

ANALYSIS

Burden of Cancers - Registry based Data from Kerala, India

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ABSTRACT

Cancer, a controllable chronic disease has emerged as a complex health issue of this era. The prevention and control of cancer and to improve quality of life of cancer victims is a scientific and public health challenge. To control the disease we need to know the burden and pattern of the disease in the community. There are only two population based cancer registries in Kerala, one, located in Thiruvananthapuram and the other covering the population of Kollam District. Population based information is not available from central or northern part of Kerala. Based on the two registry data it is estimated for the year 2020 that 147 new cancer cases occur in one day with an annual prevalence of 1,61,307 cancer patients in Kerala. Thyroid cancer incidence rate in Kerala women is the highest compared to other areas of India. Breast cancer incidence among women in urban area and Lung cancer incidence among men in rural area shows high occurrence rate compared to other population groups. Among 10 leading sites of Cancer in males Lung, Stomach, Tongue, Esophagus are known to related to tobacco use and Breast, Cervix, Thyroid cancers among females are amenable for early detection. Studies show that the tobacco habit is strongly associated in causation of cancers of Lung, Mouth, Laryngeal and Pharyngeal cancers among men and oral cancer in women. Trends of the disease occurrence among women show that Breast cancer rate has increased and cervix cancer incidence has reduced over the past two decades. The study highlights the need of population data on cancer to regularly review the burden and pattern of cancer in Kerala. Emphasis on effective cancer control activities and the support by a Government declaration 'Cancer as a notifiable disease' is most warranted.

Key Words: Cancer, Population based Cancer Registry, Tobacco

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Introduction

Cancer is known in India since Vedic times and is depicted in the ancient text book *Susruthasamhitha* as *Arbuda*. Cancer, a controllable chronic disease has emerged as a complex health issue of this era. Cancer occurs in all places, races, however its distribution and occurrence varies. Environmental factors and life style are believed to be the causes of such variation. The prevention and control of cancer and to improve the quality of life of cancer victims is a scientific and public health challenge.

It may be recalled that for cheek cancer there is a term 'Kavilvarppu' in the local native language of Kerala-Malayalam. The presence of this Malayalam term shows

the existence of the disease since a long time in Kerala. One of the earliest observations on cancer in Kerala was by Niblok in 1902 who was a surgeon in General Hospital, Madras. He mentions that many of the oral cancer patients attending the Madras General Hospital were from Malabar.¹ In 1908, Fells from Christian Missionary Society's hospital in Neyyoor, which was in erstwhile Travancore state, suggested that the cause of this disease was use of tobacco.² In 1933, Ian Morrison Orr who was also a surgeon in CMS hospital at Neyyoor made significant observations seeing the large oral cancer patient load in the hospital. The data reported by Orr has its uniqueness because it was for the first time such an effort to assess the cancer problem in Kerala was made.³

Such issues are relevant even today and there are several studies available identifying the high risk factors. Tobacco alcohol habits, physical inactivity, obesity, unhealthy diet, environmental factors etc

For control of cancer, we need to regularly review the following

- The load of cancer in the community,
- Patterns of cancer in the community

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- Treatment methods adopted and end results achieved
- Trends in cancer incidence

To observe and monitor the above we resort to studies of

- The hospital based data on cancer patients by hospital cancer registries in hospitals
- Population based cancer occurrence and surveillance by well maintained and systematized population cancer registries
- Cancer deaths recorded in official mortality records
- Surveys on cancer among the population

The findings from these can well be used for (a) To identify high risk factors, (b) Planning and implementing community cancer control and (c) their evaluation.

Cancer data availability for Kerala

The information on cancer in Kerala is now presented from three hospital-based registries and two population based registries. These registries adhere to national and international standards, which make comparisons possible and meaningful. As indicated earlier, such information is essential for cancer control actions, which require to optimize prevention, early detection and to deliver effective treatment. Palliative care becomes essential for those with uncontrolled disease.

The information on cancer from Hospital based Cancer Registers from three regions of Kerala is given below.

Table 1. Distribution of five leading sites of cancer in Males & Females (New cases - without any previous treatment anywhere)								
RCC Thiruvananthapuram New Cases 2011			AIMS Cochin 2011-12 (2 years)			MCC Thalasseri 2011		
Site	No.	%	Site	No.	%	Site	No.	%
Distribution of 5 leading cancers in Males - Hospital Based Cancer Registry data								
Lung	809	17.2	Lung	426	12.1	Lung	236	26.2
Leukaemia	478	10.2	Liver	351	9.9	Stomach	74	8.2
Tongue	285	6.1	Prostate	263	7.4	Other Mouth	69	7.7
NHL	269	5.7	Stomach	191	5.4	Esophagus	52	5.8
Stomach	259	5.5	NHL	154	4.4	Tongue	48	5.3
Total	2100	44.6	Total	1385	39.2	Total	479	53.3
All cases	4709		All cases	3531		All cases	898	
Distribution of 5 leading cancers in Females - Hospital Based Cancer Registry data								
Breast	1137	28.5	Breast	498	21.4	Breast	211	28.9
Cervix	429	10.8	Thyroid	157	6.7	Cervix	67	9.2
Leukaemia	344	8.6	Ovary	145	6.2	Mouth	65	8.9
Ovary	198	5.0	Cervix	97	4.2	Ovary	40	5.5
NHL	155	3.9	Lung	104	4.5	Rectum	34	4.7
Total	2263	56.7	Total	1001	43.0	Total	417	57.2
All cases	3990		All cases	2327		All cases	729	

RCC- Regional Cancer Centre Thiruvananthapuram in southern Kerala AIMS- Amrita Institute of Medical Science Cochin⁵ in central Kerala
MCC- Malabar Cancer Centre, Thalasseri in northern Kerala

Table 2. All cancer (Age adjusted) incidence rates of Thiruvananthapuram and Kollam districts

Year	Registry	Male	Female
2009-2011	Thiruvananthapuram Taluk	132.6	123.2
2009-2010	Kollam district	118.5	91.6

Regional Cancer Centre (RCC) Thiruvananthapuram in southern Kerala registers more than 10000 new cancer cases during the year 2011.⁴ Amrita Institute of Medical Science (AIMS) Cochin⁵ in central Kerala and Malabar Cancer Centre (MCC) Thalasseri in northern Kerala register less than 5000 cases of cancer.⁶ The pattern of cancer types among the patients attending in these hospitals is given below in **tables 1**.

The hospital based cancer data is influenced by the facilities and expertise available in the hospital. However the importance of major cancer types is apparent.

Lung, leukemia, liver, stomachs among males and breast, cervix, thyroid among females are the predominant cancer types.

Cancer Incidence Rates in Kerala

The cancer burden in Kerala is available from Population based information from two Registries (PBCR- Population based cancer registry) located in Thiruvananthapuram and Kollam districts in Southern Kerala, both under the Regional Cancer Centre, Thiruvananthapuram. These Registries are in the network of National Cancer Registry Programme (NCRP) of the Indian Council of Medical Research (ICMR) and are in the southern part of Kerala. Population based information is not available from central or northern part of Kerala.

The age specific rates seen in Thiruvananthapuram and Kollam when applied to the projected Kerala population for 2020 it is evident that there would be 147 new cases diagnosed every day in Kerala with an annual prevalence of 1,61,307 cancer cases in Kerala. The all cancer incidence rates among males and females are given in table 3. The all cancer incidence rate in Thiruvananthapuram among males was 132.6/100000 and among females it was 123.2/100000. The rates in Kollam among males was 118.5/100000 and among females 91.6/100000⁷ (**Table 2**).

Compared to other population groups in India, Thiruvananthapuram all cancer incidence rates among males stood in the 11th position and Kollam was in 7th position. Among females Thiruvananthapuram is in 6th position and Kollam is 16th position.⁷ The incidence rates may have wide variations in different regions of Kerala. In Northern and Central part of Kerala many clinicians report a high incidence of Stomach cancer and Liver cancer. Population based data is inadequate to verify this lead in these areas.

Table 3. Ten leading cancers: Age adjusted incidence rates per 100,000 in Thiruvananthapuram and Kollam Districts, Kerala

Thiruvananthapuram		Kollam		Thiruvananthapuram		Kollam	
Lung	14.4	Lung	21.6	Breast	35.1	Breast	25.1
Prostate	08.5	Mouth	5.9	Thyroid	10.0	Thyroid	9.9
Mouth	7.0	Stomach	5.5	Cervix	8.0	Cervix	7.0
Tongue	6.3	Prostate	5.4	Ovary	6.5	Ovary	5.4
Larynx	5.9	Rectum	5.1	Uterus	5.7	Lung	3.6
NHL	5.6	Larynx	4.9	Lung	3.9	Mouth	3.5
Rectum	5.1	Tongue	4.8	NHL	3.7	Rectum	2.8
Stomach	4.8	Liver	4.3	Rectum	3.7	NHL	2.6
Liver	4.7	Esophagus	4.0	Mouth	3.0	Corpus Uteri	2.6
Esophagus	4.2	NHL	3.7	Tongue	2.9	Tongue	2.6

Source: PBCR Thiruvananthapuram (2009–2011) and Kollam (2009–2010), from the three-year report of 25 Population based cancer registries, 2009–2011. NCRP-ICMR..

Pattern of cancer

The cancer pattern as per the Thiruvananthapuram and Kollam Population registry data are given in **table 3**.

It may be seen that, in total and for some sites, there were increased rates in Thiruvananthapuram compared to Kollam. This may be due to the presence of RCC, higher urbanized population and diagnostic opportunities in Thiruvananthapuram compared to Kollam district which has higher percentage of rural population than in Thiruvananthapuram. However, certain cancer types are common in both places listed in the leading ten cancers. Marginal differences in rates of stomach, esophagus, rectum, liver may be seen among males in Thiruvananthapuram and Kollam. Among women also, there is a higher incidence of breast cancer in Thiruvananthapuram than in Kollam. However the major sites affected in both places are almost similar.⁷ These observations give opportunities to study the factors that influence such differences.

An important observation from the PBCR data is the high incidence of thyroid cancer among females both in Thiruvananthapuram and in Kollam. Further, thyroid cancer incidence rates in Kerala women are the highest compared to other areas of India. Breast cancer incidence rates are also high in Thiruvananthapuram (35.1/100,000). The high Lung cancer incidence is higher 21.6/100000 in Kollam corresponds to the rates of Aizwal and Mizoram which reported highest incidence of lung cancer in India among males. Such large differences call for in-depth studies in epidemiology and etiology of the disease. Large variations in incidence rates were observed for certain cancers. Breast cancers, thyroid cancer (F), kidney cancer (M), NHL (M&F), corpus uteri, colon (M) are the cancers which have high rates in Thiruvananthapuram compared to other registration areas.⁷ The registry data help to identify cancers and their risk factors. Adequate information on risk factors and their prevalence is needed to control the disease. Epidemiologic studies are essential for this.

Tobacco related cancers

It is important to note that among men cancers of Lung, Mouth, Tongue, Larynx and among females Mouth and Tongue are among the 10 leading cancer sites and all these sites are tobacco related. Among males 43.8% of the cancers are tobacco related and females 13.6% cancers are tobacco related.²¹

When we take a closer look into results of the tobacco habit prevalence studies from Kerala during 1966–1969 in Ernakulam,⁸ 1995–1999 in Thiruvananthapuram,⁹ 1990–1997 in Karunagapally,¹⁰ 2009–2012 in Kollam;¹¹ it is evident that the tobacco habit prevalence is reducing. Smoking Habit is reduced 55.8% to 33.6% and chewing 26% to 5.6% among males. Among females also tobacco-chewing habit decreased to 27% to 3.1%. Smokeless tobacco (pan masala, gutka) use is increasing in School going children. In one survey of students it was reported that 30% students in the High school class used pan masala. The habit of tobacco use is higher in lower income group and among groups with lower level of education and it varied between age groups and religion.

The tobacco habit associated with cancer has been known for more than a century and the studies conducted in Kerala have conclusively proved that tobacco smoking and chewing are strong risk factors in elevating cancer incidence risk of lung, oral cavity, laryngeal and pharyngeal cancers among Men.^{12,13,14} The risk of Gastric cancer and Esophageal cancer is also found significant association with tobacco smoke in men (under publication). The evidence that the effect is directly related to age at start, amount smoked or chewed and the duration of habits. Bidi smoking increased the risk of oral cavity cancer such as cancers of gum, mouth, and tongue. Men who smoked bidi is for 30 years or longer, starting bidi smoking at 18 years or young is strongly related to the risk of laryngeal, pharyngeal, oral cavity cancers.¹⁴

The mainstream smoke of bidi contains higher levels of hazardous chemicals when compared to cigarette. Further to keep the lit, bidi smoker required almost 5 puffs per minute compared to the cigarette smokers who smoked two puffs per minute. The risk of cancer reduced among those who had stopped bidi smoking for 10 years of larger when compared to cigarette smokers.

Tobacco chewing has been very much practiced by both genders in Kerala and also cheek cancer among such chewers. The importance of this problem highlighted in articles published by Niblock in 1902 and Ian Orr in 1933. Cancers of mouth, throat showed strong association of tobacco smoking and chewing in a study conducted in Thiruvananthapuram.¹⁵ Tobacco chewing increases the risk of oral cavity cancer among females in Karunagapally cohort study.¹⁶

Table 4. Trends in breast and cervix cancer incidence - 1991 – 2011

Source	Year of Report	Breast cancer incidence		Cervix cancer incidence	
		TVM	KGP	TVM	KGP
CIN. 7 - 143	1991-1992	18.8	15.1	15.9	15.7
CIN. 8 - 155	1993-1997	19.7	15.0	10.9	15.0
CIN. 9 - 160	1998-2002	24.2	16.0	9.4	10.6
CIN. 10 – 164	2003-2007	35.4	16.6	10.1	8.9
NCRP – 2013	2009-2011	35.1	25.8	8.0	6.8

Source: NCRP report 2013 (2009-2011) refers to Thiruvananthapuram and Kollam District, which includes Karunagappally taluk.⁷ CIN-Cancer Incidence in Five Continents TVM – Thiruvananthapuram district, KGP – Karunagappally sub district of Kollam district

Heavy alcohol intake increases the chances of developing cancers of the mouth, throat, liver and lung. The use of alcohol, together with smoking, increased the incidence of laryngeal and pharyngeal cancer. Thus a tobacco use control strategy is a high priority need in Kerala.

Trends in cancer incidence

In **table 4**, the trends in the incidence of breast cancer and cervix cancer during the period 1991 to 2011^{17,18,19,20} are given. It may be observed that breast cancer incidence has increased over the years where as the cervix cancer incidence has been decreasing. The reasons will be difficult to assess now. So far we do not have any systematized preventive measures implemented in community level for cervix cancer or breast cancer. Hence the changes might have resulted from socio-demographic changes like age at marriage, age at first pregnancy, breast feeding practices apart from improvements in maternity care, family planning etc.

Conclusion

Cancer in Kerala is a serious health hazard. The prevalent cancer pattern indicates that a high percentages of cancer in men and women are either preventable or early detectable. The high prevalence of lung cancer highlights the need for effective intervention for curtailment of tobacco use. The increased trend of breast cancer incidence among females has to be critically evaluated. All efforts are needed for early case finding and treatment which alone will provide better survival rates and good quality of life of cancer victims. All teaching hospitals, medical colleges, major hospitals, radiotherapy treatment centers should have standard hospital based cancer registries. Even though the representative natures of the registry experience to reflect total Kerala experience is debatable. There are few limited resources, which are useful. The death registration system has to take efforts to record cause of death as not only cancer but also the mention of site of cancer. Public and professional education and participation in control efforts are essential. The data and information obtained from registries should serve as teaching materials for graduate and postgraduate teaching. Above all the efforts it is more

desirable that Govt. of Kerala makes cancer a ‘Notifiable Disease’.

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