

RESEARCH ARTICLE

Epidemiological Trends of Cancer Morbidity at a Government Medical College Hospital, Chandigarh, India

Munesh Kumar Sharma¹, Neeraj Gour^{1,2*}, Avadesh Pandey³, Dinesh Wallia⁴, Dimri Kislay³

Abstract

Aim: An epidemiological shift has resulted in increase in the prevalence of non-communicable diseases (NCD). Unlike other NCDs which are easily and definitely preventable, the knowledge of cancer prevention is still limited at present. Various aetiological factors are difficult to control since those are habit forming. Hence an available remedy remains its secondary and tertiary prevention for which appropriate planning is of paramount importance. Evidence based planning requires careful analysis of data with a view to prioritize various cancers. Keeping in view the fact that the adaptation of smoking free status in Chandigarh city might have a far reaching positive effect on the cancer related morbidity of the people, the following study was undertaken to provide base line data to be used for future comparisons. **Methods:** The registers maintained in the Department of Radiotherapy were checked and those belonging to the years 1999 to 2009 were utilized to analyze the cancer morbidity in respect to age, sex, and year of presentation to health care facility. **Results:** A total of 4,600 cancer patients (males=2276, females=2324) demonstrated a gradual increase in the number of cancer cases from 150 in the year 1999 to 783 in the year 2009. The most common cancers amongst males were cancer of gastro-intestinal tract (GIT) and lung (including larynx) constituting 37.3% and 27.1% of the total, respectively. In females these were cancers of breast and cervix representing 33.3% & 17.6% of total cancer cases, respectively, and lung cancer constituted 5.3%. The maximum cases of bone cancer (53.8% of all bone cancers) were observed amongst children aged less than 20 years and lung cancer (48.2% of all lung cancers) among the elderly aged 60-69 years. The.

Keywords: Epidemiological trend - cancer - Chandigarh - India

Asian Pacific J Cancer Prev, 13, 3061-3064

Introduction

Cancer is the most important disease compelling health personals (including general public) to realize the truth "prevention is better than cure". Primary prevention of cancer is most desirable, though it remains difficult. For its secondary and tertiary prevention, appropriate planning is of paramount importance. Evidence based planning requires careful analysis of data with a view to prioritize various cancers. In the world as a whole the cancers of lung, breast & colorectal region constitute 12.3%, 10.4% and 9.4% of total cancers respectively.

Due to higher exposure of males to causative agents cancers of lung, stomach, esophagus, liver & bladder are more common in them (WHO, 2008). The burden of cancer is distributed unequally between developed and developing countries, with particular cancer types exhibiting different patterns of distribution. The total cancer burden is highest in affluent societies, mainly due to a high incidence of tumors associated with smoking and western lifestyle. i.e., cancer of the lung, colon, rectum, breast and prostate. In developing countries, up to 25

per cent of tumors are associated with chronic infections (Bernard and Paul, 2003). Yearly around 10 million people are diagnosed and 6 million die of it. About 22.4 million persons were living with cancer in the year 2002 (WHO, 2003) (representing 19% increase since 1990).

Since 1950 mortality from cancer of stomach decreased, from carcinoma breast not changed, from carcinoma rectum decreased slightly, from cancer of prostate increased slightly. In recent years tobacco consumption has declined and lung cancer rates in men have plateaued, although rates in women continue to rise unabated. In general incidence rates of most cancers have been increasing (Frederick, 1997). Cancers associated with tobacco use account for 44% of total cancer cases in men and 20% in women. The number of cancer cases amongst males is estimated as 3.9 lacks and among females as 4.3 lacs (ICMR, 2004). Among Indian women, cancers of the cervix/ovary and breast account for nearly 60% of all cancers (WHO, 1999). In the world (American Cancer Society, 2004) the proportion of cancers in men in the decreasing order is Prostate (33%) Lung and Bronchus (13%), Colon and Rectum (11%), Urinary Bladder (6%),

¹Department of Community Medicine, College of Medicine & JNM Hospitals, Kalyani, ²Peoples College of Medical Sciences & Research Centre, Bhopal, ³Department of Radiotherapy, ⁴Department of Community Medicine, Government Medical College, Chandigarh India *For correspondence: drneeraj_g04@yahoo.com

Table 1. Age-wise Distribution of Common Cancers

Age in years	Total of all Cancer	Common to both sexes	Lung	GIT	Blood	Bone	Others
Both Sexes							
<20	134 (2.9)	124 (4.3)	0 (00)	8 (0.6)	7 (15.2)	55 (51.9)	54 (6.4)
20-39	626 (16.5)	366 (12.6)	40 (5.4)	128 (10.2)	6 (13.0)	36 (34.0)	156 (18.4)
40-49	978 (21.2)	537 (18.5)	134 (18.9)	242 (19.2)	9 (19.6)	7 (6.6)	145 (17.1)
50-59	1065 (25.3)	651 (22.5)	212 (28.7)	308 (24.4)	9 (19.6)	8 (7.5)	214 (25.2)
60-69	1119 (24.3)	794 (27.4)	239 (32.3)	363 (28.7)	4 (8.7)	0 (00)	189 (22.3)
≤70	577 (12.5)	426 (14.7)	114 (15.4)	211 (16.7)	11 (23.9)	0 (00)	90 (10.6)
Over all	4600 (100)	2898 (100)	739 (100)	1260 (100)	46 (100)	106 (100)	848 (100)
	Lung	GIT	Prostate	Blood	Testis	Others	Total
Male							
<20	0 (00)	4 (4.7)	0 (00)	5 (5.9)	0 (00)	35 (41.2)	85 (100)
20-39	26 (10.2)	84 (32.9)	0 (00)	6 (2.4)	20 (7.8)	99 (38.8)	255 (100)
40-49	108 (28.3)	150 (39.3)	1 (0.3)	9 (2.4)	17 (4.2)	96 (25.1)	382 (100)
50-59	179 (31.6)	217 (37.5)	90 (3.2)	3 (0.5)	8 (1.4)	145 (5.1)	578 (100)
60-69	203 (33.0)	233 (38.7)	31 (5.1)	2 (0.3)	3 (0.5)	130 (21.6)	602 (100)
≤70	100 (26.7)	161 (43.0)	49 (13.1)	5 (1.3)	0 (00)	59 (15.8)	374 (100)
Over all	616 (27.1)	849 (37.3)	100 (4.4)	30 (1.3)	47 (2.1)	564 (24.8)	2276 (100)
	Breast	Cervix	Lung	GIT	Uterus	Ovary	Total
Female							
<20	0 (00)	1 (2.0)	0 (00)	4 (8.2)	0 (00)	9 (8.5)	49 (100)
20-39	131 (35.3)	66 (17.8)	14 (3.8)	44 (11.9)	4 (1.07)	39 (10.5)	371 (100)
40-49	228 (38.3)	134 (22.5)	26 (4.4)	92 (15.4)	6 (1.00)	56 (9.4)	596 (100)
50-59	205 (34.9)	119 (20.3)	33 (5.5)	91 (15.5)	22 (3.7)	41 (7.0)	587 (100)
60-69	149 (28.8)	64 (12.4)	36 (6.9)	130 (25.4)	20 (3.9)	58 (11.2)	518 (100)
≤70	62 (30.5)	24 (11.4)	14 (6.9)	50 (24.6)	5 (2.5)	11 (5.4)	203 (100)
Over all	775 (33.3)	408 (17.6)	123 (5.3)	411 (17.7)	57 (2.5)	214 (9.2)	2324 (100)

Skin (4%), NHL (4%), Kidney (3%), Leukemia (3%), Oral cavity (3%) & Pancreas (2%) and in females it is Breast (32%), Lung+Bronchus (12%), Colon +Rectum (11%), Uterine+Corpus (6%), Ovary (4%), NHL (4%), Skin

(4%), Thyroid (3%), Pancreas (2%) & Urinary Bladder (2%). How this proportion is distributed among patients of cancer reporting to Government Medical College Hospital Chandigarh was the main aim of present study.

Table 2. Trends in Cancer Morbidity at GMCH from the Years 1999 -200

Males	Lung	GIT	Prostrate	Blood	Testis	Bone	Others	Total
1999	17 (27.0)	19 (30.2)	1 (1.5)	6 (9.5)	2 (3.3)	4 (6.3)	14 (22.2)	63
2000	11 (18.3)	18 (30.0)	3 (5.0)	1 (1.7)	1 (1.7)	4 (6.7)	22 (36.7)	60
2001	12 (13.2)	28 (28.6)	6 (6.6)	0 (0.0)	2 (2.2)	4 (4.4)	41 (45.1)	93
2002	18 (19.1)	34 (36.2)	2 (2.1)	1 (1.1)	6 (6.4)	2 (2.1)	31 (35.1)	94
2003	22 (19.8)	34 (30.6)	8 (7.2)	5 (4.5)	2 (1.8)	4 (3.6)	36 (32.4)	111
2004	74 (31.5)	80 (34.0)	7 (3.0)	3 (1.3)	4 (1.7)	7 (3.0)	60 (25.5)	235
2005	95 (32.2)	109 (36.9)	19 (6.4)	7 (2.4)	2 (0.7)	7 (2.4)	56 (19.0)	295
2006	74 (30.1)	84 (34.1)	10 (4.1)	2 (0.8)	3 (1.2)	6 (2.4)	67 (27.2)	246
2007	61 (28.2)	60 (24.0)	9 (3.6)	1 (0.5)	6 (2.8)	9 (4.2)	70 (32.4)	216
2008	120 (29.6)	158 (38.9)	15 (3.7)	1 (0.2)	13 (3.2)	9 (2.2)	90 (22.2)	406
2009	112 (24.4)	225 (40.5)	20 (4.4)	3 (0.7)	6 (1.3)	14 (3.1)	77 (16.8)	459
Overall	616 (27.1)	849 (37.3)	100 ()	30 ()	47 ()	70 ()	564 ()	2,276
Females	Breast	Cervix	Lung	GIT	Uterus	Ovary	Others	Total
1999	27 (31.4)	11 (12.8)	3 (3.5)	20 (23.3)	2 (2.3)	9 (10.5)	10 (11.6)	85
2000	21 (26.3)	8 (10.0)	4 (5.0)	14 (17.5)	3 (3.8)	12 (15.5)	15 (18.8)	80
2001	33 (26.7)	16 (12.9)	6 (4.8)	34 (25.6)	3 (2.4)	8 (6.50)	22 (7.70)	124
2002	24 (29.9)	22 (15.0)	18 (12)	18 (12.2)	1 (0.6)	16 (10.9)	25 (17.0)	148
2003	45 (32.1)	26 (18.6)	3 (2.1)	16 (11.4)	6 (4.3)	13 (9.30)	21 (15.0)	140
2004	69 (29.2)	42 (17.8)	12 (5.1)	44 (18.6)	4 (1.7)	33 (14.0)	30 (12.7)	236
2005	103 (38.3)	45 (16.8)	18 (6.7)	50 (15.7)	2 (0.7)	18 (6.70)	24 (8.90)	265
2006	74 (32.7)	25 (11.1)	14 (6.2)	45 (18.1)	9 (4.0)	24 (10.6)	31 (13.7)	229
2007	102 (40.8)	50 (20.0)	11 (4.4)	31 (12.4)	5 (2.0)	20 (8.00)	26 (10.4)	250
2008	132 (33.7)	90 (2.30)	13 (3.3)	67 (16.8)	10 (2.6)	31 (7.90)	45 (11.5)	391
2009	125 (33.3)	73 (19.5)	21 (5.6)	72 (18.9)	12 (3.2)	30 (8.00)	35 (9.30)	375
Overall	775 (33.3)	408 (17.6)	123 (5.3)	411 (17.7)	57 (2.5)	214 (9.20)	284(12.2)	2,324

The aims and objectives were: 1. Whether reported cancers are increasing or decreasing in number? 2. Which cancer affects what particular age? 3. Is there any sex-wise difference in cancer incidence? If so. 4. To stimulate for further study to find out different correlates of cancers. 5. To conclude & recommend. 6. To give feed back to health administrators for better bargain and for better health care plan.

Materials and Methods

As a part of training, the under graduate medical students are supposed to visit the Medical Record Department (MRD) of Government Medical College Hospital (GMCH), sector-32, Chandigarh which is barely 18 years old. Supervision of MBBS student's visit to MRD of GMCH, made us to know that disease-wise record of patients is not maintained there. Being adjacent to us, the department of Radiotherapy was visited many times during OPD hours. The faculty members were contacted and permission was obtained from them to take help of registers for analyzing data on cancer morbidity. The registers maintained in the department of Radiotherapy were checked and those belonging to the years 1999 to 2009 were utilized to analyze the cancer morbidity in respect to age, sex, and year of presentation to health care facility. Percentages were calculated to obviate the confounding effects of change in total number of patients.

Results

A total of 4600 cancer patients (Males=2276, Female=2324) had reported to the hospital within the period of 10 years (Table 1). There was a gradual increase in the number of reported cancer cases from 148 (Males=63; Females=85) in the year 1999 to 834 (Males=459; Females=375) in the year 2009 (Table 2). The most common cancers amongst males were cancer of gastro-intestinal tract (GIT) and lung (including larynx) representing 37.3% and 27.1% of total cases respectively and in females these were cancers of breast and cervix (33.3% & 17.6% respectively). The maximum cases of bone cancer (53.8% of all bone cancers) were observed amongst children aged less than 20 years and lung cancer (48.2% of all lung cancers) among the elderly aged 60-69 years. In females lung cancer constituted 5.3% of all cancers.

Discussion

In a Haryana based study (Das, 2005) it was observed that the number of patients increased from 347 in 80s to 1400 in the year 2000 and 50.9% patients developed cancer in 5th and 6th decade. Similar figures in our study were 148, 812 and 49.9%. Data from Mumbai cancer registry for the year 1982-1999, from Bangalore & Chennai for the years 1982-1996 and from the Barshi, Bhopal & Delhi for the years 1988-1996, demonstrated a steep rise in breast cancer incidence till menopause years after which the curve plateaued. The trend of increased cancer incidence with increased age was statistically

significant (Yeole, 2003). In our study the breast cancer proportion increased from 35.3% in the women aged 20-39 years to 38.3% in the women aged 40-49 years (indicating a little less steep rise). It increased with time from 26.3% in the year 2000 to 40.3% in the year 2007 and it never came back to its original percentage proportion of 25.3%. Almost 60% of all breast cancer cases were in the age group of 40-59 years. Incident rates of breast cancer increased @ 3.5% per year in the year 1991-2003 and then decreased @ 4.3% per year in between 2003-2006 eventually increasing by 9.1% in the year 2007 (Fontenoy et al., 2010). In our study the percentage proportion of breast cancer for the years 2000-2003, 2004-2006 & 2007-2009 was 29.7, 34.1 & 35.3 respectively indicating no fall in middle years though the trend of 'year-wise' increase was not consistent.

According to an important recent study (Youlten, ????) the carcinoma of lung constituted 5% of all in respect to the patients aged 0-44 years, 14% for the patients aged 45-54 years, 25% for those aged 55-64 years and 55% of all among those aged 65 years and above. These proportions were fairly uniform for both sexes. In our study lung cancer constituted 5.4% of all in the age group of 0-39 years, 18.1% of all in the age group of 40-49 years and 47.8% of all in the age group of 60 years and above. The lower percentage proportion of 47.8% among elderly (even after including 5 extra years in between 60 to 65 years) in our study as compared to a higher percentage proportion (e.g. 55.0% as above) might very well be because of the fact that under Indian circumstances some of the elderly patients of lung cancer die at home and do not reach hospital because of high cost of treatment unaffordable by them. From the year 60s to 80s to 90s there was large increase in prostate cancer in USA (Pu et al., 2004) but there was also an increase in its incidence in India (Cedrie, 1997). In our study the proportion of prostate cancer was 1.5% for the year 1999 which increased to 7.2% in the year 2003 and then it decreased to 4.4% in the year 2009. In fact the downward or upward trend of percent proportion of prostate cancer was not consistent. This may be due to small number of prostate cancer patients.

Carcinoma epidemiology can be defined as the study of the frequencies, pattern of distribution and determinants of tumor occurrence in humans (Mc Mohan, 1970). Cancer usually occurs in elderly as it requires decades to develop following exposure to etiological agents (80% cancers in the age group of 55 years and above) (Doll, 1981) in the year 1981; in the Haryana based study (Das, 2005) and in our study 62.1% of all cancers were observed in the age group of 50 years and above. The comparison of these three studies demonstrates that there has been an increased chance of cancer occurrence among the individuals of

younger ages over the years. Over all cancer's presence is more in males (Doll, 1981; WHO, 2008).

As per the Maharashtra cancer registry, among males, the crude rate for all cancers varied from 37.7 per lakh in Aurangabad to 80.2 per lakh in Nagpur. Among females similar figures were 42 per lakh and 88.6 per lakh indicating a higher cancer incidence among females as compared to males. ICMR (ICMR, 2004) also states that the cancer prevalence is higher in females. In our study, however, cancer was found to be equally distributed among both sexes (males to female ratio being 1:1.02). The esophageal cancer is rare at ages younger than 40 years. In our study 92.7% of esophageal cancers were in the age group of 40 years and above. Higher incidence of cancers of esophagus and breast may very well be because of the highest incidence of obesity in this area (National Family Health Survey –III, 2005: 2006) as obesity has been considered a major risk factor for development of these cancers (Colle, 2007). According to Maharashtra Cancer Registry increase in cancer incidence rates with age (ASRs) differed dramatically. Among males the age specific rates were 200 in the age of 50 years at all four places (Aurangabad, Nagpur, Mumbai, Pune) which increased to 400 in Nagpur & Aurangabad, to 600 in Pune and to 1000 in Mumbai by the age of 75+ years. The incidence was maximum in the age group of 65 years in Nagpur and Aurangabad after which it decreased. Among females ASR was 300 at three places (except Aurangabad) in the age group of 50 years which increased to 450 by 60 years and decreased to 150 by the year 75+ in Nagpur, increased to 700 by 65 years than decreased to 600 by 75+ years in Mumbai and increased to 550 by 70 years and decreased to 450 by 75 + years in Pune.

In our study the proportion of cancer was 26.4% in the age group of 60-69 years and 16.4% in the age group of 70 years and above. Among males the cancer of lung ranked first in Mumbai, fourth in Aurangabad and fifth in Nagpur. The cancer of oral cavity ranked first in Pune and third in Mumbai & Aurangabad. The cancer of larynx ranked first in Nagpur and second in Mumbai & Pune. The cancer of esophagus ranked first in Aurangabad, third in Nagpur and fourth in Mumbai. Thus we observe that the ranking of any particular cancer differed at different places in the same state. The cancer of tongue, prostate and lymphoma ranked among first ten cancers in all four regions. Among females cancer of breast ranked first, cervix second and ovary third at all places. The proportion-wise the cancer of lung constituted 8.3%, larynx 6.5%, mouth & esophagus 5.6%, lymphoma & prostate 5.5%, tongue 4.8% and liver, bladder & stomach 3.9% among males in Mumbai. In females, the sequencing of decreasing proportion was 26.8%, 14.0%, 7.9%, 4.2%, 3.5% 3.4%, 2.9% & 2.7% in respect to cancers of breast, cervix, ovary, esophagus, mouth, leukemia, lymphoma and In our study the percent proportion in respect to first three cancers in females were all higher being 33.3, 17.6 & 9.2. The percent proportion was higher (5.3%) even for lung cancer alone as compared to the combined one (lung, uterus & brain) mentioned above. The cancers in children aged 0-14 years constituted 3.4%, 3.6%, 3.8%, 4.5% of all cancers among males in Aurangabad, Pune, Mumbai &

Nagpur respectively. Among females similar figures were 4.4%, 1.9%, 2.7% & 3.0%. In our study the males aged less than 20 years constituted 3.7% and females 2.1% of all cancers. Out of all cancers, 1.6%-4.8% was recorded amongst the children falling in the age group of less than 15 years. In our study 2.9% of all cancers were recorded amongst children aged less than 20 years. According to a recent study⁸, the most common cancer amongst children was leukemia, constituting 25-40% of all cancers. In our study it was bone cancer, constituting 43.2% of all cancers in children.

In conclusion, breast cancer appears to be on rapid rise. The lung cancer in females is a point of worry. More epidemiological studies are required to ascertain the causes of cancer among women.

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