RESEARCH ARTICLE

A Model Approach to Calculate Cancer Prevalence From 5 Year Survival Data for Selected Cancer Sites in India

Ramnath Takiar^{1*}, Kasturi Jayant²

Abstract

Background: Prevalence is a statistic of primary interest in public health. In the absence of good followup facilities, it is difficult to assess the complete prevalence of cancer for a given registry area. Objective: An attempt was here made to arrive at complete prevalence including limited duration prevalence with respect to selected sites of cancer for India by fitting appropriate models to 1, 3 and 5 years cancer survival data available for selected population-based registries. Materials and Methods: Survival data, available for the registries of Bhopal, Chennai, Karunagappally, and Mumbai was pooled to generate survival for breast, cervix, ovary, lung, stomach and mouth cancers. With the available data on survival for 1, 3 and 5 years, a model was fitted and the survival curve was extended beyond 5 years (up to 35 years) for each of the selected sites. This helped in generation of survival proportions by single year and thereby survival of cancer cases. With the help of survival proportions available year-wise and the incidence, prevalence figures were arrived for selected cancer sites and for selected periods. Results: The prevalence to incidence ratio (PI ratio) stabilized after a certain duration for all the cancer sites showing that from the knowledge of incidence, the prevalence can be calculated. The stabilized P/I ratios for the cancer sites of breast, cervix, ovary, stomach, lung, mouth and for life time was observed to be 4.90, 5.33, 2.75, 1.40, 1.37, 4.04 and 3.42 respectively. Conclusions: The validity of the model approach to calculate prevalence could be demonstrated with the help of survival data of Barshi registry for cervix cancer, available for the period 1988-2006.

Keywords: Survival - model - prevalence - breast cancer - cervix cancer - lung cancer

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Introduction

Prevalence is a statistic of primary interest in public health because it identifies the level of burden of disease or health-related events on the population and health care system. Prevalence represents new and pre-existing cases alive on a certain date, in contrast to incidence which reflects new cases of a condition diagnosed during a given period of time. Prevalence is a function of both the incidence of the disease and survival. The prevalence for cancer is calculated in two major ways: Tumor based and person based. Whenever the interest of investigator lies in finding out the prevalence of certain tumor like breast cancer, cancer of cervix or lung cancer then actually the tumor based prevalence is calculated. But, when the interest is to find out the number of person suffering from cancer regardless of the tumor from which they are suffering then the calculation of person based prevalence is required.

Cancer is still a relatively a rare disease in India (incidence $\approx 0.1\%$) and no good follow-up facilities are available, at present, with many of the Indian cancer registries. The complete survival data of cancer cases can be of great help in this regard. But, the survival data which

is available with our country is only for a limited duration (1 year, 3 years and 5 years) and that too for selected cancer sites only which at most may facilitate estimating of cancer cases for limited duration only. Estimation of prevalence for complete duration for various cancer sites including all-sites cancer still remains a challenge. An attempt is therefore made to develop a model approach to estimate the prevalence of cancer cases using Indian cancer Incidence and limited survival data.

The objectives of the present study were: *i*) Using the available cancer survival data of 1 year, 3 years and 5 years for selected cancer sites including all-sites of cancer, to identify a best fit model for each site; *ii*) The best fit model equation to be used to extend the cancer survival curve beyond 5 years say up to 30 years or till such period that survival becomes zero; *iii*) From the extended survival curve, to generate the proportion of survivals by single years say for 1-30 years duration; *iv*) The survival proportions as obtained above by single years are helpful in determining the limited duration prevalence or complete prevalence; *v*) To show the validity of extending survival curve beyond 5 years with the help of a live data; and *vi*) To calculate the prevalence of cancer cases for selected cancer sites using the results of the study.

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Materials and Methods

The prevalence is calculated in two major ways: i) Tumor based; and ii) Person based. In Tumor Based Cancer, an attempt is made to find out the number of primary cancers diagnosed among individuals living on a specified date while in Person Based Cancer, an attempt is made to find out the number of individuals living with cancer on a specified date. Since the personbased approach counts the number of individuals with cancer rather than the number of diagnosed tumors, it can underestimate the true burden of cancer. The person based prevalence is again categorized in two ways: i) Complete prevalence; and *ii*) Limited duration prevalence. The Complete Prevalence represents the proportion of people alive on a certain day who previously had a diagnosis of the disease, regardless of how long ago the diagnosis was, or if the patient is still under treatment or is considered cured. The registries with long duration of working (more than 30 years) and good follow-up facilities could only give the complete prevalence. The registries with short duration of working say 15-20 years can at-most provide the information on Limited Duration Prevalence. It represents the proportion of people alive on a certain day who had a diagnosis of the disease, within the past 'X' years. Prevalence can be examined over various durations of time say 5 years, 10 years or 15 years.

In a Scientific Report (N0. 162) of IARC, the registries of Bhopal, Chennai, Karunagappally and Mumbai provided their survival rates for three selected periods (1, 3 and 5 years) and for 16, 20, 22 and 28 sites, respectively. Three sites each were identified for males (Stomach, Lung and Mouth) and females (Breast, Cervix and Ovary) separately. In addition, cancer as a whole (All-sites) is also considered. The survival data was pooled separately for each selected site by periods for all the registries. Using the pooled-survival data of 1 year, 3 years and 5 years of selected cancer sites an attempt was made to identify a best fit model to describe the 1 year, 3 years and 5 years survival data. Then the best fit model equation was utilized to extend the survival curve beyond 5 years say up to 30 years or till such period that the survival becomes zero. From the extended survival curve, the proportion of survivals by single years say for 1-30 years duration is determined. The survival proportions so obtained by single years in combination with the knowledge of prevailing incidence rates of cancers are helpful in determining the life time prevalence or complete prevalence.

For calculation of prevalence, for the selected cancer site, it is assumed that the cancer incidence rate for the registry remains constant over the years and the incidence cases of the registry are 100,000 for the base year 2001. Further, the incidence cases are expected to grow proportionately to the population growth rate (16.34% decadal growth rate). Then, applying the survival proportions and the incidence estimates for the years say 2001-2030, the prevalence figures are estimated. The prevalence to incidence ratio is also calculated for each single year till such time that it almost become constant. Such a P/I ratio is termed as stabilized P/I ratio. Then stabilized P/I ratio can be utilized to multiply the latest incidence cases to arrive at the point prevalence.

An attempt is also made to predict prevalence cases of selected cancer sites, utilizing the published data of incidence cases at India level for selected cancer sites and for selected periods (Takiar et al., 2009).

There are two points in the model approach which needs to be highlighted. First, it looks like a simulation technique used for calculation of prevalence. Second, the use of survival equation to estimate the survival proportions outside the actual range ie., beyond 5 years. It is therefore desirable to show that the model fitted in such a way is good and can be used to derive the prevalence of cancer for any given cancer site. To prove the point, it is essential that the model approach is to be applied to a long term follow up data of a certain cancer site and then its validity to be established. Fortunately, 18 years follow up data on incidence and mortality of cervix cancer was available from Barshi cancer registry. From the incidence and mortality data, the actual survival data will be generated for the period 1988-2006 and thus the actual prevalence cases will be determined for each single year. Then, using the first five year survival data and best fitted model equation a survival curve will be generated for the period 1988-2006 and prevalence will be determined for the entire period by single years and will be compared with that of actual prevalence at each point. A non-significant chi-square, derived from actual and fitted values, will prove that the model fitted is good and can be used to predict survival and thereby prevalence for the desired period.

Results

The absolute percentage survival by different years and by different cancer registries is provided in Table 1. The survival for 1 year varied between 55.2% in the registry of Mumbai to 62.3% in the registry of Bhopal. The 3 years survival did not show much variation between the registries (34.0-36.1%). However, the 5 years survival varied between 25.4% in Karunagappally to 28.1% in the registry of Mumbai. The pooled absolute % survival was observed to be 55.5%, 35.4% and 27.8% for the duration of 1 year, 3 years and 5 years, respectively. With the help of SPSS, a suitable curve was fitted and shown in Figure 1. The type of equation and the respective constants are also shown in Figure. The equation is termed as the best fit equation. It can be seen that the observed and fitted values are quite close to each other suggesting the fit is good.

With the help of the best fit equation, the survival proportions are estimated for 1 year to 26 years and shown in Table 2. The estimated survival proportion is 0.553 for first year, 0.432 for second year, 0.362 for third year and so on. The survival proportion became zero for the year 24.

An approach used for calculation of prevalence is shown in Table 3. The first row in the table, show the cancer incidence cases which are assumed for the years 2001-2005. The selected years are shown in second row. The years for which prevalence is to be calculated is shown in second column. The corresponding survival proportions are shown in first column. Considering the incidence cases for the year 2001 are 100000 and using the survived proportions, the survived cases for the years 2001-2005 can be estimated to be 55259, 43209, 36361, 31160 and 27281, respectively. Similarly, for the year 2002, the incidence cases are 101634 and the survived from this for the years 2002-2005 are 56162, 43915, 36752 and 31669, respectively. The prevalence for the year 2001 will be 55259 while for year 2002, it will be 43209+56162=99371; for the year 2003, it will be 36161+43915+57080=137156. Finally, the prevalence for the year 2005 will be 200627.

In Table 3, the incidence as well as the demonstration of calculation of prevalence of cancer for the year 2001-2005 is shown. The similar calculations for the year 2006-2024 are extended and complete calculations are shown in Table 4.

The prevalence (P) to incidence (I) ratio calculated for 2001-2024 for India is shown separately in Table 5. The ratio appears to stabilizing to 3.42 after the year 2022.

Based on the follow-up data of Barshi registry on the incidence and mortality cases of cervix for the period 1988-2006, the prevalence figures were calculated for each year and shown in second and sixth columns (Table 6). Following the survival of 1 year, 3 years and 5 years from the above data, as described earlier, a survival curve was generated and estimated prevalence figures were arrived for selected years and shown in third and seventh columns. The actual and estimated prevalence figures showed no significant variation from each other. The overall non-significant chi-square value suggests that the fit is good.



Figure 1. Observed and Fitted Absolute % Survival, All Sites Cancers



Figure 2. Observed and Fitted Values-cervix Data, Barshi (1988-2006)

The actual and fitted prevalence figures are also shown in Figure 2.

The percentage absolute survival of selected cancer sites, pooled for all selected cancer registries, is shown for 1 year, 3 years and 5 years period in Table 7. The 5 years pooled survival for the cancer sites of Breast, Cervix, Ovary, Lung, Stomach and Mouth was 41.6%, 43,7%, 23.6%, 7.0%, 8.2%, 31.4% respectively.

Following the procedure described earlier, the incidence and prevalence figures were generated for selected cancer sites with the help of suitable survival curves and prevalence to Incidence ratios are calculated for different years but shown for years which are multiple of five (5, 10, 15, 20, 25, 30, 35) in Table 8. The P/I ratio for the cancer sites of breast, cervix, ovary, stomach, lung and mouth for 5 years duration was 2.87, 2.89, 1.84, 0.77, 0.69 and 2.12 respectively. Similarly, the respective life time figures for above sites were 4.90, 5.33, 2.75, 1.40, 1.37 and 4.04 respectively. For All sites, the ratio for 5 year, 10 years, 15 years and life time was 1.88, 2.75, 3.19 and 3.42, respectively.

Considering the above stabilized P/I ratios for selected cancer sites and with the knowledge of cancer incidence cases for India, the prevalent cancer cases are calculated for India for selected three periods and shown in Table 9. In India, by the year 2020, the prevalent cancer cases of breast, cervix and ovary are estimated to be 605.1, 657.1

Table 1. Percentage Survival of Cases by DifferentRegistries and Different Years (1990-1999)

Registry	Period of study	No. of sites	Cases	1 year	3 years	5 years
Bhopal	1991-1995	16	1863	62.3	35.6	27.9
Chennai	1990-1999	20	22598	55.3	34.0	27.4
Karunagpal	ly 1993-2001	22	1601	59.3	34.3	25.4
Mumbai	1992-1999	28	46162	55.2	36.1	28.1
Pool	ed over all Regi	stries	72224	55.5	35.4	27.8

*Sankarnarayan R and Swaminathan R (2011): Cancer Survival in Africa, Asia, the Caribbean and Central America, IARC Scientific Publications No. 162

Table 2. Estimated Survival Proportions by Differentyears-All Sites Cancers

Year	Absolute % Survival	Year	Absolute % Survival
1	0.553	14	0.094
2	0.432	15	0.082
3	0.362	16	0.071
4	0.312	17	0.060
5	0.273	18	0.050
6	0.241	19	0.041
7	0.214	20	0.032
8	0.191	21	0.023
9	0.171	22	0.015
10	0.152	23	0.008
11	0.136	24	0.000
12	0.121	25	-0.007
13	0.107	26	

Table 3. Calculation of Prevalence Based on Survival Pattern* Seen in India

Survival proportion	Incidence [®] Year	100000 2001	101634 2002	103296 2003	104984 2004	106700 2005	Prev (P)	Inc (I)	P/I
0.553	2001	55259ª					55259	100000	0.55
0.432	2002	43209 ^b	561621				99371	101634	0.98
0.362	2003	36161°	439152	570801			137156	103296	1.33
0.312	2004	31160 ^d	367523	446342	580131		170559	104984	1.62
0.273	2005	27281°	316694	373533	453632	589611	200627	106700	1.88

^aIncidence*0.553; ^bIncidence*0.432; ^cIncidence*0.362; ^dIncidence*0.312; ^cIncidence*0.273

P/I		0.553	0.978	1.328	1.625	1.880	2.103	2.297	2.468	2.618	2.749	2.865	2.966	3.053	3.129	3.195	3.250	3.296	3.334	3.365	3.388	3.405	3.416	3.421	3.421
Inc (I)		100000	101634	103296	104984	106700	108444	110216	112017	113848	115709	117600	119522	121476	123461	125479	127530	129614	131732	133885	136074	138298	140558	142855	145190
Prev (P)		55259	99371	137156	170559	200627	228016	253174	276421	298002	318103	336877	354444	370907	386351	400849	414460	427239	439236	450487	461028	470898	480120	488719	496721
34 103296 104984 106700 108444 110216 112017 113848 115709 119522 121476 123461125479 127530 129614 131732 133885 1360741 38298 140558142855145190 Previ 32 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015 2016 2017 2018 2019 2020 2021 2022 2023 2024		552.	15 57080	13715 44634 58013	50 37353 45363 58061 [705:	26 32187 3763 46104 50055 20062	15 28180 32713 3533 4555 60004	31 24906 2541 33347 30314 47634 61800 25315	2 22138 2513 20108 3721 30525 4800 2011	29800 11 11 11 12 20 20 20 20 20 20 20 20 20 20 20 20 20			8 [410] 1 1000 2000 2001 2001 2001 2001 2001	37090 3701 3701 3701 3702 3707 3707 3707 3707 3707 3700 3700	5: 1107 15:21 102 15:21 15:20 15:000		61446 (2002) 2000 2000 2000 2000 2000 2000 20	5 7.93 5.00 1010 1151 13204 15005 1542 2512 25203 2515 5519 5517 1523 1525 1522 25203 2517 25275 25203 2517 2527	5 60/4 7412 2020 1014 1026 1024 1240 1244 12412 2010 2242 35081 30/99 40110 56005 72794 43023 43923	0 5178 6306 7533 6973 10240 11050	3 4007 553 600 755 000 755 000 152 1575 1576 1571 2033 23214 26459 30254 34791 40387 47635 57851 75193 46102	2 2020 240 2410 2500 2410 2500 1244 15950 15953 1204 20127 23593 28892 30749 33359 41047 48414 58797 76422 47089	2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	4 12/2 24769 28232 32281 37122 43093 5023 6/28 8038 9468 11033 12753 14652 16759 19112 21760 24769 28232 32281 37122 43093 50827 61727 80231 49672
00 10163 01 2007	59	39 56162	51 43915	50 36752	31 31669	11 2772(31 24505	10 21781	52 19422	31 17341	74 15480	51 13796	12258	32 10844	12 9535	0 8316	1176	3 6105	3 5095	1 4139	3 3233	4 2371	1540	141 C	5
dence 1000 ear 200	01 552	02 4320	03 361(04 3110	05 2728	06 241	07 2145	191 80	09 1706	10 1523	11 1357	12 1206	13 1067	14 938	15 818	16 706	17 600	18 501	19 407	20 318	21 233	22 152	73 75		5
ival Incie ortion Ye	259 20	20 20	61 20	60 20	381 20	11 20	31 20	10 20	162 20	31 20	74 20	61 20	70 20	82 20.	82 20	60 20	06 20	13 20.	73 20	81 207	33 200	24 200	52. 202	12 203	- F0-
Prope	0.552	0.432	0.361	0.311	0.272	0.241	0.214	0.191	0.170	0.152	0.135	0.120	0.106	0.093	0.081	0.070	0.060	0.050	0.040	0.0318	0.023	0.015	0.007	0 000	

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| Table 5. Prevalence to Incidence Ratio by Different Years

					-		
Year	P/I	Year	P/I	Year	P/I	Year	P/I
2001	0.55	2007	2.3	2013	3.05	2019	3.36
2002	0.98	2008	2.47	2014	3.13	2020	3.39
2003	1.33	2009	2.62	2015	3.19	2021	3.4
2004	1.62	2010	2.75	2016	3.25	2022	3.42
2005	1.88	2011	2.86	2017	3.3	2023	3.42
2006	2.1	2012	2.97	2018	3.33	2024	3.42

Table 6	. Validation	of Calculation	of Prevalence	by
Fitting (the Apropria	ate Model		

	0						
Year	Actual	Prevalence	Chi-	Year	Actual	Prevalence	Chi-
	Prevalence	by model	sqaure		Prevalence	by model	sqaure
1988	29	27	0.14	1998	214	197	1.35
1989	49	50	0.02	1999	215	212	0.04
1990	71	71	0	2000	222	223	0
1991	99	96	0.09	2001	231	238	0.21
1992	134	116	2.42	2002	245	247	0.02
1993	144	130	1.36	2003	243	250	0.2
1994	179	150	4.7	2004	256	267	0.47
1995	192	171	2.3	2005	271	280	0.3
1996	200	180	2	2006	284	289	0.09
1997	202	187	1.11	Tota	l X ² =16.82	2, p value=	0.54

Table 7. Percentage Survival of Cases of SelectedCancer Sites by Different Years-Pooled for fiveRegistries (1990-1999)

Cases	1 years	3 years	5 years
10812	78.5	58.2	41.6
9376	76.2	59.5	43.7
2941	53.3	37.8	23.6
5693	29.5	10.4	7.0
5038	33.6	10.5	8.2
4063	61.6	40.5	31.4
	Cases 10812 9376 2941 5693 5038 4063	Cases 1 years 10812 78.5 9376 76.2 2941 53.3 5693 29.5 5038 33.6 4063 61.6	Cases1 years3 years1081278.558.2937676.259.5294153.337.8569329.510.4503833.610.5406361.640.5

*Source: Sankaranarayanan R and Swaminathan R (2011)

Table 8. Prevalence to Incidence Ratio by DifferentCancer Sites and Periods (5-30 years)

Year	All sites	Breast	Cervix	Ovary	Stomach	Lung	Mouth
5	1.88	2.87	2.89	1.84	0.77	0.69	2.12
10	2.75	4.06	4.22	2.45	0.99	0.91	3.13
15	3.19	4.56	4.83	2.65	1.12	1.05	3.68
20	3.39	4.77	5.12	2.72	1.21	1.15	3.95
25	3.42	4.85	5.25	2.74	1.29	1.24	4.04
30	-	4.89	5.31	2.75	1.35	1.31	-
35	-	4.9	5.33	2.75	1.4	1.37	-
Life time	3.42	4.9	5.33	2.75	1.4	1.37	4.04

Table 9. Estimated Prevalence Cases for SelectedCancer Sites Utilzing Stabilized Ratio for India (2010-2020)

Site of	Inci	dence cas	ses*	P/I	Prevalence				
cancer	2010	2015	2020	ratio	2010	2015	2020		
Breast	90,659	106,124	123,634	4.90	444,229	520,008	605,807		
Cervix	103,821	113,138	123,291	5.33	553,366	603,026	657,141		
Ovary etc	. 30,482	33,218	36,199	2.75	83,826	91,350	99,547		
Males									
Lung	44,301	47,622	51,193	1.40	62,021	66,671	71,670		
Stomach	25,831	27,767	29,850	1.37	35,388	38,041	40,895		
Mouth	30,920	38,380	46,784	4.04	124,917	155,055	189,007		
All sites**	979,78	7 1.060.88	391.148.75	8 3.42	3.350.8723	3.628.240	3,928,752		

*Takiar R et al. (2010), **ICMR Bulletin (2010) 100.0

and 99.5 thousand respectively. Similarly, the prevalent among males by the year 2020 will be 71.7, 40.9 and 189.0 thousand respectively. By the year 2020, the overall prevalent cancer cases in India are estimated to be rising to 3.9 fmllions.

Table 4. Calculation of Prevalence based on Survival pattern* seen in India

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50.0

20.3

54.2

Discussion

Prevalence of cancer is a statistic of primary interest in public health. It identifies the level of burden of cancer on the population and health care system. It is taken as a function of both the incidence of the disease and survival. In India, while reasonably good incidence data is available, still mortality data is far from being reliable and satisfactory. The variation seen in MI ratio of various Indian registries further substantiates this fact: NCR \$00.0 continuous incidence data and five year survival data, the (2010). In the absence of good follow up facilities at the registry level, the correct assessment of prevalence of cancer is a distant dream.

under different conditions is well documented (Merrill et al., 2000; Kruijshaar et al., 2002; Kruijshaar et al., 2003; Nacul et al., 2007). Incidence-prevalence-mortality 50. Qevels. Further the approact advocated in the present (IPM) models have been used for improving estimates of disease epidemiology. The discrepancies between model estimates and observations are sometimes caused both by 25.01-5 years survival data to generate prevalence figures for the data inaccuracies and change in the trends of incidence or mortality Kruijshaar et al. (2002). In SEER data, also, models are used to estimate the Cancer prevalence Merrill et al. (2000). Disease models describing the relationship between incidence, prevalence and mortality are also used to detect data problems or to supplement missing data Kruijshaar et al. (2003). The model can be used to estimate population prevalence of COPD from large general practices to national level, and as a tool to identify areas of high levels of unmet needs for COPD priority health actions Nacul et al. (2007). A robust and well-researched disease prevalence model can help Health Planners to assess the true needs of their community, calculate the level of services needed and invest the appropriate level of resources for prevention, early detection, treatment and care.

The model approach used in the paper allow us to estimate the prevalence for different cancer sites and for different time periods say for multiples of 5 years like 5, 10, 15, 20, 25, 30 and 35 years. The exercise carried out in the present paper further showed that for all the cancer sites, a year comes in a period (up to 35 years) when prevalence to incidence ratio become constant or do not show appreciable changes. The fact that PI ratio becomes almost constant or stabilizes after certain duration for all the cancer sites shows that from the knowledge of incidence, the prevalence can be calculated. The stabilized P/I ratio for the cancer sites of breast, cervix, ovary, stomach, lung and mouth for life time was observed to be 4.90, 5.33, 2.75, 1.40, 1.37 and 4.04 respectively. The variation in PI ratio by different sites is logical as they have different survival rates. The higher the survival rate, the higher the PI ratio. Since, the stomach and lung cancer are known to have low survival rates so their PI ratios are also shown to be lower as compared to other sites.

The exercise based on Barshi cervix data proved the following points beyond doubt that: i) From the best fit survival curve to 1, 3 and 5 years survival data, the curve can be extended beyond 5 years; ii) From the survival curve, the survival proportions can be decided for each single year between 1-18 years; iii) In combination of knowledge of incidence and mortality the prevalence figures can be calculated for each single year; iv) The model generated prevalence figures beyond 5 years and for life time were found to be comparable with actual prevalence figures; v) The model approach used in the present paper is validated for its prediction power, adequately with the support of actual data. Since the requirement of the model approach to estimate the prevalence figures for limited duration as well as for life time prevalence is only the knowledge of

approachevill be creteffective. Realizing the fact that most of the Indian cancer The use of models in assessment of different diseases 75.0 registries are not having good full advocate the use of **P** ratio values provided by us to be used for generating of prevalence figures at their registry paper can be replicated anywhere in the world with the knowledge of current incidence, population figures and their country level 38.01 registry level.

In conclusion, the validitation the model approach to calculate prevalence is demonstrated with the help of Qurvival data of Barshi registry for Cervix cancer, available for the period 1988-2006. Given the incidence of cancer at India leve for at the gegistry level, the overall prevalence can be oblained simply by multiplying the incidence by a factor of 3.42. Simgarly, for the cancer of breast, cervix and ovary the multip tying factor to get lifetime prevalence from the knowledge of incide will be 4.9, 5.33 and 2.75, respectively. In the case of males, for the cancer of lung, mouth and stornach, the multiplying factor will be 1.4, 1.37 and 4.04, respectively.

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