

## ORIGINAL ARTICLE

## DISTRICT-WISE DISTRIBUTION AND TRENDS OF CANCER INCIDENCE IN NEPAL: A FIVE-YEAR ANALYSIS (2016–2020)

Krishna Prasad Subedi<sup>1\*</sup>, Rishiram Poudel<sup>1</sup>, Shivaji Poudel<sup>2</sup>, Deji Kumar Gautam<sup>2</sup>, Pramod Bhatta<sup>3</sup>, Hari Bahadur Rana<sup>4</sup><sup>1</sup>Nepal Sanskrit University, Beljhundi, Dang, Nepal<sup>2</sup>B.P. Koirala Memorial Cancer Hospital, Bharatpur, Chitwan, Nepal<sup>3</sup>Institutes of Medicine, Tribhuvan University, Kathmandu, Nepal<sup>4</sup>Chitwan Medical Colleges, Teaching Hospital, Bharatpur, Nepal

## ABSTRACT

**Introduction:** Cancer is an increasing public health concern in Nepal. This study utilizes secondary data collected from B.P. Koirala Memorial Cancer Hospital (BPKMCH), the national authority responsible for data collection under the National Cancer Registry.**Method:** A total of 62,492 new cancer cases were diagnosed and treated between January 1, 2016, and December 31, 2020. Key variables such as name, age, sex, address, and cancer site were recorded to determine the distribution of cancer across the country. These variables were verified and categorized based on topographical regions where patients reported. Cancer cases were coded according to the International Classification of Diseases for Oncology (ICD-O-10, Third Edition), and data analysis was performed using SPSS version 29.0.**Results:** The highest number of cancer cases was reported from Kathmandu (12.33%), followed by Jhapa (4.10%) and Morang (3.74%) districts.**Conclusion:** The incidence of cancer showed an increasing trend over the study period. To reduce the cancer burden in Nepal, well-organized awareness campaigns, HPV vaccination, and regular screening programs are strongly recommended.**Key words:** Topography; District; Incidence; Oncology<https://doi.org/10.3126/jmmihs.v10i1.77785>

\*Corresponding Author: Krishna Prasad Subedi, PhD Scholar, Nepal Sanskrit University, Beljhundi, Dang, Nepal

Email: krishnasubedidr@gmail.com

Received 8 february 2025; Received in Revised from 15 february 2025; Accepted 20 April 2025

## INTRODUCTION

Cancer is the second leading cause of death globally, responsible for an estimated 9.6 million deaths—or one in six deaths—in 2018. Lung, prostate, colorectal, stomach, and liver cancers are the most common types among men, while breast, colorectal, lung, cervical, and thyroid cancers are most prevalent in women<sup>1</sup>. Approximately 70% of cancer-related deaths occur in low-and middle-income countries<sup>2</sup>. Asia, home to 60% of the global population, bears nearly half of the global cancer burden. The number of cancer cases in Asia is projected to rise from 6.1 million in 2008 to 10.6 million by 2030<sup>3</sup>. According to the World Health Organization (WHO), India has a cancer mortality rate of 79 per 100,000 and accounts for over 6% of total deaths—figures comparable to those in high-income countries<sup>4</sup>.

In Nepal, cancer has emerged as a significant public health challenge. The country's first Oncology Department was established at Bir Hospital in Kathmandu. This was followed by the establishment of the Bhaktapur Cancer Care Centre in 1992, which later became Bhaktapur Cancer Hospital (BCH) under the management of the Nepal Cancer Relief Society (NCRS) with support from the Rotary Club, local people of Bhaktapur, and the Government of Nepal. The hospital is currently operated by the Ministry of Health and Population of Nepal<sup>5</sup>. A major milestone came in 1999 with the establishment of B.P. Koirala Memorial Cancer Hospital (BPKMCH) in Bharatpur, a tertiary cancer treatment center supported by the government of Nepal and the People's Republic of China<sup>5</sup>. This was followed by the opening of Manipal Medical College and Teaching Hospital in Pokhara in 2000<sup>5</sup>.

Currently, cancer diagnosis and treatment services are available in multiple centers across Nepal. The Hospital-Based National Cancer Registry Programme is coordinated by 45 major hospitals, including some of the most prominent institutions in the country, such as BPKMCH, Tribhuvan University Teaching Hospital (TUTH), Bir Hospital, and Kanti Children's Hospital, among others<sup>6</sup>. This national registry helps compile comprehensive data on cancer incidence, mortality, and treatment trends, enabling a better understanding of cancer's burden and distribution in Nepal.

This study uses secondary data from the National Cancer Registry

Programme of Nepal, which compiles information from 45 major hospitals across the country. It aims to provide a district-wise overview of cancer incidence in Nepal from 2016 to 2020, contributing to a better understanding of cancer distribution and informing evidence-based public health interventions.

## METHODS

This was a descriptive cross-sectional study based on secondary data obtained from the B.P. Koirala Memorial Cancer Hospital (BPKMCH), Bharatpur, Chitwan, which serves as the national coordinating center for the Hospital-Based National Cancer Registry Programme in Nepal. The registry collects cancer data from 45 major hospitals across the country.

All new cancer cases diagnosed and treated between January 1, 2016, and December 31, 2020, were included in this study. Recurrent cases and follow-up patients were excluded. The data included basic variables such as name, age, sex, address (district), and site of cancer.

Each cancer case was coded using the International Classification of Diseases for Oncology, Third Edition (ICD-O-3). Data validation and verification were performed to ensure consistency and completeness of records.

The collected data were tabulated and analyzed based on sex, age groups, and geographic distribution (district-wise address). All statistical analyses were carried out using Statistical Package for the Social Sciences (SPSS) version 29.0.

## How to Cite

Subedi, K.P. et al. District-Wise Distribution and Trends of Cancer Incidence in Nepal: A Five-Year Analysis (2016–2020). *Journal of Manmohan Memorial Institute of Health Sciences*. 10, 1, 55–57. DOI:<https://doi.org/10.3126/jmmihs.v10i1.77785>.



## RESULTS

### Distribution of Total Cases Based on Sex

Among the 62,492 participants, 46.40% were male and 53.60% were female (Table 1).

**Table 1. Distribution of Total Cases Based on Sex**

Sex	Number	Percent (%)
Male	28994	46.40
Female	33498	53.60
Total	62492	100.00

### Distribution of Cases by Broad Age Group and Sex

Cancer cases were most prevalent in the 35–64 years age group, accounting for 55.33% of total cases, with a higher proportion in females (61.72%) compared to males (47.95%). The 65+ years group followed, contributing 29.54% of cases, with males (36.28%) more affected than females (23.71%). Younger age groups, 15–34 years and 0–14 years, had lower prevalence, with females slightly more affected in the former, and males in the latter. Overall, cancer is most common in middle-aged individuals, with a higher burden among females, and a significant proportion of cases in older males (Table 2).

Broad-Age Group	Male (#)	Male (%)	Female (#)	Female (%)	Total (#)	Total (%)
0–14 years	1,520	5.24	957	2.86	2,477	3.96
15–34 years	3,052	10.53	3,921	11.71	6,973	11.16
35–64 years	13,903	47.95	20,676	61.72	34,579	55.33
65+ years	10,519	36.28	7,944	23.71	18,463	29.54
Total	28,994	100.00	33,498	100.00	62,492	100.00

### District-wise Distribution of Cancer Cases

Out of the total 62,492 participants, the highest number of cancer cases was reported from Kathmandu, accounting for 12.33% (7,716 cases), with a slightly higher number among females (4,097) than males (3,619). Jhapa followed in second rank with 2,565 cases (4.10%), and Morang ranked third with 2,344 cases (3.74%). Other notable districts with relatively high cancer burden included Sunsari (3.62%), Chitwan (3.21%), and Rupandehi (2.82%). The top ten districts collectively accounted for a significant proportion of total reported cancer cases, with female cases consistently outnumbering male cases in all listed districts.

**Table 3. Top 10 Districts with Highest Cancer Prevalence (Both Sexes)**

Rank	District	Male (#)	Female (#)	Total Cases	Percent (%)
1	Kathmandu	3,619	4,097	7,716	12.33
2	Jhapa	1,119	1,446	2,565	4.10
3	Morang	1,065	1,279	2,344	3.74
4	Sunsari	990	1,273	2,263	3.62
5	Chitwan	896	1,116	2,012	3.21
6	Rupendehi	740	1,028	1,768	2.82
7	Lalitpur	779	933	1,712	2.74
8	Kaski	681	867	1,548	2.47
9	Bhaktapur	692	770	1,462	2.34
10	Nawalparasi	646	815	1,461	2.33

### Cancer Cases among Males by District

Among the 62,492 participants analyzed, the highest number of male cancer cases was reported from Kathmandu district, with a total of 3,619 cases, accounting for 12.48% of all male cancer cases. Jhapa (1,119 cases, 3.86%), Morang (1,065 cases, 3.67%), and Sunsari (990 cases, 3.41%) followed, indicating a higher prevalence in the eastern Terai region. Chitwan reported 896 cases (3.09%), while Lalitpur recorded 779 cases (2.69%).

A notable portion of cases (746; 2.57%) was listed under “Unknown” districts, suggesting incomplete geographic data in some records. Other districts with relatively high case numbers included Rupandehi (740 cases; 2.55%), Kavrepalchowk (725 cases; 2.50%), and Bhaktapur (692 cases; 2.39%).

**Table 4. Top 10 Districts with Highest Cancer Cases among Males**

Rank	District	Cases	Percent (%)
1	Kathmandu	3,619	12.48
2	Jhapa	1,119	3.86
3	Morang	1,065	3.67
4	Sunsari	990	3.41
5	Chitwan	896	3.09
6	Lalitpur	779	2.69
7	Unknown	746	2.57
8	Rupendehi	740	2.55
9	Kavrepalchowk	725	2.50
10	Bhaktapur	692	2.39

### Cancer Cases among Females by District

Analysis of female cancer cases revealed a distribution pattern similar to that observed among males. Kathmandu district reported the highest number of cases among females, with 4,097 cases, accounting for 12.23% of the total female cancer burden. Jhapa (1,446 cases; 4.32%), Morang (1,279 cases; 3.82%), and Sunsari (1,273 cases; 3.80%) followed, indicating a continued high prevalence in Province 1.

Chitwan ranked fifth with 1,116 cases (3.33%), followed by Rupandehi (1,028 cases; 3.07%) and Lalitpur (933 cases; 2.79%). Notably, Kaski district appeared among the top ten for females, reporting 867 cases (2.59%), as did Nawalparasi (815 cases; 2.43%). Bhaktapur, consistent with male data, reported 770 cases (2.30%).

**Table 5. Top 10 Districts with Highest Cancer Cases among Females**

Rank	District	Cases	Percent (%)
1	Kathmandu	4,097	12.23
2	Jhapa	1,446	4.32
3	Morang	1,279	3.82
4	Sunsari	1,273	3.80
5	Chitwan	1,116	3.33
6	Rupendehi	1,028	3.07
7	Lalitpur	933	2.79
8	Kaski	867	2.59
9	Nawalparasi	815	2.43
10	Bhaktapur	770	2.30

## DISCUSSION

This study provides a comprehensive overview of cancer prevalence across different demographic and geographic strata in a large population cohort of 62,492 participants. A higher proportion of cases

was observed among females (53.6%) compared to males (46.4%), aligning with global trends where certain cancers (e.g., breast and cervical) disproportionately affect women and contribute to a higher overall burden<sup>1,7</sup>.

Age-wise, cancer prevalence peaked in the 35–64 years group, accounting for 55.33% of all cases. This pattern underscores the increasing cancer risk associated with age, lifestyle, and occupational exposure during middle adulthood<sup>8</sup>. The higher prevalence among females in this age group (61.72%) may reflect early detection programs and gender-specific cancers, especially in urban and peri-urban districts with better healthcare access<sup>9</sup>. Conversely, the elderly population (65+ years) showed a higher burden among males (36.28%), possibly linked to delayed diagnosis, comorbidities, and lifestyle factors such as tobacco and alcohol use<sup>10</sup>.

Geographic analysis revealed Kathmandu as the district with the highest cancer burden (12.33%), followed by Jhapa and Morang. The clustering of cases in urban centers like Kathmandu Valley may reflect both higher environmental risks and better diagnostic services, which contribute to increased detection rates<sup>11</sup>. Similar trends were noted across sexes, with urban districts like Lalitpur and Bhaktapur consistently ranking among the top contributors. This distribution aligns with findings from other South Asian contexts, where cancer prevalence correlates with population density and healthcare infrastructure<sup>12</sup>.

## CONCLUSION

Cancer prevalence was highest among females and middle-aged individuals (35–64 years), with cases concentrated in urban districts like Kathmandu, Jhapa, and Morang. These trends indicate a need for targeted interventions in densely populated regions and age-specific cancer control strategies.

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## ACKNOWLEDEMENTS

The author extends sincere thanks to Soma Kanta Baral, Kishor Kumar Pradhananga, Bhola Siwakoti, Sunil Parajuli, Salim Ansari, Laxmi KC, and Mina Dawadi for their valuable contributions and support throughout this research.

## CONFLICT OF INTEREST

Authors declared, there is no conflict of interest.