

Potential Years of Life Lost Due to Premature Mortality from Cancer in Karlovac County (Croatia), 2006–2010

Biserka Hranilović¹ and Ervin Jančić²

¹ Department of Epidemiology, Institute of Public Health County of Karlovac, Karlovac, Croatia

² Department of Neurology, General Hospital Karlovac, Karlovac, Croatia

ABSTRACT

The aim of this paper was to estimate cancer burden in the Karlovac County using potential years of life lost due to cancer and contribute to setting priorities in cancer control at the local level. Potential years of life lost (PYLL) is an important public health mortality indicator that goes into the category of social indicators and has a great role in the process of health care planning in defining priorities for the prevention of premature death. In this paper PYLL is defined as the number of years of life lost by persons who died in the age of 1–75. In the period 2006–2010 there were 4118 death in Karlovac County in the 1–75 age group which makes 48204 potential years of life lost, where 33856.5 (70.24%) PYLL referred to men, and 14347.5 (29.76%) PYLL to women. Cancer was responsible for the largest proportion of premature death (33.17%), in which 62.90% of premature death referred to men and 37.10% to women. Lung cancer was the leading cause of premature death due to cancer for men (31.04% of PYLL due to cancer) and the breast cancer for women (17.95% PYLL due to cancer). In the observed period cancer caused the shortening of the average life span of 11.9 years, out of which the biggest loss was caused by melanoma (18.7 years). Population health measures based on PYLL are useful for measuring and monitoring the impact of local efforts to reduce premature mortality.

Key words: potential years of life lost, premature mortality, cancer

Introduction

Cancer is the second leading cause of death in Croatia as well as in Karlovac County and represents one of major public health problems. It is not only a problem for the elderly, but is also an important cause of premature mortality. To setting priorities of cancer control it is necessary to quantify the cancer burden.

Mortality rates do not fully account for the burden of premature mortality. Potential years of life lost (PYLL) give more importance to the causes of death that occurred at younger ages than those occurred at older ages. In comparison to standard mortality measures PYLL are therefore a more exact tool for «quantifying» the burden of mortality¹.

PYLL is an important public health mortality indicator that goes into the category of social indicators and has a great role in the process of health care planning in defining priorities for the prevention of premature death².

The aim of this paper was to estimate cancer burden in the Karlovac County use PYLL due to cancer and contribute to setting priorities in cancer control at the local level.

Materials and Methods

Mortality data for 5-years age group obtained from the Croatian Bureau of Statistics for the period 2006–2010. Causes of death were coded according to the International Classification of Diseases, 10th Revision (ICD-10).

As an indicator of premature mortality, we used the potential years of life lost (PYLL) and the premature mortality was defined as death before the age of 75. The cut off 75 was used as an approximate life expectancy of inhabitants in Karlovac County. Infant deaths (under 1 year of age) were excluded because most cases of infant mortal-

ity are due to causes specific to this early period of life and often have a different etiology.

The method of calculating PYLL consists of a summation of the number of deaths at each age (between 1 and 75) multiplied by the remaining years of life up to age 75

The average of potential years of life lost (APYLL) was calculated dividing the PYLL by the number of deaths for each cancer. This parameter is interesting because it provides the measure of burden of cancer to the individual patient. It shows, on average, how much the patient's life is likely to be shortened by their cancer³.

Results

In the period 2006–2010 there were 4118 deaths in Karlovac County in the 1–75 age group, where 2623 or 63.70% referred to men, and 1495 or 36.30% to women. Cardiovascular diseases were responsible for 41.11% of all deaths. Cancer was the second leading cause of death with a share of 32.71% and external causes of death were in the third place with 8.91% of all deaths (Table 1).

PYLL, percentage of PYLL as well as the APYLL for the most common cancer sites are shown in Table 2. In the Karlovac County in the observed period 48204 of potential years of life were lost, or per year average 9640 PYLL. Men were responsible for a greater proportion of PYLL (70.24% or 33856.5 PYLL) while women accounted for 29.76% or 14347.5 PYLL. Cancer was responsible for the

TABLE 1.
PERCENTAGE OF DEATH AND PERCENTAGE OF PYLL FOR MAIN CAUSES OF DEATH, KARLOVAC COUNTY, 2006–2010

Cause of death	PYLL (1–75)		Death (1–75)	
	Total %	Total %	Total %	Total %
All causes	48204	100	4118	100
Cardiovascular diseases	14237.5	29.54	1693	41.11
Cancer	15991.5	33.17	1347	32.71
External causes of death	8677.5	18.00	367	8.91
Digestive diseases	3707.5	7.69	271	6.58
Respiratory diseases	985	2.04	110	2.67

largest proportion of premature death and accounted for 33.17% or 15991.5 PYLL, in which 62.90% (10059 PYLL) of the death referred to men and 37.10% (5932.5 PYLL) to women.

Lung cancer was the leading cause of premature death due to cancer for men (3122.5 PYLL or 31.04%), and also the second cause of PYLL for woman (815 PYLL or 13.74%). The leading cause of premature death due to cancer for women were breast cancer with 1065 PYLL (or 17.95%). Due to the premature death of colorectal cancer there were 1790 PYLL (11.19%), where 1032.5 (10.26%) PYLL referred to men, and 757.5 (12.77%) PYLL to women.

TABLE 2.
LEADING CAUSES OF PREMATURE DEATH DUE TO CANCER IN KARLOVAC COUNTY, 2006–2010

Cancer sites	Total			Males			Females		
	PYLL	%PYLL	APYLL	PYLL	%PYLL	APYLL	PYLL	%PYLL	APYLL
All sites	15991.5	100	11.9	10059	29.71	11.9	5932.5	41.35	11.9
Lung	3937.5	24.62	12.1	3122.5	31.04	12.0	815	13.74	12.7
Colorectal	1790	11.19	9.6	1032.5	10.26	9.1	757.5	12.77	10.4
Breast							1065	17.95	13.3
Stomach	1035	6.47	11.5	732.5	7.28	11.6	302.5	5.10	11.2
Brain+CNS	742.5	4.64	15.2	447.5	4.45	14.4	295	4.97	16.4
Pancreas	652.5	4.08	9.2	410	4.08	10.8	242.5	4.09	7.3
Leukemia	542.5	3.39	15.5	400	3.98	16.7	142.5	2.40	13.0
Ovary	542.5						542.5	9.14	16.4
Esophagus	467.5	2.92	12.6	375	3.73	13.4	92.5	1.56	10.3
Kidney	440	2.75	12.2	397.5	3.95	12.8	42.5	0.72	8.5
Melanoma	392.5	2.45	18.7	180	1.78	18.0	212.5	3.58	19.3
Lymphoma	370	2.31	13.2	175	1.74	12.5	195	3.29	13.9
Liver	345	2.16	9.6	255	2.54	9.8	90	1.52	9.0
Prostata	230			230	2.29	5.8			
Cervix	175						175	2.95	17.5

In the observed period cancer caused the shortening of the average life span of 11.9 years, same for both sexes. The largest average loss of years was caused by melanoma (18.7 years), for men 18.0 years and for women 19.3 years.

Discussion

This paper presents an estimation of the burden of premature mortality due to cancer in Karlovac County using PYLL, percentage of PYLL and AYLL.

In the observed period 2006–2010 cardiovascular diseases had a higher proportion in total mortality at the age 1–75, but cancer was the leading cause of premature death. Higher share of premature mortality due to cancer was in men and the largest proportion of these premature deaths were caused by lung cancer. Lung cancer was the leading single cancer site responsible for by far more PYLL than any other cancer, followed by colorectal cancer and female breast cancer. Those three cancer sites were responsible for 42.48% of all premature mortality due to cancer. Many of these deaths can be delayed or avoided by the use of appropriated intervention⁴.

Intensive measures of primary and secondary prevention of lung cancer, colorectal cancer and female breast cancer through health promotion, increasing response to the national screening programmes as well as the timely and appropriate treatment can reduce PYLL which will be reflected in reduction of premature mortality^{5–10}.

All of cancers that occur in younger age like brain, leukemia, ovary and cervix are responsible for greater shortening of average life span. For example, prostate cancer, which is one of the most common cancer sites in men has less impact on average life shortening because it affects relatively older men and it had the lowest APYLL of any of cancers, only 5.8 years. Melanoma is significant because the percentage PYLL is relatively small for this cancer (2.45% of PYLL) whereas the APYLL of 18.0 years for men, and 19.3 years for women indicate that the impact per patient is high. Considering that melanoma is most common in old age our data obtained require for further monitoring. The use of APYLL to indicate the impact of cancer type on individual patient and may be helpful where individual needs are important.

One of the main functions of the local public health department is to conduct public health surveillance, including population health assessments. Population health

measures based on PYLL are useful for measuring, ranking and monitoring the leading causes of premature death for a local geographic area⁶.

Premature mortality is a major public health concern but there has been little consensus on how it should be defined and reported^{7,9}. For measuring premature mortality and calculating years of life lost some authors use life expectancy at birth, while others have arbitrarily selected cut off age (for example 65, 70 or 75 years) and also some authors have chosen to exclude infant deaths while others have not.¹ We have used an upper cut off age 75 (excluding infant deaths) because it is easy to calculate, it is available down to small area level and some papers in Croatia used the same method of calculation⁸.

In future work, to determine priorities and to help in health planning as well as to monitor and evaluate the impact of local efforts to reduce premature mortality in Karlovac County it is necessary to take into account the longer time period. To monitor the trends of premature mortality it is necessary to use the PYLL rates and to compare different areas it is necessary to use PYLL age-standardised rate.

The agreement on the definition of premature mortality as well as agreement on the method of calculating years of life lost would enable mutual comparison of different geographical areas, both at local and at national level.

Conclusion

The presented data for premature mortality from cancer shows that in the majority of cases it is caused by preventable deaths. A large proportion of premature death due to cancer, particularly common cancer, can be avoided by modifying behaviours. The analysis showed that there is a need for more intensive measures in primary and secondary prevention, as well as the improvement in treatment.

Despite some of limitations, population health measures based on PYLL are useful for measuring and monitoring the impact of local efforts to reduce premature mortality.

Improving quality of data and analysis of all mortality indicators are useful to monitor the effects of screening programmes, efforts at earlier diagnosis and treatment, and effects of environmental.

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B. Hranilović

*Institute of Public Health County of Karlovac, V.Mačeka 48, 47 000 Karlovac, Croatia
e-mail: biserka.hranilovic@ka.t-com.hr*

POTENCIJALNO IZGUBLJENE GODINE ŽIVOTA ZBOG PRIJEVREMENE SMRTNOSTI OD KARCINOMA U KARLOVAČKOJ ŽUPANIJI (HRVATSKA), 2006–2010

SAŽETAK

Cilj rada bio je procijeliti breme karcinoma u Karlovačkoj županiji koristeći potencijalno izgubljene godine života zbog karcinoma i doprinijeti utvrđivanju prioriteta u kontroli karcinoma na lokalno razini. Potencijalno izgubljene godine života su važan javnozdravstveni indikator koji ubrajamo u kategoriju socijalnih indikatora i ima značajnu ulogu u procesu planiranja u zdravstvenoj zaštiti kod definiranja prioriteta u prevenciji prijevremene smrtnosti. U radu su potencijalno izgubljene godine života definirane kao broj izgubljenih godina života za osobe koje su umrle u dobi 1–75 godina. U razdoblju od 2006 do 2010 bilo je 4118 umrlih u dobi 1–75 godina što je uzrokovalo 48204 potencijalno izgubljene godine života, gdje se 33856.5 (70,24%) odnosi na muškarce i 14347.5 (29,76%) na žene. Karcinomi su bili odgovorni za najveći udio prijevremenih smrti (33,17%), od čega se 62,90% odnosi na muškarce i 37,10% na žene. Karcinom pluća je bio vodeći uzrok prijevremene smrtnosti zbog karcinoma kod muškaraca (31,04%) i karcinom dojke kod žena (17,95%). U promatranom razdoblju karcinomi su uzrokovali skraćenje prosječnog životnog vijeka za 11.9 godina, od čega je najveći gubitak uzrokovan melanomom (18,7 godina). Populacijske mjere zdravlja temeljene na potencijalno izgubljenim godinama života su korisne za mjerenje i praćenje učinka u smanjenju prijevremene smrtnosti na lokalnom nivou.