

Epidemiological Study of Malignancy in North Karnataka Region: A 4 Year Hospital Based Study

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Abstract

Modern civilization, urbanization, industrialization, changes in daily life style, population growth and aging all have contributed to epidemiological changes in many diseases, including cancer in India and other countries. Knowledge based on epidemiological patterns and trends would be of great help in identifying persons at high risk for the development of a particular cancer and also forms the scientific basis for the planning and organization of prevention, diagnosis and treatment of cancer in a community.

An attempt was made to study the age, sex, site and histopathological type of malignancy occurring in the population reported in our hospital in the last four years.

Of the total 18540 cases received for histopathological evaluation, 2560 cases (13.8%) were diagnosed as malignant. Among them 1364 cases (53%) were females and 1196 cases (47%) were males. 41-60 years (53%) of age range constituted maximum number of cases. Cervix was the most common site of malignancy in females and oesophagus and oral cavity in males. Squamous cell carcinoma was the most common type followed by adenocarcinoma in various sites. Lymphoma, sarcoma, germ cell tumors and metastatic deposits were among others reported.

Keywords: Adenocarcinoma; Cervix; Malignancy; Oesophagus; Oral Cavity; Squamous Cell Carcinoma.

Introduction

"Epidemiology is the study of the distribution and determinants of health-related states or events in

specified populations and the application of this study to control of health problems."

Epidemiology of cancer has been described as the study of cancer's distribution by age, sex, economic status etc and of those factors which determine its prevalence [1]. This definition suggests that cancer epidemiology must be considered in terms of descriptive epidemiology dealing with the distribution of the disease and analytic epidemiology concerned with the search for causative factors [1].

Cancer is a major cause of morbidity and mortality in developing and developed countries. In many low-income and middle-income countries like India, most of the population does not have access to a well organised and well regulated cancer care system [2]. The cancer profile varies in different parts of the world and an epidemiological study helps to know the common cancers prevalent in particular segments of a population and the risk factors involved [3,4].

Epidemiological data based studies on cancer often provides research foundation for the establishment of suitable strategies to assist in cancer control [5].

Materials and Methods

A 4 year retrospective study from January 2013 to December 2016 was done in Department of Pathology, Karnataka Institute of Medical Sciences, Hubballi. Total of 18540 specimens were received for histopathological evaluation, of which 2560 cases (13.8%) were diagnosed as malignant. The data was collected and various determinants like age, sex, site and histopathological type of malignancy diagnosed were studied.

Results

shown in Table 1.

1. Age Distribution in the Present Study

Among the total 2560 cases diagnosed as malignant on histopathology, maximum number of cases were seen between 41-60 years of age, least number of cases were found in extreme age groups, that is between 1-20 years and 81-100 years as

2. Sex Distribution in the Present Study

Of the total 2560 cases diagnosed as malignant, 1364 (47%) cases were females and 1196 (53%) cases were males as shown in Figure 1. Female to Male ratio was 1.13: 1 A slight female predominance was noted. (Figure 1).

Table 1: Age distribution in the study

Age (Years)	Frequency (Number of Cases)	Percent (%)
1-20	33	1
21-40	462	18
41-60	1345	53
61-80	682	27
81-100	38	1
Total	2560	100

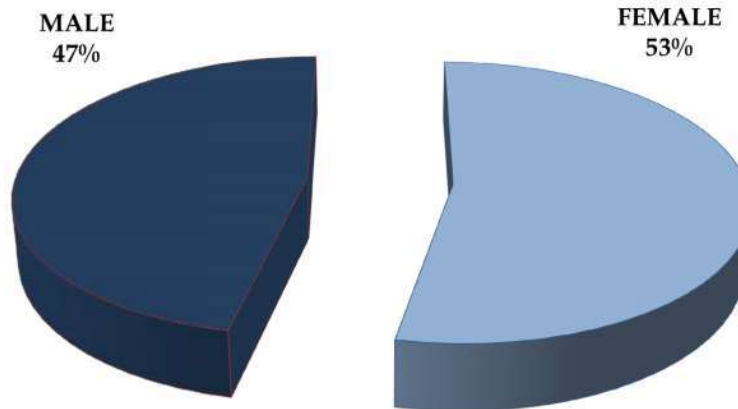


Fig. 1: Sex distribution in the study

3. Most Common Organ/Site Involved in Malignancy in Females and Males in the Present Study

The most common organ/site involved in

malignancy was cervix in females and oral cavity and oesophagus in males, as depicted in Figure 2 and 3 respectively.

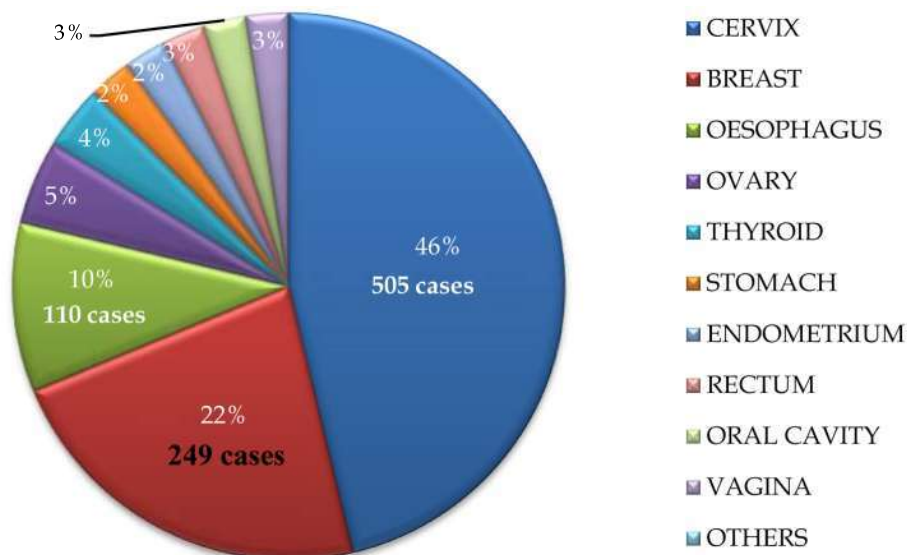


Fig. 2: Most common organ/site of malignancy in females in the study

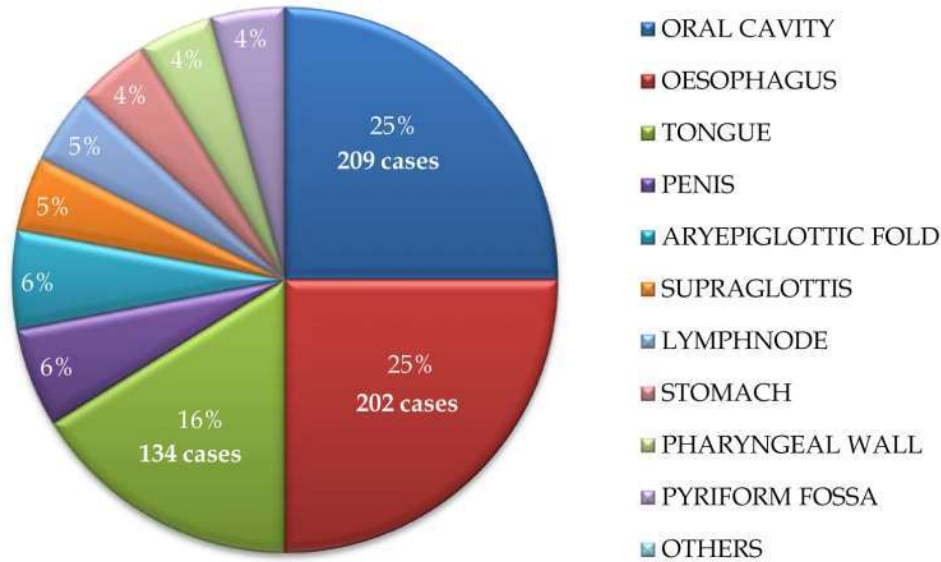


Fig. 3: Most common site/organ of malignancy in males in the study

In females, **cervix** was the most common organ affected by malignancy, followed next in frequency by breast, oesophagus, ovary, thyroid and others. Malignancy of cervix constituted 37% of all the cases in females.

In males, **oral cavity and oesophagus** were the most commonly affected sites/organ in malignancy, followed next in frequency by tongue,

penis, aryepiglottic fold and others. Malignancy of oral cavity and oesophagus constitute to 17.5% and 17% of all the cases in males respectively (Figure 3).

4. Categories of Malignancy in the Present Study

The category of malignancies in males and females in the present study is shown in Table 2.

Table 2: Category of malignancy in the present study

Histopathological Type	Number of Cases	Percentage (%)
Epithelial tumors	2451	96
Mesenchymal tumors	45	1.7
Germ cell tumors	13	0.5
Haematolymphoid tumors	49	2
Undifferentiated tumors	02	0.07

The most common category of malignancy in the present study was epithelial tumor, followed next in frequency by haematolymphoid malignancies, mesenchymal tumors, germ cell tumors and undifferentiated tumors.

Epithelial Tumors

In the category of epithelial tumors, squamous cell carcinoma was the most common type seen in 1698 cases (69%), followed by adenocarcinoma in 675 cases (28%).

In females, squamous cell carcinoma was the most common histopathological type of malignancy in cervix (484 cases, 96%), oral cavity

(25 cases, 96%), oesophagus (104 cases, 95%), vagina (22 cases, 85%). In males, squamous cell carcinoma was the most common histopathological type of malignancy in tongue (134 cases, 100%), penis (45 cases, 100%), oral cavity (205 cases, 98%), oesophagus (186 cases, 92%) and other sites like aryepiglottic fold, supraglottis, pharyngeal wall, pyriform fossa also showed predominantly squamous cell carcinoma.

Squamous cell carcinoma in various organ/site showed a male preponderance with male to female ratio of 1.2:1. Adenocarcinoma was the second most common histopathological type of malignancy in the category of epithelial tumors.

In females, adenocarcinoma was most commonly seen to involve breast (246 cases, 97%), endometrium (27 cases, 93%), rectum (25 cases, 93%), stomach (26 cases, 90%), thyroid (32 cases, 86%).

In males, adenocarcinoma was the most common histopathological type of malignancy in stomach (38 cases, 97 cases).

Squamous cell carcinoma was most common tumor compared to adenocarcinoma in the category of epithelial tumors in males.

Adenocarcinoma showed a female preponderance with female to male ratio of 2.6:1. This was due to the increased number of breast malignancy in females showing infiltrating ductal carcinoma.

Mesenchymal Tumors

In the category of mesenchymal tumors, sarcomas (unclassified) in various organ/site were the most common type seen in 13 cases (29%), followed next in frequency by neural tumors in 11 cases (24%), bone tumors in 9 cases (20%) in both males and females.

Mesenchymal tumors showed a slight male preponderance, Male to female ratio was 1.25: 1.

Haematolymphoid Tumors

Haematolymphoid tumors category showed that Non Hodgkins Lymphoma cases were more in number compared to Hodgkins Lymphoma, 42 cases (86%) and 7 cases (14%) respectively.

Male to female ratio was 2:1.

Apart from the lymphnode being the most common site of Non Hodgkins lymphoma, other organ/sites involved were supraglottis, parotid, gastrointestinal tract and nasal cavity.

Germ Cell Tumors

Category of germ cell tumors showed mostly mixed germ cell tumors in 7 cases (54%), yolk sac tumor in 5 cases (38%) and dysgerminoma in 1 case (8%). Male to female ratio was 1.16:1.

Discussion

Epidemiology is the only way to study cancer in humans at the population level. It is a discipline

with a well developed set of principles for study conduct, analysis and interpretation and it enables us to study gene environment interactions and to assess the effects of our interventions at the population level [6].

Life style changes, age composition of the population and total population size are the determinants of cancer magnitude [7].

1. Comparison of age distribution in the present study with other studies.

Increasing life expectancy is one of the important factors for the increased incidence of cancer. The life expectancy at birth has steadily risen in India from 45 years in 1971 to 62 years in 1991, indicating a shift in the demographic profile. It is estimated that life expectancy of Indian population will increase to 70 years by 2021-2025 [8].

Due to such changes in age structure, population will face an increase in incidence of cancers and some other non-communicable diseases, which have a higher chance of occurrence among elderly [8]. In the present study also higher incidence of cancer was seen between 41-60 years.

2. Comparison of sex distribution in the present study with other study

In the present study female to male ratio was 1.13:1 with slight female preponderance accounting to 53% of cases. This was in concordance with other studies [9- 15].

Study done by Kalyani R et al. [9] at Kolar, showed that among the total 19,615 cases received for histopathology and Fine Needle Aspiration Cytology, 2744 (13.98%) were malignant, of which 1200 were males and 1544 females, with Male: Female ratio of 0.7: 1. This finding was similar to the present study.

3. Comparison of organ/site of involment in malignancy in the present study with other study

Comparison of the most common organ/site involved in malignancy in females and males in the present study with other study is shown in Table 3.

Females

There was a slight variation in the common organs involved in malignancy in females in the present study with study conducted by Kalyani R et al. [9] Most common organ involved in females was oral

Table 3: Comparison of the most common organ/site involved in malignancy in females and males in the present study with other study

	Kalyani R et al [9]	Present study
Females	Oral cavity	Cervix
	Cervix	Breast
	Breast	Oesophagus
	Stomach	Ovary
	Oesophagus	Thyroid
	Thyroid	Stomach
	Ovary	Endometrium
	Bone	Rectum
	Rectum	Oral cavity
	Males	Oral cavity
Stomach		Oesophagus
Oesophagus		Tongue
Bone		Penis
Prostate		Aryepiglottic fold
Liver		Supraglottis
Laryngx		Lymph node
Penis		Stomach
Bladder		Pharyngeal wall

cavity in the study done by Kalyani R et al. [9], however in the present study oral cavity malignancy was predominantly seen in males.

The reason for higher incidence of cervical and breast cancer in females in this region could be attributed to the low socio-economic status, early age of marriage and first pregnancy, multiple pregnancies, decreased genital hygiene. Similar risk factors were also seen among women with cervical cancer in various other studies [6,9,12,14-18].

According to the National Cancer Registry Program (NCRP) the leading cancer sites in females are breast and cervix [19].

It is also recognized that psychosocial and cultural factors influence, access to education, prevention, screening, treatment and role of stigma related to breast and cervical cancers are also some of the causes for the limited attention given to these cancers [20].

Males

Concordant results were seen with the most common organ/site of involvement in males in the present study and study done by Kalyani R et al. [9] at Kolar.

Increased incidence of malignancies of oral cavity and oesophagus in males could be due to the exposure to risk factors like cigarettes smoking, chutta smoking, oral snuff, betel nut, pan and tobacco chewing which are commonly noted in this region.

Also the increased intake of spicy food, intake of excess salt, preserved food, smoked food and

alcohol consumption is more prevalent in this region and they contribute to malignancies in the tongue, pharyngeal wall, pyriform fossa, aryepiglottic fold, vocal cords and stomach. Similar risk factors were also noted in study done by Kalyani R et al. [9] at Kolar.

4. Comparison of the histopathological type of malignancy noted in the present study with other study.

In the present study the most common histopathological type of malignancy in cervix was squamous cell carcinoma (484 cases, 96%), this finding was in concordance with study done by Kalyani R et al. [9] at Kolar who also showed that majority of cervical cancers (271 cases) were histologically squamous cell carcinomas (262 cases, 97%). Regular screening programs and Pap smears help in the early detection of carcinoma of the cervix [3,9].

The most common histopathological type of malignancy in breast was infiltrating ductal carcinoma (246 cases, 97%) in the present study. Study done by Kalyani R et al. [9] at Kolar also showed that adenocarcinoma (159 cases, 95%) was most common histopathological type of malignancy in breast (168 cases).

In the present study most common histopathological type of malignancy seen in males was squamous cell carcinoma in oral cavity, tongue, pharynx, laryngx, oesophagus, similar to result in study done by Kalyani R et al. [9] at Kolar. Detection of precancerous lesions or use of oral cytology with

Toluidine blue helps in the early detection of cancer [3,9]. In oesophagus (312 cases), squamous cell carcinoma (287 cases, 92%) was most common histopathological type of malignancy compared to adenocarcinoma (20 cases, 6.4%) in males and females. This was in concordance with study done by Kalyani R et al. [9] who also showed that majority of oesophageal cancers (175 cases) were squamous cell carcinoma (166 cases, 95%) followed by adenocarcinoma (8 cases, 4.5%) in both the sexes. 80% of oesophageal cancers in developing countries are squamous cell carcinoma and they are associated with smoking, alcohol, malnutrition, use of hot beverages, betel nut chewing, along with decreased intake of fresh fruits and vegetables. Oesophageal cancers in developed countries are adenocarcinomas seen commonly in white men, associated with obesity and chronic gastro-oesophageal reflux [3,9].

Thyroid malignancies (48 cases) were more common in females (39 cases, 81%) than males (9 cases, 19%). The most common histopathological type of malignancy was papillary carcinoma (33 cases, 69%), followed by follicular carcinoma (10 cases, 21%), medullary carcinoma (4 cases, 8%) and poorly differentiated carcinoma (1 case) in the present study. Study done by Kalyani R et al. [9] at Kolar also concluded that thyroid cancers (94 cases) were relatively common in females (76 cases, 81%) than males (18 cases, 19%) and histologically, a majority were papillary carcinoma (83 cases, 88%) similar to the present study.

The risk factors for thyroid cancers can be attributed to bore well water usage, exposure to ionizing radiation, consumption of cruciferous and goitrogenic vegetables seen in this region [9]. It is reported that too much iodine causes papillary carcinoma and iodine deficiency causes follicular carcinoma [3]. Consumption of bore well water and goitrogenic vegetables could be the risk factors for thyroid malignancy in this region.

Conclusion

A hospital based study gives an insight into the pattern of malignancies and also helps to identify the high risk groups for malignancy. It also provides research foundation for the establishment of suitable strategies for the cancer control.

Cancer prevention and control are the most important measures rather than its successful management.

In the present study higher incidence of malignancy was noted in females with cervix and breast being the most common organs involved. Poor socioeconomic status, poverty, early age of marriage and pregnancy, poor genital hygiene, lack of education and awareness, stigma associated with these cancers were among the few risk factors noted in this region leading to the higher incidence of these malignancies.

Males in the present study showed higher incidence of malignancy in organs like oral cavity, oesophagus, tongue, pharyngeal wall, aryepiglottic fold, stomach. Cigarette smoking, tobacco chewing, intake of spicy food, excess salt, alcohol was more commonly seen in this region which contributed to malignancies in the above sites. Life style modification, increased awareness and education, detection of pre cancerous lesions and timely treatment is required to reduce to incidence of malignancy in the above sites.

Squamous cell carcinoma was found to be the most common histopathological type of malignancy in both males and females, followed by adenocarcinoma in the present study. Our hospital-based study gives a baseline data regarding the cancer profile, its association with probable risk factors and help to plan cancer prevention and screening programs in future.

References

1. Phillips AJ. The Epidemiology of Cancer. 1969 Dec; 15(12):44-47.
2. Mallath MK, Taylor DG, Badwe RA, Rath GK, Shanta V. The growing burden of cancer in India: epidemiology and social context. *Lancet Oncol.* 2014 May;15(6):e205-12. doi: 10.1016/S1470-2045(14)70115-9.
3. Stewart SB, Kleihues P. World cancer report. IARC Press Lyon. 2003.
4. Gaur DS, Kishore S, Harsh M, Kusum A, Bansal R. Pattern of cancers amongst patients attending Himalayan Institute of Medical Sciences, Dehradun. *Indian J Pathol Microbiol* 2006;49:193-98.
5. Sahoo S, Suvarna S, Chandra A, Wahi S, Kumar P et al. Prevalence based Epidemiological Cancer Statistics: A Brief Assessment from Different Populations in India. *Oral Health Dent Manag. Health Dent. Manag.* 2013;12(3):132-7.
6. Shanthala S, Agadi BS, Kulkarni BB, Patil BR, Hallikeri UR, Chowkimath SM et al. Snap shot of epidemiological pattern of cervical cancer patients reporting to a tertiary cancer care center in North Karnataka, India. *Int J Adv Biol Res* 2014;4(2):178-83.
7. Projection of cancer incident cases for India -till 2026. *Asian Pac J Cancer Prev.* Jul 2013.

8. Murthy NS, Chaudhry K, Rath GK. Burden of Cancer and Projections for 2016, Indian Scenario: Gaps in the Availability of Radiotherapy Treatment Facilities. *Asian Pacific Journal of Cancer Prevention*. 2008;9: 671- 77.
 9. Kalyani R, Das S, Singh Bindra MS, Kumar HML. Cancer profile in Kolar: A ten years study. *Indian J Cancer*. Apr-Jun 2010;47(2):160-65.
 10. Gaur DS, Kishore S, Harsh M, Kusum A, Bansal R. Pattern of cancers amongst patients attending Himalayan Institute of Medical Sciences, Dehradun. *Indian J Pathol Microbiol* 2006;49:193-98.
 11. Banerjee AK, Bhattacharya N, Chowdhury MK, Chattopadhyay R, Sengupta J. Incidence of malignancy in Bankura (A retrospective study). *J Indian Med Assoc* 1944;92:400-02.
 12. Malhotra V, Shah BS, Sabharwal S. Pattern of cancer in Dayanand Medical College & Hospital, Ludhiana (A ten year retrospective study). *Indian J Pathol Microbiol*. 2001;44:27-30.
 13. Shah A, Jan GM. Pattern of cancer at Srinagar (Kashmir). *Indian J Pathol Microbiol* 1990;33:118-123.
 14. Sharma RG, Ajmera R, Saxena O. Cancer profile in eastern Rajasthan. *Indian J Cancer* 1994;31:160-73.
 15. Rao DN, Ganesh B. Estimate of cancer incidence in India in 1991. *Indian J Cancer* 1998;35:10-18.
 16. Rajesh N, Sreelakshmi K, Ramesh K. Socio-demographic profile of patients with cancer of cervix attending tertiary care hospital. *Int J Sci Res*. 2014;3(8):331-32.
 17. Fotra R, Gupta S, Gupta S. Sociodemographic risk factors for cervical cancer in Jammu region of J and K state of India first ever report from Jammu. *Indian J Sci Res* 2014;9(1):105-10.
 18. Sreedevi A, Javed R, Dinesh A. Epidemiology of cervical cancer with special focus on India. *Int J Womens Health*. 2015;7:405-14.
 19. Nandakumar A, Ramnath T, Chaturvedi M. The magnitude of cancer cervix in India. *Indian J Med Res*. 2009;130(3):219-21.
 20. Nyblade L, Stockton M, Travasso S, Krishnan S. A qualitative exploration of cervical and breast cancer stigma in Karnataka, India. *BMC Womens Health*. 2017;17:58.
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