

RESEARCH ARTICLE

Epidemiological Trends of GI Cancers in Patients Visiting a Tertiary Care Hospital in Chandigarh, North India

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Abstract

Background: Cancer has become an epidemic disease. Nearly ten million new cancer cases are diagnosed annually in the world and out of these about half are from the developing world. To appropriately plan for treatment, management and prevention of the disease, it becomes necessary to study the trends about morbidity caused by cancers. **Materials and Methods:** Data for patients diagnosed with any form of gastrointestinal (GI) cancers was extracted from records maintained in the outpatient department registers of the Oncology Department of Government Medical College and Hospital in Chandigarh from 1999 to 2012. Trends were analysed for different categories of GI cancers for the period of 12 years. **Results:** In present study GI cancers accounted for 23 % of all registered cases (n-9603) of carcinomas. Males predominated for all GI cancers except in the gall bladder. Gastrointestinal cancers as a proportion of total cancers increased from 21% in 1999 to 25.9% in 2012 with a significant increasing trend in our series (χ^2 for linear trend=9.36, $p<0.003$). Cancers of the tonsil, oral cavity and pharynx taken together showed an increasing trend over the years (χ^2 for trend=55.2, $p<0.001$) whereas cancers of the lower GI ($\chi^2=19.6$, $p<0.0001$) and gall bladder ($\chi^2=19.5$, $p<0.0001$) showed a declining trend in our series. **Conclusions:** GI cancers form a significant proportion of all cancers reporting to our data. In depth studies to ascertain the reasons for the changing trends are required to design intervention programs. Further information is necessary from cancer registries and from the hospital records of oncology departments.

Keywords: Gastrointestinal cancers - epidemiological trends - Chandigarh, North India

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Introduction

Cancer (Kark-Roga) is known to have existed since prehistoric times and traces of cancer have been found in the bones of Egyptian Mummies embalmed 5000 years ago. Cancer has become an epidemic disease of modern times (Langer et al., 2012). Nearly ten million new cancer cases are diagnosed annually in the world and out of these about half cases are from developing world only. It is predicted that by the end 2020, over 10 million people would die globally each year because of cancer with 70% deaths from the developing countries (Murray et al., 1996).

The International Agency for Research on Cancer (IARC), the specialized cancer agency of the World Health Organization (WHO), provides the global data on cancer incidence, mortality, and prevalence. The IARC's online database, provides a comprehensive overview of cancer burden and also the most recent estimates for 28 types of cancer in 184 countries worldwide (GLOBOCAN, 2012). The most commonly diagnosed cancers worldwide in 2012 were those of lung (1.8 million, 13.0% of total), breast (1.7 million, 11.9%), and colorectal (1.4 million, 9.7%). The most common causes of cancer deaths were cancers of the lung (1.6 million, 19.4% of the total), liver (0.8 million,

9.1%), and stomach (0.7 million, 8.8%).

Among gastrointestinal tract cancers, colorectal cancer is the third most common cancer in men (746,000 cases, 10.0% of the total) and the second most common in women (614,000 cases, 9.2% of the total) worldwide. Commonly observed cancers in Indian population are of breast, lung, colon, rectum, stomach and liver (Rao et al., 1998; ICMR, 2000; Murthy et al., 2004). These compiled data show that in 2004, the number of male, female and the total cancer patients were 390809, 428545 and 819354 respectively which increased to 462408, 517378 and 979786, respectively by 2010 (Ali et al., 2010).

Ali et al. (2010) documented the geographical distribution of different cancers in India. Stomach cancer is the second most common cancer in Andhra Pradesh and Nagaland and the third commonly reported cancer in Jammu & Kashmir, Sikkim, Arunachal Pradesh, Tamil Nadu, Mizoram and Goa. Oral cancer is the second and third most common cancer in Goa and Assam, respectively. Head and neck cancer is prevalent in Tripura and oesophageal cancer is a common type of malignancy after lung cancer in Jammu and Kashmir, Assam and Karnataka. Gall bladder cancer is not common in India but it is prevalent in certain parts of Punjab, Uttar Pradesh and

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Bihar. Tongue cancer is the most common type of cancer in Madhya Pradesh and then after at second position in Goa. Oropharyngeal cancer is prevalent in Haryana and Meghalaya.

In southern India the common cancers among male were found to be stomach, oral cavity, oesophagus and leukaemia whereas common cancers of females were cervix, breast, oral cavity and esophageal cancers (Jagnatha et al., 2005; Reddy, 2010). Similarly, a study from West Bengal, an eastern state of India has reported head and neck, lungs and oral cancers to be common in males and in females breast cancer was leading followed by cervical and stomach cancers (Maiti et al., 2012). In contrast, among north Indian males, cancers of gastrointestinal tract, larynx and lung are common and among females, cancers of the breast, cervix and lung were the leading malignancies (Sharma et al., 2012).

Among males, an increasing trend of cancers of prostate, colon, rectum and liver whereas in females, an increasing trend is seen in cancers of breast, corpus uteri, lung, ovary, thyroid and gallbladder (ICMR, 2009).

According to GLOBOCAN 2012, for colorectal cancer, there were 64,000 cases; 49,000 deaths and 5 year prevalence is 87 in both the sex. Around 456,000 (3.2% of the total) new cases of Oesophageal cancer were reported in 2012, making it the eighth most common cancer worldwide. Oesophageal cancer incidence rates worldwide in men are more than double as compare to women (male: female ratio 2.4:1). In India, due to Oesophageal cancers there were 42,000 cases; 39,000 deaths and 5 year prevalence is 22 in both the sex.

The stomach cancer is fifth most common malignancy in the world and new cases of stomach cancer estimated to have occurred in 2012 were around one million (952,000 cases, 6.8% of the total). In India, there were 63,000 cases 59,000 deaths due to stomach cancer.

Around 782,000 new liver cancer cases were reported in 2012 and it is most prevalent in less developed regions. It is the fifth most common cancer in men (554,000 cases, 7.5% of the total) and the ninth in women (228,000 cases, 3.4%). In India, there were 27,000 cases and 27,000 deaths due to liver cancer

Around 57% of all cancers and 65% of cancer deaths in 2012 occurred in less developed regions of the world. The GLOBOCAN 2012 report predicts a substantive increase to 19.3 million new cancer cases per year by 2025, due to growth and ageing of the global population.

To appropriately plan for treatment, management and prevention of the disease, it becomes necessary to study the trends about morbidity caused by cancers. The study was planned to have an insight about trend of gastrointestinal cancers in last 14 years in a tertiary level hospital, to review the different types of reported Gastro-intestinal cancers over the years and their age wise and gender wise distribution.

Materials and Methods

Demographic, clinical and histo-pathological data of patients attending the oncology department of Government Medical College and Hospital in Chandigarh is maintained

in the Outpatient Department registers. Data of patients diagnosed with any form of GI cancers was extracted from these records from 1999 to 2012 and entered in MS excel for different variables such as year of diagnosis, age at the time of visiting the hospital, gender and site of cancer. The descriptive analysis was carried out and the moving average over three years was used for smoothening of data.

Results

A total of 9603 cases of different cancers were registered from 1999-2012 in the radiotherapy department of the hospital. Among these 2186 were diagnosed as gastrointestinal cancers which are about 23% of total cancers. Gastrointestinal cancers as a proportion of total cancers have increased from 21% in 1999 to 25.9% in 2012 with a significant increasing trend in our series (χ^2 for linear trend=9.36, $p<0.003$).

The gastrointestinal cancers were categorised into different types of cancers on the basis of site of cancer after consensus was obtained among researchers. There were around 13 such categories and these categories were again sub-grouped under 7 categories. These were Cancers of Oral Cavity, Lip and Pharynx; Upper Gastro-intestinal tract ; Lower Gastro-intestinal tract; Gall Bladder; Pancreas; Liver and Tonsil. Majority of cancers were among Cancers of Oral Cavity, Lip and Pharynx; Upper Gastro-intestinal tract and Lower Gastro-intestinal tract. The decreasing order of 13 cancers was Oesophagus>Tongue>Gall Bladder>Pharynx>Colon>Oral Cavity>Rectum>Stomach>Liver>Pancreas >Anal Canal>Small GI.

Around 67% of the registered population was males (Figure 1). The ratio of males to females varied among different age groups. In age group of less than 30 years male to female ratio was 1.5:1, in 30-79 years age group the ratios was 2:1, in 80-89 years it was around 3:1 and age 90 years and above only males were reported (Table 1).

Among males, the frequency of cancers in terms of numbers is - carcinoma of tonsil; of tongue, oral cavity and pharynx; of lower GI; of upper GI; of pancreas; of liver and of gall bladder. Among females, the decreasing order of cancers is - carcinoma of gall bladder; of liver; of pancreas; of upper GI; of lower GI; of tongue, oral cavity and pharynx and of tonsil.

The minimum age at the time of visiting hospital was 7 years and maximum age registered was 94 years. Around 75 % of the registered cases were aged between

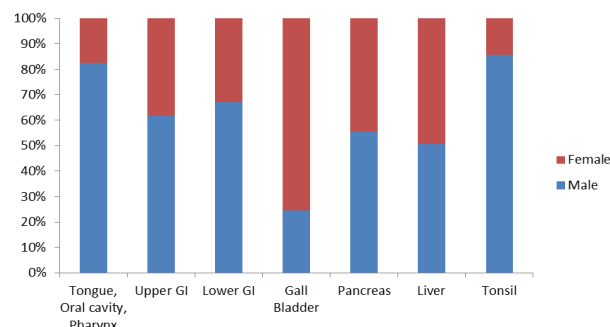


Figure 1. Distribution of Different GI Cancers by The Gender of Cases (n=2186)

Table 1. Distribution of Cases by Gender among Different Age Groups (n-2186)

	11	31	105	318	389	403	155	43	5
Gender of cases	<20 years	20-29 years	30-39 years	40-49 years	50-59 years	60-69 years	70-79 years	80-89 years	>90 years
Male	11	31	105	318	389	403	155	43	5
(%)	57.9	59.6	62.9	68.1	68.4	65	68.3	71.7	100
Female	8	21	62	149	180	217	72	17	0
(%)	42.1	40.4	37.1	31.9	31.6	35	31.7	28.3	0

Table 2. Distribution of Gastrointestinal Cancers by Age from 1999-2012 (n-2186)

Type of Cancer	<20 years	20-29 years	30-39 years	40-49 years	50-59 years	60-69 years	70-79 years	80-89 years	>90 years	Total %
Tongue, Oral cavity, Pharynx	0.30%	2.80%	6.70%	21.00%	26.60%	28.80%	10.40%	3.00%	0.30%	100%
Upper GI	0.40%	1.60%	6.90%	19.90%	30.10%	28.90%	9.20%	3.00%	0.20%	100%
Lower GI	2.40%	4.20%	13.40%	20.00%	19.40%	26.90%	11.00%	2.10%	0.60%	100%
Gall Bladder	0.80%	1.70%	5.40%	24.60%	23.80%	31.70%	10.00%	2.10%	0%	100%
Pancreas	4.80%	3.20%	9.50%	19.00%	20.60%	30.20%	7.90%	4.80%	0%	100%
Liver	1.40%	1.40%	8.50%	21.10%	18.30%	29.60%	18.30%	1.40%	0%	100%
Tonsil	0.70%	0.70%	4.60%	27.50%	32.00%	20.90%	11.10%	2.60%	0%	100%

Table 3. Distribution of Gastrointestinal Cancers Over the Years from 1999-2012(n-2186)

Type of cancer	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Tongue, Oral cavity, Pharynx	23%	9%	13%	7%	24%	35%	36%	28%	32%	34%	45%	39%	36%	37%
Upper GI	23%	35%	28%	36%	20%	25%	18%	18%	25%	27%	23%	30%	29%	27%
Lower GI	27%	29%	16%	22%	33%	16%	19%	20%	21%	21%	11%	11%	9%	14%
Gall Bladder	27%	18%	23%	29%	8%	11%	12%	20%	11%	6%	8%	11%	11%	8%
Pancreas	0%	6%	8%	0%	4%	2%	1%	5%	2%	2%	2%	2%	4%	3%
Liver	0%	3%	12%	7%	10%	2%	1%	2%	0%	0%	0%	0%	8%	6%
Tonsil	0%	0%	0%	0%	2%	9%	12%	8%	9%	9%	12%	7%	4%	5%
Total	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

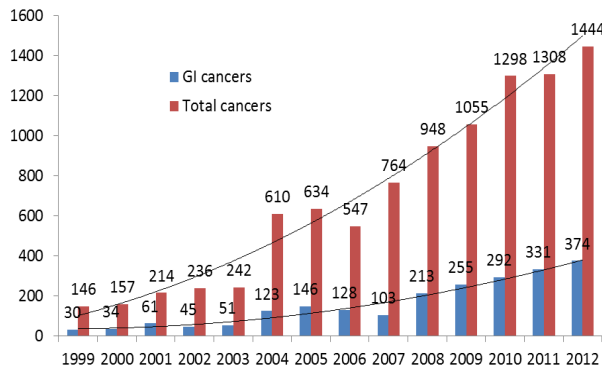


Figure 2. Trend of Gastrointestinal Cancers among Total Cancers from 1999-2012 (n2186)

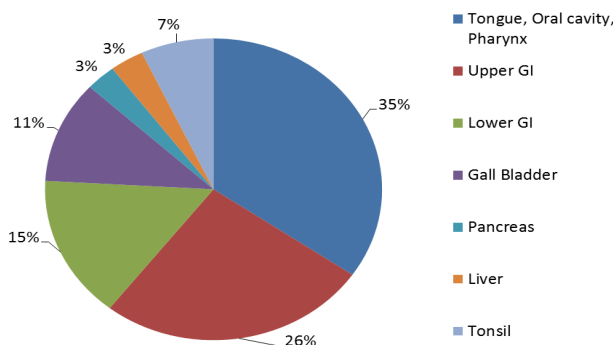


Figure 3. Proportion of Different Cancers among Total GI Cancer Cases Registered

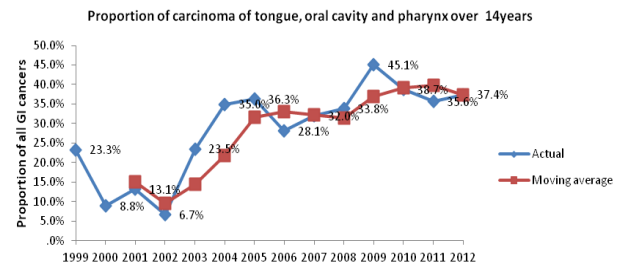


Figure 4. Proportion of Carcinoma of Tongue, Oral Cavity and Pharynx Out of All GI Cancers Over Past 14 Years

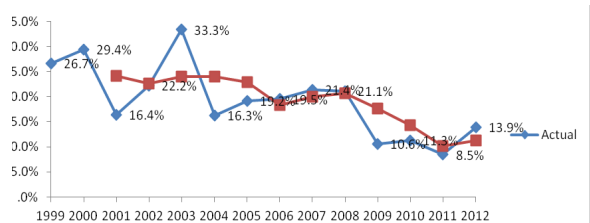


Figure 5. Proportion of Cancers of the Lower GI tract Out of All GI Cancers Over Past 14 Years

40-70 years and 42% of them were 60 or more than 60 years of age (Table2).

Cancers of the tonsil, oral cavity and pharynx taken together showed an increasing trend over the years (χ^2 for trend=55.17, $p<0.001$) whereas cancers of the Lower GI ($\chi^2=19.588$, $p<0.0001$) and gall bladder ($\chi^2=19.5$, $p<0.0001$) showed a declining trend in our series. Other categories of cancers show a stable trend as a proportion of all GI cancers in our series (Table 3, Figure 2-6).

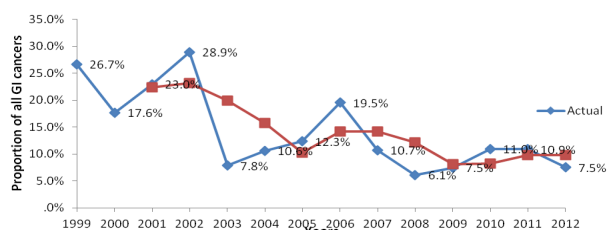


Figure 6. Proportion of Gall Bladder Cancers Out of All GI Cancers Over Past 14 Years

Discussion

In present study GI cancers contributed to 23% of overall registered cases (n-9603) of carcinomas. In present study males predominated in all GI cancers except in Gall bladder cancer. The order of decreasing trend of different GI cancers in males was just opposite to that in females. Around 75 % of the registered cases were aged between 40-70 years. Gastrointestinal cancers as a proportion of total cancers have increased from 21% in 1999 to 25.9% in 2012 with a significant increasing trend in our series (χ^2 for linear trend=9.36, $p<0.003$). Cancers of the tonsil, oral cavity and pharynx taken together showed an increasing trend over the years (χ^2 for trend=55.17, $p<0.001$) whereas cancers of the Lower GI ($\chi^2=19.588$, $p<0.0001$) and gall bladder ($\chi^2=19.5$, $p<0.0001$) showed a declining trend in our series. The other categories of cancers show a stable trend as a proportion of all GI cancers in our series.

Forty two percent of GI cancers presented in age group 60+ years of age. In a study conducted in West Bengal from January 1996 to December 2000, the G.I.T Cancers constituted 10% of all cancers and 4.6% were in the Geriatrics age group (Bhattacharya et al., 2004). In a Haryana based study the cancers of gastrointestinal tract (GIT) constituted 6.6% of all cancers out of which 18.1% were in the age group of 60+ years and the male to female ratio was 1.25:1 whereas in present study it is 2:1 (Das, 2005).

The decreasing order of 13 different GI cancers in present study was Oesophagus>Tongue>Gall Bladder>Pharynx>Colon>Oral Cavity>Rectum>Stomach>Liver>Pancreas>Anal Canal>Small GI and also in other study it was reported to be oesophagus, colon, rectum and stomach (Das, 2005). A different observation was reported in another Indian study where the GI cancer distribution was gall bladder (53 per cent), Oral cavity (20 per cent), colorectal (13 per cent), liver (5 per cent), oesophagus (4.5 per cent), Stomach (3.5 per cent), colon (0.76 per cent) and pancreas (0.65 per cent) (Barbhuiya et al., 2009).

The present study reported a significant increase in overall GI cancer but failed to comment on significant increase or decrease in different GI cancers except a declining trend in gall bladder carcinoma. Over the years some of the studies (Schein, 1992; Mikov et al., 1997; Murthy et al., 2004) have demonstrated a decreasing trend of gastric cancers. One of these studies reported an increase in the cancer of gall bladder in both sexes and that of colon in females. A rising trend in mouth cancer was observed in Mumbai and Delhi (PBCR) among male whereas among females (NCRP, 2009) there was a

declining trend. Another study from Odisha showed an increase in cancer of liver and gall bladder from 2008-2011 but no significant change in the reported cases of stomach Cancer (Hussain et al., 2011).

The most common age at presentation was 40-70 years so all the cancers were most commonly represented in the same age group which is different to other studies where different cancers have age specific trend (Murthy et al., 2011).

In the present study males were more than females among the registered cases so males predominated over females in all the cancers except in gall bladder cancer. A study conducted in north central region of India (Cancer Hospital and Research Institute, Gwalior); covering the patients mostly from rural areas and belonging to poor socio-economic status the female-male ratio was 2.3: 1.15 (Barbhuiya et al., 2009). In contrast to present study the other study reported that the proportion of females outnumbered males with female: male ratio 1.1:1. The number of female cases increased four folds and that of males three fold over the period studied (Hussain et al., 2011).

In conclusion, GI Cancers form a significant proportion of all cancers reporting to our OPD. Out of these the cancers of tongue oral cavity, pharynx showed an increasing trend over the 14 years under study, perhaps reflecting the increasing use to tobacco products before effective and proactive tobacco use control measures were enacted. Cancers of the upper GI tract and gall bladder showed a declining trend over the years. In depth studies to ascertain the reasons for the changing trends are required to design intervention programs. This data may well come from the cancer registries.

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