

RESEARCH COMMUNICATION

Cancer Incidences in Rural Delhi - 2004-05**N Manoharan*, B B Tyagi, Vinod Raina****Abstract**

There are no data available on cancer incidence pattern in rural Delhi. This is the first report on cancer incidence among Delhi Rural population during 2004-05 which gives the first hand information on cancer incidence. The data for this report has been collected by Delhi Population based cancer registry. The sources for cancer registration are more than 162 Government Hospitals/centers and 250 private hospitals and nursing homes. A total of 594 cancer cases with 317 males and 277 females were registered during the period 1st January 2004 to 31st December 2005. The age adjusted (world population) incidence rates for all sites were 55.2 per 100,000 for males and 47.7 per 100,000 for females. The leading sites of cancer among Delhi Rural males was oral cavity (ASR: 8.0 per 100000) followed by lung (ASR: 6.5), larynx (ASR: 4.0) and bladder (ASR: 4.1). In females cervix uteri (ASR: 10.3 per 100,000) was the most common site of cancer followed by breast (ASR: 7.8), gallbladder (ASR: 3.5) and ovary (ASR: 3.3). The overall incidence rates of cancer in Delhi Rural were comparatively very less than Delhi Urban. A statistically significant difference was also found between Delhi Rural and Delhi Urban in incidence rates (ASR) for first four common sites. The rates in Delhi Rural are also comparatively lower than other rural registries situated in India.

Key Words: Cancer registration - incidence pattern - India - New Dehi

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Introduction

The population based Cancer Registry at Delhi was established in Dr BR Ambedkar Institute Rotary Cancer Hospital, All India Institute of Medical Sciences, New Delhi in January 1986 with a mandate to collect cancer incidence, treatment and survival data which can be used to monitor the impact of cancer among the Delhi urban population (Manoharan et al., 2009). However, hitherto no data have been available for the Delhi rural population. In this paper an attempt has been made to describe about the cancer incidence pattern among the Delhi rural population during 2004-05.

Materials and Methods

Delhi, the capital of India covers an area of 1483 sq.kms. The population of Delhi includes Hindu, Urdu, English and Punjabi speaking masses. The literacy rate of Delhi is approximately 81.8%. The rural and urban compositions of Delhi are 591.9 and 891.1 sq.kms respectively. According to 2001 census, the total population of Delhi was 13850507 (Urban: 12905780; Rural: 944727) with 93.01% of people living in urban areas. The rural Delhi consists of 165 villages. The sex ratio in Delhi Rural is 806 females per 1,000 males. The literacy rate in Rural Delhi is 78.75%. The population density of Delhi Rural is 1692 persons/sq.km.

The Medical Social Workers of Delhi Population Based Cancer Registry who were well trained in cancer

registration technique viz, interviewing methods, data abstraction from case records, coding etc. and who are assigned to collect the cancer data on urban population were utilized to collect the cancer data on rural population. They visit various hospitals and nursing homes and interviewed the patients who are either undergoing cancer treatment or being investigated for cancer at radiotherapy department. They also examined the case records maintained by various departments of the hospitals viz, pathology, hematology and radiology etc. They record details of all patients with malignant tumors into a special form. Date of incidence of a case is defined as date of hospital admission or date of first diagnosis (for outpatient) whichever is earlier. All the information collected is crosschecked for completeness of the data. Sometimes a patient may register his/her name in more than one hospital for treatment. So care has been taken to exclude duplicates and ensure that each patient is included only once in the records. They also personally visit the vital statistics departments and collected information about deaths where the death certificate states the cause of death as cancer or tumor. These death records are then matched with morbidity records. Cases not matching with the records are registered as Death Certificates Only cases (DCO'S) in that corresponding year.

The main criterion for registration is that the case should have been residing in Delhi Rural area for at least one year at the time of first diagnosis of cancer. This also includes clinically diagnosed cases. The sources of registration data are 162 major Govt. Hospital /Centers/

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Table 1. Population at Risk by Five Year Age Group and Sex, Delhi Rural, 2004-05

Age group (in years)	Males	Females
00-09	231,569	194,480
10-14	126,914	108,812
15-19	115,304	81,802
20-24	109,125	77,693
25-29	97,361	84,054
30-34	86,984	74,271
35-39	79,820	62,982
40-44	58,719	43,735
45-49	42,350	32,152
50-54	29,439	21,873
55-59	18,977	17,478
60-64	15,331	16,411
65-69	11,518	11,326
70-74	8,650	7,851
75+	9,832	9,355
Total	1,041,893	844,275

Institution and more than 250 private hospitals and nursing homes and from the vital statistics departments of the municipal corporations. The primary site and morphology data were coded using the International Classification of Disease for Oncology (ICD–O, 3rd edition) (Fritz and Percy, 2000). Information on other variables was coded according to the international guidance (Jensen et al., 2003). These codes were converted to ICD.10 (1994) for tabulation.

After entering the data into the computer quality

control checks for completeness and validity of the data were carried out using the methods proposed by Parkin et al. (1994).

The population at risk during the 2 year period was estimated using Difference Distribution Method (Takiar and Shobana, 2009) based on the Census figures of 1991 and 2001(Census of India, 1991; 2001). The total population in Delhi rural during 2004-05 was 1886168 comprising 1041893 (55.2%) males and 844275 (44.8%) females with a sex ratio of 806 females per 1000 males. Table 1 gives the population at risk by sex and 5 years age groups.

The results are presented as number of cases by site, sex and age along with annual average crude (CR) and age-standardized incidence rates (ASR) per 100,000 population by direct method using the world standard population (Jensen et al., 2003). The incidence rates for common cancer between Rural and Urban Delhi populations during 2004-05 were also compared and presented.

Results

A total of 594 new cancer cases were diagnosed among Delhi rural population during 2004-05 and were registered by Delhi Population based cancer registry. Among them 317 (53.4%) were males and 277 (46.6) were females. The number of cases by site (ICD.10) age group, percentage, crude rates and ASR's for males and females were given in Tables 2 and 3, respectively. The rates for all sites

Table 2. Incidence Cases, Rates by Site and Age Group, Delhi Urban, 2004-05, Males

ICD.10	Site	Number of cases by age group (in years)							Total	Crude Rate*	ASR	
		0-14	15-24	25-34	35-44	45-54	55-64	65+				
C00-06	Oral cavity	0	2	1	8	10	17	6	44	13.9	4.2	8.0
C09-10,12-14	Pharynx	0	0	0	1	7	5	6	19	6.0	1.8	4.0
C15	Oesophagus	0	0	1	4	4	4	3	16	5.0	1.5	2.7
C16	Stomach	0	0	0	1	1	2	1	5	1.6	0.5	1.0
C18	Colon	0	1	0	0	2	2	0	5	1.6	0.5	0.8
C19-21	Rectum	0	0	0	0	0	0	3	3	0.9	0.3	0.6
C22	Liver	0	0	0	1	0	1	1	3	0.9	0.3	0.5
C23-24	Gallbladder	0	0	1	0	2	1	9	13	4.1	1.2	2.8
C25	Pancreas	0	0	0	0	1	0	1	2	0.6	0.2	0.4
C32	Larynx	0	1	0	2	6	4	8	21	6.6	2.0	4.0
C33-34	Lung etc.	0	0	0	6	12	6	11	35	11.0	3.4	6.5
C40-41	Bone	3	5	3	0	2	0	1	14	4.4	1.3	1.4
C43-44	Skin	0	0	0	0	1	2	2	5	1.6	0.5	1.1
C47+C49	Conn. & Soft tissue	2	0	0	0	3	0	0	5	1.6	0.5	0.6
C61	Prostate	0	1	0	0	0	4	3	8	2.5	0.8	1.8
C62,60,63	Other Male Genital organs	0	2	2	3	2	0	4	13	4.1	1.2	1.9
C67	Bladder	0	0	0	2	2	6	9	19	6.0	1.8	4.1
C64-66,68	Kidney	1	0	1	0	0	1	0	3	0.9	0.3	0.4
C70-72	Brain, Nervous System	1	3	2	3	2	2	1	14	4.4	1.3	1.7
C73	Thyroid	0	0	0	0	1	0	0	1	0.3	0.1	0.1
C81	Hodgkins Disease	1	1	0	1	0	0	0	3	0.9	0.3	0.2
C82-85, C96	NHL	2	3	1	2	7	1	4	20	6.3	1.9	2.9
C90	Multiple Myeloma	0	0	0	0	1	3	0	4	1.3	0.4	0.9
C91	Lymphoid leukemia	4	0	0	0	0	0	0	4	1.3	0.4	0.4
C92-94	Myeloid leukemia	0	1	0	2	1	0	0	4	1.3	0.4	0.4
C95	Leukaemia Unspecified	1	0	1	0	0	0	0	2	0.6	0.2	0.2
	Other and Unspecified	2	0	2	5	7	9	7	32	10.1	3.1	5.7
All Sites		17	20	15	41	74	70	80	317	100.0	30.4	55.2

* Incidence rate per 100,000

Table 3. Incidence Cases, Rates by Site and Age Group, Delhi Urban, 2004-05, Females

ICD.10	Site	Number of cases by age group (in years)							Total	Crude %	ASR Rate*	
		0-14	15-24	25-34	35-44	45-54	55-64	65+				
C00-C06	Oral Cavity	0	1	0	1	1	4	0	7	2.5	0.8	1.4
C09-10,12-14	Pharynx	0	0	0	0	0	1	1	2	0.7	0.2	0.5
C15	Oesophagus	0	0	0	2	4	5	1	12	4.3	1.4	2.6
C16	Stomach	0	0	0	1	0	1	1	3	1.1	0.4	0.6
C18	Colon	0	0	2	0	0	1	0	3	1.1	0.4	0.4
C19-21	Rectum	0	0	0	1	2	0	0	3	1.1	0.4	0.6
C22	Liver	0	1	0	0	1	0	0	2	0.7	0.2	0.3
C23-24	Gallbladder	0	0	0	6	3	8	1	18	6.5	2.1	3.5
C25	Pancreas	0	0	0	0	1	2	1	4	1.4	0.5	0.9
C32	Larynx	0	0	0	0	1	1	0	2	0.7	0.2	0.5
C33-34	Lung etc.	0	0	1	0	0	1	3	5	1.8	0.6	1.0
C40-41	Bone	0	2	0	0	0	0	1	3	1.1	0.4	0.4
C43-44	Skin	0	1	0	0	0	0	2	3	1.1	0.4	0.6
C47+C49	Conn. & Soft Tissue	1	1	1	0	0	0	0	3	1.1	0.4	0.3
C50	Breast	0	2	7	17	8	10	4	48	17.3	5.7	7.8
C53	Cervix Ulteri	0	2	4	17	19	6	10	58	20.9	6.9	10.3
C56	Ovary	0	0	3	6	4	3	3	19	6.9	2.3	3.3
C51-52,54-55,57-58	Other Fem.Genit. Organs	0	0	0	1	5	1	0	7	2.5	0.8	1.4
C67	Bladder	0	1	0	1	0	1	0	3	1.1	0.4	0.4
C64-66,68	Kidney	5	0	1	1	1	0	0	8	2.9	0.9	1.0
C70-72	Brain, Nervous System	0	0	1	2	1	2	2	8	2.9	0.9	1.5
C73	Thyroid	0	2	4	3	0	1	0	10	3.6	1.2	1.1
C81	Hodgkins Disease	2	0	0	0	1	0	0	3	1.1	0.4	0.4
C82-85 C96	NHL	2	0	2	0	1	1	0	6	2.2	0.7	0.8
C90	Multiple Myeloma	0	0	0	1	1	1	0	3	1.1	0.4	0.6
C91	Lymphoid leukemia	2	0	2	0	0	1	2	7	2.5	0.8	1.1
C92-94	Myeloid leukemia	1	2	2	2	0	1	1	9	3.2	1.1	1.2
C95	Leukemia Unspecified	0	0	1	0	0	0	0	1	0.4	0.1	0.1
	Other and Unspecified	1	2	2	3	3	1	5	17	6.1	2.0	3.0
All Sites		14	17	33	65	57	53	38	277	100.0	32.8	47.7

* Incidence rate per 100,000

combined were 30.4 per 100,000 (crude) and 55.2 per 100000(ASR) for males. In males, oral cavity was the most commonly reported malignancy (13.9% of all cases, ASR 8.0) followed by lung (11.0% of all cases, ASR 6.5), larynx (6.6% of all cases, ASR 4.0), bladder (6.0% of all cases, ASR 4.1).

The crude and age adjusted (world population)

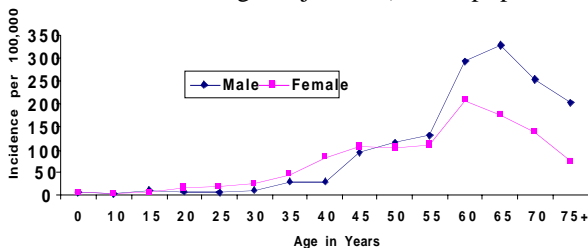


Figure 1. Age-specific Incidence Rate Curves

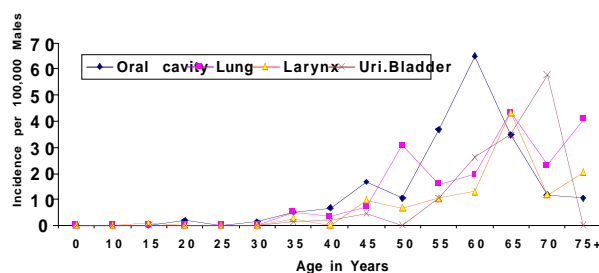


Figure 2. Age-specific Curves for Oral Cavity, Lung, Larynx and Urinary Bladder Cancers in Males

incidence rates for females were 32.8 per 100,000 and 47.7 per 100,000 respectively. Cervix cancer (20.9%, ASR 10.3) was the most frequently reported malignancy among females followed by breast (17.3%, ASR 7.8), ovary (6.9%, ASR 3.3), and gall bladder (6.5% ASR 3.5).

Figure 1 shows the age specific incidence rate curves for all sites for males and females. In males there is a progressive increase up to the age of 65 start decline in the oldest age groups. In females the rates increases steadily up to the age of 60 years and fall only in the ages 65 years and above. The female incidence rates are more compared to males up to the age of 45 years and less than males from 50 years onwards..

Figure 2 shows the age-specific curves for first four leading sites viz., oral cavity, lung, larynx and urinary bladder in males and Figure 3 the equivalent curves for

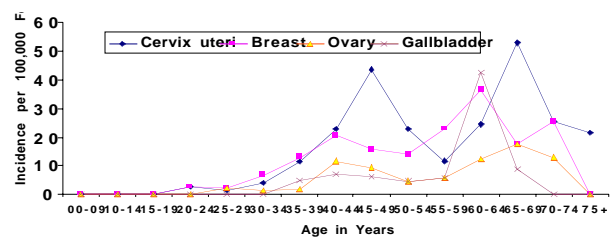


Figure 3. Age-specific Curves for Breast, Cervix Uteri, Ovary and Gallbladder Cancers in Females

Table 4. Age Standardized Incidence Rates (per 100,000) for Common Sites in Delhi and other Indian Registries - Males

Site	Delhi (04-05)	Karunagapalli Barshi (04-05)	Ahmadabad* (98-02)	Dindigul District (04-05)	(2003)
Oral cavity	8.0	5.5	13.8	14.1	8.2
Lung	6.5	1.4	21.3	6.6	3.6
Larynx	4.0	2.8	5.3	2.7	3.0
Urinary Bladder	4.1	1.5	4.2	1.7	0.5
All sites	55.2	49.2	116.9	67.5	57.1

*Other than Urban

Table 5. Age Standardized Incidence Rates (per 100,000) for Common Sites in Delhi and other Indian Registries - Females

Site	Delhi (04-05)	Karunagapalli Barshi (04-05)	Ahmadabad* (98-02)	Dindigul District (04-05)	(2003)
Cervix	10.3	22.8	10.6	7.9	26.6
Breast	7.8	9.4	16.0	9.2	12.0
Ovary	3.3	3.8	4.8	3.4	2.3
Gallbladder	3.5	0.4	0.3	0.5	0.4
All sites	47.7	59.9	80.0	43.1	69.4

*Other than Urban

cervix uteri, breast, ovary and gallbladder in females.

Tables 4 and 5 compare the age-standardized incidence rates for common sites in Delhi with the rural registries reported from India among males and females respectively (Curado et al., 2007; National Cancer Registry Programme, 2008a; Swaminathan et al., 2005). Tables 6 and 7 compare the age-standardized incidence rates for common sites in Delhi Rural with Delhi Urban for males and females respectively. The rates in Delhi rural are comparatively lower than Delhi Urban rates for all common sites and the difference is found statistically significant (P<0.05).

Of the total cases of 594, 75.4% were diagnosed on the basis of microscopic verification-either by histology or cytology; 24.6% were diagnosed on the basis of non microscopic (clinical, biochemical, endoscopy or radiological examination) findings. The percentage of

Table 6. Comparison of Age-standardised Incidence Rates (ASR) for Common Sites, Males, 2004-05

Site	Delhi Rural ASR	S.E.	Delhi Urban ASR	S.E.	Significance
Oral Cavity	8.0	1.15	12.5	1.42	P<0.05
Lung	6.5	1.03	13.5	0.40	P<0.05
Larynx	4.0	0.84	8.5	0.31	P<0.05
Bladder	4.1	0.90	6.5	0.28	P<0.05

Table 7. Comparison of Age-standardised Incidence Rates (ASR) for Common Sites, Females, 2004-05

Site	Delhi Rural ASR	S.E.	Delhi Urban ASR	S.E.	Significance
Cervix Uteri	10.3	1.24	17.4	0.44	P<0.05
Breast	7.8	1.05	31.4	0.60	P<0.05
Gallbladder	3.5	0.76	7.4	0.29	P<0.05
Ovary	3.3	0.68	8.3	0.31	P<0.05

cases identified through DCO'S was nil.

Discussion

This is the first report on cancer incidence in rural Delhi. As expected the overall cancer incidence rate in Delhi rural is lower than that of Delhi urban. The first five common sites in Delhi rural are almost similar to Delhi urban. The overall incidence rates for males in Delhi Rural are higher than Barshi, the first rural cancer registry established in India. But the rates among Delhi rural females are less than Barshi females.

Among Delhi Rural males, oral cavity was the leading site. The rates are comparable with Dindigul, a District in Tamil Nadu, South India with a predominant rural population. The rates are lesser than Karunagapalli, a rural registry situated in Kerala (Curado et al., 2007) and Ahmadabad (other than Ahmadabad urban) but more than Barshi rural registry which also reported oral cavity as the leading site. This may be due to high prevalence of tobacco chewing and bidi smoking in rural population in India.

Lung was the second leading site among Delhi Rural males whereas in Delhi Urban it was first common site. The rate are comparable with Ahmadabad (other than Ahmadabad urban) where lung also the second leading site. The rates in Delhi rural are higher than Barshi but less than Karunagapalli and many other regions (both rural and urban) reported from India.

Larynx is the third leading site of cancer in Delhi rural males. Except Karunagapalli, all other rural registries have less incidence rates compared to Delhi Rural. But several urban registries have reported a higher incidence of larynx cancer compared to Delhi rural.

The fourth common site of cancer among Delhi Rural males was Urinary bladder. The rates are comparable with Karunagapalli. The rates are higher than Barshi and many other parts of India (National Cancer Registry Program, 2008b) but less than Delhi Urban and Chennai. Studies conducted in Mumbai (Notani et.al., 1993) and Western countries have identified smoking as one of the major risk factor for bladder cancer.

The most striking observation is that in Delhi Rural cervix cancer which account for 20.9% of cancers in females was the first leading site, whereas in Delhi urban it accounts only 14.9% of cases with breast as the first common site (National Cancer Registry Programme, 2008a). It is consistent with the fact that the cancer of cervix is the predominant cancer of rural population as many Indian rural areas reported cervix cancer as the leading site among women. The north eastern districts of Tamil Nadu and Pondicherry which have a high proportion of rural population has reported a very high incidence of cervix cancer compared to Barshi and Delhi Rural (National Cancer Registry Programme, 2004). Ambillikai Caner Registry has reported the highest incidence of the cervical cancer in the world (Rajkumar et.al, 2000).

Breast was the second leading site of cancer among Delhi rural women accounting for 17.3% of all cancer in females whereas in Delhi Urban it was 26.8%. Barshi also reported breast as the second leading site, but the

rates are higher than Delhi rural. The Delhi rural rates are low compared to other registries reported from India. The vast difference between the urban and rural incidence rates may be due to the difference in life style factors exist among urban and rural women. Like Delhi urban, ovary is the third leading site of cancer among Delhi rural females. The rates are lower than Barshi but comparable with Ahmadabad (other than Ahmadabad urban). In general, the rates are lower than other parts of India.

Gallbladder ranked as the fourth common site of cancer among Delhi rural women. In Delhi Urban also it is the fourth leading site of cancer in females. The Delhi Rural rates are more than Barshi, Karunagapalli, Dindigul district and Ahmadabad (other than Ahmadabad urban) but less than Delhi Urban and Bhopal. The gallbladder cancer incidence is generally high in Northern India and some part of North Eastern India (National Cancer Registry Programme, 2008b) in comparison to other parts of India.

In general the overall incidence rates for all sites in Delhi Rural are lesser than many other rural registries reported from India. This may be due to high economic status and availability of good health care facilities in Delhi for Rural population compared to other rural registries areas in India.

In conclusion, these first data on cancer incidence in Delhi Rural despite some limitations provide a comprehensive picture on cancer occurrence among Delhi Rural population, which in turn can be utilized for further etiological studies as well as cancer control program. Also it is suggested that tobacco control measures are urgently needed to control oral cavity and lung cancer among rural males as National Family Health Survey (International Institute of Population Sciences, 2009) has reported that the prevalence of tobacco use among Delhi Rural was 44.6%. Early detection and treatment of cervical and breast cancer should also be given top priority.

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