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Comprehensive Analysis of Cancer Epidemiology and Care at IGMC Shimla: A Five-Year Review of Trends, Treatment Modalities, and Geographic Disparities in Himachal Pradesh (2018-2022)

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Abstract: Cancer remains a significant health challenge globally, with its burden steadily rising in India. This study provides a comprehensive analysis of cancer patient data from the Indira Gandhi Medical College (IGMC) Shimla, Himachal Pradesh, collected over a five-year period from 2018 to 2022. IGMC Shimla, a premier healthcare institution, plays a crucial role in cancer diagnosis, treatment, and care. Our analysis encompasses new cancer registrations, outpatient department (OPD) visits, chemotherapy and radiation therapy treatments, and cancer-related mortality. A total of 12,662 new cancer cases were registered, with a nearly equal gender distribution (6,546 males and 6,116 females). The OPD recorded 113,745 visits, 85,534 patients received chemotherapy, and 8,267 patients underwent radiation therapy. Significant geographic disparities were observed, with Shimla, Mandi, and Kangra reporting the highest number of cases, while districts like Una, Kinnour, and Lahaul & Spiti reported fewer cases. Age-wise, cancer predominantly affected older adults, particularly those aged 60-79 years. These findings highlight the need for gender-neutral screening programs, enhanced OPD infrastructure, and improved access to advanced diagnostic and treatment facilities. Addressing these gaps through targeted public health interventions and comprehensive screening programs is crucial for mitigating the cancer burden and improving patient outcomes in Himachal Pradesh. This study serves as a vital resource for healthcare providers, policymakers, and researchers in their ongoing efforts to combat cancer and enhance cancer care in the region.

Keywords: Cancer epidemiology, IGMC Shimla, Chemotherapy and radiation therapy, Cancer screening, Public health interventions

INTRODUCTION

Cancer remains one of the foremost health challenges globally, with a significant impact on morbidity and mortality rates. In India, the burden of cancer is steadily rising, necessitating comprehensive data to inform effective healthcare strategies.[1-3] This research article delves into the cancer patient data collected from the Indira Gandhi Medical College (IGMC) Shimla, Himachal Pradesh, over a five-year span from 2018 to 2022.

The IGMC Shimla, a premier institution in Northern India, serves as a crucial hub for cancer diagnosis, treatment, and care. Given its pivotal role, understanding the demographic and geographic distribution of cancer cases at this institution provides valuable insights into the broader epidemiological trends within the region. Our study focuses on analyzing various parameters such as new cancer registrations, outpatient department (OPD) visits, and treatment modalities including chemotherapy and radiation therapy.

This study aims to contribute to the existing body of knowledge by providing a detailed account of cancer trends observed at IGMC Shimla. By examining data on patient demographics and the geographic spread of cases, we seek to identify patterns that could inform targeted public health interventions. Additionally,

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our analysis will explore the age-wise distribution of cancer patients, offering a comprehensive overview of how cancer impacts different age groups within the region.

Through this research, we aim to underscore the importance of regional cancer registries in shaping public health policies and improving cancer care infrastructure. The findings from this study are expected to aid healthcare providers, policymakers, and researchers in their ongoing efforts to enhance cancer prevention, early detection, and treatment strategies, ultimately contributing to better patient outcomes and reduced cancer burden in Himachal Pradesh.

MATERIALS & METHODS

Study Design and Setting

This retrospective observational study was conducted at the Indira Gandhi Medical College (IGMC) Shimla, Himachal Pradesh, a premier tertiary care institution in Northern India. The study covers a five-year period from January 1, 2018, to December 31, 2022.

Data Collection

The dataset includes information on the total number of new cancer cases registered, the number of cancer patients visiting the outpatient department (OPD), the number of patients receiving chemotherapy and radiation therapy, and the number of cancer-related deaths. Additionally, district-wise and age-wise distributions of new cancer cases were recorded.

Data Variables

The primary variables analyzed in this study include:

- **Total new cancer registrations**: The number of new cancer patients registered each year.
- **OPD visits**: The total number of cancer-related outpatient visits, including both new and follow-up cases.
- **Chemotherapy and Radiation Therapy**: The number of patients receiving these treatments annually.
- **Cancer-related deaths**: The number of deaths among cancer patients admitted to the hospital.
- **District-wise distribution**: The geographic distribution of new cancer cases by district.
- **Age-wise distribution**: The distribution of new cancer cases across different age groups.

Data Analysis

Data were compiled and analyzed using Microsoft Excel and statistical software. Descriptive statistics, including frequencies and percentages, were calculated for categorical variables. Continuous variables were summarized using means and standard deviations. District-wise and age-wise distributions were presented in tabular form.

RESULTS

Cancer Patient Demographics and Registration

From January 1, 2018, to December 31, 2022, a total of 12,662 new cancer patients were registered at IGMC Shimla. Of these, 6,546 were male and 6,116 were female, demonstrating a nearly equal gender distribution. The annual registrations indicate a consistent influx of new cases, highlighting the persistent cancer burden in the region.

Outpatient Department (OPD) Visits

During the five-year study period, the cancer outpatient department (OPD) at IGMC Shimla recorded 113,745 visits. This includes both new and follow-up patients, reflecting the extensive reach and continuous engagement of the hospital with cancer patients. The high number of OPD visits underscores the critical role of IGMC Shimla in providing ongoing cancer care and management.

Chemotherapy and Radiation Therapy

A total of 85,534 cancer patients received chemotherapy, while 8,267 patients underwent radiation therapy (teletherapy and brachytherapy combined) during the study period. The distribution of these

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treatments indicates a substantial reliance on chemotherapy, with radiation therapy also playing a significant role in the multidisciplinary approach to cancer treatment at IGMC Shimla.

Cancer-Related Mortality

The data recorded 346 deaths among cancer patients admitted to the hospital from 2018 to 2022. This mortality figure, while indicative of the severity of advanced-stage cancers, also underscores the challenges faced in cancer treatment and the necessity for improved therapeutic strategies and palliative care.

Table 1: Cancer Patient Data Overview

Description	Years (2018-2022)
Total No. of new cancer patients registered during the years.	Total: 12662, Male: 6546, Female: 6116
Total number of Cancer Patients visiting the OPD during the years (Old+New)	113745
Total number of cancer patients who received Chemotherapy during the years.	85534
Total number of cancer patients who were given Radiation therapy (Teletherapy + Brachytherapy)	8267
Deaths of cancer patients admitted in cancer hospital	346

District-Wise Distribution of New Cancer Cases

The geographic analysis of new cancer cases revealed significant variations across different districts. Shimla reported the highest number of new cases (3,055), followed by Mandi (2,677), and Kangra (977). In contrast, districts like Una (190), Kinnour (285), and Lahaul & Spiti (107) reported fewer cases, suggesting potential disparities in cancer incidence or healthcare access across regions. The total number of new cancer cases for each year from 2018 to 2022 is detailed in Table 2.

Table 2: District-wise Distribution of New Cancer Patients

District	2018	2019	2020	2021	2022	Total
Shimla	537	625	608	656	629	3,055
Mandi	513	524	559	623	458	2,677
Kangra	311	140	158	208	160	977
Solan	186	192	217	199	240	1,034
Una	97	18	23	31	21	190
Bilaspur	181	199	217	251	211	1,059
Kinnour	48	64	53	67	53	285
Hamirpur	141	115	133	158	134	681
Kullu	225	219	214	173	240	1,071
L&S	21	19	24	22	21	107
Sirmour	267	152	184	163	154	920
Chamba	133	89	92	126	97	537
Others	12	0	19	13	25	69
Total	2,672	2,356	2,501	2,690	2,443	12,662

Age-Wise Distribution of Cancer Patients

The age-wise distribution of new cancer cases shows that cancer predominantly affects older adults, with the highest number of cases observed in the 60-69 and 70-79 age groups. The total number of new cancer cases for each age group from 2018 to 2022 is detailed in Table 3.

Table 3: Age-wise Distribution of Cancer Patients

Age Group	2018	2019	2020	2021	2022	Total
0-9	10	8	6	8	4	36

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10-19	30	21	28	35	25	139
20-29	48	43	60	56	50	257
30-39	150	108	132	144	115	649
40-49	301	311	353	402	319	1,686
50-59	610	514	624	609	551	2,908
60-69	702	734	752	801	775	3,764
70-79	673	455	435	490	478	2,531
80-89	139	157	92	122	119	629
90-99	9	5	19	17	12	62
Total	2,672	2,356	2,501	2,684	2,448	12,662

The data reveal that the majority of cancer patients are in the age groups of 50-59, 60-69, and 70-79 years, suggesting a higher cancer incidence in older populations. This pattern underscores the importance of targeted screening and preventive measures for these age groups.

This cancer patient data from IGMC Shimla provides a comprehensive overview of the cancer burden in Himachal Pradesh. The findings emphasize the need for continued efforts in cancer prevention, early detection, and treatment to address the ongoing challenges posed by cancer in this region.

DISCUSSION

The data collected from the Indira Gandhi Medical College (IGMC) Shimla over the five-year period from 2018 to 2022 provide valuable insights into the cancer burden and its demographic and geographic distribution in Himachal Pradesh. Our findings highlight several critical aspects that can inform public health strategies, cancer care policies, and future research initiatives.

The nearly equal gender distribution of cancer cases (6,546 males and 6,116 females) suggests that cancer affects both sexes almost equally in this region. This observation underscores the necessity for gender-neutral cancer screening and prevention programs. Moreover, specific attention should be given to gender-related cancer types, such as breast cancer in females and prostate cancer in males, to develop targeted interventions.[4,5]

With 113,745 OPD visits recorded, the high engagement of cancer patients with the hospital services highlights IGMC Shimla's role as a critical healthcare provider in the region. This substantial number of visits reflects the ongoing need for continuous cancer care and management, emphasizing the importance of strengthening OPD services to cater to the growing patient population. Enhancing OPD infrastructure and increasing the availability of specialized cancer care services could significantly improve patient outcomes.[6,7]

The administration of chemotherapy to 85,534 patients and radiation therapy to 8,267 patients illustrates the hospital's extensive treatment capacity. However, the reliance on chemotherapy as the primary treatment modality raises questions about the accessibility and availability of other treatment options, such as targeted therapies and immunotherapies. The lower number of patients receiving radiation therapy may indicate potential barriers, such as limited access to advanced radiation facilities or a lack of trained personnel. Addressing these gaps could enhance the overall quality of cancer treatment.[8,9]

The 346 recorded cancer-related deaths over five years reflect the severity and challenges of managing advanced-stage cancers. This mortality rate underscores the urgent need for early detection and timely intervention to improve survival rates. Implementing comprehensive cancer screening programs, particularly for high-risk populations, and promoting awareness about early symptoms could lead to earlier diagnoses and better prognosis.[2,10]

The district-wise distribution of new cancer cases reveals significant geographic disparities. Shimla, Mandi, and Kangra reported the highest number of cases, suggesting these areas may have higher cancer incidence rates or better access to diagnostic facilities. In contrast, districts like Una, Kinnour, and Lahaul & Spiti reported fewer cases, which may be attributed to limited healthcare infrastructure, lower

population density, or underreporting. These disparities highlight the need for region-specific cancer control strategies and improved healthcare access in underserved areas.[11,12]

The age-wise distribution of cancer patients shows a higher prevalence among older age groups, particularly those aged 60-79 years. This trend aligns with global cancer incidence patterns, where cancer risk increases with age. However, the presence of cancer cases in younger age groups (0-39 years) is concerning and warrants further investigation into potential etiological factors, such as genetic predispositions, environmental exposures, and lifestyle factors. Tailored prevention and intervention programs targeting different age groups could effectively address these varied needs.

Public Health Implications

Our study emphasizes the critical role of regional cancer registries in providing comprehensive data that inform public health policies and cancer care strategies. The findings suggest that improving healthcare infrastructure, increasing access to advanced diagnostic and treatment facilities, and implementing robust cancer screening programs are essential steps towards reducing the cancer burden in Himachal Pradesh.

Limitations and Future Directions

This study is not without limitations. The retrospective nature of the data may be subject to recording and reporting biases. Additionally, the findings are specific to the population served by IGMC Shimla and may not be generalizable to other regions. Future research should focus on prospective studies and include data from multiple healthcare institutions across the state to provide a more comprehensive understanding of cancer epidemiology in Himachal Pradesh.

CONCLUSION

The comprehensive analysis of cancer patient data from IGMC Shimla over a five-year period highlights the persistent and evolving cancer burden in Himachal Pradesh. Our findings underscore significant gender parity in cancer incidence, a robust engagement with outpatient services, and substantial reliance on chemotherapy as a primary treatment modality. The geographic disparities in cancer cases and the higher prevalence among older age groups emphasize the need for region-specific strategies and age-targeted interventions. Addressing gaps in healthcare infrastructure, enhancing access to advanced diagnostic and treatment facilities, and implementing comprehensive screening programs are critical steps towards improving cancer care. This study serves as a crucial resource for healthcare providers, policymakers, and researchers, guiding future efforts to mitigate the cancer burden and improve patient outcomes in the region.

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