6]*Final Year MBBS Student, Al Falah School of Medical Sciences and Research Centre, Al Falah University, Faridabad, India*

***Abstract*—Background: Cancer is a major public health concern and a leading cause of morbidity and mortality worldwide. Understanding the distribution and patterns of malignancies in specific regions is essential for improving early detection, prevention strategies, and healthcare planning. This study aimed to analyze the spectrum and distribution of cancers in a rural tertiary care centre in Faridabad, India.**

Methods: A retrospective study was conducted at a tertiary care centre over a six-year period from January 2020 to December 2025. Data were obtained from hospital medical records of all admitted cancer patients. Variables including age, gender, cancer type, and year-wise distribution were collected and analysed using MS Excel and SPSS version 21. The results were expressed as frequencies and percentages.

Results: A total of 125 cancer cases were recorded during the study period. The highest number of cases was observed in 2024 (38 cases), while the lowest was in 2020 (3 cases). Breast cancer was the most common malignancy, accounting for 69 cases (55.2%), followed by stomach cancer (16 cases, 12.8%), laryngeal cancer (14 cases, 11.2%), and rectal cancer (11 cases, 8.8%). The majority of cancers occurred in the 41–60 years age group. Gender distribution showed that breast cancer was observed exclusively among females, while stomach, laryngeal, and penile cancers were more prevalent among males. Rare malignancies such as gastrointestinal stromal tumour (GIST), retroperitoneal liposarcoma (RPLS), and skin cancer were observed in a small number of cases.

Conclusion: Breast cancer was the most common malignancy in the study population, with a significant burden observed in middle-aged individuals. Gastrointestinal and head-and-neck cancers also contributed substantially to the cancer spectrum. The findings highlight the need for increased awareness, early screening programs, and preventive strategies to reduce cancer burden, particularly in rural populations.

***Index Terms*—Cancer epidemiology, breast cancer, gastrointestinal cancers, rural healthcare, cancer burden, retrospective study**

I. INTRODUCTION

Cancer ranks as a leading cause of death and an important barrier to increasing life expectancy in every country of the world.[1] The World Health Organization reported in 2019 that cancer is among the top two causes of premature death (before 70 years of age) in 112 of 183 nations, and it ranks third or fourth in 23 more countries. Overall, the burden of cancer incidence and mortality is rapidly growing worldwide; this reflects both aging and growth of the population as well as changes in the prevalence and distribution of the main risk factors for cancer, several of which are associated with socioeconomic development.[2,3]

Globally, approximately 10.1 million cancer cases occur among males and 9.2 million among females

annually, with estimated deaths of 5.5 million and 4.4 million respectively. Female breast cancer has surpassed lung cancer as the most diagnosed cancer, with an estimated 2.3 million new cases (11.7%), followed by lung (11.4%), colorectal (10.0 %), prostate (7.3%), and stomach (5.6%) cancers. Lung cancer remained the leading cause of cancer death, with an estimated 1.8 million deaths (18%), followed by colorectal (9.4%), liver (8.3%), stomach (7.7%), and female breast (6.9%) cancers. It is estimated that 30–50% of cancers are preventable through the reduction of modifiable risk factors and the application of established, evidence-based preventive measures. The overall burden of cancer can be further lowered by promoting early diagnosis and ensuring timely, appropriate treatment and patient care. Many types of cancer have favourable outcomes when identified at an early stage and managed properly. Numerous retrospective studies worldwide have examined various cancers in relation to social, demographic, and clinicopathological factors, particularly in breast, cervical, and gastric cancers.

II. MATERIALS AND METHODS

Study Design and Period

The study was conducted as a retrospective descriptive study among the various cancer patients admitted in our tertiary care centre for a period of 6 years from January 2020 to December 2025. The data and the case sheets from the hospital records were obtained from the MRD department. Ethical approval was obtained from the Institutional Ethics Committee of Al-Falah School of Medical Sciences and Research Centre.

Study Population

All inpatients diagnosed with cancer during the six-year study period were included in the study. The case sheets were reviewed by the investigators on the variables viz age, gender, diagnosis, cancer site, investigations, and treatment aspects.

Data Collection and Entry

The data were entered in the MS excel sheet and analysed using SPSS software version 21. The data were expressed in terms of frequencies and percentages.

Outcome Measures

The study outcomes included the spectrum and frequency of different cancer types, gender-wise distribution, age-group patterns across malignancies, and the surgical interventions performed for each cancer type.

III. RESULTS

As shown in Table 1, During the study period from 2020 to 2025, a total of 125 cancer cases were recorded at the study center. The number of cases showed variation across the years, with the highest number reported in 2024 (38 cases), followed by 2025 (29 cases) and 2022 (23 cases). The lowest number of cases was observed in 2020 (3 cases).

Among the different types of malignancies identified, breast cancer constituted the largest proportion with 69 cases (55.2%), making it the most common cancer observed during the study period. This was followed by stomach cancer with 16 cases (12.8%), laryngeal cancer with 14 cases (11.2%), and rectal cancer with 11 cases (8.8%).

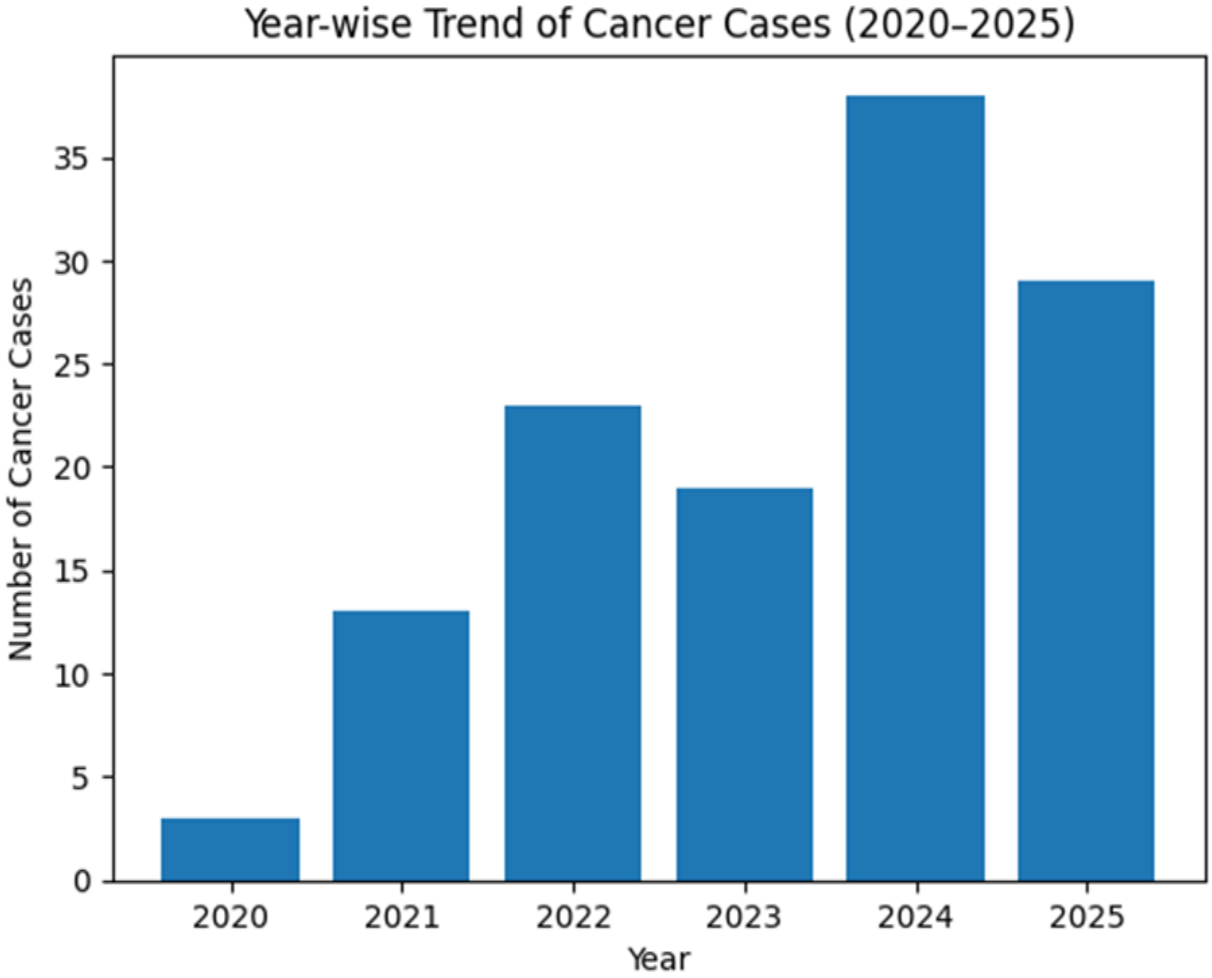
Table 1: Year Wise Distribution of Cancer Cases (2020-2025)

Cancer Type	2020	2021	2022	2023	2024	2025	*Total*
CA Breast	0	9	17	5	27	11	69
CA Stomach	0	2	1	4	6	3	16
CA Rectum	0	0	0	2	4	5	11
CA Prostate	0	0	1	0	0	0	1
CA Penis	0	2	0	3	1	0	6
CA Thyroid	1	0	1	1	0	0	3
CA Skin	0	0	0	0	0	1	1
CA Larynx	1	0	0	4	0	9	14
GIST	1	0	0	0	0	0	1
RPLS	0	0	3	0	0	0	3
Total	3	13	23	19	38	29	125

Less frequently reported cancers included penile cancer (6 cases, 4.8%), thyroid cancer (3 cases, 2.4%), and retroperitoneal leiomyosarcoma (3 cases, 2.4%). Rare malignancies such as prostate cancer, gastrointestinal stromal tumour (GIST), and skin cancer were each observed in one case (0.8%) during the entire study period.

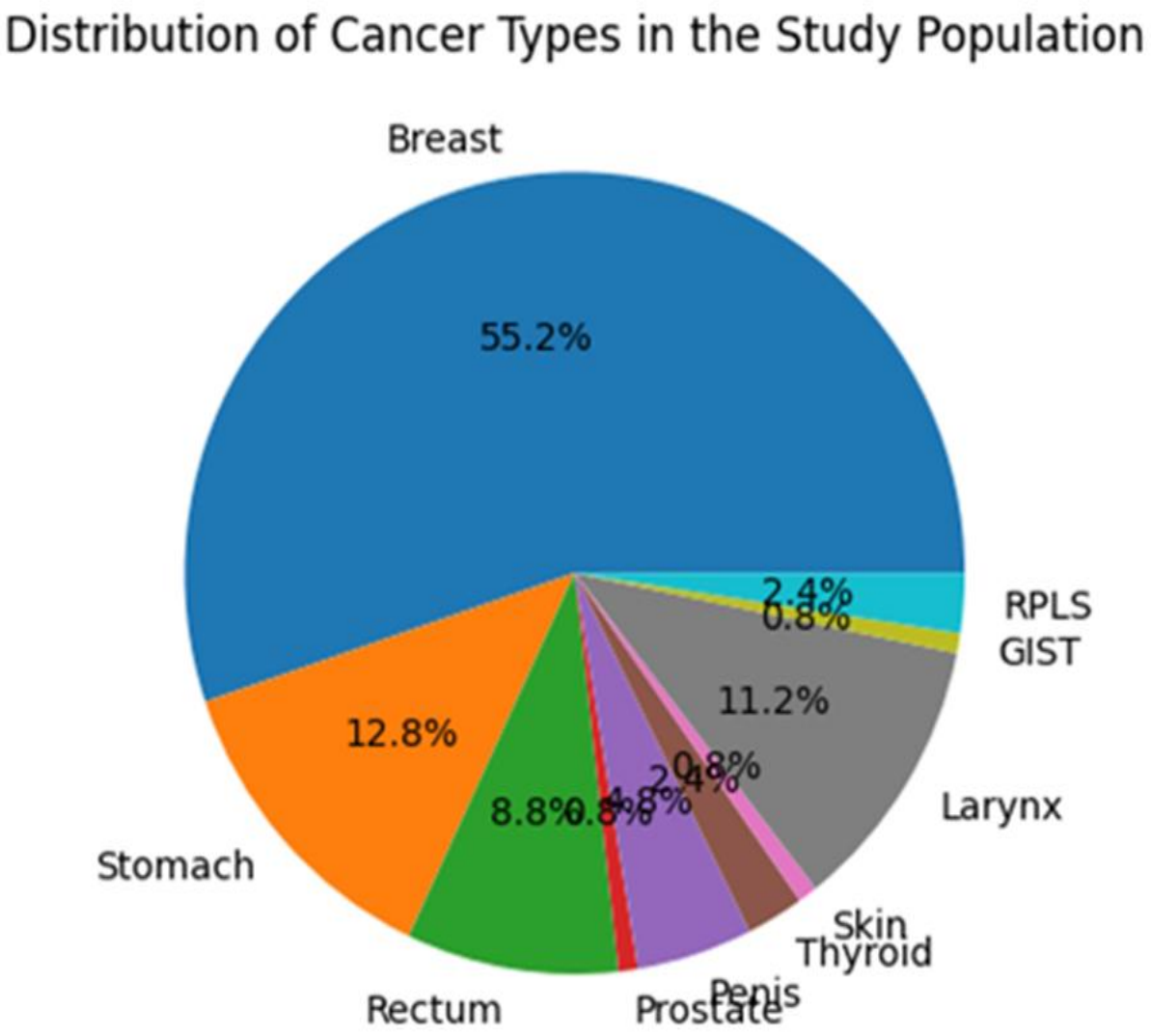
An increasing trend in cancer detection was observed from 2020 to 2024, with a peak in 2024, followed by a slight decline in 2025. Breast cancer cases were reported consistently across most years and showed a notable increase in 2024 (27 cases). Similarly, laryngeal cancer showed a rise in 2025 with 9 cases, representing the highest annual count for this cancer type.

Overall, the findings indicate that breast cancer remains the predominant malignancy in the study population, while gastrointestinal and head-and-neck cancers also contribute significantly to the overall cancer burden followed by stomach cancer (12.8%), laryngeal cancer (11.2%), and rectal cancer (8.8%). Other malignancies such as penile, thyroid, and retroperitoneal leiomyosarcoma accounted for smaller proportions of the total cancer burden.



The majority of cancer cases were observed in the 41–50 years and 51–60 years age groups, indicating a higher burden of malignancies in the middle-aged population.

Among breast cancer cases (n = 69), the highest number of cases was reported in the 41–50 years age group (22 cases), followed by the 51–60 years age group (20 cases). A smaller number of cases were observed in the 31–40 years (12 cases) and 61–70 years (10 cases) age groups, while only 3 cases were reported among individuals aged 71–80 years.



As shown in Figure 1, the distribution of cancer cases according to age group and type of cancer is presented. Stomach cancer (n = 16) was predominantly seen in the 51–60 years age group (7 cases), followed by the 41–50 years age group (6 cases). Fewer cases were reported among individuals aged 61–70 years (2 cases) and 71–80 years (1 case).

Similarly, rectal cancer (n = 11) was more common among the 51–60 years age group (4 cases) and 41–50 years age group (3 cases), while 2 cases each were observed in the 61–70 years and 71–80 years age groups.

Laryngeal cancer (n = 14) showed a higher occurrence in the 41–50 years age group (8 cases), followed by 31–40 years (3 cases) and 51–60 years (3 cases).

Less common malignancies such as penile cancer (n = 6) were mainly observed in the 51–60 years age group (3 cases), followed by the 61–70 years age group (2 cases). Thyroid cancer (n = 3) was distributed across the 21–30 years, 51–60 years, and 71–80 years age groups.

Rare cancers such as prostate cancer, gastrointestinal stromal tumour (GIST), and skin cancer were observed in isolated cases within specific age groups.

Overall, the findings suggest that most cancers in the study population occurred between 41 and 60 years of age, highlighting the increased burden of malignancies in the middle-aged population

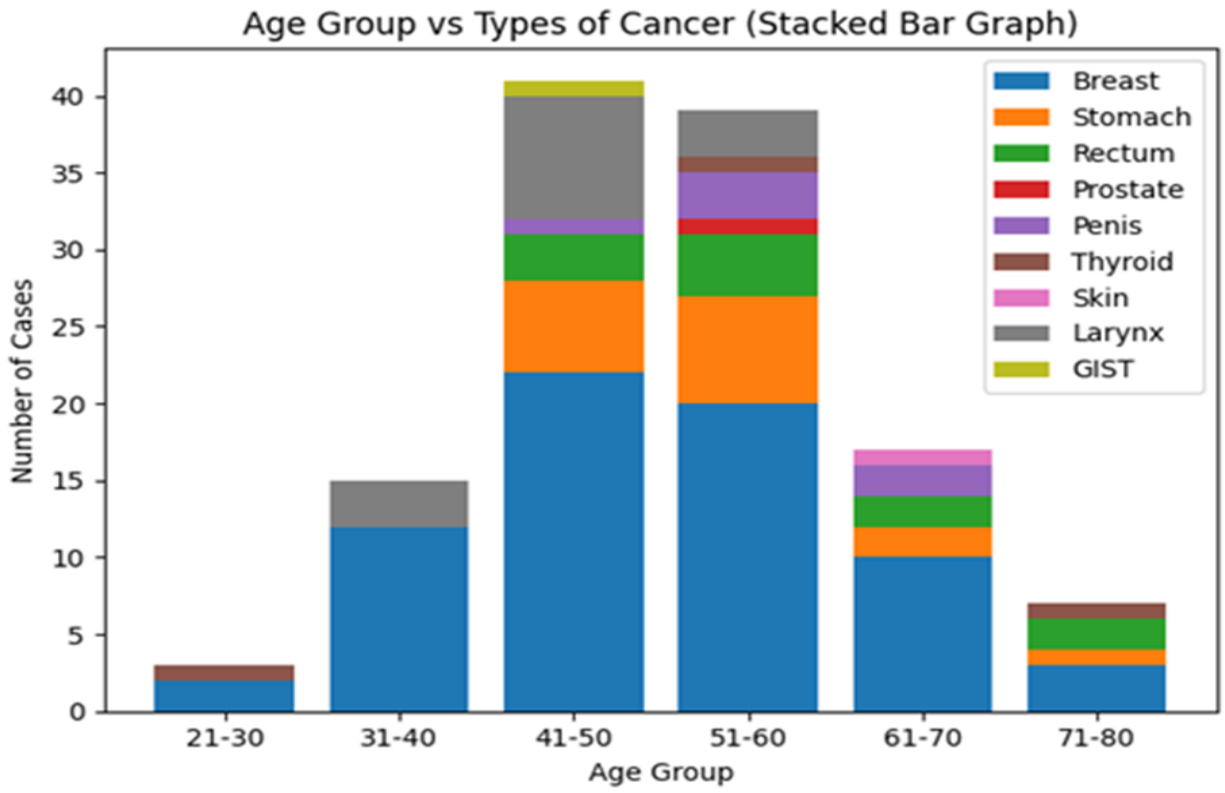


Figure 1: Age – Wise Distribution of Different Cancers

As shown in Table 2, The gender-wise distribution of cancer cases showed a clear variation across different malignancies. Breast cancer was observed exclusively among females, accounting for 69 cases, with no cases reported among males. In contrast, certain cancers were found predominantly among males. Stomach cancer was reported in 14 males and 2 females, while rectal cancer showed a relatively comparable distribution with 6 cases in males and 5 in females.

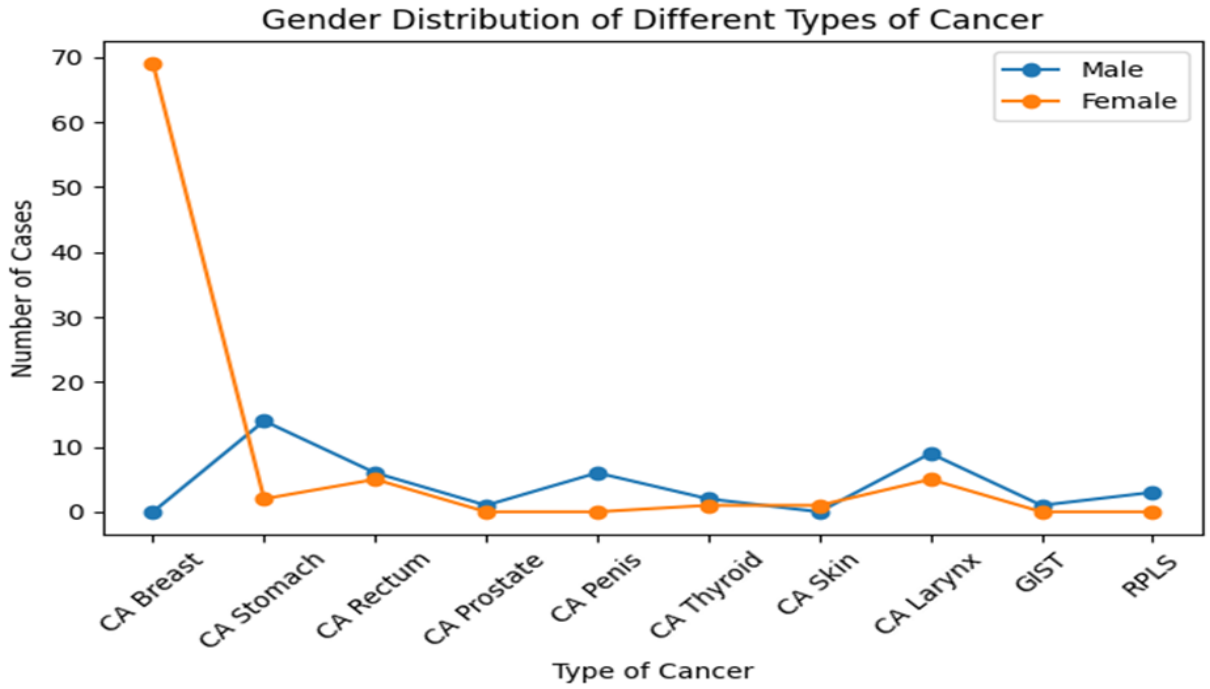
Table 2: Gender – Wise Distribution of Cancers

Cancer Type	Male	Female
CA Breast	0	69
CA Stomach	14	2
CA Rectum	6	5
CA Prostate	1	0
CA Penis	6	0
CA Thyroid	2	1
CA Skin	0	1
CA Larynx	9	5
GIST	1	0
RPLS	3	0

Male-specific malignancies included prostate cancer (1 case) and penile cancer (6 cases), with no cases reported among females. Thyroid cancer was observed in 2 males and 1 female, while skin cancer was reported only in 1 female. Laryngeal cancer was more common in males, with 9 cases, compared to 5 cases in females.

Rare tumours such as gastrointestinal stromal tumour (GIST) and retroperitoneal liposarcoma (RPLS) were reported only among males, accounting for 1 case and 3 cases, respectively.

Overall, the findings demonstrate that while certain cancers such as breast cancer are exclusively seen among females, many other malignancies such as stomach, laryngeal, and penile cancers show a higher predominance among males in the studied population.



IV. DISCUSSION

The present retrospective study analysed the pattern and distribution of cancers diagnosed at a rural tertiary care centre in Faridabad over a six-year period from 2020 to 2025. Understanding the epidemiological pattern of cancers in hospital-based settings is important for identifying regional trends and planning preventive strategies.

In the present study, a total of 125 cancer cases were recorded during the study period. An increasing trend in cancer detection was observed from 2020 to 2024, with the highest number of cases reported in 2024. Similar increasing trends have been reported in several Indian cancer registries, which attribute the rise to population ageing, lifestyle changes, and improved diagnostic facilities.[4]

Breast cancer emerged as the most common malignancy in the present study, accounting for 55.2% of the total cases. This finding is consistent with several Indian epidemiological studies that report breast cancer as the most frequently diagnosed malignancy among women in India. According to epidemiological analyses from Indian cancer registries, breast cancer incidence has shown a significant increasing trend across multiple cities including Delhi, Bangalore, and Chennai.[5]

The predominance of breast cancer observed in this study is also similar to findings reported by Kuraparthy et al., who observed breast carcinoma as the leading cancer among women in a community hospital-based study in southern India.[6] These findings highlight the growing burden of breast cancer in developing countries, particularly in urbanizing and semi-urban populations.

Gastrointestinal malignancies such as stomach and rectal cancers constituted the second and fourth most common cancers in the present study. Similar findings have been reported in other Indian hospital-based studies, where gastrointestinal cancers contribute significantly to the overall cancer burden. Dietary habits, tobacco consumption, alcohol use, and chronic infections have been identified as major contributing risk factors in the Indian population.

Laryngeal cancer represented another significant proportion of malignancies in this study and was predominantly observed among males. This observation is consistent with previous Indian studies that demonstrate a strong association between tobacco use, alcohol consumption, and the occurrence of head and neck cancers. Tobacco-related cancers continue to represent a major public health challenge in India.

Age-wise analysis revealed that the majority of cancer cases occurred in individuals between 41 and 60 years of age. Similar age-related trends have been reported

in multiple Indian studies where the peak incidence of several malignancies occurs in the fifth and sixth decades of life. The increased occurrence of cancer in this age group may be due to prolonged exposure to environmental and behavioural risk factors along with biological ageing processes.

Gender-wise analysis in the present study showed that breast cancer was observed exclusively among females, whereas several malignancies such as stomach and laryngeal cancers were more common among males. These gender differences may be explained by variations in biological factors, hormonal influences, and lifestyle-related risk exposures.

Although rare malignancies such as gastrointestinal stromal tumour and retroperitoneal liposarcoma were identified in this study, their occurrence reflects the wide spectrum of cancers encountered in clinical practice.

Despite certain limitations such as its retrospective design and single-centre setting, this study provides useful insight into the pattern of cancers in a rural tertiary healthcare centre. Hospital-based studies remain important sources of epidemiological data in India where population-based cancer registries are still limited.[7]

Overall, the findings of the present study contribute to the understanding of cancer epidemiology in rural and semi-urban regions of northern India and highlight the need for improved cancer awareness, screening programs, and early diagnostic services.

V. CONCLUSION

The present retrospective study highlights the pattern and distribution of malignancies diagnosed at a rural tertiary care centre over a six-year period. Breast cancer emerged as the most common cancer in the study population, accounting for more than half of the total cases, followed by stomach, laryngeal, and rectal cancers. The majority of cases were observed in individuals between 41 and 60 years of age, indicating a higher burden of malignancies in the middle-aged population.

Gender-wise analysis revealed that breast cancer was confined to females, whereas several malignancies such as stomach, laryngeal, and penile cancers were more prevalent among males. These variations may reflect differences in biological factors, lifestyle behaviours, and exposure to environmental risk factors.

The study also identified a small proportion of rare malignancies including gastrointestinal stromal tumour and retroperitoneal liposarcoma. Although these cancers were less frequent, their presence emphasizes the diverse spectrum of malignancies encountered in clinical practice.

Overall, the findings underscore the importance of strengthening cancer awareness programs, promoting early detection through screening initiatives, and addressing modifiable risk factors such as tobacco use and unhealthy lifestyle habits. Improving access to early diagnosis and timely treatment may significantly reduce the burden of cancer in rural and semi-urban populations

Declaration by Authors

Ethical Approval: Approved
Acknowledgement: None
Source of Funding: None
Conflict of Interest: The authors declare no conflict of interest

REFERENCES

[1] 1. Bray F, Laversanne M, Weiderpass E, Soerjomataram I. The ever-increasing importance of cancer as a leading cause of premature death worldwide. Cancer. In press.

[2] 2. Omran AR. The epidemiologic transition. A theory of the epidemiology of population change. Milbank Mem Fund Q. 1971; 49:509-38.

[3] 3. Gersten O, Wilmoth JR. The cancer transition in Japan since 1951. Demogr Res. 2002; 7:271-306.

[4] 4. Sathishkumar K, N V, Badwe RA, Deo SVS, Manoharan N, Malik R, Panse NS, Ramesh C, Shrivastava A, Swaminathan R, Vijay CR, Narasimhan S, Chaturvedi M, Mathur P. Trends in breast and cervical cancer in India under National Cancer Registry Programme: An Age-Period-Cohort analysis. Cancer Epidemiol. 2021 Oct; 74:101982. doi: 10.1016/j.canep.2021.101982. Epub 2021 Jul 16. PMID: 34280846.

[5] 5. Malvia S, Bagadi SA, Dubey US, Saxena S. Epidemiology of breast cancer in Indian women. Asia Pac J Clin Oncol. 2017 Aug;13(4):289-295.

doi: 10.1111/ajco.12661. Epub 2017 Feb 9. PMID: 28181405.

[6] 6. Kuraparthy S, Reddy KM, Yadagiri LA, Yutla M, Venkata PB, Kadainti SV, Reddy RP. Epidemiology and patterns of care for invasive breast carcinoma at a community hospital in Southern India. World J Surg Oncol. 2007 May 23; 5:56. doi: 10.1186/1477-7819-5-56. PMID: 17519044; PMCID: PMC1891296.

[7] 7. K V Deepa, Jubina Balan Venghateri, Monty Khajanchi, Anita Gadgil, Nobhojit Roy, Cancer epidemiology literature from India: Does it reflect the reality? *Journal of Public Health*, Volume 42, Issue 4, December 2020, Pages e421–e427