

RESEARCH COMMUNICATION

Cancer in Women in Kerala - a Transition from a Less-developed State

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Abstract

An epidemiologic assessment of the problem of cancer in women in Kerala based on 3 Population Cancer Registry data and a Hospital Based data is presented. Kerala's Socio-economic and demography presents an intermediate development from a less developed to a better-developed state. As yet, the women follow a tradition-based life style. Cancer incidence rate in Kerala was only 80% of urban rates than seen in Urban Metropolis in India. The pattern of site distribution has shown that GI, Breast & Cervix cancers are the predominant cancers. Oral cavity cancers also show a high frequency. Thyroid cancer has a higher incidence rate in Kerala compared to other areas. Lung cancer among women has higher incidence rate in Karunagappally women. A high prevalence of tobacco use is reported among the men in the above area. Breast cancer incidence rate in the rural areas was only 60% of the rate seen in Urban Trivandrum. Unlike in other rural and urban areas of India Cervix cancer has a low incidence rate in Kerala women. This may be due to better education and also due to the changes in marital and other life style practices. Only 15% of cancer patients attend for medical assistance in localized stage of disease. The need for public education is highlighted and focusing on tobacco use control, self-examination and screening.

Key Words: Cancer in women – Kerala

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Introduction

Health problems in women are of great importance in any society and culture as they form the sheet anchor for the upkeep and integrity of the family and society. Kerala, a highly preferred global tourist destination, is a small coastal state situated along the South West of India with a population of 31,838,619 people (2001 census) with 15,468,664 men and 16,369,955 women. Male to female ratio is 0.94:1. This female preponderance existed for the past several decades. 26% of the population lived in urban areas and 74% in rural areas (2001 Census). In Kerala the socio-economic development has been unique and uniform so much so the areas designated as rural by the Governmental census appear as extension of the nearby urban area.

A major successful family planning program launched in the State in the fifties has resulted in reducing the birth rate. The decadal (1991 – 2001) growth rate was 7.99%. This in turn has generated the small family set up. The female literacy has now reached 88%, which has been the corner stone for progress. Girls looking out for employment and their concern for economic stability have raised the age at first marriage. Social changes along with life style changes are continuously taking place. However, certain traditionally

maintained cultural practices are still upheld. Thus, tobacco smoking by women is considered unsocial and is practiced by less than 5% of the population. In Kerala expectation of life at birth has been increasing and in 1999 – 2000 it was 69.3 for males and 75.8 years for females, equaling some of the European populations. Control of infectious and parasitic

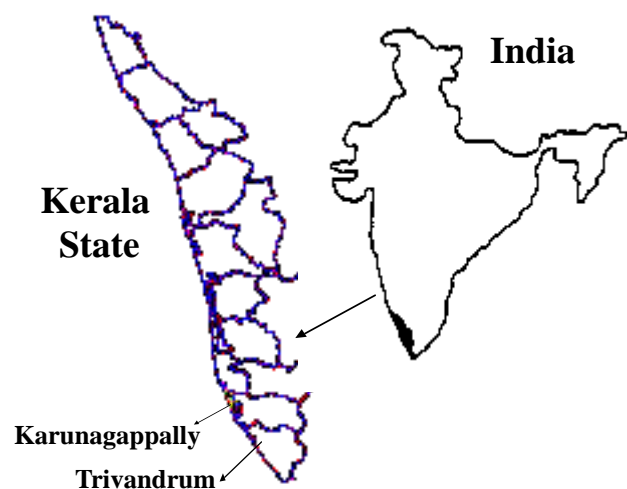


Figure 1. Locations of Cancer Registries in Kerala

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diseases, reductions in maternal mortality, birth rate, infant mortality, improved nutritional status etc., resulted in increased incidence of chronic and degenerative diseases like cancer, diabetes, Heart diseases etc. Cancer is not a notifiable disease in the country and also in Kerala. Death registration though almost complete, cause of death is not available in most of the registered deaths. The death rate in 2001 stood at 6.8 per 1000 whereas it was 8.4 for the country. The birth rate was 17.3 and for all India it was 25.4. Maternity and child health has been a priority in health sector and most of the deliveries take place in nursing homes and infant mortality rate was 11.0 in Kerala but for India it was 66.0.

The objective of assessing the cancer problem in women is to aid control of cancer. The community burden, the site pattern, now prevalent stage distribution of cancer cases while attending for 1st treatment are assessed along with social practices, which are essential for planning cancer control. The trend of the incidence of disease over time is also an essential information required for implementing and evaluating control programmes. Thus this presentation is a descriptive epidemiology of cancer in women in Kerala.

Subjects and Methods

For the present study cancer incidence data from two Population Based Cancer Registries (PBCR); one in Karunagappally and the other in Trivandrum along with the data from the Hospital Cancer Registry (HCR), Trivandrum are used. Locations of the registries are shown in Fig. 1. Data for comparison are obtained from the reports of the National Cancer Registry Programme (NCRP) of Indian Council of Medical Research (ICMR) and from 7 other registries outside the NCRP network, located in Kolkatta, Nagpur, Aurangabad, Pune and Ahmedabad. Registries at Karunagappally and Trivandrum are also outside the ICMR-NCRP network. The population registries cover only 4.6% of the total population of Kerala.

The measures used in this study are incidence rates and relative frequencies. The capital of Kerala is Thiruvananthapuram (Trivandrum) and the Regional Cancer Centre (RCC) in Trivandrum is the comprehensive cancer center of Kerala. Karunagappally taluk lies 100 kms north of Trivandrum. The density of population is more than 2000/Km², 96% of the taluks population is rural and 4% urban. The Karunagappally registry was launched by RCC in 1990 and is the 1st Population registry of Kerala. It covers a population of almost 4,10,514 (2001 Census) and was established as a special purpose cancer registry (NBRR) to investigate the cancer causing potential of chronic exposure to natural radiation, which was present in this taluk. The Trivandrum Registry, established in 1994 has two components, one covering almost 5,00,000 urban population (Trivandrum U) and the other a rural population of 5,00,000 (Trivandrum R) residing in three community development blocks adjoining the Urban Trivandrum area.

All the registries employ an active cancer registration methodology. Social workers visit Hospitals, Pathology

Table 1. Age Adjusted incidence Rates (AAR) Cancer in Women Overall in India

Place	Ref. Source	Year	AAR
Bangalore	NCRP-1	2001-2002	112.4
Barshi (Rural)	NCRP-1	2001-2002	53.5
Bhopal	NCRP-1	2001-2002	94.7
Chennai	NCRP-1	2001-2002	115.4
Delhi	NCRP-1	2001-2002	118.7
Mumbai	NCRP-1	2001-2002	101.9
Ahmedabad	GCR	1998	96.0
Mizoram*	NCRP-2	2003	103.5
Aizawl	NCRP-2	2003	237.3
Dibrugarh	NCRP-2	2003	54.5
Sikkim	NCRP-2	2003	89.6
Kamrup(U)	NCRP-2	2003	150.8
Imphal	NCRP-2	2003	78.7
Silchar	NCRP-2	2003	66.4
Pune	ICS	2001	106.2
Aurangabad	ICS	2001	59.0
Nagpur	ICS	2001	103.0
Trivandrum			
(Urban)	RCC-1	2001-2002	89.9
(Rural)	RCC-1	2001-2002	76.9
Karunagappally			
(Rural)	NBRR	2002-2003	90.1

* excluding Aizawl

Laboratories, Clinics etc. and record information on cancer cases. Further, cases of cancer registered as cause of death by the Vital Statistics Division of Local Administration are collected. Thus mortality and incidence data are obtained from the preserved medical records. In Karunagappally, there is no cancer hospital and there are no laboratories, which undertake pathological diagnosis. Hence special efforts are required to identify and register all cancer cases. More than 60 sources are visited regularly together with regular field visits by the investigators who identify cancer cases through social workers and health workers in the area. Computer does data quality check, duplicate elimination and processing. Both the PBCR's have their data published in Cancer Incidence in 5 Continents Vol. VII & VIII of IARC.

The Hospital Cancer Registry, Trivandrum by the RCC was established in 1982 as part of the NCRP of ICMR. In RCC, trained social investigators collect information directly from patients at the time of registration in the hospital. A high quality of registration is maintained by the registry.

Results

In Table 1, the Age Adjusted Incidence Rates (AAR) of cancer in women seen in 20 registration areas in India are shown. The lowest rates were seen in Barshi, Dibrugarh and Aurangabad and the highest was reported from Aizawl in Mizoram State. The rates in Kerala were around 35% of rates in Aizawl, and almost 60 to 80% of Delhi and Mumbai rates, with only small differences between the Urban and Rural rates in Kerala. In Figure 2, the age specific incidence rates for the three population groups are shown. All the rates are almost similar till age 40 years. There is an increased

Figure 2. Age Specific Incidence Rates in Females for Three Population Groups in Kerala

incidence in the 45-60 age group in Urban Trivandrum. The differences seen in the 60+ age groups may be due to selective reporting in old ages. The crude incidence rates, the microscopic verification percentage, cancer mortality rate and mortality / incidence ratio are shown in Table 2 for the three registration areas.

Discussion

In the absence of complete knowledge of etiology, epidemiology often gives leads for cancer control. Kerala has attained several progressive social indices like low birth

Table 2. Incidence and Mortality from Cancer in Women in Kerala (K, 2002-2003 and T, 2001-2002)

	Karunagappally	Trivandrum	
		Rural	Urban
Crude Incidence Rate*	81.1	79.9	97.4
Age Adjusted Incidence*	90.1	76.9	89.9
Mortality Rate*	32.0	19.9	20.8
Microscopic verification	82.9%	94.3%	94.5%
Mortality / Incidence	39.0%	25.0%	21.4%

Σ per 100,000 population

Table 3. Percentages of Major Cancer Types in Women

ICD	Site	Karunagappally	Trivandrum	
			Rural	Urban
C00-C06	Oral Cavity	10.7	7.0	12.1
C15-C26	Digestive System	13.0	9.3	11.2
C30-C39	Respiratory System	4.1	2.9	3.6
C50	Breast	21.7	34.0	26.2
C53	Cervix	11.3	7.4	8.6
C54	Uterus	1.2	3.2	2.9
C56	Ovary	4.9	6.0	4.5
C73	Thyroid	6.9	7.1	9.4
Total		73.8	76.9	78.5
All Cancer (Nos)		346	564	488

Table 4. Leading Oral Cancer Sites in Women (AAR)

Site	Karunagappally	Trivandrum	
		Rural	Urban
Tongue	3.7	2.3	3.3
Other Mouth	3.6	1.8	3.4
All Oral	9.7	6.1	9.3

and death rates, high literacy rate, wide spread distribution of healthcare facilities etc., which denotes a transition from a less privileged society to a more developed societal setting. As is well known the Urban-Rural differences are minimal in Kerala life pattern. Perhaps all regions in the country will pass through this phase during their developmental process.

Epidemiology of Cancer among women in Kerala is studied using data from established cancer registries. The population-based data presented are from two ‘rural’ areas (Census definition), one Urban area and a hospital based data. All these are located in the southern area of the state. This may be the limitation of the study for generalizing the experience of the state. Overall, in Kerala there was lower cancer incidence in Urban and Rural women compared to rates in other urban areas of the country. But the Kerala rates are higher than in some of the lesser-developed parts of the country. The mortality rate in Karunagappally appears to be higher than in Trivandrum. This needs continued observation. In all the three registration areas the truncated adjusted rates were almost double the age adjusted incidence rate for all cancer, which highlights the incidence in 35 to 64 age group.

The rates in the two rural areas are almost similar, with 70 to 80 percent of all cancers were located in oral cavity, digestive system, respiratory system, brain genital system and thyroid together (see Table 3). Several studies have been conducted on oral cavity cancers (see Table 4) which have uniformly identified tobacco use as the most important high risk factor associated with the development of oral and pharyngeal cancers (Orr,1933; Santha and Krishnamoorthy,1959; Hirayama, 1966; Sankaranarayan et al,1989). In the rural areas chewing tobacco is more common than among urban women (Reddy and Gupta, 2004). Age-specific prevalence of tobacco habits is shown in Figure 3. Perhaps the increased incidence of other mouth cancers in rural areas may be due to this. Tobacco habit curtailment is necessary for preventing oral cancers. Cancers of the oesophagus and stomach, as well as the lower GI tract, are relatively infrequent in Kerala (see Table 5).

Lung cancer rates are low (see Table 6), women do not smoke tobacco, which is a practice to be encouraged and sustained. However the role of environmental tobacco smoke due to husbands smoking practices cannot be ruled out. In

Figure 3. Age Specific Prevalence of All Tobacco Habits (Females) in Karunagappally 1990 –1998

Table 5. Prominent Sites of Cancer in GI Tract in Three Population Groups (AAR)

Cancer Site	Karunagappally	Trivandrum	
		Rural	Urban
Oesophagus	1.6	0.4	1.1
Stomach	2.5	0.6	1.0
Colon-Rectum	5.0	4.2	5.0
Liver	0.8	0.9	0.6
Pancreas	0.3	1.3	0.3
Other GI	1.8	1.0	1.0
All GI	12.0	8.4	9.0

Table 6. Respiratory Cancers in Women (AAR)

Site	Karunagappally	Trivandrum	
		Rural	Urban
Lung	2.7	1.6	1.3
All Resp. System	3.9	2.5	2.9

Karunagappally, almost 60% of males above 15 years indulged in smoking (Jayalakshmi, 2006). The AAR rates for comparable with those for Bangalore 2.4, Chennai 3.1, Delhi 3.0, Mumbai 3.0 and higher than in Barshi 0.5 and Bhopal 1.1 (NCRP Registries – 2001-2002).

In most developed countries, breast cancer incidence is more than cervix cancer incidence. Increase of breast cancer incidence and reduction in cervix cancer incidence are taking place in most population groups even in Indian Registries. The known risk factors of breast cancer viz., late age at marriage and pregnancy, less number of children may be causative to an increase of breast cancer in the community. Like in other parts of the country breast and cervix together formed 45 to 50 percent of all cancer. Breast cancer rate in urban Trivandrum (see Table 7) is close to the urban rates in Mumbai, Delhi and Chennai. Cervix cancer rates in Kerala are lower than in other registries. Socio economic life style factors seem to be the major promoter of such differences.

Table 7. Incidence Rates (AAR) of Breast, Cervix, Ovary and Uterus Cancers

Site	Karunagappally	Trivandrum	
		Rural	Urban
Breast	19.6	30.5	19.8
Cervix	10.8	6.8	6.6
Ovary	4.0	5.3	3.5
Uterus (Body)	1.0	2.9	2.4
Other Genital	0.3	1.7	1.4

Table 8. AAR of Breast and Cervix Cancers (NCRP Registries – 2001-2002)

Place	Breast	Cervix
Bangalore	26.6	17.8
Barshi	10.3	20.7
Bhopal	22.4	19.4
Chennai	28.6	26.6
Delhi	30.3	19.8
Mumbai	27.4	13.6

In all the three areas, breast, cervix, ovary and thyroid cancers are among the five leading cancer types. Most significant variation seen is in the rates of breast cancer in urban Trivandrum compared to both rural areas. The rural rates are only 2/3 rd of urban rates. Along with breast cancer, the increased incidence rate of cancer of ovary in urban Trivandrum women is noteworthy. Among urban Trivandrum women 34% of all cancer is breast cancer compared to 20 to 25% seen in rural Kerala and AAR of breast cancer among Trivandrum urban women was twice the rate seen in rural Kerala. This large difference needs to be evaluated in relation to occupation and life style along with case registering issues especially because of the minimal urban rural life style difference observed. In this context it is worth noting the increasing age at first marriage. This may result in changes in breast cancer incidence. Changes in the age at first childbirth have been correlated with breast cancer incidence in Mumbai (Yeole et al.,1990) and such a phenomenon may be present in Kerala.

A significant feature observed is the low rate of cervix cancer in both urban and rural areas. Life style practices especially related to marital, genital and sexual practices are known to be related to this cancer. The low rates seen in Kerala women might be the resultant of progress in the overall health practices resulting from social and economic transition and increased awareness. Pap smear testing is available in very few centers. Apart from marital and reproductive life style factors, better hygiene, nutritional status, public awareness and early detection are the reasons attributed for changes seen in cervix cancer incidence. A gradual decline of cervix cancer incidence has been noted by other registries (Yeole et al.,1989)

In Kerala, cancer of the thyroid has also a higher incidence rate when compared to data seen in other areas of the country (see Table 9). The increased incidence of thyroid cancer in women in Kerala required more observations and studies. Recent data obtained from the cancer atlas project of NCRP indicated localized increase of thyroid cancer in certain North Eastern areas of the country and along the West cost South of Mumbai. (Nandakumar et al., 2004.)

Studies on trends in relation to educational level have indicated that the prevalence of buccal cavity, pharynx and

Table 9. AARs for Thyroid Cancers in Women in Different Centers in India

Place	Ref. source	Ca Thyroid AAR
Bangalore	NCRP-1	3.0
Barshi	NCRP-1	0.7
Bhopal	NCRP-1	1.2
Chennai	NCRP-1	2.1
Delhi	NCRP-1	2.4
Mumbai	NCRP-1	1.5
Poona	ICS	1.1
Nagpur	ICS	0.4
Aurangabad	ICS	0.6
Trivandrum (Urban)	RCC-1	5.8
Trivandrum (Rural)	RCC-1	6.7
Karunagappally	NBRR	5.2

cervical cancers decrease in relation to educational level whereas breast and ovarian cancers show a reversal pattern. (Yeole, 2002.) Changes in the age at first childbirth have been correlated with breast cancer incidence in Mumbai. (Yeole et al., 1990) and such a phenomenon may be present in Kerala.

A close observation on trends is essential in order to plan and evaluate any cancer control programme. A major proportion of cancers seen in Kerala women are either early detectable or preventable. Because of the high literacy in women a concerted effort to educate the women in early cancer detection, cancer awareness, self-examination methodologies etc., can bring in positive benefits. With minimum available technical skills, these can be undertaken. As a larger proportion of children goes to school in Kerala the anti cancer education could be undertaken with immense advantage right from school years.

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