



## INCREASED RISK OF DIFFERENT TYPES OF CANCERS IN THE STATE OF JAMMU AND KASHMIR: A COMPREHENSIVE REVIEW

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### ABSTRACT

Carcinogen is any agent, chemical, physical or viral that causes cancer or increase the incidence of cancer and the process by which cancer develops in various tissues of the body is referred to as carcinogenesis. A number of factors are responsible for promoting cancer, viz; physical, chemical, lifestyle, dietary, pharmacological, reproductive and genetic factors, DNA/RNA viruses and infectious diseases. Among the risk factors, the use of tobacco (cigarette, cigar, pipe or smokeless tobacco), unhealthy diet (rich in fatty foods) and physical inactivity (leading to obesity) are more likely to increase a person's risk for cancer than the very low levels of pollutants in food, drinking water and air. Many different approaches to the treatment of cancer can be adopted such as surgery, radiation therapy, chemotherapy, immunotherapy or a combination of the four. In addition, during the

past decades, researchers have made astonishing progress in identifying the cause of cancer at the molecular level, but it is considered that the management of disease is still not up to the mark and there is an emergent need of the more rational and target specific drugs with more efficacy and minimum side effects. The cancer cases are on rise in Jammu and Kashmir with lung cancer becoming most prominent due to smoking. The summer capital Srinagar tops the number with 898 cancer patients in 2015 while the number stands at 853 in Jammu. The lowest number of cases has been recorded in Leh and Kargil districts of the Ladakh region where it stands at 62.

**KEYWORDS:** Cancer, Increased Risk, Jammu and Kashmir.

## INTRODUCTION

The word 'Cancer' was coined by a Greek Physician Hippocrates. Cancer is characterized by loss of control of cellular growth leading to excessive proliferation and spread of cells. This disease can affect all living cells in the body, at all ages and in both genders. Thus, cells that divide when new cells are not needed form lumps or mass of extra tissues (called an error), can be benign or malignant. Cells in benign tumor do not invade other tissues and does not spread to other parts of the body. Benign tumor is not cancerous and is seldom a threat to life. On the other hand, malignant means that the affected cells in the body are cancerous. Malignant tumor can attack the tissues lying in the surrounding region and spread in the body. This is how cancer spread and form secondary tumors in other parts of the body. This spread of cancer is called metastasis, which cannot be controlled by the body itself. Some of the earliest evidence of human bone cancer was found in mummies in ancient Egypt and in ancient manuscripts dates about 1600 B.C. The world's oldest recorded case of breast cancer hails from ancient Egypt in 1500 BC and it was recorded that there was no treatment for the cancer, only palliative treatment.<sup>[3]</sup> Cancer is a leading cause of mortality and morbidity all over the world. It is a result of abnormal proliferation without differentiation and apoptosis of cells.<sup>[4,5]</sup> It is usually of two types i.e., Benign (neoplastic cells forming clustered in a single mass and cannot spread to other sites) and Malignant (neoplastic cells invade neighbouring normal cells and spread throughout the body through circulatory system). Some major risk factors of cancer include ageing population, environmental pollutants, genetic factors, unhealthy life styles, obesity, use of tobacco products, viral infections, radiation, etc. (<https://www.ncbi.nlm.nih.gov/books/NBK54025/>). According to the cancer statistics of National Institute of Cancer Prevention and Research (NICPR) approx. 2.5 million people are estimated to be suffering from carcinoma and over 7 lakh new cancer patients are registered in India leading to more than 5,56,400 cancer related deaths. After China and the US, India stands for the third highest number of cancer cases among women (<http://cancerindia.org.in/statistics/>). The battle against cancer is multi-dimensional and involves clinicians, basic researchers, and epidemiologists as foot soldiers and it is unanimously accepted as a global and national priority. As it is the leading cause of death, so a lot of research is going on for the development of treatment strategies for cancer all over the world like chemotherapy and radiotherapy.<sup>[6]</sup> However, the problem with cancer is that it remains undetected until its last stage of metastasis which makes it quite difficult to target

particular cancer cells that have spread to other body parts.

Different types of carcinomas are shown in a tabular form:

S.no	Carcinoma	Who rankings	Risk factors	Complication/ symptoms	Reference
1	<b>STOMACH</b> (developing from the lining of stomach)	4 <sup>th</sup> most common worldwide	Helicobacter pylori(65-80%), smoking	Dysphagia, heartburn, during meals sensation of being full, anemic, weight loss	[7, 8]
2	<b>LUNG</b> (uncontrolled cell growth in tissues of lung)	1 <sup>st</sup> most common carcinoma worldwide	Tobacco smoking (80%), genetic, radon gas, airpollution	Coughing including (blood), chest pain, shortness of breath	[9, 10,11]
3	<b>BLOOD</b> (starts from bone marrow)	Common type of carcinoma	Family history, smoking, down syndrome, ionizing Radiations	Bleeding and bruising, fever, feelingtired	[12, 13]
4	<b>BREAST</b> (develops from breast tissue)	5 <sup>th</sup> most common type of carcinoma worldwide	Obesity, alcohol consumption, hormone replacement therapy, ionizing radiations	Lump in breast, breast shape changed, fluid coming from nipple	[14], (American Cancer Society. Breast Cancer Facts & Figures 2017-2018. Atlanta: American Cancer Society, Inc. 2017.)
5	<b>COLORECTAL</b> (cancer that affects colon and rectum)	3 <sup>rd</sup> most leading type of carcinoma worldwide	Unhealthy diet, obesity, smoking, alcoholuse	Changes in bowel habits, diarrhoea or constipation, pain and bloating in abdomen	[15]
6	<b>OVARIAN</b> (cancer that forms in ovary)	7 <sup>th</sup> most common type of cancer worldwide	Never having children, obesity,genetic factors, fertility medication	Vague, bloating, pelvic pain, loss of appetite, abdominal swelling	[16]
7	<b>SKIN</b> (arise from skin)	Most common type worldwide	Light skin, poor immune function	Ulceration, hard lump with a scaly top, mole that changed in size, shape, colour	[17]

In this study, we mainly focussed on the state Jammu and Kashmir especially Kashmir region. More than 90% of the population follows the Muslim religion which show an unprecedented 87% rise in cancer cases during last 7 years from 2011 to 2017 as shown in figure below.

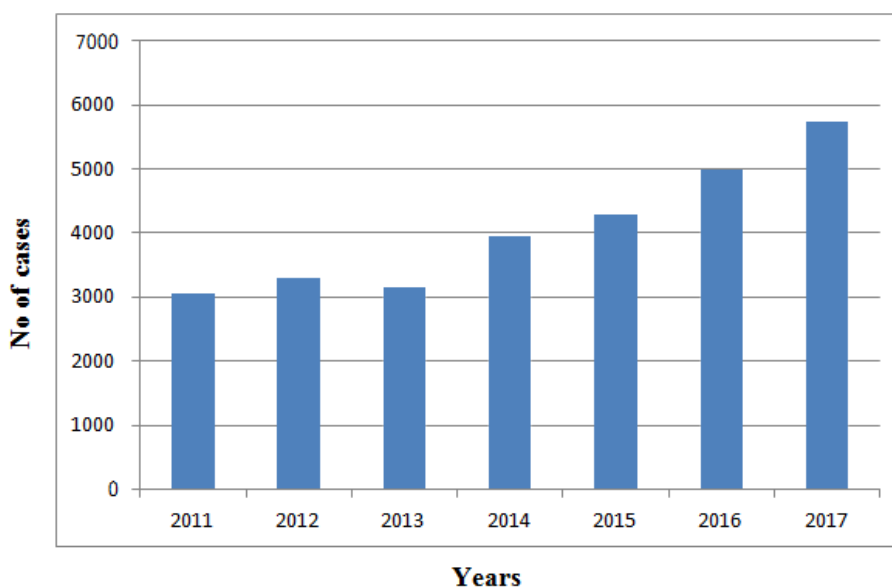
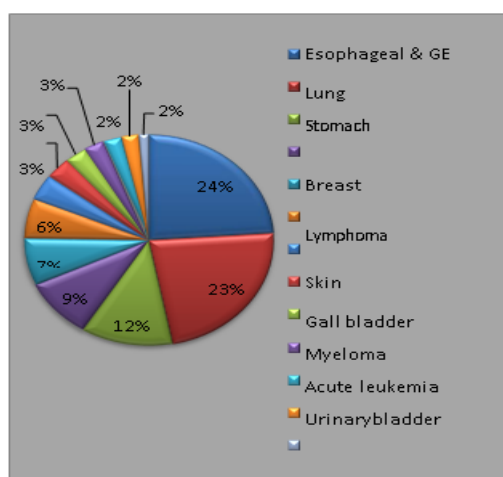


Figure 1: Represents the increased cases of cancer from years 2011to 2017 (Ref: Greater Kashmir scenario 2018).

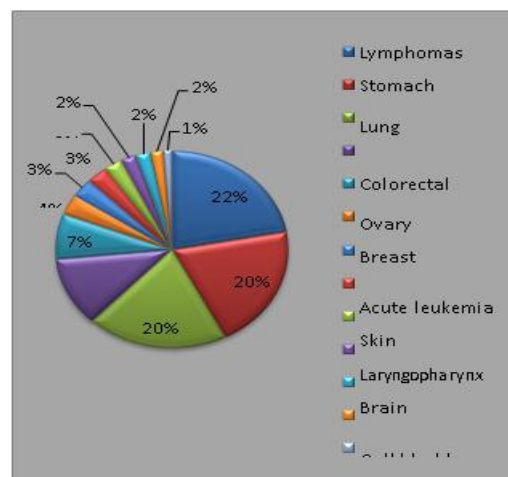
By scanning the literature of cancer scenario in Jammu and Kashmir the data has been found. According to the collected data of Wani, et al, a total of 24768 patients with carcinoma reported to RCC (SKIMS) from 2000 to 2012, out of which 15193 were males and 9575 were females. Most of the patients fall in the age group 65- 69.<sup>[18]</sup> According to the data collected by Rasool, et al, **8648** cancer patients were registered between the years 2009 and 2011 from Sher-I-Kashmir Institute of Medical Sciences, Soura, Srinagar, India (IMP) Out of which 5174 were males and 3474 were females and it was found that the leading sites of cancer in males were esophagus, and in females were breast cancer.<sup>[1]</sup> By the survey of Khair Ul Nisa et. al between the years 2016 and 2017, **6359** patients had been diagnosis from different types of cancers from four major hospitals in Jammu and Kashmir state i.e., Government Medical College (GMC) Hospital Jammu, Acharya Shri Chander College of Medical Sciences and Hospital (ASCOMS) Jammu, Sher-i-Kashmir Institute of Medical Sciences (SKIMS) Srinagar, and Government Medical College (GMC) Hospital Srinagar. Majority of them were men 4038 (63.5%) and women were 2321 (36.5%).<sup>[2]</sup>

### LEADING SITES

The leading site of cancer in Jammu and Kashmir between 2009-2011 and 2016-2017 is shown below in figure 2 and figure 3 respectively.<sup>[1,2]</sup> Cancer, stomach and lungs has a high incidence in both males and females in Kashmir.<sup>[2]</sup>



**Figure 2:** Pie chart represents the leading site of Cancer in both sexes from 2009 to 2011.<sup>[1]</sup>



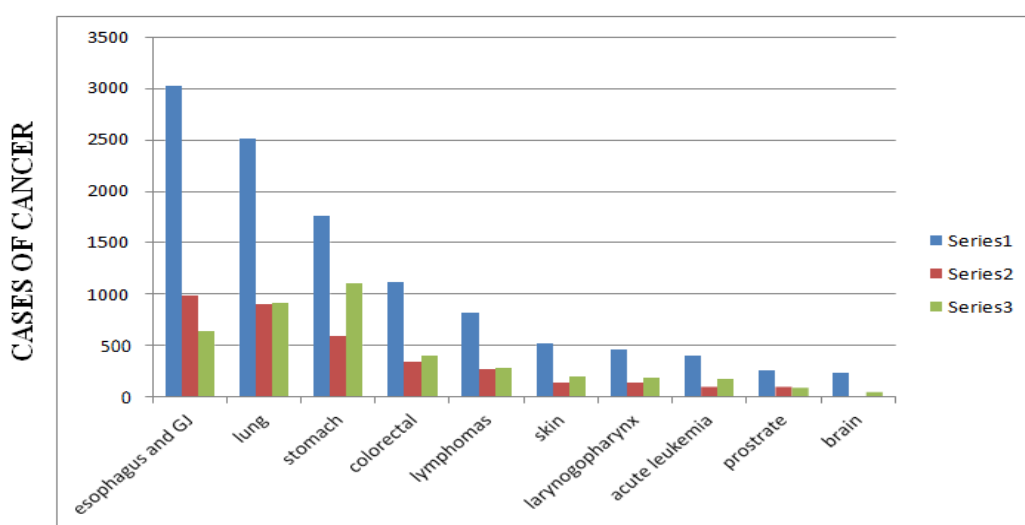
**Figure 3:** Pie chart represents the leading site of cancer in both sexes from 2016 to 2017.<sup>[2]</sup>

**Figure 2:** Represents the leading sites of cancer in both sexes from 2009-2011. Cancer Esophageal and GE(24%) is highest and followed by lung(23%), stomach(12%),

colorectal(9%), breast(7%), lymphoma(6%), ovary(4%), skin(3%), gall bladder(3%), myeloma(3%), acute leukemia(2%), urinary bladder(2%) and prostate(2%).<sup>[1]</sup>

**Figure 3:** Represents the leading sites of cancer in both sexes from 2016-2017. Cancer lymphoma(22%) is highest and followed by stomach(20%), lung(20%), Esophageal and GE(11%), colorectal(7%), ovary(4%), breast(3%), acute leukemia(3%), skin(3%), laryngopharynx(2%), brain(2%), gall bladder(2%) and prostate(1%).<sup>[2]</sup>

**Leading sites in males:** In Jammu and Kashmir, the leading sites of cancer in males are shown in figure 4.



### SITES OF CANCER

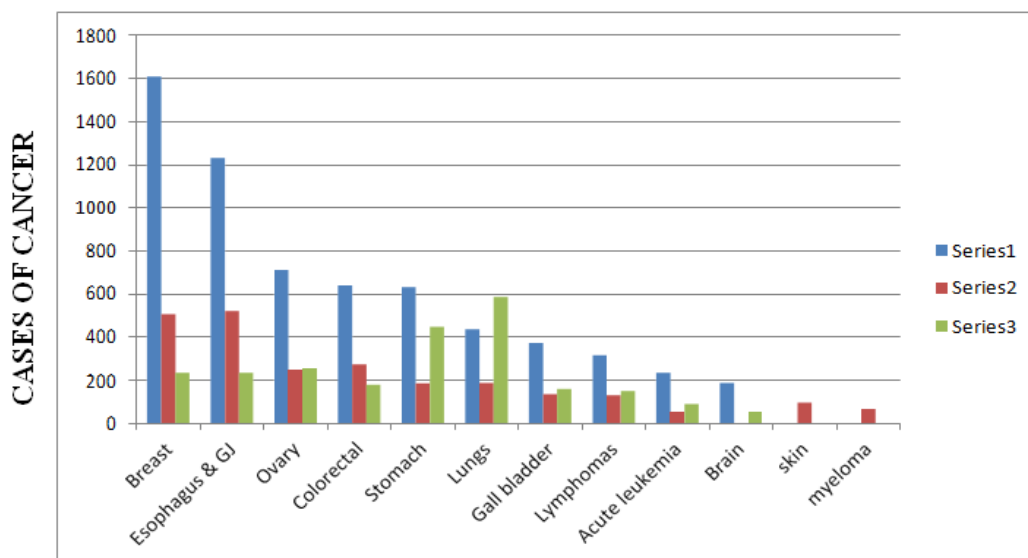
Figure 4: Bar chart represents the number of male patients with respect to cancer site in Jammu and Kashmir from the years 2000 to 2017.

**Series 1:** represents the total male patients i.e., 15193 between the years 2000-2012 with the leading site of cancer which is placed in order. Cancer esophagus and GE(19.95%) stands first in the list and followed by lung(16.54%), stomach(11.60%), colorectal(7.36%), lymphomas(5.40%), skin(3.46%), laryngopharynx(3%), acute leukemia(2.62%), prostate(1.7%) and brain(1.54%).<sup>[18]</sup>

**Series 2:** Represents the total male patients i.e., 5174 from 2009-2011 with the leading site of cancer in order. Cancer esophagus and GE(19%) stands first and followed by lung(17.4%) then stomach(11.4%), colorectal(6.6%), lymphomas(5.1%), skin(2.7%), myeloma(2.2%) and prostate(2%).<sup>[1]</sup>

**Series 3:** represents the total male patients i.e., 4038 from 2016-2017 with the leading site of cancer in order. Stomach cancer (27.30%) stands first and followed by lung (22.58%), esophagus and GE junction (15.88%), colorectal (10.07%), lymphomas, skin, laryngopharynx, acute leukemia, prostate and brain.<sup>[2]</sup>

**Leading sites in females:** In Jammu and Kashmir, the leading sites of cancer in females are shown in figure 5.



**Figure 5:** Bar chart represents the number of female patients with respect to cancer site in Jammu and Kashmir from the years 2000 to 2017.

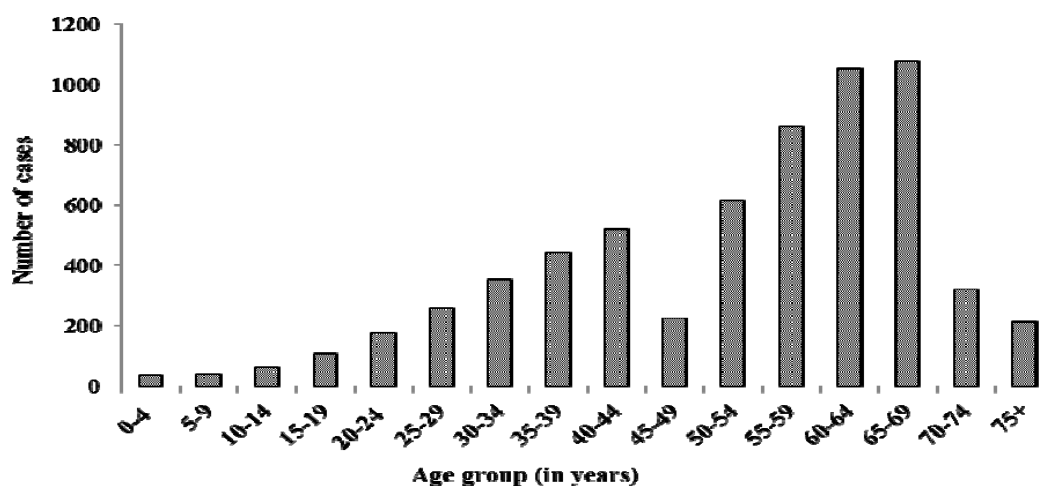
### SITES OF CANCER

Figure 5: Bar chart represents the number of female patients with respect to cancer site in Jammu and Kashmir from the years 2000 to 2017.

**Series 1:** Represents the total female patients i.e., 9575 between the years 2000-2012 with the leading site of cancer which is placed in order. Cancer breast (16.83%) stands first in the list and followed by esophagus and GE(12.85%), ovary(7.45%), colorectal(6.68%), stomach(6.6%), lung(4.56%), gall bladder(3.9%), lymphomas(3.30%), acute leukemia(2.45%) and brain(1.95%).<sup>[18]</sup>

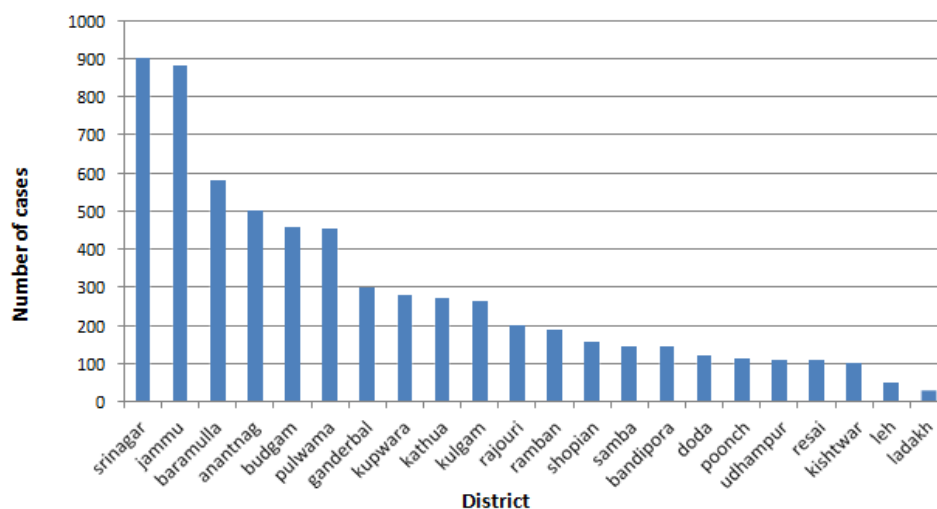
**Series 2:** Represents the total female patients i.e., 3474 from 2009-2011 with the leading site of cancer in order. Cancer esophagus and GE(15%) stands first and followed by breast(14.6%), colorectal(7.9%), ovary(7.2%), lung(5.4%) then stomach(5.3%), gall bladder(3.9%), lymphomas(3.8%), skin(2.8%) and myeloma(1.9%).<sup>[11]</sup>

**Series 3:** Represents the total female patients i.e., 2321 from 2016-2017 with the leading site of cancer in order. Cancer lungs(25.24%), stomach(19.35%), ovary(11.12%), breast(10.06%), esophagus and GE junction, colorectal, gall bladder, lymphomas, acute leukemia and brain.<sup>[2]</sup> By comparing the surveyed data of Wani et.al and Khair Ul Nisa et.al from different hospitals in the state Jammu and Kashmir, we found that the highest incidence of carcinoma was found between the age group of 65-69, followed by 60-64 age group, 55-59 age group and 50-54 age group as shown in bar graph figure 6 below.<sup>[2,18]</sup>



**Figure 6:** Bar graph represents the number of cancer patients with respect to age.<sup>[2]</sup>

It was also found that the majority of cancer patients belonged to the districts of Srinagar and Jammu and followed by the Baramulla, Anantnag etc. as shown in figure below.



**Figure 7:** Bar graph represents the number of cancer patients with respect to their district.

## DISCUSSION

The incidence and pattern of different types of carcinoma varies from country to country. It has been found that there is increased incidence of cancer in developed countries because of their different diet patterns, lifestyle and living conditions. There are various risk factors of increasing the dreadful, non communicable disease i.e., cancer are Infection with viruses and bacteria especially in developing countries, Genetic factors also participate the cancer risk caused due to environmental exposure to genotoxins. There is increased risk of cancer between the middle and old age group, although no age is safe.<sup>[2]</sup> J&K is the northern-most state of india, In the study and survey of Kashmir region of state jammu and Kashmir by Rasool, et al between the years 2009-2011 it was found that the leading sites of cancer in males were esophagus, this type of carcinoma is probably because Kashmiris take hot tea called “Noon-Chai” both in the morning and in evening time, and this has been proposed as responsible for the high incidence of this carcinoma in the Kashmiri population and in females were breast cancer and it was also found by the survey of Khair Ul Nisa, et al between the years 2016-2017 that the leading sites of cancer in males were stomach and in females were lung cancer. Majority of the population in Kashmir valley are working as a farmer. Smoking is a common habit in these farmers and 70% males had a positive tobacco smoking history.<sup>[18]</sup> In our study we found 80-90% of cancers are due to environmental factors of which, life-style related factors are the most important and preventable.<sup>[18]</sup> We only know the patients who has registered themselves in hospitals for treatment but there are also more in the periphery who might not be able to reach. The leading sites of cancer in the valley are esophagus and GE Junction, lung, stomach, colorectal, lymphomas, skin, laryngopharynx, acute Leukemia, prostate. The knowledge of leading sites of cancer in population not only provides a clue about causation, but should also give the useful insight into the early detection. This will also help in treatment and prevention of these leading cancers. At present the state does not have the advanced technologies for detecting cancer in its initial stage, origin, spread but as the carcinoma patients increases every year the state has also increasing the infrastructure development for the cancer treatment.

## CONCLUSION

The overall incidence of cancer in state Jammu and Kashmir shows an increasing trend and the number of cancers diagnosed is expected to double between the period 2012 and 2027. Future studies have been focused on sources and types of environmental pollution that may improve our understanding of risk factors for these malignancies in this region. This will also



help in the allocation of available resources for prevention and treatment of these cancers.

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