RESEARCH ARTICLE

Projection of Burden of Cancer Mortality for India, 2011-2026

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Abstract

Projection of load of cancer mortality helps in quantifying the burden of cancer and is essential for planning cancer control activities. As per our knowledge, there have not been many attempts to project the cancer mortality burden at the country level in India mainly due to lack of data on cancer mortality at the national and state level. This is an attempt to understand the magnitude of cancer mortality problem for the various calendar years from 2011 to 2026 at 5-yearly intervals. Age, sex and site-wise specific cancer mortality data along with populations covered by the registries were obtained from the report of National Cancer Registry Programme published by Indian Council of Medical Research for the period 2001-2004. Pooled age sex specific cancer mortality rates were obtained by taking weighted average of these six registries with respective registry populations as weights. The pooled mortality rates were assumed to represent the country's mortality rates. Populations of the country according to age and sex exposed to the risk of cancer mortality in different calendar years were obtained from the report of Registrar General of India providing population projections for the country for the years from 2011 to 2026. Population forecasts were combined with the pooled mortality rates to estimate the projected number of cancer mortality cases by age, sex and site of cancer at various 5-yearly periods Viz. 2011, 2016, 2021 and 2026. The projections were carried out for the various cancer-leading sites as well as for 'all sites' of cancer. The results revealed that an estimated 0.44 million died due to cancer during the year 2011, while 0.51 million and 0.60 million persons are likely to die from cancer in 2016 and 2021. In the year 2011 male mortality was estimated to be 0.23 million and female mortality to be 0.20 million. The estimated cancer mortality would increase to 0.70 million by the year 2026 as a result of change in size and composition of population. In males increase will be to 0.38 millions and in females to 0.32 millions. Among women, cancer of the breast, cervical and ovary account for 34 percent of all cancer deaths. The leading sites of cancer mortality in males are lung, oesophagus, prostrate and stomach. The above results show a need for commitment for tackling cancer by reducing risk factors and strengthening the existing screening and treatment facilities.

Keywords: Cancer mortality - future projections - ageing - India

Asian Pac J Cancer Prev, **14 (7)**, 4387-4392

Introduction

Population growth and aging are the largest contributors to the increasing total number of cancer cases and the shift in the burden of cancer and other chronic diseases toward economically developing countries (Thun et al., 2010). A total of 57 million deaths occurred in 2008, of which 36 million (63%) were due to Non - Communicable diseases (WHO, 2010). Cancer is a leading cause of death worldwide, accounting for 7.6 million deaths (around 13% of all deaths) in 2008 and in India causing 0.63 million deaths (Globocan 2008, IARC 2010). Cancer burden will rise more rapidly with ageing populations and changes in lifestyles associated with economic development (Shin et al., 2012). Cancer mortality in India is around 555,000 in 2010 (Dikshit et al., 2012). More than 30% of cancer could be prevented, mainly by not using tobacco, having a healthy diet, being physically active and moderating the use of alcohol. In developing countries up to 20% of cancer deaths could be prevented by immunization against the infection of HBV/HCV and HPV (WHO, 2012).

Studies have shown that appropriate changes in lifestyle will reduce the mortality and morbidity caused due to cancer (Varghese, 2004). This offers the prospect for initiating primary and secondary prevention measures for control and prevention of cancers (Murthy and Mathew, 2004). More than 70% of the cases report for diagnostic and treatment services in the advanced stages of the disease, which has lead to a poor survival and high mortality rate (Dinshaw et al., 1999). At present, for India as a whole the magnitude of the cancer mortality cases by site and sex based on scientific methods till the year 2026 is not available. A precise knowledge about the magnitude of the cancer mortality problem for present as well as for future would help health policy planners to evolve and implement cancer facilities in the country. The present study estimates load of cancer mortality at the country as well as state levels for quinquennial years from 2011 to 2026 for "all sites" of cancer as well as for some of the leading cancer sites by gender reported by the population

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based cancer registries.

Materials and Methods

The data on the occurrence of cancer mortality in India is available from the population-based cancer registries established in various parts of the country. Although the area and population covered by these registries is small, it gives a fair idea of the extent of the cancer problem in the country. A network of 26 Population Based Cancer Registries (PBCR) is functioning under the National Cancer Registry Programme (NCRP) of the Indian Council of Medical Research (ICMR) based on 3 year report of PBCR 2006-2008 (NCRP, 2010). They are located at Bangalore, Bhopal, Chennai (earlier known as Madras), Delhi, Mumbai (earlier known as Bombay), Kolkata (earlier known as Calcutta) and a rural registry at Barshi (Maharashtra), Ahmedabad rural registry, Ahmedabad Urban registry (Gujarat), Pune, Aurangabad, Nagpur, Wardha , Thiruvananthapuram, Kollam (Kerala) and eleven in the northeastern region. In the present paper we have taken the data on cancer mortality from 2001-2004 from six earlier established Population Based Cancer Registries (NCRP, 2006).

The number of cancer mortality cases by site, sex and five- year age group for each of the registries were obtained by multiplying the age-specific-mortality rates with the respective populations.

Sources of data

Data on cancer mortality from 2001 to 2004 according to sex and each site wise were based on records of the 6 Population Based Cancer Registries i.e Bangalore, Barshi, Bhopal, Chennai, Delhi, Mumbai for the age groups 0-4, 5-9, 10-14, 15-19, 20-24, 25-29, 30-34, 35-39, 40-44, 45-49, 50-54, 55-59, 60-64, 65-69, 70-74 and 75+ (NCRP, 2006).

Estimation of pooled mortality rate: The annual mortality data of all the 6 registries located in different parts of the country were combined to get pooled annual mortality number of cases of cancer. The annual populations of all the 6 registries by age and sex in the respective five year age groups were added up to obtain the total population for all the registries. The pooled age specific mortality rates of cancer by site, age and sex for all the 6 registries were obtained by dividing the respective pooled number of cases with the corresponding pooled population.

Population of the country and of states exposed to risk: Population of the country and for various 15 major states of country, according to age and sex by different quinquennial years from 2011 to 2026 were obtained from the report of population projections carried out for the country for the years 2001 to 2026 based on Census of India 2001, by the Registrar General of India (Registrar General of India, 2006).

Estimation of load of cancer mortality: The respective age and sex specific pooled mortality rates by site based on 6 registries were multiplied by with the corresponding projected age and sex specific population figures to estimate the projected number of cancer cases by age, sex and site for various calendar years 2011, 2016, 2021 and 2026. The number of deaths of cancer for site "s" (N^s) in a particular year was estimated using the relationship $N=\sum_n P_x * {}_nM_x$, where ${}_nP_x$ represents the projected population in the x to $x+n$ age group for a particular year and ${}_nM_x$ being the pooled mortality rate of cancer by site in the same age group for a particular site. The projections have been carried out for the various selected sites of cancer and tobacco related sites taken together. Estimation of mortality cases have been done both at the national level as well as for 15 major states of India which covers 95% of the country's population.

Assumptions: The projection of number of persons dying of cancer have been done with the following assumption: *i*) rates obtained from these 6 Population Based Cancer registries represent country's mortality rate as well as for the various states of the country and; *ii*) age-specific cancer mortality rates for the latest available year will remain unchanged over next 15 years.

Results

The life expectancy at birth of the Indian population has been rising over the last few decades. According to the projections based on total fertility rates, the total estimated population of India for the years 2011, 2016, 2021 and 2026 (as of 1st June of the year) would be 1192, 1268, 1339 and 1399 million respectively (Table 1) (Registrar General of India, 2006). The pooled age specific mortality rate of cancer of all sites is presented in Table 2. The estimated cases of cancer mortality for "all sites"

Table 1. Projected Population (in 000's) of India for Quin-Quennial Years from 2011-2026

Age group	Males (Year)				Females (Year)			
	2011	2016	2021	2026	2011	2016	2021	2026
0-4	60,745	60,353	58,951	55,328	54,133	53,748	52,465	49,257
5-14	121,410	119,825	119,496	117,896	110,653	106,364	105,994	104,524
15-29	179,839	185,729	182,630	178,818	161,882	169,860	166,480	161,149
30-44	123,418	138,714	158,466	174,137	119,710	129,487	143,586	157,423
45-59	83,765	94,435	103,945	114,374	78,478	92,347	104,485	113,751
60-69	28,684	35,365	43,068	50,453	28,118	33,618	41,474	50,633
70-79	19,454	22,746	27,527	34,169	22,214	26,368	31,177	37,927
Total	617,315	657,167	694,083	725,175	575,188	611,792	645,661	674,664

*Source: Registrar General of India (2006)

by sex reveal that an estimated 0.44 million (436,590), 0.51 million (510,508), 0.60 million (598,968) persons developed cancer during the year 2011, 2016 and 2021. In the year 2011 male mortality was estimated to be 0.23 million and female mortality to be 0.20 million (Table 3). The estimated number of cancer mortality would increase to 0.70 million (704,996) by the year 2026. Mortality of cancer in males is higher as compared to females at all time periods.

Further estimation of cancer mortality, by major states of India, reveals that burden is very high, in those states which are highly populous. The predominant mortality in males as revealed through the registry report are of cancer of Lung, Oesophagus, Stomach, prostrate, Liver, Larynx, NHL, Tongue, Mouth, Brain, central nervous system etc. The annual total number of cases of Lung and Oesophagus together would increase from 0.05 million to 0.08 millions in 2011 to 2026. Among males, Lung cancer is the leading mortality cancer site in India in 2011 being 29,391 cases (0.03 million) followed by cancer of Oesophagus, contributing to 18,568 cases i.e. 0.02 million. Lung cancer mortality in males would rise from 29,392 cases in 2011 to 48,976 cases (0.05 million) in 2026. Oesophagus cancer mortality to 0.03 million in 2026 whereas Prostrate cancer mortality the 3rd commonest contributing about 14,562 cases (0.01 million) in 2011 to 25,334 cases (0.03 million) in 2026.

Stomach cancer mortality occupies 4th position with total cases among males increasing from 14,432 cases (0.01 million) in 2011 to 23,711 cases (0.02 million) in 2026 (Table 4). It may be seen that all the leading sites of cancer mortality shown in table 4 have revealed an increase of nearly 13 percent during the 15 years time period i.e from 2011 to 2026 as a result of change in age structure and size of population. The estimated number of mortality cases of breast would increase from 0.04 million to 0.06 million during 2011 to 2026. Similarly, cervix cancer mortality would rise from 0.02 million to 0.03 million. Third to sixth leading positions of cancer mortality among females are occupied by cancers of ovary, Oesophagus, lung and stomach respectively (Table 4).

Table 5 shows the projected number of Tobacco Related Cancers (TRC) mortality in males and females. The sites of cancers included among TRC were lip, tongue, mouth, tonsil, Oropharynx, hypopharynx, pharynx, Oesophagus, larynx, lung and urinary bladder. Selection of these sites as TRC is based on the NCRP report (2005). The estimated number of TRC mortality in males would rise from 0.09 million (95,734) in 2011 to 0.16 million (158,253) in 2026. Amongst men, TRC mortality accounted for nearly, 41 percent of all cancers seen amongst men in 2011. However, in females TRC mortality accounts for only 18.8 percent of cancers in 2011. When both genders are considered, the cases of cancer mortality due to TRC's would rise from 0.13 million (133,782) in 2011 to 0.22 million (220,874)

Table 2. Pooled Age-Specific Rate, Crude Rate (CR) and Age Standardized Rates (ASR) for Cancer Mortality Per 100,000

Age group	Males	Females
0-4	3.2	2.1
5-9	2.6	1.8
10-14	2.6	2.1
15-19	2.6	2.5
20-24	3	2.4
25-29	3.5	3.9
30-34	5.5	6.8
35-39	9.3	14.2
40-44	17.9	27.7
45-49	32.2	46.2
50-54	64	71
55-59	100.2	96.9
60-64	143.8	113.1
65-69	200.6	140.7
>70	571.4	395.1
CR	30.96	27.54
ASR	47.36	39.02

*A crude rate (CR) is calculated by dividing the number of new cancers or cancer deaths observed during a given time period by the corresponding number of person years in the population at risk. For cancer, the result is usually expressed as an annual rate per 100,000 persons at risk. (http://globocan.iarc.fr/glossary.htm) An age-standardised rate (ASR) is a summary measure of the rate that a population would have if it had a standard age structure. The ASR is a weighted mean of the age-specific rates; the weights are taken from population distribution of the *standard population*. (http://globocan.iarc.fr/glossary.htm)

Table 3. Projected Annual Cases of Cancer Mortality in Males and Females during Quinquennial Years, 2011-2026

Age group	Males (Year)				Females (Year)			
	2011	2016	2021	2026	2011	2016	2021	2026
India	233773	272850	321614	380207	202817	237658	277354	324789
Haryana	4975	5734	6804	8230	4047	4712	5524	6582
Delhi	3261	4227	5516	7134	2433	3076	3873	4868
Rajasthan	11591	13678	16188	19245	10553	12484	14632	17240
Uttar Pradesh	35526	40936	47413	55278	28310	33603	39478	46615
Bihar	17473	20565	24034	28034	13818	16606	19623	23176
Assam	5123	6101	7361	8899	4234	5075	6080	7294
West Bengal	18526	22059	26384	31496	15573	18373	21652	25544
Orissa	8557	9786	11338	13277	7590	8792	10180	11864
Madhya Pradesh	12359	14410	17003	20287	10809	12668	14760	17346
Gujarat	11474	13900	16923	20568	10546	12503	14753	17447
Maharashtra	23764	27205	31939	38049	21334	24219	27611	31971
Andhra Pradesh	17368	20284	23921	28233	16163	18971	22082	25669
Karnataka	12434	14637	17339	20523	11404	13377	15665	18327
Kerala	8843	10066	11651	13505	8956	10102	11475	13067
Tamil Nadu	17002	19438	21027	25587	15005	17382	20056	23005
NE excl Assam	2546	3086	3752	4540	2085	2526	3059	3710

Table 4. Projected Cases of Cancer Mortality in India during Quinquennial Years (2011-26) by Site

Site Name	Males (Year)				Females (Year)			
	2011	2016	2021	2026	2011	2016	2021	2026
Tongue	8774	10249	12031	14112	2739	3227	3784	4453
Mouth	7425	8702	10197	11890	5627	6657	7833	9243
Salivary Gland	598	698	826	984	344	409	481	572
Tonsil	1782	2074	2406	2798	307	368	436	513
Oth. Oropharynx	1343	1570	1843	2168	396	470	550	641
Nasopharynx	985	1137	1323	1537	343	405	477	568
Hypopharynx	5338	6257	7378	8699	1567	1839	2144	2505
Pharynx Uns.	3800	4474	5342	6419	1271	1502	1769	2107
Oesophagus	18568	21854	25913	30754	12502	14775	17410	20642
Stomach	14432	16957	20057	23712	8324	9813	11531	13576
Small Intestine	588	689	816	974	461	544	638	761
Colon	6410	7491	8867	10552	5353	6332	7468	8891
Rectum	5392	6275	7375	8724	4031	4719	5487	6439
Liver	12983	15276	18171	21642	6712	7910	9321	11092
Gallbladder	3956	4634	5469	6466	5861	6905	8111	9572
Pancreas	6393	7512	8911	10597	4530	5360	6337	7584
Nose, Sinuses	745	874	1034	1230	460	545	643	760
Larynx	12196	14341	17056	20369	1963	2327	2750	3273
Lung etc.	29392	34628	41171	48977	9646	11396	13408	15812
Bone	2156	2422	2761	3175	1817	2072	2383	2772
Other Skin	1163	1359	1608	1913	803	946	1116	1332
Conn. & Soft Tissue	1518	1730	1980	2276	1052	1186	1324	1481
Breast	796	939	1115	1324	36485	42830	49848	57899
Vulva	-	-	-	-	458	545	647	780
Vagina	-	-	-	-	761	892	1043	1222
Cervix Uteri	-	-	-	-	20108	23628	27572	32128
Corpus Uteri	-	-	-	-	2148	2555	3039	3606
Uterus Unspecified	-	-	-	-	3734	4402	5172	6110
Ovary etc.	-	-	-	-	12234	14338	16711	19498
Penis	1026	1201	1416	1662	-	-	-	-
Prostate	14562	17136	20683	25334	-	-	-	-
Testis	789	890	1000	1112	-	-	-	-
Kidney etc.	2884	3374	3978	4691	1326	1548	1800	2098
Bladder	6846	8052	9640	11640	1872	2227	2637	3157
Brain, Nervous System	6685	7614	8679	9864	4799	5476	6230	7100
Thyroid	1192	1399	1667	2002	1879	2220	2621	3123
Hodgkins Disease	1530	1741	1999	2296	951	1085	1229	1415
NHL	9064	10450	12152	14178	6174	7193	8379	9839
Multiple Myeloma	3799	4472	5329	6370	2226	2625	3108	3707
Lymphoid Leuk.	4708	5077	5513	5999	2446	2646	2878	3158
Myeloid Leukaemia	6492	7360	8396	9592	4640	5234	5874	6602
Leukaemia Uns	2110	2347	2616	2916	2003	2240	2514	2841
All Sites	233773	272850	321614	380207	202817	237658	277354	324789

Table 5. Projected Number of Tobacco Related Cancer Mortality at National Level during Quinquennial Years by Site for Males and Females from 2011 to 2026

India	Males (Year)				Females (Year)			
Site Name	2011	2016	2021	2026	2011	2016	2021	2026
Lip	272	312	363	427	158	187	225	275
Tongue	8774	10249	12031	14112	2739	3227	3784	4453
Mouth	7425	8702	10197	11890	5627	6657	7833	9243
Tonsil	1782	2074	2406	2798	307	368	436	513
Oth. Oropharynx	1343	1570	1843	2168	396	470	550	641
Hypopharynx	5338	6257	7378	8699	1567	1839	2144	2505
PharynxUnspecified	3800	4474	5342	6419	1271	1502	1769	2107
Oesophagus	18568	21854	25913	30754	12502	14775	17410	20642
Larynx	12196	14341	17056	20369	1963	2327	2750	3273
Lung etc.	29392	34628	41171	48977	9646	11396	13408	15812
Bladder	6846	8052	9640	11640	1872	2227	2637	3157
All TRC No.	95734	112514	133340	158253	38048	44974	52945	62621
All TRC %	41.0	41.2	41.5	41.6	18.8	18.9	19.1	19.3
All Sites	233773	272850	321614	380207	202817	237658	277354	324789

Table 6. Projected Number of Cancer Mortality Cases in India during Quinquennial Years by Broader Age Group from 2011 to 2026

	Age group					
Year	0-4	5-14	15-29	30-44	45-59	>60
2011	3081	5321	10074	31671	104232	282212
2016	3060	5189	10598	34533	121759	335368
2021	2988	5174	10460	38262	137415	404668
2026	2804	5105	10187	42741	150581	493577

in 2026 as a result of change in size and age composition of the population. Age wise the estimated cancer mortality cases are increasing from 2011 to 2026 (Table 6).

Discussion

Several models have been attempted in the developed countries to project the cancer mortality by using registry data. The updated estimates of cancer mortality based on set of assumptions and methods have been prepared for India and major 15 states for 2011-2026 in this study. There are certain limitations in the collection of mortality data in India because of the limitation in registration of death and certification of cause of death (Ferlay et al., 2010).

The study conducted in India based on the data of 5 PBCR for the year 1999-2000 estimated cancer mortality for the year 2000 had been 0.157 million (Marimuthu, 2008). Out of total 0.35 million deaths from 1998-2003 based on Verbal Autopsy in India during the year 2001-2003, deaths due to cancer were 0.034 million in males and 0.028 million in females (Jha et al., 2006).

The verbal autopsy method is a systematic retrospective inquiry from the caregiver close to the deceased person about the signs and symptoms of illness prior to death of the deceased and is used to help in determining the underlying medical cause of death. Usually such a caregiver is close relative or an attendant who is knowledgeable about the events or circumstances leading to death of the deceased. The method has been widely used to ascertain causes of death both in children and adults to have an effective mortality statistics, properly designed instrument to suit local conditions, trained interviewer and physicians to interpret questionnaire is required (ICMR, 2009).

As per the indices of burden of cancer in 2004 the number of cancer deaths in males are 0.138 million and in females 0.121 million (ICMR, 2006). In 2008 cancer deaths were estimated to be 0.63 million in India (Globocan 2008; IARC, 2010). In our study the estimated cancer mortality in 2011 was 0.436 million which was much lower compared to the cancer mortality estimated by Globocan (2008). Lung cancer is the leading cause of cancer death in developed countries and is rising in alarming rates in developing countries (Khuri et al., 2001). In our study the leading cause of death estimated is Breast cancer in Females followed by Lung Cancer in Males and Cervical cancer in Females. The percentage of Tobacco related products smoked in India are Bidi (28.4-79%), cigarettes (9-53.7%), hooka (3.4-77.3%) and mixed (7.5-13.6%) (Jindal and Behera, 1990).

For Lung cancer, the obvious factors which need to be avoided as a preventive measure are tobacco and particulate matter that can be breathed in like cooking oils, coal dusts and asbestos, vegetable and fruits are protective. For Breast cancer, the strongest protective factors would appear to be exercise, pregnancy, lactation and consumption of soy products, followed by intake of fish and vegetables. For Cervical cancer, factors which need to be avoided as preventive measures are infection with high risk human papilloma viruses and smoking and to a lesser extent sexually transmitted disease (Moore and Sobue, 2010). Organized population based screening linked to treatment of the detected neoplasias can lead to more than 70 percent reduction of disease related mortality (Kitchener et al., 2006).

Out of 122429 deaths from 1993-2003 in India, 7137 (5.8%) deaths were due to cancer which occurred in 1.1 million homes in 6671 small areas that were randomly selected to be representative of all of India. In the year 2010, the estimated cancer deaths were 0.556 million out of which 0.290 million cancer deaths were estimated in males and 0.266 million cancer deaths were estimated in females. Tobacco related cancers deaths were 0.084 million in males (42%) and 0.036 million in females (18.3%). 70% of the fatal cancers occur in the productive age group of 30-69 years. By 70years, in rural area one in 22 men and one in 30 women are likely to die of cancer whereas in urban area the risks are one in 20 for men and one in 24 for women (Dikshit et al., 2012).Our study estimated that in 2011, cancer mortality was 0.436 million out of which 0.234 million were in males and 0.202 million in females. Tobacco related cancer deaths were 0.095 million in males and 0.038 million in females. The estimated cancer mortality would increase to 0.705 million in the year 2026. The mortality was larger in Males compared to that of Females. Our study results are almost similar to that of Dikshit et al. (2012). The study conducted in Europe based on WHO cancer mortality data up to 2002 estimated that in 2004 there were 1.7 million deaths (Boyle and Ferlay, 2005). Also another study conducted in Europe estimated 1.25 million cancer deaths in 2015 and it is larger in males i.e 13% than in females i.e 11% (Quinn et al., 2003).

In the developing countries the problems are more complex and different from the developed countries. For example, India entered into 'population explosion' era in 1920's and after 1940s mortality rates started falling. In 1980's, a very large cohort born in 1940's have already entered into 'cancer prone' age. The problem is more vexed when society is undergoing a rapid change in life styles especially when tobacco consumption may be on increase. This is likely to initiate an epidemic of cancers in the midst of already existing heavy load of communicable diseases. In order to plan and develop cancer control measures an accurate estimation of cancer mortality is essential. The present estimates of cancer mortality have been based on the data from 6 population based registries only because of their special efforts to improve the coverage of mortality data through home visits (Murthy et al., 2010).

The present projections carried-out have not made any adjustments for possible increase in prevalence

of tobacco habit which may have a bearing on cancer mortality especially TRC. No accurate data exists for tobacco consumption though high consumption rate among youngsters have been reported. However, reports are available for increase in tobacco consumption habits. Increasing tobacco smoking instead of tobacco chewing might lead to increase in mortality of lung cancer, which is more difficult to detect and cure. When, suitable adjustments will be made for increasing tobacco habits, the estimates may get further increased.

Even, if the age specific cancer mortality rates remain unchanged, large increase in absolute number of cancer cases in the next one and half decade of the present century is already programmed due to aging of population in the developing countries. Accurate information on the cause of death in the country is not available. In urban areas all deaths are generally registered but information on the cause of death is lacking. If cancer is mentioned as a cause of death, the anatomical site is not mentioned or the histology or morphology is not stated (Murthy et al., 2010). With the increase in life expectancy, there will be increase in incidence and mortality of cancer. Strengthening/augmenting the existing diagnostic/ management facilities along with primary prevention of tobacco related cancers would help in early detection and linked reduction of mortality. A stronger national initiative on tobacco control would be helpful for cancer control too. Health system strengthening, especially primary health is needed for surveillance of suspected cancer cases and referral for further investigations and management. Well functioning primary care systems are needed to ensure continuous and palliative care for cancer patients (Shin et al., 2012). The present estimates of mortality highlight that existing facilities are inadequate. Cancer screening facilities for early detection, awareness of cancer, modifying lifestyle, reduction in tobacco use and establishment of adequate treatment guidelines that can effectively be carried out at different levels (district hospitals, teaching hospitals, specialized hospitals etc.) would also help in reduction of mortality due to cancer. As a result of it unless the efforts are made to detect the cancer at early stages by educating people to recognize the early signs of cancer, the mortality would increase.

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