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UNDERSTANDING THE PROBLEM OF CANCER IN KASHMIR: A SOCIOLOGICAL ANALYSIS OF PREVALENCE PATTERNS

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ABSTRACT

Cancer is a major global health issue, surpassing cardiovascular disease as the second major cause of death worldwide. Rising cancer incidence due to a variety of factors highlights the need to better understand the prevalence patterns at the local level in order to improve the availability and accessibility of healthcare facilities. This empirical study is an attempt in this regard. It explores and describes the prevailing trends and patterns of cancer in the Kashmir valley in the union territory of Jammu and Kashmir. Based on the descriptive analysis of a total of 2365 registered cases of various cancers in one of the major tertiary care health centres, this paper finds that the major forms of cancer affecting people in the research area are related to the gastro-intestinal tract (42.5%), followed by the thoracic (25.5%) systems of the human body. Among males, lung cancer (6.4%) is the commonest cancer, while among females, the leading cancer site relates to the breast (6.3%) across all ages. Further, the interviews with various health care specialists also revealed the same pattern of cancer prevalence in Kashmir. The overall findings of this study suggest that no large population-based epidemiological studies have examined cancer patterns in the Kashmir valley. The site-specific studies will elucidate epidemiological variations and recommend cancer prevention strategies.

Keywords: Cancer, Gastrointestinal Tract, Kashmir Valley, Malignancy, Prevalence.

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1. INTRODUCTION

Cancer is a terrifying word. It shakes most of us to our very core. Our parents and grandparents couldn't even say the word 'cancer.' It was not mentioned at all. Despite the advances in the diagnosis and treatment of cancer over the decades, there is still a dearth of general understanding of cancer (Galsky, 2010). Cancer is a serious disease caused by cells that are not normal and can spread to one or many parts of the body. According to the World Health Organization (WHO),[1] Cancer is a large group of diseases that can start in almost any organ or tissue of the body when abnormal cells grow uncontrollably, go beyond their usual boundaries to invade adjoining parts of the body and spread to other organs." Cancer is a process of uncontrolled cellular growth that can manifest in over 200 different ways (Bhat & Bhat, 2013: 50).

[1] https://www.who.int/health-topics/cancer#tab=tab_1 (Accessed 19/01/2023)

Cancer is a multicausal disease with an elongated period. Available research discloses that two categories of risk factors generally give rise to cancer. One is the tendencies, and the other is the triggers. The tendencies that may also refer to internal causes of cancer designate an inclination or predilection to cancer due to genetic, ethnic, or hereditary factors. The triggers, on the other hand, refer to the external factors located outside an individual's body and can arise from the environment, one's lifestyle, or some viruses (Bhat & Bhat, 2013: 51-52). External factors are mostly recognized as environmental. They include different risk factors in the form of lifestyles, infections, pollution, dietary habits, tobacco use in any form, alcohol consumption, occupational hazards, socio-cultural, psychological, and economic conditions, and so on (Bhat & Akram, 2021: 527). Evidence shows that the environment is the major contributor to various kinds of human cancers, contributing to 80-90 percent of cancer causation (Anand et al., 2008: 2097; Park, 2015: 384). The remaining 5-10 percent is due to inherited factors (Anand et al., 2008).

According to the figures produced by the International Agency for Research on Cancer (IARC) and available in the form of GLOBOCAN 2020, the global burden of cancer is estimated to have risen to 19.3 million new cases and 10.0 million deaths in 2020, showing a slight increase from 18.1 million cases to 9.6 million deaths in 2018. Worldwide, the total number of people alive within five years of cancer diagnosis, called the 5-year prevalence, is estimated to be 50.6 million cases (GOLOBOCAN World, 2020) compared to 43.8 million in 2018. Globally, an estimated 28.4 million new cases of cancer are projected to occur by 2040 showing a 47 percent increase from the estimated 19.3 million cases in 2020 due to demographic changes and increased exposure to risk factors associated with globalization and a growing economy (GLOBOCAN World, 2021; Sung et al., 2021).

Further, the estimates suggest that female breast (11.7% of the total cases) has become the most common cancer affecting people worldwide, followed by cancers of the lung (11.4%), colorectal cancer (10.0%), prostate cancer (7.3%), and stomach cancer (5.6%) by incidence. However, lung cancer (18.0% of the total cases) followed by cancers of the colorectal (9.4%), liver (8.3%), stomach (7.7%), and female breast (6.9%) have been found to be the most common causes of cancer-related deaths (GOLOBOCAN World, 2020). Overall figures suggest an increasing trend in terms of the incidence, mortality as well as prevalence attributed to the aging, growing population, and changes in the prevalence and distribution of the main risk factors, several of which are associated with socio-economic development (Gersten & Wilmoth, 2002: 271; Sung et al., 2021: 209).

The trends and patterns of cancer differ from country to country with the levels of development. Due to the fast-growing economy along with changes in lifestyle-related behaviors, India is also experiencing a simultaneous increase in cancer cases (Reddy et al., 2005: 1745). In India, 2018 more than 1.15 million new cancer cases with 0.78 million cases of deaths were reported in 2018 (GLOBOCAN India Factsheet 2018), which jumped to 1.32 million cases with 0.85 million cancer deaths in 2020 (GLOBOCAN India Factsheet, 2020). The five-year prevalence of cancer is estimated to be 2.72 million cases in 2020 (GLOBOCAN India Factsheet, 2020) compared to 2.25 million cases in 2018. In India, the most prevalent cancer among both sexes for incidence and mortality is breast cancer (13.5%) and ranks number one among all. It is followed by lip/oral cavity (10.3%), cervix (9.4%), and lung (5.5%) cancer by incidence and cervical (9.1%), lip/oral cavity (8.8%), and lung (7.8%) cancers by mortality (GLOBOCAN India, 2020). However, in 2018 the most common sites of cancer among Indian men were tobacco-related, including lip/oral cavity, lung, oesophagus, and others. In contrast, amongst Indian women, in addition to tobacco-related cancers, cervix, breast, and ovarian cancers were the most common (Bray et al., 2018; GLOBOCAN India Factsheet, 2018). The magnitude of the cancer problem in the Indian sub-continent is increasing due to poor to moderate living standards and inadequate medical facilities (Ali et al., 2011: 56). There are significant variations concerning the prevalence of various cancers in India when compared to other developed countries of the world. Even within India, variations exist in the prevalence patterns of different cancer sites.

The above delineation provides an overview of the cancer problem and its associated aspects at a macro level. However, there is a need-to-know things at a micro or local level, which is essential for ensuring the availability and accessibility of various healthcare facilities, including treatment. The information about cancer trends and patterns at the gross root level is a prerequisite for effective planning of cancer control interventions. Situated within this background, this study explores the phenomenon of cancer in Kashmir, emphasising its common trends and patterns. Our objective here is to assess the prevalence patterns and distribution of various cancers among the patients attending a tertiary care health centre in a geographically landlocked area called Kashmir valley.

2. RESEARCH METHODOLOGY

Study Setting

This study has been carried out in Government Medical College (GMC henceforth), one of the oldest tertiary care health centres located in the district Srinagar of Kashmir valley. Besides being primarily a teaching hospital, GMC also provides super and super specialty services. Since its establishment in 1959, it has continuously contributed towards producing significant healthcare human resources throughout the Kashmir valley. Currently, seven (07) hospitals are affiliated with GMC, also located in the district of Srinagar. All these hospitals have a total bed strength of 2150. On average more than 100 patients stay in them as in-patients. Overall, more than 22 departments, including clinical, non-clinical, and super-specialty ones, are functioning in these hospitals. The faculty of the GMC teaches in 22 departments carrying out practicals, demonstrations, and clinical services throughout the year. GMC caters to the health needs of the people not only from the Kashmir valley but also the people from Ladakh and Jammu area.

Data Sources and Data Collection

As said, the present paper attempts to project the trends and patterns of various cancers in Kashmir Valley. This paper includes the details of all those cancer patients registered and treated in the departments of medical oncology and radiotherapy of GMC from January 2020 to December 2021. All the patients registered during this period were identified from the registry files maintained by the two said departments. The details concerning the cancer site, residence, age, gender, and other details of each case have been very well collected during the field survey. Data have been collected for a period of six months from October 2021 to March 2022, only after seeking formal permission from the concerned officials of the health care centre.

Besides the cancer registry data, this study also includes some reflections about the cancer prevalence in Kashmir revealed by various cancer specialists working in different health care centres in varying capacities. These reflections were shared by cancer experts in a face to face interaction with the first author during his field work. For gaining deep insights, an open ended interview guide was used and all the interviews were held in person after taking care of all the ethical considerations. As a matter of anonymity, these specialists have been referred to with the acronym HCPs which stands for health care providers in this study.

Analysis of Data

After the necessary checking and editing, all the data have been analysed using statistical techniques such as frequencies and percentages. Data analysis has been done on an MS windows-based PC. All data were first entered into Microsoft Excel software and cleaned and coded based on various variables before being entered into an electronic database of the IBM Statistical Package for the Social Sciences (SPSS) version 20 for analysis and interpretation. The results are presented in the form of tables and figures, followed by their interpretations. Throughout the entire process of analysis, the completeness and accuracy of the data have been carefully examined.

3. A BRIEF OVERVIEW OF KASHMIR

Kashmir, commonly known as the Kashmir valley, is a vital yet geographically more youthful part of the famous Himalayan range. Politically, it is a significant part of the Jammu and Kashmir Union Territory, accommodating a better portion of its population and economic activities. It stretches between the great Himalayas and the Pirpanjal range and includes the districts of Anantnag, Pulwama, Kulgam, Shopian, Baramulla, Bandipora, Ganderbal, Srinagar, Budgam, and Kupwara. The Kashmir Valley is 15,853 square kilometres in size. The general elevation of the valley is 1,828 meters above the sea level (Ullah & Purohit, 2020). Kashmir valley is primarily a Muslim-dominated part of Jammu and Kashmir, with the majority of its population practicing Islam, followed by those who follow Hinduism. According to the 2011 census, the total population of Kashmir valley is 68.88 million. About 59 percent of the total population lives in Anantnag, Srinagar, Baramulla, and Kupwara districts.

4. RESULTS

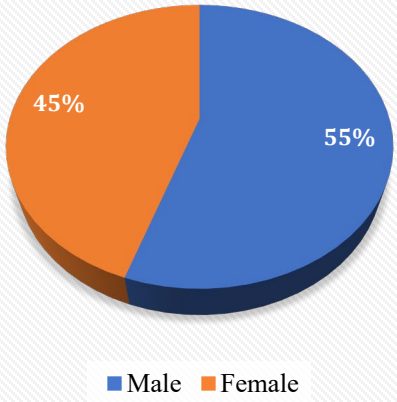
The results revealed that a total of 2365 cancer cases with more than 115 cancer types were registered at the health centre from Jan 2020 to Dec 2021. Among all the registered cases, 55 percent (N = 1305) were males, and 45 percent (N = 44.8) were females (**Fig. 1**). Of all the cases registered during the said time period, there were 2337 (99%) Muslims and 28 (1%) non-Muslims (Hindu, N = 4 and Sikh, N = 24) (**Fig. 2**). Here, the variations in the data are attributed to the Muslim-majority population in Kashmir. The age-wise distribution of cancer cases shows that the majority of cases fell

within the age group of 41-60 (43.8%), followed by people aged 61 and above (38.3%) among both sexes for all ages (**Table 1**). The age-wise distribution of cancer types exposed the alarming revelations. Lung cancer (6.4%), followed by breast cancer (6.3%), was found to be the most common site affecting people aged 41-60. The other major forms of cancer affecting this age group include oesophagus (4.05%), stomach (3.63%), rectum (2.74%), colon (2.49%), and ovary (2.36%). The detailed overview of distribution of cancer types across different age groups is presented in Table 2. Further, the data analysis found that the mean age of presentation or diagnosis of cancer in Kashmir is 55.96 years in terms of both genders.

Among all the cancer sites, lung cancer (13.7% of the total cases) and breast cancer (11.8% of the total cases) were found to be the most common sites affecting men and women of all ages. Further, the distribution of cancer types by gender showed that cancers of the lung (10.6%), followed by stomach (7.8%), and oesophagus (6.6%) have the highest occurrence among males. In contrast, cancers of the breast (11.5%), oesophagus (5.0%), and ovary (4.6%) are among the most common sites affecting females in Kashmir, as per the sources available. Table 3 presents a detailed picture of the distribution of cancer types among males and females.

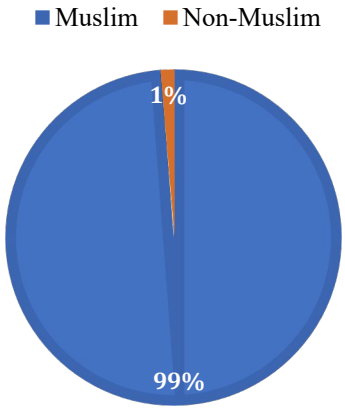
The district-wise distribution of registered cancer cases revealed that the majority of the cases were reported from district Srinagar (N = 596), followed by Anantnag (N = 322), Baramulla (N = 308), and then by the rest of the districts. Table number 4 helps us to understand the prevalence patterns of cancer cases among all the ten districts of Kashmir Valley. This study also takes the lead in revealing the anatomical site-wise classification of cancer types where it finds that gastrointestinal tract cancers, commonly called GIT cancers (oesophagus, liver, GE junction, stomach, gall bladder, pancreas, colon, rectum, appendix, colorectal, and anal) form the major burden of cancer in Kashmir (42.5%), followed by Thoracic cancers (lungs, breast, mesothelioma, and thymus) (25.5%), and genitourinary cancers (kidney, urinary bladder, vulva, pelvis, testis, penis, prostate, cervix, ovary, and vagina) (13.0%) as the most common affecting both males as well as females (**Fig 3**).

Fig 1: Distribution of Cases by Sex



Source: Field work.

Fig 2: Distribution Of Cases By Religion



Source: Field Work.

Table 1: Distribution of Cancer Cases by Age

Age Group	Frequency	Percent
04-14	10	.4
15-21	23	1.0
22-40	390	16.5
41-60	1037	43.8
61 and above	905	38.3
Total	**2365**	**100.0**

Source: Field Work.

Table 2: Types of Cancer and Age

Types of Cancer	Age Groups					Total
	04-14	15-21	22-40	41-60	61 and above	
Lung	0	0	21	152	150	323
Breast	0	1	93	149	36	279
Oesophagus	0	0	16	96	161	273
Stomach	0	0	18	86	123	227
Colon	0	0	24	59	62	145
Rectum	1	4	39	65	34	143
Ovary	0	4	34	56	15	109
Prostate	0	0	2	18	68	88
GE Junction	0	0	5	27	41	73
Urinary Bladder	0	0	3	21	19	43
Gall Bladder	0	0	10	21	18	49
CUP	0	0	2	11	11	24
Endometrium	0	0	4	13	4	21
Larynx	0	0	1	8	13	22
NHL	0	0	9	31	13	53
Glioblastoma	0	0	3	12	0	15
Nasopharynx	0	0	2	11	3	16
Tongue	0	0	5	5	2	12

Pancreas	0	0	12	12	11	35
Meningioma	0	0	6	6	3	15
Multiple Myeloma	0	0	4	28	10	42
Liver	0	0	0	6	9	15
Skin	0	2	1	11	18	32
Cervix	0	0	4	15	6	25
Renal Cell Carcinoma	0	1	3	9	7	20
Vocal Cord	0	0	0	12	10	22
Lymphoma	0	2	6	13	7	28
Glioma	0	0	4	8	0	12
Other	9	9	59	76	51	204
Total	**10**	**23**	**390**	**1037**	**905**	**2365**

Source: Field Work.

Table 3: Types of Cancer and Gender

Types of Cancer	**Gender**		**Total**
	Male	**Female**	
Lung	250	73	323
Breast	9	270	279
Esophagus	154	119	273
Stomach	167	60	227
Colon	69	76	145
Rectum	79	64	143
Ovary	0	109	109
Prostate	88	0	88
GE Junction	62	11	73
Urinary Bladder	36	7	43
Gall Bladder	17	32	49
CUP	12	12	24
Endometrium	0	21	21
Larynx	20	2	22
Non-Hodgkin's Lymphoma	40	13	53
Glioblastoma	10	5	15
Nasopharynx	15	1	16
Tongue	5	7	12
Pancreas	24	11	35
Meningioma	9	6	15
Multiple Myeloma	25	17	42
Liver	11	4	15
Skin	17	15	32
Cervix	0	25	25
Renal Cell Carcinoma/ Kidney	13	7	20
Vocal Cord	22	0	22
Lymphoma	18	10	28
Glioma	7	5	12
Other**	126	78	204
Total	**1305**	**1060**	**2365**

Source: Field Work.

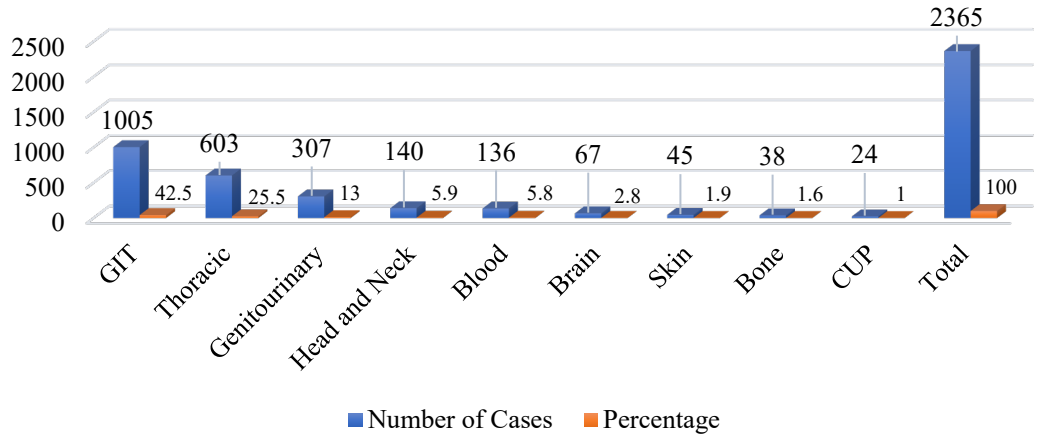
** Others here refer to cancer types like pyriform fossa, vulva, DLBCL, mixed germ cell tumor, hypopharynx, thyroid, rectosigmoid, oral cavity, basil cell carcinoma, hodgkin's lymphoma, melanoma, neuroendocrine, colorectal, chronic lymphocytic leukemia, giant cell tumor, leukemia, and so on.

Table 4: District-Wise Distribution of Cancer Cases

District	Frequency	Percent
Budgam	298	12.6
Srinagar	596	25.2
Ganderbal	73	3.1
Anantnag	322	13.6
Pulwama	234	9.9
Kulgam	102	4.3
Shopian	113	4.8
Baramulla	308	13.0
Bandipora	154	6.5
Kupwara	165	7.0
Total	**2365**	**100.0**

Source: Field Work.

Fig 3: Anatomical Site Wise Classification Of Cancer Types



Source: Field Work.

As said earlier in the methodological part, this study includes observations by some HCPs about the prevailing trends and patterns of cancer in Kashmir. Here, these observations are presented as additions and justifications to the above data presented in the form of tables and figures. We have included these observations as revealed by HCPs in the form of narrations.

According to HCP 1 who is an Associate Professor at Surgical Oncology in GMC, Srinagar:

> *"As far as Kashmir is concerned, it has a unique profile of cancer, which means the most common cancers here are slightly different compared to those at the national level. It has a unique distribution of cancers. In national data, head and neck cancers are number one, while here in Kashmir, we mostly observe cancers of the lung, oesophagus, or breast. The general trend prevailing here revolves around mostly the cancers of the lung, oesophagus, breast, and stomach, in addition to other cancers."*

According to HCP 2 who is Professor at Medical Oncology in SKIMS, Srinagar:

> *"As far as cancer prevalence in Kashmir is concerned, we can say that almost about 5000-8000 cancer patients get registered here every year. About 5000 cases get registered at SKIMS, plus another 2-3 thousand per year from other hospitals dealing with cancer care in Kashmir. Out of my personal experience, on*

estimation, about 8000 patients are reported every year in Kashmir, which includes the patients from Jammu districts and Ladakh also."

Likewise, HCP 3 who works as Assistant Professor in GMC, Srinagar observes:

"Among males, we most often see patients with lung cancer. If we go back some 5 to 10 years, we used to see oesophageal cancer as the most common among both sexes, but now lung cancer has become the most common among men, while breast cancer is more common among women. Though oesophageal cancer is still there as it was, lung cancer has now achieved the top position among all malignancies.

Sharing his observations about the changing trends and patterns of cancer in Kashmir, HCP 4, Professor in the department of radiation oncology, GMC, Baramulla, says:

"Approximately about ten years ago, our pattern of cancer was such that the food pipe (oesophagus), stomach, or kangri cancers were the most common. But now, the other lifestyle-related cancers have increased in incidence, and among those is lung cancer in males, followed by breast cancer in females. Today, our cancer patterns are almost the same as those of other metropolitan areas. If we look at Delhi, Karnataka, Mumbai, or any other state, even the USA, the number one cancer among females is breast cancer, and the number one cancer among males is lung cancer. The same is true here (in Kashmir) as our cancer pattern has changed over the past ten years."

Further, sharing their observations concerning the possible risk factors of cancer in Kashmir, these HCPs revealed that the distinct sociocultural and climate conditions have led to the consumption of unique dietary practices like sun-dried vegetables, red meat, pickles (anchar) prepared locally, intake of salted-tea (noon chai) added with sodium bicarbonate, dried and smoked fish, chilies, spice cake (wuer), sedentary lifestyles, tobacco use and others are regarded probable causes for occurrence of various cancers especially the GIT, lung, and breast cancers among people in Kashmir.

5. DISCUSSION

In the present study, 2365 cancer cases were registered over two years, from January 2020 to December 2021, with males outnumbering females. The findings reveal that the prevalence of cancer is higher among males than females. Similar observations have been made by various other previous studies, which have also found the predominance of male cancer cases over female cases in Kashmir valley (Ali et al., 2016; Bhat et al., 2015; Khuroo et al., 1992; Nisa & Kumar, 2018; Qureshi et al., 2016; Qayoom et al., 2020; Rumana et al., 2011; Rasool et al., 2012). Tobacco use in various forms and occupational risk factors has been attributed to the increasing number of male cancer patients in the entire Kashmir valley. The religion-wise distribution of cancer cases is the distinct characteristic of this study, as no other study has revealed anything concerning the religion of cancer patients being registered in valley-based cancer hospitals. This study helps us to gain insights into the prevailing trends and patterns of cancer amongst Muslims, as Kashmir valley is predominantly inhabited by people who profess Islam as their religion.

Overall, among both sexes, lung cancer, followed by breast cancer, was found to be the most common malignancy affecting people. The findings are significantly different from various previous studies, which have observed oesophageal, gastroesophageal junction (GEJ), and stomach cancers as the most common among both sexes (Ayub et al., 2011; Dhar et al., 1993; Khuroo et al., 1992; Khan et al., 2011; Wani et al., 2014). However, Khan et al. (2021) have also found lung and breast cancers as the commonest cancer in Kashmir, which is similar to the findings of the present study. The significant results of this study reveal that gastrointestinal tract (GIT) cancers are the leading sites of cancer found among both males and females in Kashmir. Our findings are slightly different from the national level data, where we mostly see head and neck cancers and oral cavity cancers attributed to tobacco use as the leading cancer sites among both sexes. While in Kashmir the oral cavity cancers contribute a very less percentage to overall cancer burden. There are significant number of previous studies (Chanda et al., 2007; Iqbal et al., 2016; Qurieshi et al., 2016; Rumana et al., 2011; Rasool et al., 2012) have also found GIT cancer as the most common cancer affecting people in Kashmir. Various epidemiological studies have shown that an increased risk of GIT cancers is associated with the diet and the local foodstuff of the Kashmiris, most of which have been found to contain important irritants and carcinogens (Murtaza et al., 2006; Siddiqi et al., 1992). Locally used dried and smoked fish and meat, dried and pickled vegetables, red chili, Brassica oleracea called *'Hakh'* in the local language, hot noon chai (salted tea), and Hookah (Hubble Bubble) smoke have been considered the most probable risk factors for various cancers (Dar et al., 2015; Iqbal et al., 2016; Ji et al., 1998; Mir et al., 2005).

The most striking finding observed in this study is that cancer of the ovary has become the third leading cancer site among women in Kashmir, which is totally different from the national level, where cancer of the ovary comes in at number eight (8) and not among the top ten (10) cancers at the global level as per the GLOBOCAN India (2020) and

GLOBOCAN world (2020) estimates, respectively. Another worrying observation made in this study is related to cancer of the cervix, which affects the opening of the uterus among women, has come to number nine (9), slightly better than that of the global and national levels, where it falls at number seven and number three respectively, as per the GLOBOCAN (2020) estimates.

This study also takes the lead in presenting a district-wise distribution of cancer cases in Kashmir valley, where it is found that the occurrence of cancer differs across all the districts in the Kashmir valley, with the highest number of patients reporting from the district Srinagar, followed by districts Anantnag, Baramulla, Budgam, and Pulwama. The results obtained after the analysis show negligible variations and are in agreement with previous studies regarding the district-wise distribution of cancer prevalence in Kashmir. In studies carried out by Koul et al. (2010), Nisa and Kumar (2018), and Qayoom et al. (2020), it has been found that the maximum number of cancer cases in Kashmir are reported from district Srinagar, followed by Baramulla, Anantnag, and Budgam districts. The uneven distribution of cancer among different districts of Kashmir is majorly attributed to the population of a particular district.

6. CONCLUSION

The patterns of various malignancies in the Kashmir valley have not been adequately studied, and no major population-based epidemiological studies have been conducted so far. However, few studies have argued that the pattern of high oesophageal and low cervical malignancies seen in this area is attributable to variances in lifestyle and the region's particular socio-cultural and religious traditions. The smoking and lifestyle-related cancers, such as the lung and the breast cancers, are common in the valley. The incidence of such cancers may climb further in the near future due to rising smoking rates and decreasing physical activity among children and young adults. This study also concludes that the overall cancer prevalence varies across all the ten districts with higher prevalence in districts which have more population. The Site-specific epidemiological studies will shed light on variances in the epidemiological profile and may also recommend preventive approaches for dealing with such cancers.

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CONFLICT OF INTEREST

The authors declare no conflict of interest between them.

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