

**CANCER MORTALITY IN SRINAGAR CITY: A GEOGRAPHICAL
ANALYSIS**

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ABSTRACT

The present study was an attempt to analyze the Cancer mortality in Srinagar city. Analysis of data reveals that there is an alarming increase in cancer mortality rate due to some leading behavioral and dietary risks. The present study shows that the total cancer patients registered in the cancer death registry were 600 (2006–2016), of which 389 (64.83%) were males and 211 (35.16%) were females. Overall male to female ratio was 2: 1.1. Male deaths were more dominant than female deaths in case of lung cancer & GIT cancer. Within the age group of 41 to 60 around 85 patients died due to lung cancer (32.1%) followed by other (21.5%), GIT (18.5%), Blood (15.1%), Breast (7.5%) and Ovary (4.95). Even a young age of 0-5 witnessed blood cancer. Highest mortality from cancers was reported from the Batamaloo area where 28.5% of total death because of cancer in Srinagar city was noted. Mortality was also high in the medical block Khanyar (26.1%) and Zadibal (20.5%). Low mortality was noted from the medical block S.R.Gung & Hazratbal where number of deaths due to cancer was 13.6% and 11.1% respectively.

Key words: Cancer, Mortality, Disease, Carcinogenic, Srinagar city

Introduction

Cancer may be regarded as a group of diseases characterized by an abnormal growth of cells, ability to invade adjacent tissues and even distant organs and eventual death of the effected patient if the tumor has progressed beyond that stage when it can be successfully removed (Park, 2011). Cancer which was a second ranking disease after heart disease as a killer has surpassed the heart disease and is now the number of one killer (WHO, 2010). Cancer is multi causal process; various risk factors are: physical environment (climate, soil and water) and socio-cultural (individual behavior, lifestyle, food habits, alcohol, tobacco consumption, hygiene and occupation). Nearly about 80% of all human cancers are environmental in origin (Haris, 1970), while as 10 to 20% of all human cancers may be associated with dietary factors (Doll and Peto, 1981). Metals and metalloids such as Ar, Cd, Cr, Nr and Sc found in varied diets have been reported carcinogenic (I.A.R.C, 1982). Cancer sites varies from country to country depending on

the development; liver and esophagus cancers are most common in third world countries, while lung cancer is most common in developed countries. Several cancer sites are linked with diet composition; colon cancer have been associated with low fiber intake; breast and prostate cancers has been related to western diets while high salted food have been associated with stomach cancer. Important cancer regions in India have been associated with physical, biological, socio-economic and cultural factors (Akhtar, 1978).

In Kashmir Division, there is an Increasing incidence of cancer mortality with considerable variation in different types of cancers in different areas with different physical & socio-economic setup (Akhtar & Rather, 2001). Kashmir is witnessing a surge in the number of cases in the past few years with lung cancer topping the list. The cancer mortality rate among Kashmiris had increased due to some leading behavioral and dietary risks, including high body mass index, low fruit and vegetable intake, lack of physical activity, tobacco use and lack of regular check-up. The changing life style and food habits among the Valley had caused surge in all the cancers especially in Esophagus, Colon and Breast cancers. There is an alarming increase in cancers in Kashmir (Nazir et al. , 2016). World is facing an epidemic of non-communicable diseases and it is believed to get worse at the end of this decade. Non-communicable diseases are responsible for more than three-fifths of the deaths globally (36 million), largely contributed by cardiovascular diseases (48% of non-communicable disease deaths), cancers (21% of non-communicable disease deaths), chronic respiratory diseases (4.2 million deaths), and diabetes mellitus (1.3 million deaths) It is predicted that cancer will be an important cause of mortality and morbidity all over the world in next few decades (Mariya et. al, 2016). In the backdrop of this issue of great concern, the present study was carried out to study the geographical distribution of deaths due to common cancers and the causes responsible for these deaths. The present study shall be of great help for future health care planning.

Area of study

Srinagar city lies between 33°59'14"N to 34°12'37"N latitude and 74°41'06" E to 74°57'27"E longitude. It is spread over 234.46 Sq. Km (Municipal limit) areas. It extends from Alestang in the north to Humhama in the south and Lawaypora in the west to Khanmou in the southeast. The city is located on both sides of the river Jhelum (a tributary of river Indus) locally called Vyeth in Kashmir (Fig. 1). City about midway from either end of the valley, to the west of a spur which protrudes down from the chain of mountains forms its northern boundary. The physiographic setting of Srinagar city is characterized with low lying agricultural fields in the flood plain of

river Jhelum in south and west. It has steep hills in the east and north east and the famous Karewa hills (locally called as Wudars) in far southeast. Karewas are flat and fertile agricultural mounds on the border of the Jhelum flood plain. These mounds flank the surrounding mountain precipice and are reminiscent of an earlier phase of intensive deposition. Their initial platforms have since been eroded and dissected into isolated uplands. They are believed to have been formed during the Miocene Orogeny (Pal and Srivastava, 1982).

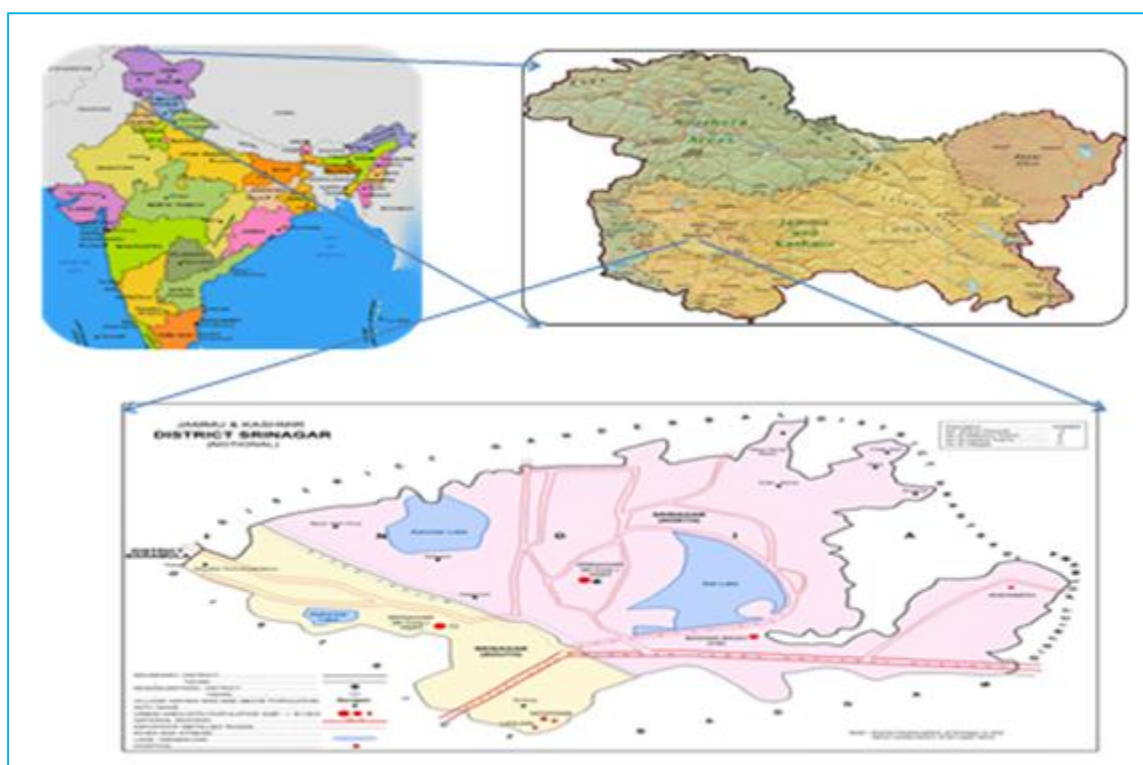


Fig. 1: Study Area

Literature Review

Ayub, S.G., Ayub, T., Khan, S.N., Rasool, S., Mahboob-ul-Hussain, Wani, K.A., Kuchay, S. Lone, M.M. and Andrabi, K.I. (2011) carried out a study on “Epidemiological Distribution and Incidence of Different Cancers in Kashmir Valley 2002-2006”. The study reveals that esophagus is the leading site of cancer in both sexes, followed by lung, brain, head and neck in males and breast and rectum in females. The incidence of cervical cancer in females and prostate cancer in males is lower in Kashmir as compared to Indian registries. .

Pundit, A.A. and Siddiqi, M.A. (2012) made study on “Burden of Cancer in the Valley of Kashmir: The study reveals that stomach cancer is the leading one with an average frequency of 19.2% followed by esophagus and lung as 16.5% and 14.6% respectively. Stomach (23%) and lung (21%) are the leading cancer in men while as esophagus cancer tops (18.3%) in women

followed by breast cancer (16.6%). Kashmir is a very high risk area of most commonly occurring cancers particularly cancers of gastrointestinal tract.

Wani, M.A., Jan, F.A., Khan, N.A., Pandita, K. K., Khurshid, R. and Khan, S.H. (2014) made study on “Cancer Trends in Kashmir, Common types, Site Incidence and Demographic Profiles: National Cancer Registry 2000-2012”. The study shows that cancer of esophagus, stomach and lungs have a high incidence both in men and women in Kashmir. The study reveals that overall incidence of cancer in Kashmir shows an increasing trend and number of cancer diagnosed is expected to double between the periods of 2012 to 2027.

Dhar, G.M., Shah, G.N., Naheed, B and Hafiza (1993) worked on “Epidemiological trend in the Distribution of Cancer in Kashmir Valley”. The study reveals that cancer of esophagus was the most frequent type in both sexes, accounting for 42.9% of all types of cancers in the valley. The preponderance of esophagus cancer was attributable to the local practice of drinking hot salt tea.

Rasool, S., Ganai, B.A., Syed, S.A. and Masoodi, A., (2012) made study on “Esophageal Cancer: Associated Factors with special reference to the Kashmir valley”. The study shows that esophageal cancer is a multifactorial disease and no single agent has been identified so far as the sole cause of cancer. High incidence in Kashmir have been associated with the consumption of hot salted tea, sun dried, smoked food, tobacco in the form of hookaha and various genetic factors.

Qureshi, M. A., Masoodi. M. A., Kadla, S.A., Sheikh Z. A and Gangadaran, P (2011) made study on “Gastric Cancer in Kashmir”. The study reveals that Gastric cancer has been reported to be highly prevalent malignancy in Kashmir. Particular life style habits like consumption of salted tea and tobacco smoking by hookaha as well as Helicobacter pylori infection are main risk factors. Present study is also an attempt in the same direction.

Methodology

The study is based on secondary data. Mortality data for different types of cancers prevailing in the study area was collected from Sher-I-Kashmir Institute of Medical Science (SKIMS) which is the specialized medical institution catering to cancer patients either directly or referred by hospitals of lower level throughout the valley. In the present study, an effort has been made to project the mortality rate of various cancer patients being treated in SKIMS Soura from 2007 - 2016. After permission from ethics committee data was collected from the said hospital. The

present study is probably the first study of its kind which has depicted the true caseload of cancer being handled in SKIMS hospital

Research highlights

- Deeper insight into the data collected as above will open new avenues for research in cancer study & diagnosis to help develop more effective therapies.
- Evidence-based strategies for cancer prevention and early detection and management of the disease can go a long way in reducing the incidence of the dreaded disease.

Result & Discussion

Cancer Mortality in Srinagar City

According to official data available at Regional Cancer Centre, Sheri Kashmir Institute of Medical Sciences Soura, the number of registered patients has shown an alarming increase during past few years; around 600 people have died due to cancer in Srinagar city. Lung cancer was the most commonly encountered cancer (27.8%) followed by other cancer (22%), GIT (21.1%), Blood (18.8%), breast cancer (6.8%) and ovary cancer (3.3%),(Table 1). During 2007 there were total of 9 deaths from cancer & it increased to 7.9% during 2016 (Table 1). Annual increase in cancer mortality displays variation from 2008 to 2012 & there was a rapid decrease in cancer mortality in year 2013. Highest rate of cancer mortality was in the year of 2014. Mortality from the lung cancer has increased from 22.2% in 2007 to 38.2% in 2016, while mortality from breast cancer has declined from 11.1% in 2007 to 2.1% in 2016. Other types of cancers have witnessed an increasing trend but with fluctuations. Mortality from cancer exhibited an overall annual increasing trend from 2007 to 2016(Fig. 2).

Table 2 clearly shows that high incidence of lung cancer was found in the month of January (31.8%) whereas least incidence were found in the month of September (13.5%). The mortality rate of GIT cancer was high in the month of March (33.3%) & least in the month of August (10.2%). Similarly for blood, breast, ovary, and other cancers the high incidences were in the month of April (25.6%), March (12.6%), April (6.7%), April (21.6%) & no or low incidences in the month of May, Nov (16.1%), June (2.23%), May, July, Aug, Nov (0%), & Dec (15.9%) respectively (Fig 3).

Cancer mortality displays lot of difference between males & females, there is approximately 50% predominance of male death over females (Fig. 4). Total cancer patients registered in the cancer death registry were 600 (2006–2016), of which 389 (64.83%) were males and 211 (35.16%) were females (Table3). Overall male to female ratio was 2: 1.1. Male deaths were more dominant than female deaths in case of lung cancer & GIT cancer (Fig. 4).

Mortality from cancer is more in the higher age group than in the lower age groups in all block of Srinagar city. Most of the patients were in the age group of 41-60 accounting for about 44% of the total (Table 4). Within this age group around 85 patients died due to lung cancer (32.1%) followed by other (21.5%), GIT (18.5%), Blood (15.1%), Breast (7.5%) and Ovary (4.95). Even a young age of 0-5 witnessed blood cancer (Fig. 5). The rise in the number of cancer mortality could be attributed to larger number of ageing population, unhealthy life styles, and use of various forms of tobacco and related products, unhealthy diet and in most cases, the non-availability of better diagnostic facilities.

Table 1: Cancer Mortality Srinagar City by Year (2007-2016)

Percentage number of Registered Deaths with cancer in different blocks of Srinagar city from 2007-2016

Year	Lung Cancer	GIT Cancer	Breast Cancer	Ovary Cancer	Blood Cancer	Other Cancer	Total
2007	02 (22.2)	02 (22.2)	01 (11.1)	01 (11.1)	01 (11.1)	02 (22.2)	09 (1.5)
2008	10 (21.7)	08 (17.3)	07 (15.2)	02 (4.3)	08 (17.3)	11 (23.9)	46 (7.6)
2009	23 (27.0)	16 (18.8)	04 (4.7)	02 (2.35)	12 (14.1)	28 (32.9)	85 (14.1)
2010	24 (32)	19 (25.3)	04 (5.3)	04 (5.3)	10 (13.3)	14 (18.6)	75 (12.5)
2011	19 (30.6)	10 (16.1)	04 (6.4)	01 (1.61)	16 (25.8)	12 (19.3)	62 (10.3)
2012	17 (22.0)	16 (20.7)	04 (5.1)	02 (2.5)	14 (18.1)	24 (31.1)	77 (12.8)
2013	12 (31.5)	08 (21.0)	01 (2.6)	01 (2.6)	05 (13.1)	11 (28.9)	38 (6.3)
2014	23 (22.3)	22 (21.3)	11 (10.6)	05 (4.8)	33 (32.0)	09 (8.7)	103 (17.1)
2015	19 (32.7)	08 (13.7)	04 (6.8)	00 (0)	11 (18.9)	16 (27.5)	58 (9.6)
2016	18 (38.2)	18 (38.2)	01 (2.1)	02 (4.2)	03 (6.3)	05 (10.6)	47 (7.8)
Total	167 (27.8)	127 (21.1)	41 (6.8)	20 (3.3)	113 (18.8)	13 (22)	600

Source: SKIMS Soura, 2017

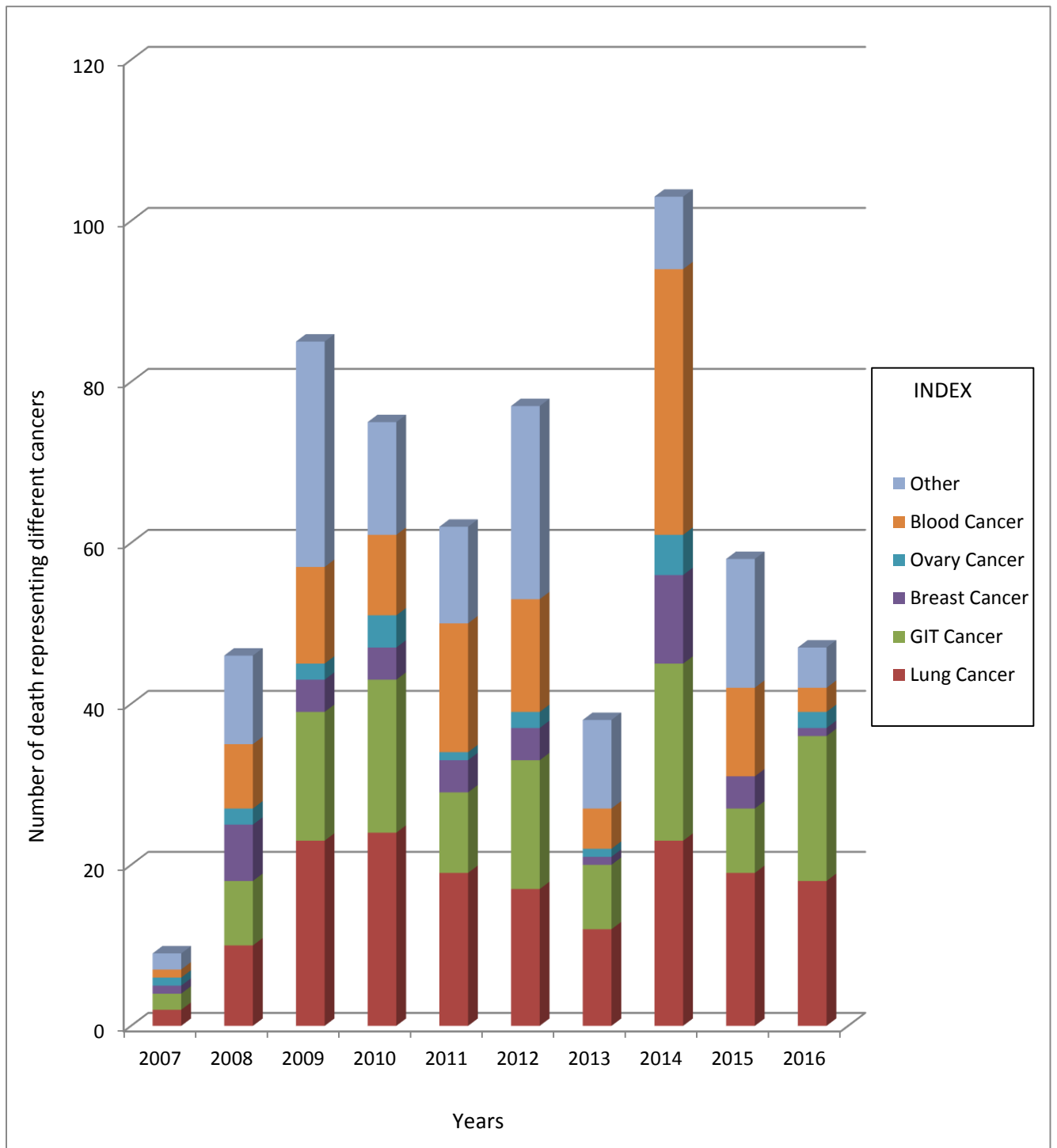


Fig. 2: Annual mortality rate in Srinagar city

Table 2: Cancer Mortality in Srinagar City by Months (2007-2016)

Number of Registered Deaths with % to Total

Month	Lung Cancer	GIT Cancer	Breast Cancer	Ovary Cancer	Blood Cancer	Other Cancer	TOTAL
January	21 (31.8)	16 (24.24)	03 (4.54)	03 (4.54)	10 (15.15)	13 (19.69)	66 (11)
February	14 (32.5)	06 (13.95)	03 (6.9)	03 (6.9)	08 (18.6)	09 (20.9)	43 (7.1)
March	17 (26.9)	21 (33.3)	08 (12.6)	01 (1.5)	08 (12.6)	08 (12.6)	63 (10.5)
April	15 (20.2)	15 (20.2)	04 (5.4)	05 (6.7)	19 (25.6)	16 (21.6)	74 (12.3)
May	09 (29.0)	07 (22.5)	02 (6.45)	00 (0)	05 (16.1)	08 (25.8)	31 (5.1)
June	09 (20.9)	08 (18.6)	01 (2.23)	02 (4.6)	11 (25.5)	12 (27.9)	43 (7.1)
July	17 (30.3)	07 (12.5)	02 (3.5)	00 (0)	16 (28.5)	14 (25)	56 (9.3)
August	17 (43.5)	04 (10.2)	03 (7.6)	00 (0)	07 (0.001)	08 (20.5)	39 (6.9)
September	05 (13.5)	10 (27.0)	02 (5.4)	01 (8.1)	08 (21.6)	11 (29.7)	37 (6.1)
October	13 (13)	17 (17)	06 (9.6)	03 (4.8)	09 (14.5)	14 (22.5)	62 (10.3)
November	14 (33.3)	07 (16.6)	04 (9.5)	00 (0)	05 (11.5)	12 (28.5)	42 (7)
December	16 (36.3)	09 (20.4)	03 (6.8)	02 (4.5)	07 (15.9)	07 (15.9)	44 (7.3)
Total	167 (27.8)	127 (21.1)	41 (6.8)	20 (3.3)	113 (18.8)	132 (22)	600

Source: SKIMS Soura, 2017

Fig. 3: Monthly Cancer Mortality in Srinagar City

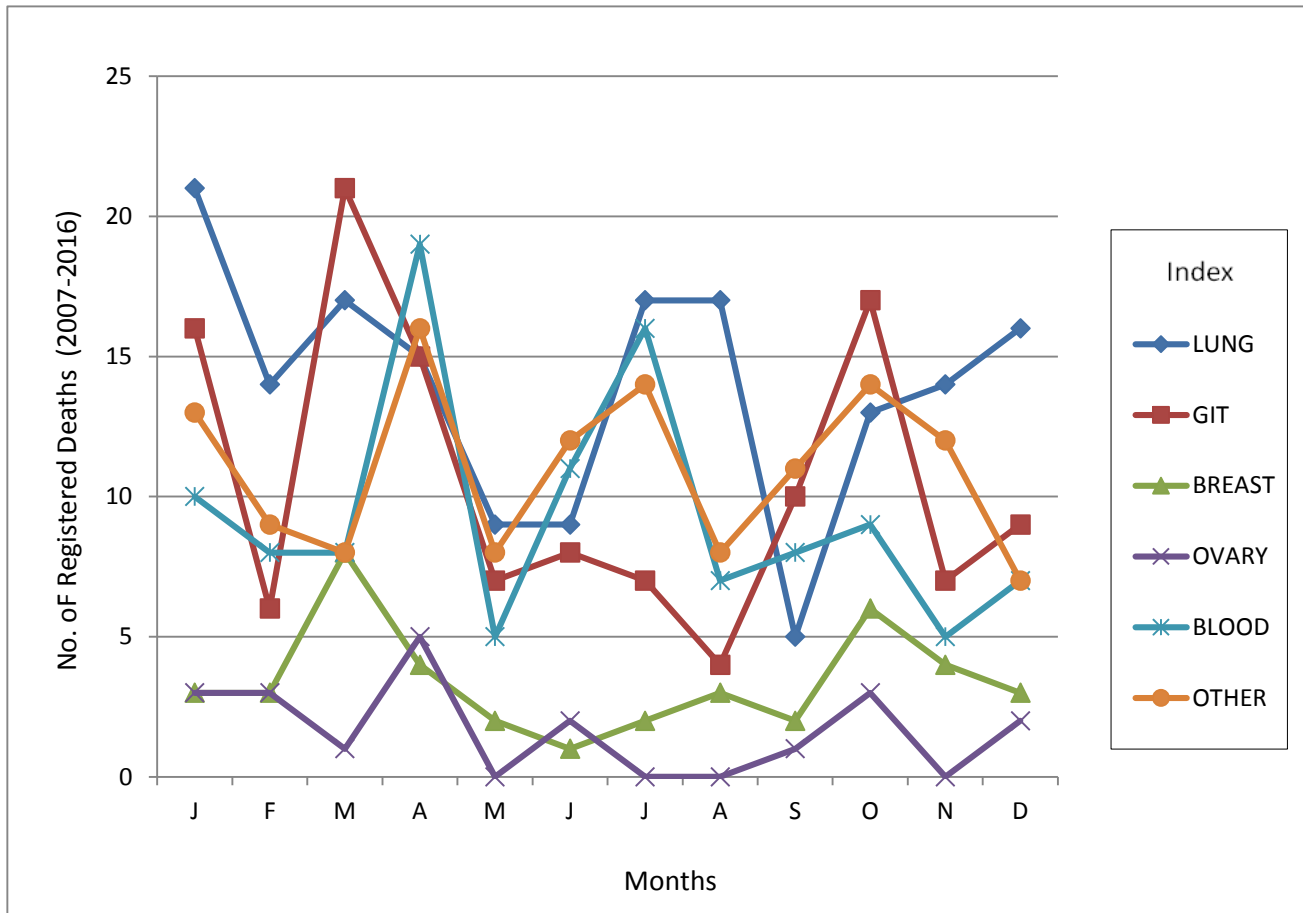


Table 3: Male –Female Cancer Mortality In Srinagar (2007-2016)

Number of Registered Deaths with % to Total

District	Males	Females	Total
Srinagar	389 (64.83)	211 (35.16)	600

Source: SKIMS Soura, 2017

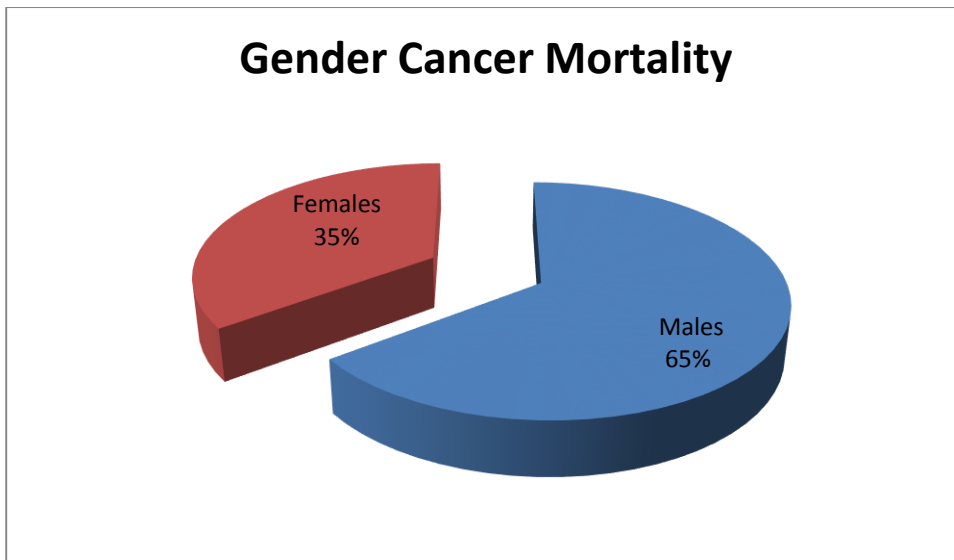


Fig .3: Gender Ratio of Cancer Mortality in Srinagar

Table 4: Cancer Mortality in Srinagar City by Age (2007-2016)

Age Groups	Number of Registered Deaths with % to Total						
	Lung Cancer	GIT Cancer	Breast Cancer	Ovary Cancer	Blood Cancer	Other Cancer	Total
Up to 5	00 (00)	00 (00)	00 (00)	00 (00)	03 (50)	03 (50)	06 (1)
6-15	00 (00)	00 (00)	00 (00)	00 (00)	05 (71.4)	02 (28.5)	07 (1.16)
16-25	00 (00)	04 (23.5)	01 (5.8)	01 (5.8)	06 (35.2)	05 (29.4)	17 (2.8)
26-40	07 (9.5)	21 (28.7)	10 (13.6)	05 (6.8)	16 (21.9)	14 (18.6)	73 (12.1)
41-60	85 (32.1)	49 (18.5)	20 (7.5)	13 (4.9)	40 (15.1)	57 (21.5)	264 (44)
61-80	69 (31.3)	51 (23.1)	10 (4.5)	01 (0.45)	43 (19.5)	46 (20.9)	220 (36.6)
81-100	06 (46.1)	02 (15.3)	00 (00)	00 (00)	00 (00)	05 (38.4)	13 (2.1)
TOTAL	167 (27.8)	127 (21.1)	41 (6.8)	20 (3.3)	113 (18.8)	132 (22)	600

Source: SKIMS, Soura 2017

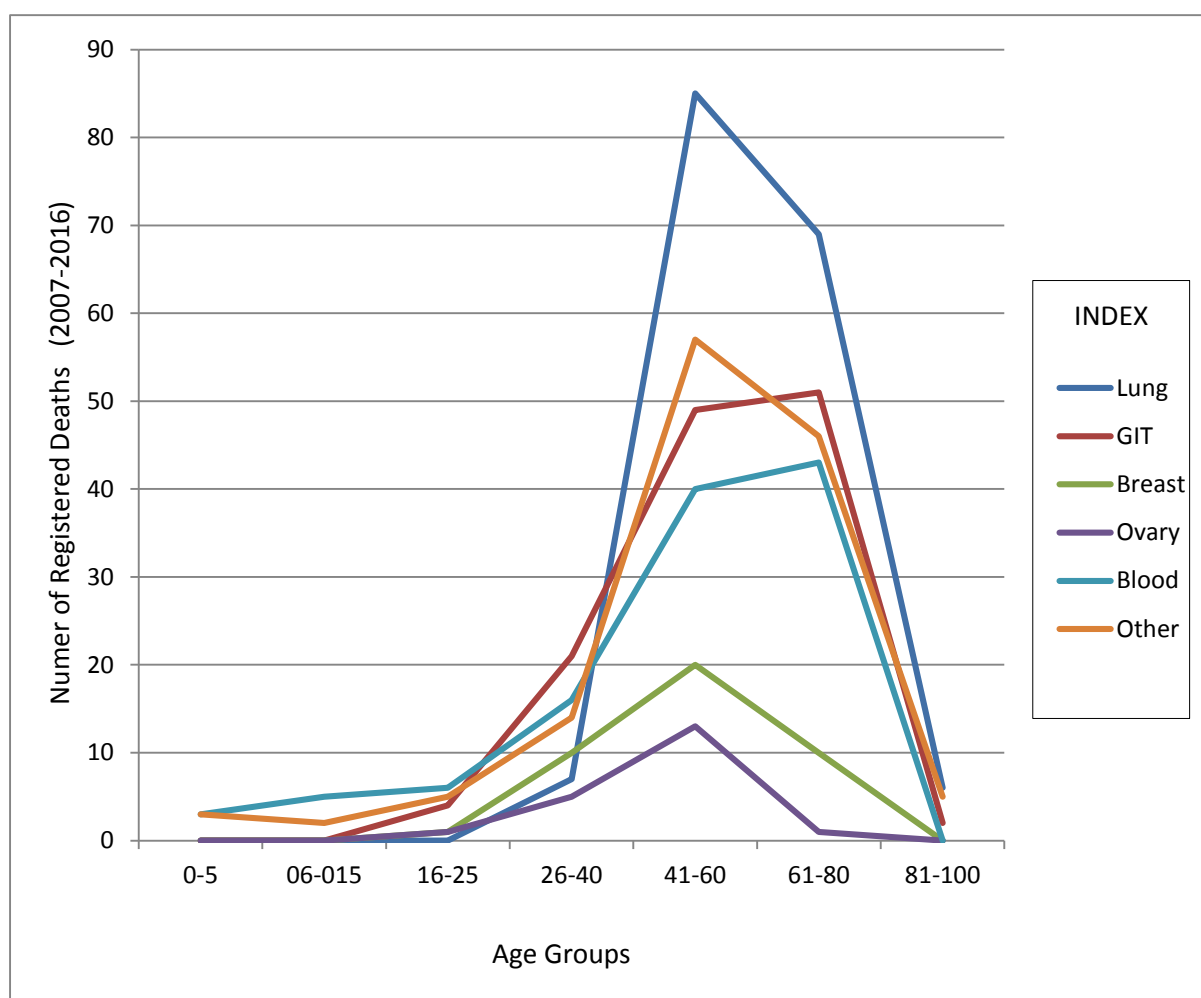


Fig. 5: Cancer Mortality of different age groups

Spatial Pattern of Cancer Mortality

There exists marked variation in mortality from cancers among the different medical blocks of Srinagar city. Highest mortality from cancers was reported from the Batamaloo area where 28.5% of total death because of cancer in Srinagar city was noted. Mortality was also high in the medical block Khanyar (26.10 %) and Zadibal (20.50 %). Low mortality was noted from the medical block S.R.Gung & Hazratbal where number of deaths due to cancer was 13.60 % and 11.10 % respectively (Table 5) . Srinagar city has the largest urban concentration with modern life style. Urban life style, unhealthy diet etc may be encouraging the cancer incidences. Variations in mortality due to different types of cancers are also noted between medical blocks of Srinagar city. Lung cancer with a mortality of 30.50 % to the total cancer death was most dominant in Khanyar

area of Srinagar city. GIT cancer (23.50 %) was first ranking cancer in khanyar, Breast cancer (9.94%) in Batamaloo, and ovarian cancer (4.06%) in Zadibal area. Blood & other types of cancers have recorded high mortality in Batamaloo medical block. Lung cancer is the leading cancer reported overall (27.80 %) (Fig. 6). The reason for this may be due to the fact that use of tobacco in different forms like cigarette smoking, hukka, also known as hubble bubble and snuff is quite prevalent in city.

Table 5: Cancer Mortality In Srinagar City (2007-2016)

Medical Blocks	Number Of Registered Deaths (With percentage to total)						Total
	Lung Cancer	GIT Cancer	Breast Cancer	Ovary Cancer	Blood Cancer	Other Cancer	
Hazratbal	12 (17.90)	18 (26.80)	02 (2.98)	03 (4.47)	14 (20.80)	18 (26.80)	67 (11.10)
Zadibal	36 (29.20)	23 (18.60)	08 (6.50)	05 (4.06)	21 (17.07)	30 (24.30)	123 (20.50)
Batamaloo	45 (26.30)	33 (19.20)	17 (9.94)	03 (1.75)	33 (19.20)	40 (23.30)	171 (28.50)
Khanyar	48 (30.50)	37 (23.50)	08 (5.09)	05 (3.18)	26 (16.50)	33 (21.01)	157 (26.1)
S.R.Gung	26 (31.70)	16 (19.50)	06 (7.31)	04 (4.87)	19 (23.10)	11 (13.40)	82 (13.60)
Total	167 (27.80)	127 (21.10)	41 (6.80)	20 (3.30)	113 (18.80)	13 (22)	600

Source: SKIMS, Soura 2017

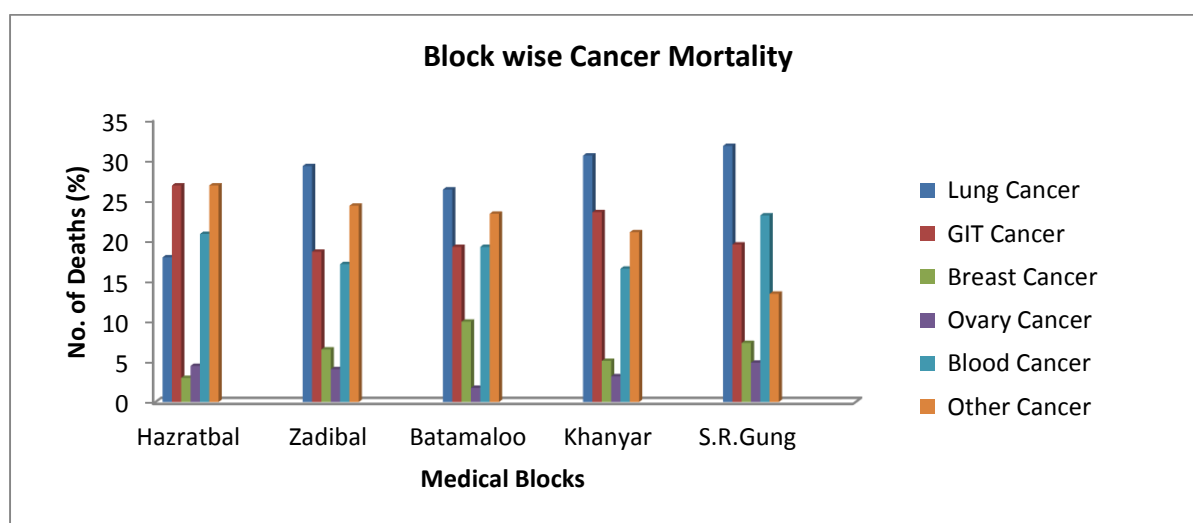


Fig. 6: Block wise Cancer Mortality in Srinagar City

Conclusion and Suggestions:

There is an increasing incidence of cancer mortality with considerable variation in mortality for different types of cancers in different areas with different physical, socio-economic & cultural environments in Srinagar city.

Situation is changing as far as the deadly disease cancer is concerned. The diseases are alarmingly on surge. There are patients hailing from ever part of city which are diagnosed with such a terminal disease. Lung cancer, which for few years back was not witnessed in that alarming number, has surpassed the GIT cancers across city. Tobacco use is the leading cancer risk factor at the global level causing 71 per cent of lung cancer death. In Srinagar city, the situation is very grim with the highest number of lung cancer cases, which is increasing alarmingly. The cancer mortality rate among Kashmiris had increased due to some leading behavioral and dietary risks, including high body mass index, low fruit and vegetable intake, lack of physical activity, tobacco use and lack of regular check-up. The changing life style and food habits among the people had caused surge in all the cancers especially in Lung, GIT and Blood cancers.

The rise in cancer cases is also due to intake of spicy food, changing dietary habits and consumption of bulk of contaminated food items available in the market. There is massive adulteration in mass consumption food items which kills people slowly. There are increasing number of patients complaining of food poisoning, gastric troubles and other problems. Any delay in detection of the cancer can prove fatal.

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