

Cancer incidence in the Republic of Mauritius- 5 Years Review 1997 to 2001

Dr. SS Manraj, Dr. SB Poorun, Mr. R Eddoo, Dr. N Jeebun, Mrs. L Moussa, Mr. P Burhoo

Victoria Hospital, Mauritius

(Received 24 October 2005 and accepted 15 November 2005)

ABSTRACT: 6484 new cases of cancer have been registered in Mauritius during 1997-2001 corresponding to Age-Standardized Incidence Rates (ASR world) of 99.9 per 100,000 in men and 121.1 per 100,000 in women. The commonest sites of cancer in men were colorectal cancer (9.5%) followed closely by oral cavity & pharynx (9.4%) and prostate (8.8%). In women breast cancer was, by far, the main site (28%, ASR 31.7) ahead of cervical cancer (11.7%) and colorectal (5.7%) and leukaemias (4.7%). Comparisons with figures from neighbouring countries show much lower rates in Mauritius for both sexes.

KEY WORDS: Health, Cancer, Incidence

INTRODUCTION:

Cancer is a public health problem in Mauritius. Mortality statistics show that cancer is the second cause of deaths responsible for some 9-10% of annual deaths. In order to undertake a National Program for Cancer Control, it was necessary to understand the burden of cancer in our country. As a cancer registry provides an accurate picture of cancer in the population, efforts have been made since the beginning of the 1990s to set up and run a registry in Mauritius with the assistance of French Cooperation and subsequently from World Health Organization.

Results for the period 1989-1996 have been published in 1999^{1, 2}. The marked predominance of cancer of the female breast and of the uterine cervix shown in that study had urged the Health authorities to include mammary and cervical screening in the Caravane de Santé project as from 2001.

We present here the results from the National Cancer registry of the Republic of Mauritius for the period 1997 to 2001. A task force at the Mauritius Institute of Health coordinated this registry work. It is based on a retrospective semi-

active institution-based registration of cancer cases seen at various public and private health institutions of the country.

MATERIAL AND METHODS:

During this second phase, the National Cancer Registry of Mauritius has strived to reach "population-based level" in the registration process. All newly diagnosed and/or treated cases of cancer in public laboratories and hospitals and in the unique Cancer Centre of the island have been registered retrospectively malignant neoplasm whether in-situ or invasive as well as basal cell carcinomas have been included in the incidence study.

Since 1997, at the end of every year, the archives of the public pathology (at Central Laboratory, Victoria Hospital) and all regional hematology laboratories have been accessed and data regarding malignant cases were retrieved. The Radiotherapy Centre Patient Register and that of the Overseas Treatment Unit (for patients seeking financial assistance to proceed abroad for specialized medical care e.g. surgery for brain tumors) were also used.

Corresponding Author: Dr S S Manraj, Consultant Pathologist, Central Health Laboratory, Victoria Hospital, Quatre Bornes, Mauritius, E-Mail: ssmanraj@intnet.mu

The innovation during this second phase has been to convince all private pathologists in Mauritius to supply data on cases of cancer they diagnose, according to a simplified standard format. Data has been obtained from that particular source as from 2000.

All information collected was utilized to fill in the basic registration forms. For each cancer patient the following information were recorded: surname, names, registration number, hospital, town/district of residence, age, sex, ethnic group, primary site of cancer, morphology, histological grading and source of information. These data were then coded and entered into a computer (Epi Info 6 software). ICD-0 (3e edition) was used for coding topography. A simplified coding system (\square 80 types) was used to code histological types. The details of each patient were crosschecked with the information collected from other sources to ensure completeness of records. By comparing characteristics of each case with the master index, great care was taken to remove cases diagnosed in previous years, recurrences or metastases from a cancer already registered (that is to avoid duplication).

Finally the annual listings of summary discharge sheets from all regional hospitals with cancer mentioned as diagnosis have been obtained from the statistical department of the Ministry of Health. Though the surnames and names do not appear on these listings, other criteria have been used to identify some additional cases every year corresponding to those patients diagnosed of cancer at hospital settings without however any laboratory confirmation and who were not referred to Radiotherapy Centre probably corresponding to terminally ill elderly patients.

Basal-cell carcinomas of the skin, In-situ carcinomas from all sites as well as all Glial tumours of the brain, whatever be their histological grade, have been registered and included in analysis. Urothelial papillomas and Meningiomas have not been registered. Annual global cancer mortality information has been collected also from the statistical department of the Ministry of Health. Autopsy is not regularly practiced in Mauritius except for medico-legal purposes and also cancer is not a notifiable disease in this country. Population Census data available by sex and 5 year age groups have been utilized as denominators to calculate incidence and mortality rates.

Results:

During the period 1997-2001, 6484 new cases of cancer have been diagnosed in Mauritius (including Rodrigues) out of which 55% occurred in females. This gives a crude incidence rate of 99.9 per 100,000 among males and 121.1 per 100,000 for females (**Table 1**). The Age-Standardised Incidence Rate (A.S.R.) compared to the world population is 118.7 per 100,000 among males and 117.1 per 100,000 among females (**Table 1**). Colorectal (9.5%), Mouth/Pharynx (9.4%), and prostate (8.8 %) are the leading cancers in males whereas in females breast cancer (28%) rank top, far ahead of cervical cancer (11.7%) and colorectal and ovarian cancer (both responsible for some 10.6% of the total) (**Table 2**). As regards the age and sex wise distribution of cancer incidence, only 3.0% of all cancers are registered in the children (N=194) with a male predominance (M/F ratio=1.3) contrary to what has been reported in the adults (M/F ratio=0.82) with female predominance. The maximum incidence of cancer was reported at the age above 65 years of age in both males and females (**Table 3**). Distribution according to year of diagnosis shows a marked increase of the cases of cancer in both males and females in the year 2000, due to inclusion of additional list of new cases reported by the private pathologists (**Table 4**). Mortality rates due to cancer for the same period are 67.9 per 100,000 in males and 60.9 per 100,000 in females. The most prevalent sites are reported as lungs (18.2 %), stomach (12.5 %) and prostate (8.4 %) in males; and breast (17.2 %), uterine cervix (13.3%) and stomach (8.6 %) in females. The Mortality/Incidence ratio is 0.68 in males and 0.5 in females (**Table 5**). For certain sites like the pancreas, liver, lungs and stomach the mortality/incidence ratio is much greater than one (**Table 6**). This could be explained by some degree of under-notification of incident cases (like pancreas) or on the contrary by an exaggeration of the numerator i.e. over-reporting due to the common sites of metastasis. Overall and site-specific incidence rates are in general much lower in Mauritius than corresponding figures for Reunion Island and Singapore³ (**Table 7**). Year wise comparison of cancer incidence shows overall increase in trends in both male and female. In males, this increase is mainly due to significant increase in the cancers of prostate and in females, it is mainly due increase in the incidence of breast cancers (**Table 8**).

Table 1: Cancer Incidence figures in males and females

	<i>Male</i>	<i>Female</i>	<i>Total</i>
<i>New cases</i>	2 922	3 562	6 484
<i>%</i>	%	%	100 %
<i>Inc. Rate</i>	99.9	121.1	
<i>ASR (world)</i>	118.7	117.1	
<i>Mean age</i>	56 yrs	54 yrs	
<i>Median age</i>	58 yrs	55 yrs	

Table 4: Year wise distribution of cancer cases in both males and females

	<i>Male</i>	<i>Female</i>	<i>Total</i>
1997	612	624	1236
1998	536	712	1248
1999	516	624	1140
2000	662	824	1486
2001	596	778	1374

Table 2: Incidence of cancer according to sites in both males and females

Site	No.	%	<i>Male</i>		Site	No.	%	<i>Female</i>	
			Incidence Rate /100,000	ASRworld				Incidence rate /100,000	ASR world
Mouth & Pharynx	275	9.4	9.1	11.3	Breast	998	28	33.9	31.7
Prostate	258	8.8	8.8	11.6	Ut. cervix	415	11.7	14.1	13.7
Colorectal	277	9.5	9.5	11.8	Colorectal	210	5.9	7.1	7.2
Lungs	250	8.6	8.6	11.2	Ovary	145	4.1	4.9	4.9
Stomach	207	7.1	7.0	9.0	Leukaemias	166	4.7	5.6	5.6
Leukaemias & Myelomas	213	7.3	7.3	7.9	Mouth & Pharynx	110	3.1	3.7	3.6
Bladder	164	5.6	5.8	6.8	Stomach	98	2.8	3.3	3.4
Lymphomas	155	5.3	5.3	5.7	Lymphomas	94	2.6	3.2	3.2
Larynx	102	3.5	4.4	3.4	Lungs	72	2.0	2.5	2.6
Brain & Nervous system	90	3.0	3.3	3.3	Bladder	42	1.2	1.4	1.3
Other sites	931	31.9	-	-	Other sites	1212	34	-	-
ALL SITES	2922	100%	99.9	118.7	ALL SITES	3 562	100	121.1	117.1

Table 3: Age and sex wise distribution of incidence of cancer

Age	No.	Male		No.	Females	
		%	Incidence Rate		%	Incidence Rate
			/100,000			/100,000
0 -14 yrs	88	3.7	14.3	68	2.4	11.3
15 - 44yrs	314	13.5	28.2	645	23.2	55.1
45 - 54 yrs	348	15.0	140	567	20.4	223
55 – 64 yrs	535	23.0	411	573	20.6	389
> 65 yrs	905	38.9	772	810	29.1	495
Unknown	106	4.6	-	121	4.3	-
All Sites	2326	100%	99.8	2784	100%	119.2

Table 5: Mortality figures due to cancers in males and females

	Male	Female
Deaths	1 986	1 792
Mortality Rate (/ 10 ⁵)	67.9	60.9
Mortality rate ASR (world)	87.9	60.9
Sex-ratio (M/F)	1.1	1.1
Mort/Inc. (M/I)	0.68	0.5

Table 6: Mortality Incidence ratios (M/I) for selected cancer sites

	Male	Female
Pancreas	1.9	2.2
Liver	1.4	1.4
Lungs	1.4	1.7
Stomach	0.83	1.6
Brain & nervous system	0.70	0.57
Lip, oral cavity & pharynx	0.45	0.3
Colorectum	0.48	0.5
Leukaemias & Myeloma	0.37	0.6
Lymphomas	0.26	0.2
Breast	0.13	0.3
Uterine cervix	-	0.45
Ovary	-	0.5
Prostate	0.65	-
All sites	0.68	0.5

Table 7: Comparison with selected cancer registries (ASR world)

	Mau	Reu	India (Bom)	Sing
Female breast	32	83	19	47
Uterine cervix	14	10	31	15
Lungs	11	30	5.4	33
Prostate	12	56	7.6	14
Stomach	9	7.8	4.3	17
ALL SITES	117	281	102	210

Mau (Mauritius), Reu (Reunion), Bom (Bombey), Sing (Singapore)

Table 8: Comparison of incidence rates for selected cancer sites from 1989 to 2000

	<i>Male</i>			<i>Female</i>		
	89-92	93 – 96	97-2000	89 – 92	93 – 96	97 - 2000
<i>Breast</i>	0.3	0.4	0.6	21.6	29.2	31.5
<i>Uterine cervix</i>	-	-	-	18.8	21.3	13.9
<i>Ovary</i>	-	-	-	6.4	5.1	5.0
<i>Lungs</i>	8.6	8.9	8.1	1.9	1.2	2.2
<i>Prostate</i>	4.0	5.4	8.9	-	-	-
<i>Colorectum</i>	9.0	11.5	8.7	5.4	6.8	6.1
<i>Stomach</i>	6.1	6.4	7.3	3.2	3.9	3.3
<i>Lip & Phar.</i>	7.0	7.1	9.3	3.0	3.0	3.6
<i>Bladder</i>	4.4	4.3	5.3	1.7	1.5	1.6
ALL SITES	65.6	79.5	99.8	92.5	111.1	119.2

DISCUSSION:

The Republic of Mauritius consists of the main Island of Mauritius and the Island of Rodrigues. The Island of Mauritius is situated in the South East Indian Ocean, 800 km off the east coast of Madagascar. It covers an area of 1865 square kilometres. As at 31 December 2001, the estimated resident population of the Island of Mauritius was 1,163,875 and for the Island of Rodrigues, it was 36,006. The Mauritian population comprises various ethnic groups - 51% are Hindus, 17% Muslims (both groups are people of Indian origin), 29% General Population (people of African and of French origin) and 3% Chinese.

Over the last twenty-five years, the health status of the Mauritian population has undergone sustained and significant improvements. Life expectancy at birth has improved; in 2001 it was 68.1 years for males and 75.3 years for females. During the same year, the total fertility rate declined to 1.91 and the Infant Mortality Rate was 13.9 per 1000 live births. The main causes of morbidity and mortality have shifted from infections to chronic and degenerative diseases. The distribution of deaths by chapter of the ICD showed that diseases of the circulatory system were responsible for 49.1% of the deaths in 2001. Neoplasm with 11.4 % of the deaths in 2001 and a specific death rate of 7.6 per 1000 were at second place.

Public health care services are provided free of charge to the population. The Island of Mauritius is divided into 5 health regions, each with a catchments population of about 200,000 inhabitants. Rodrigues Island is considered as the sixth health region. Each health region has its regional referral hospital with a network of health centres, which provides primary health care services. The public health system in Mauritius, in addition to the 5 Regional

Hospitals, comprises 3 districts, 1 psychiatric and 4 specialised hospital; there are 26 Area Health Centres and 106 Community Health Centres. In the private sector, at the end of 2000, there were 14 nursing homes (private clinics) with a total of 588 beds. The latter report some 300-400 admissions due to neoplasm annually. At the end of 2001, there were 1107 doctors in the Republic of Mauritius, which is one doctor for every 1089 inhabitants. More than half (62.7%) of these doctors were employed in the public sector, among whom 245 were specialists⁴.

In terms of cancer diagnosis and treatment, all histopathology and cytology investigations for hospital patients are carried out at the Central laboratory, Victoria Hospital. Similarly, there is a unique Radiotherapy Unit (45 beds) situated in Victoria Hospital that caters for Radiotherapy and chemotherapy needs of cancer patients. In the private sector, four pathology laboratories and two CT scans were in operation at the time of the study.

CONCLUSION:

This present cancer incidence study has confirmed the findings of the 1989-1996 periods and has also shown an increase in incidence more significant in the male population. It is now our aim to embark as from 2005 on the third phase of the project whereby we intend to:

1. Collect more data for each cancer case e.g. profession, address, personal history (menstruation, contraception, parity etc.) for gynaecological malignancies, most valid basis of diagnosis, TNM coding etc.
2. Obtain death records from Civil status Office particularly those cases where cancer is included as cause of death in the death certificates (all of which are filled in by qualified medical practitioners in Mauritius).

In this way, Mortality/incidence Ratios would be better assessed and survival figures would become available for each cancer site.

3. Continue to use the customized version of the software package for cancer registries (CANREG 4) prepared by I.A.R.C. (Lyon, France) for data entry and analysis.

ACKNOWLEDGEMENT:

We are thankful to *Permanent Secretary (Ministry of health & quality of life), Chief Medical Officer (Ministry of health & quality of life), WHO office (Port-Louis & Brazzaville), Director & staff (MIH, Pamplémousses), Pathologists (Public & Private), Doctors having*

participated in the study, Staff (Medical records office & statistical department) and IARC (Lyon, France) who helped in conduction of this study.

REFERENCES:

1. Manraj SS et all. Bilan du Cancer à Maurice pour la période allant de 1989 à 1993. *Revue de Pathologie Exotique* Jan 1998;3-7.
2. Manraj SS, Poorun SB, Burhoo F. *Cancer study in Mauritius* 1989-1996.
3. *Cancer Incidence in five continents*. Volume VII.
4. Roussety F. *Health Statistics Annual*. Ministry of Health & Quality of life, Mauritius 1997 through 2000.