

# Cancer incidence among patients attending a tertiary care cancer hospital in central India – A retrospective study



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## ABSTRACT

**Background:** Cancer is a leading cause of mortality and morbidity in the world. Cancer incidence varies widely throughout India from east to west and from north to south making the prevention and control programs difficult the alarming increase of cancer cases in low and middle-income countries like India warrants us to have a better knowledge about the transition in the epidemiology in various parts of the country. **Aims and Objectives:** The aim of this study was to assess the incidence of different cancers among patients visiting a tertiary care cancer hospital in central India. **Materials and Methods:** The data were collected retrospectively from the medical record database of a tertiary care cancer hospital in Central India from the time period between January 2017 and December 2021. A total of 13011 patients were registered at our hospital between this time period. Data were analyzed for the site of disease and tabulated, and then, the percentage distribution was calculated. **Results:** Head-and-neck cancer was the most commonly reported one followed by cervical cancer and breast cancer. Among gynecological malignancies, cervical cancer dominated the spectrum followed by ovarian cancer and endometrial cancer. Tobacco-related cancers were seen in high number each year. Less commonly reported cancers were that of urethral, adrenal, germ cell tumors, and choriocarcinoma followed by that of eye and ear. **Conclusion:** There is an urgent need to set up stringent hospital-based and population-based cancer registration system to understand the profile of cancer in each geographical region for a better understanding and implementation of cancer control programs.

**Key words:** Cancer epidemiology; Incidence; Central India; Mortality; Morbidity

## INTRODUCTION

The low- and middle-income countries (LMICs) are undergoing an epidemiological transition wherein the burden of communicable diseases is declining and non-communicable diseases like cancers are rising.<sup>1</sup> By 2025, around 20 million cancer cases are expected in LMICs.<sup>2</sup>

A considerable variation in the incidence of cancers is there between high-income countries (HICs) and LMICs.<sup>3</sup> In both men and women, the incidence varies from 95/10 000 in the LMICs to over 571/100 000 in the HIC countries.<sup>4</sup> The

situation is dramatically altering in LMICs over the past few decades, especially due to lifestyle changes, industrialization, migration of population from rural areas to cities, and increased life expectancy.<sup>5,6</sup> Non-communicable diseases are responsible for more than three-fifths of the deaths globally (36 million) which is largely contributed by cardiovascular diseases (48%), cancers (21%), chronic respiratory diseases (4.2 million deaths), and diabetes mellitus (1.3 million deaths).

The information on the number of new cancer cases and cancer deaths is not available from major regions of the world. The coverage was quite unequal, as in Latin America, 95%

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of the population was covered, whereas in Asia, it was only 9%.<sup>7</sup> In India, to identify the burden of cancers, a Cancer Registry Programme was started by the Indian Council of Medical Research in 1982 with an objective of determining the magnitude and pattern of various cancers. It started with six cancer registries, three population-based cancer registries (PBCRs) and three hospital-based cancer registries. The Indian Council of Medical Research and the National Centre for Disease Informatics and Research published the NCRP report 2020 which included 28 PBCRs and 58 hospital-based cancer registries. It gives an overview of the cancer incidence patterns across India between 2012 and 2016.<sup>8</sup>

The cancer incidence differs dramatically based on the geographical location within India. The highest cancer incidence was observed in Northeast India, with the most common cancers being nasopharyngeal, hypopharyngeal, esophageal, stomach, liver, gallbladder, laryngeal, lung, breast, and cervical cancers. There is an overall trend suggesting a transition to lifestyle-related cancers such as breast and colorectal cancers. The incidence of infection-related cancers such as cervical and stomach cancers is declining.<sup>9</sup>

Shetty *et al.*<sup>8</sup> in their study have looked into the geographical distribution of cancers and have reported the common (oral, breast, cervical, and lung) and emerging (prostate, ovarian, and endometrial) cancers across India to assess if national efforts can be directed accordingly. They selected six PBCRs with the highest number of patients from each zone in the country (north, south, east, west, central, and northeast), which included a total of 187891 patients. The report highlighted that oral, cervical, and breast cancers constitute the major cancer burden (more than 50%) and that there are incommensurately high incidence rates of cancer in Northeast Baghelkhand region, and Malajkhand region of central India. They also reported that the incidence of lung, breast, prostate, and colorectal cancers is increasing.

The primary purpose of this study is to find the pattern of incidence of cancer in the Central India region which caters cancer care to a large region including Mahakoshal region, Vindhya region, Bundelkhand region, Baghelkhand region, and Malajkhand region of central India.

### Aims and objectives

The aim of this study was to assess the incidence of different cancers among patients visiting a tertiary care cancer hospital in central India.

## MATERIALS AND METHODS

### Study design

The present retrospective study was carried out at a tertiary care cancer hospital in Madhya Pradesh in central India.

13011 histopathologically proven patients of malignancy were registered during the time period January 2017–December 2021.

### Data collection method

The data regarding the newly registered cases were obtained from the medical record database maintained at the hospital.

### Data analysis

Data analysis was done using Microsoft Excel sheet and percentage analysis of each cancer was done.

### Inclusion criteria

A patient who is histopathologically proven of cancer (including new cases as well as recurrence cases) and who is newly registered at our center.

### Exclusion criteria

A patient who is not histopathologically proven and who is not registered at our center.

## RESULTS

There were 13011 cancer cases registered during the time period from January 2017 to December 2021. Among them, head-and-neck cancer was the most common (30.67%) followed by cervical cancer (15.8%) and breast cancer (12.4%) (Table 1 and Figures 1 and 2) Among gynecological cancers which constituted 19.7% of the total cases, cervical cancer was the most common (80.4%) followed by ovarian cancer (13.7%) and endometrial cancer (4%) (Figure 3). Tobacco-related cancers almost dominated. Less commonly seen were urethral cancer (0.007%), germ cell tumors (0.03%), choriocarcinoma (0.03%), eye (0.17%), and ear cancers (0.12%). Hematological malignancies constituted 5.7% of the total.

## DISCUSSION

India exhibits heterogeneity in cancer. Approximately 70% of cancers in India were potentially preventable through modifiable risk factors.<sup>10</sup> Lung (9 PBCRs), mouth (9 PBCRs), esophagus (5 PBCRs), stomach (4 PBCRs), and nasopharynx (1 PBCR) cancers were the most common cancers in men.<sup>11</sup> Lung cancer was the leading site in metropolitan cities and the southern region, whereas mouth cancer was the leading site in the West and Central regions. Lung cancer and oral cancer were the most common cancers among males in the Indian subcontinent.<sup>4</sup> Cancers of the esophagus, stomach, and nasopharynx were the leading sites in the Northeastern region of India with the cancer incidence pattern being

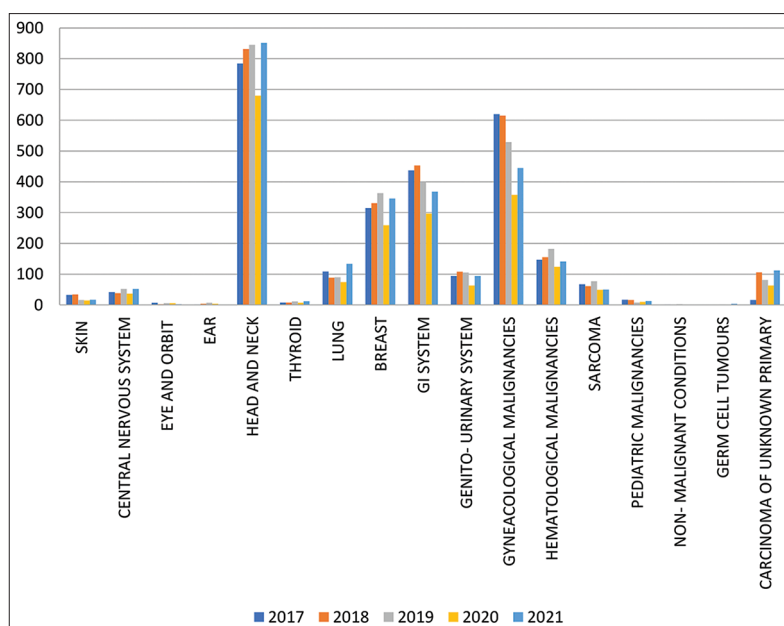
**Table 1: Site wise distribution and incidence of various cancers**

Cancer site	Total	%
Skin	115	0.088
Central nervous system	221	1.69
Eye and orbit	23	0.17
Ear	16	0.12
Head and neck	3991	30.67
Thyroid	46	0.35
Lung, mediastinum, heart	496	3.8
Breast	1614	12.4
GI system	1955	
Esophagus	507	3.89
GIT	807	6.2
Hepatobiliary	641	4.9
Genitourinary system	464	
Kidney and Ureter	61	0.46
Bladder	137	1.05
Urethra	1	0.007
Testis and scrotum	69	0.53
Prostrate	137	1.05
Penis	59	0.45
Gynecological malignancies	2567	
Ovary	354	2.72
Choriocarcinoma	4	0.03
Endometrium/uterus	104	0.079
Cervix	2064	15.8
Vagina	20	0.15
Vulva	21	0.16
Hematological malignancies	749	
Lymphoma	261	2
Leukemia	407	3.12
Plasma cell disorders	81	0.62
Sarcoma	304	
Soft tissue sarcoma	257	1.97
Bone sarcoma	47	0.36
Pediatric malignancies	64	0.49
Non-malignant conditions	3	0.02
Carcinoma of unknown primary	378	2.9
Germ cell tumors	5	0.03
Total	13011	

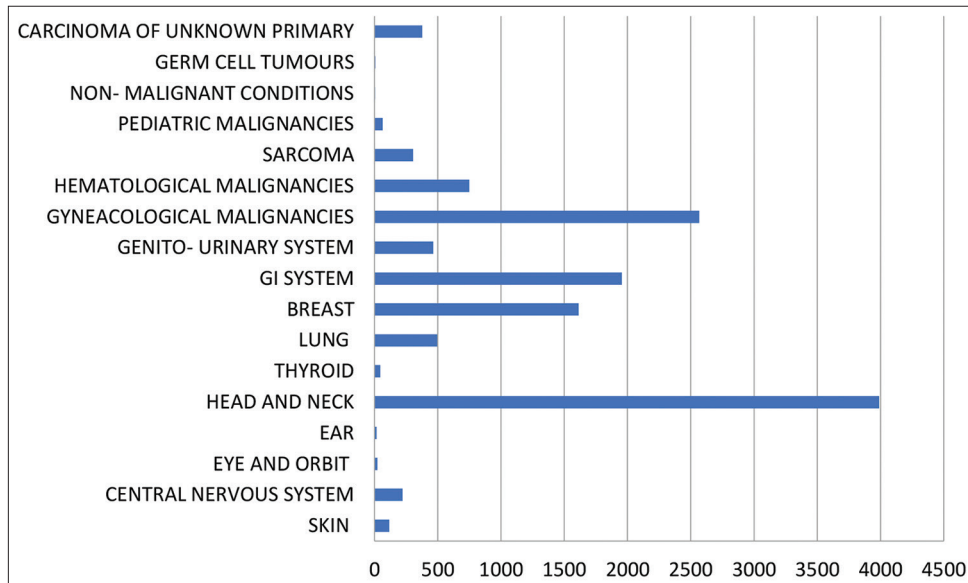
different from the rest of India but it is quite similar to the incidence pattern seen in the Southeast Asian region.<sup>12</sup>

Cancer of the breast (19 PBCRs) and cervix uteri (7 PBCRs) are the most common cancers reported in women. The highest burden of breast cancer was observed in metropolitan cities. There is an increase in the trend of breast cancer incidence, whereas cervix uteri cancer is on the decline. A steady increase in breast cancer in most of the PBCRs including newer ones poses a great health challenge to women in India.<sup>13</sup> At present, breast cancer and cervix uteri are the leading sites of cancer among women in India, posing an important public health problem that needs important input from various health and other agencies to tackle.<sup>14</sup> This study too shows similar results in terms of the incidence of breast and cervical cancer.

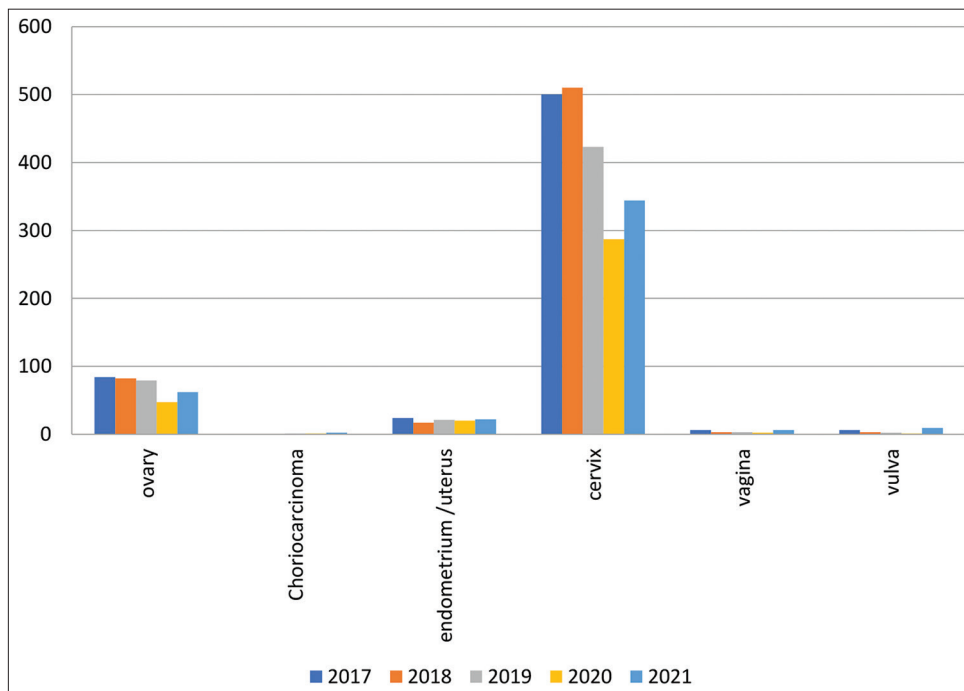
The most common risk factor studied is tobacco in the form of smoking and smokeless, which is most commonly seen in the Indian subcontinent.<sup>15</sup> The use of tobacco in its various forms is considered to be a risk factor in 45% male cancers and 17% female cancers in India.<sup>16</sup> There are cancers of several anatomic sites which are known to be associated with the use of tobacco.<sup>10</sup> Based on PBCR data, almost one-third of the cancers were known to be associated with the use of tobacco in India. India state-level disease burden initiative cancer collaborators estimate that tobacco use was the highest contributing risk factor for cancer in India. In India, lung cancer can be attributed to tobacco use and air pollution, which are the leading risk factors.<sup>17</sup>



**Figure 1:** The distribution of various cancers as per site



**Figure 2:** The site wise incidence of various cancers



**Figure 3:** The subsite incidence of various gynecological malignancies

As it is difficult to obtain information on the clinical extent of disease and treatment from PBCRs, the hospital database is used for such an analysis. Majority of breast and cervix uteri cancers were diagnosed at a locally advanced stage. Two-thirds of the patients with head-and-neck cancer were diagnosed at the locoregional stage. Multimodality was the most common treatment given for breast and head-and-neck cancers.<sup>11</sup> A multi-institutional study estimated that 65% of new head-and-neck cancers with locally advanced disease did not receive the benefit of optimal treatment which resulted in poor survival.<sup>18</sup>

Less than one-fifth of lung and stomach cancers were diagnosed as being localized only.<sup>11</sup> A hospital-based study from northern India showed that 90% of patients with lung cancer were diagnosed at an advanced stage and there was a delay in diagnostic evaluation and treatment.<sup>19</sup> Creating cancer awareness, preventing risk factors, and improving access to care among people would result in downstaging of cancer.<sup>11</sup> The rate of increase in the incidence of cancer of the lung among women is a glaring calling for systematic evidence-based and focused anti-tobacco campaigns targeting the urban woman. A large proportion of tobacco-

related cancers can be prevented by anti-tobacco programs. Teenage students need to be targeted as most of them pick up habits at this time. Legislation has to be enforced for prohibiting tobacco advertisements and sale of tobacco to youngsters. Prevention of cancers through the reduction of tobacco use should be an important strategy of the National Cancer Control Programme of India.<sup>20</sup>

A multidisciplinary approach to cancer treatment is essential and this has to be made available at all Regional Cancer Centers. The services of a trained surgeon and a clinical Oncologist are needed to plan the most appropriate treatment. Efforts should be made to reduce the waiting time for cancer patients to get any cancer-directed treatments. An essential drug list has to be prepared for cancer chemotherapy and chemotherapy services for common cancers have to be made available in all centers. More than 80% of cancers in India present in advanced stages and palliative care and pain relief are essential to provide a good quality of life for these patients.<sup>20</sup>

### Limitations of the study

This study covers only a small proportion of the population in Central India. Hence, a larger study covering the whole population is needed to authenticate the results.

## CONCLUSION

This study provides a framework on the incidence and trends of various cancers in Central India which showed that head-and-neck cancers dominated followed by cervical and breast cancer. The estimated rise in cancer in 2030 could only be reduced by a multidisciplinary approach by including awareness programs, organizing screening camps at all levels, taking preventive measures, and making treatment facilities available for each citizen in the country.

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**LMP**- Definition of intellectual content, literature survey, prepared first draft of manuscript, data collection, data analysis, manuscript preparation; **KP**- Statistical analysis and interpretation; **HVS**- Concept, design, clinical protocol, manuscript preparation, editing, and manuscript revision; **YT**- Literature survey, coordination, and manuscript revision.

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