

RESEARCH ARTICLE

Gynaecological Cancer Mortality in Serbia, 1991-2010: A Joinpoint Regression Analysis

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Abstract

This descriptive epidemiological study aimed to analyse the mortality trends from gynaecological cancer in Serbia. Average annual percentage of change (AAPC) and the corresponding 95% confidence intervals (CIs) were computed for trend using joinpoint regression analysis. Nearly 25,000 gynaecological cancer deaths occurred in Serbia during the 1991-2010 period, with the average annual age-standardised mortality rate being 17.2 per 100,000 women. Increase of mortality was observed for cancer of the vulva and vagina (AAPC=+1.3%, 95% CI=0.1 to 2.6), ovarian cancer (AAPC=+0.8%, 95% CI=0.4-1.3) and for cervical cancer (AAPC=+0.7%, 95% CI=0.3 to 1.1). Mortality rates for gynaecological cancer overall declined in women aged 30-39 years, but mortality was increased in middle-aged women (for cervical cancer) and in the elderly (for ovarian cancer). Improvements to and implementation of the national cervical cancer screening programme conducted in 2013 and expected to be finalised in the following years throughout Serbia should contribute to improvement.

Keywords: Gynaecological cancer - mortality trend - joinpoint regression analysis - Serbia.

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Introduction

Gynaecological cancers (including the malignant neoplasms of cervix, uterine body and ovary) accounted for 489,025 deaths and were deemed accountable for 14.6% of all cancers among women in 2008 worldwide (International Agency for Research on Cancer, 2008; Forouzanfar et al., 2011; Jemal et al., 2011). Developing countries accounted for approximately 75% of the gynaecological cancer deaths (International Agency for Research on Cancer, 2008; Jemal et al., 2011). Geographic variations in cancer mortality for certain gynaecological sites have also been noticed (Arbyn et al., 2008; International Agency for Research on Cancer, 2008; Jung et al., 2010).

The most commonly diagnosed gynaecological cancer is cervical cancer, the fourth leading cause of cancer death in women worldwide, accounting for 8.2% (275,100) of the total cancer deaths among women in 2008 (International Agency for Research on Cancer, 2008). In recent decades, cervical cancer is a major public health problem in developing countries (Arbyn et al., 2008; Kimman et al., 2012; D'Souza et al., 2013), while in most of developed countries mortality from cervical cancer has been steadily declining (de Kok et al., 2011; Howlader et al., 2013). Worldwide, cervical cancer was the second most common cause of death among all female cancers in young women 15-44 years of age (Arbyn et al., 2008).

Overall mortality rates for gynaecological cancers declined between 1992 and 2010 in the United States,

but progress has been uneven among the cancer types (Howlader et al., 2013). In all races, mortality from cervical and ovarian cancer has been on decline since 2001 by -1.7% and -1.6% per year, respectively. In the same period, mortality from cancer of the uterine body and uterus, part unspecified, increased by +0.4% per year. Mortality from uterine and ovarian cancers has been steadily declining over the last few decades in some European countries (Austria, Germany, Netherlands, Switzerland, Sweden), while mortality rates are still increasing in a few southern and eastern European countries (Latvia, Lithuania, Romania, Croatia) (Arbyn et al., 2008; Arbyn et al., 2010; La Vecchia et al., 2010; Kelava et al., 2012).

Based on the GLOBOCAN 2010 estimates, mortality from gynaecological cancer ranks Serbia among countries with the highest death rates in Europe (International Agency for Research on Cancer, 2008). The aim of this study was to assess temporal changes in mortality rates of gynaecological cancer in Serbian population over the 1991-2010 period.

Materials and Methods

Data sources

The study comprised the female population of the Republic of Serbia (all ages), during the period 1991-2010, excluding the Autonomous Province of Kosovo and Metohia, for which the data have been unavailable since 1998. Data on women who died of gynaecological cancer

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Table 1. Gynaecological Cancer Mortality Rates per 100,000 Women in Serbia, Excluding the Autonomous Province of Kosovo and Metohia, in 1991-2010 period.

Year	All		Uterus		Ovary		Others*	
	No.	ASRs	No.	ASRs	No.	ASRs	No.	ASRs
1991	1074	16.8	719	11.2	290	4.7	65	1.0
1992	1136	17.5	783	12.1	286	4.5	67	0.9
1993	1136	17.2	746	11.4	312	4.7	78	1.0
1994	1158	17.5	771	11.5	334	5.2	53	0.7
1995	1135	16.8	742	11.0	330	4.9	63	0.8
1996	1098	16.5	732	11.0	291	4.6	75	1.0
1997	1166	17.1	770	11.4	311	4.6	85	1.1
1998	1198	17.3	806	11.7	311	4.7	81	1.0
1999	1161	16.5	782	11.3	320	4.5	59	0.8
2000	1146	16.6	761	11.1	304	4.5	81	1.1
2001	1235	17.4	791	11.5	356	4.9	88	1.0
2002	1247	17.4	853	12.1	318	4.6	76	0.8
2003	1206	16.3	784	10.7	329	4.6	93	1.0
2004	1247	17.0	796	11.0	348	4.9	103	1.1
2005	1274	17.2	821	11.2	369	4.9	84	1.0
2006	1332	18.3	832	11.5	406	5.7	94	1.0
2007	1353	18.2	829	11.3	390	5.3	134	1.4
2008	1284	17.7	812	11.4	377	5.2	95	1.0
2009	1264	16.6	763	10.1	412	5.6	89	0.9
2010	1318	17.7	783	10.8	416	5.5	119	1.4
Overall	24168	17.2	15676	11.3	6810	4.9	1682	1.0

*ASR-Age standardized rate (per 100,000 women, using world standard population); Other cancers were included cancer of vulva, vagina, placenta and of other and unspecified female genital organs.

Table 1. Joinpoint Regression Analysis*† (of age-specific and age-standardized rates) of Gynaecological Cancer Mortality Rates per 100,000 Women in Serbia, Excluding the Autonomous Province of Kosovo and Metohia, by age, in 1991-2010 period.

	Age					
	30-39	40-49	50-59	60-69	70+	All ages
All gynaecological cancers						
AAPC	-1.0*	0.3	0.6	+0.1‡	+0.6*	0.2
(95%CI)	(-1.8 to -0.1)	(-0.5 to 1.0)	(-0.1 to 1.2)	(-0.3 to 0.6)	(0.1 to 1.2)	(-0.1 to 0.4)
Cervical cancer						
AAPC	-0.2	+1.3*	+2.1*	-0.1	-0.2	+0.7*
(95%CI)	(-1.7 to 1.3)	(0.4 to 2.2)	(1.3 to 2.8)	(-0.8 to 0.7)	(-1.1 to 0.7)	(0.3 to 1.1)
Corpus uteri/NOS						
AAPC	-7.7*	-4.4*	-1.4*	-1.5*	-0.5	-1.8*
(95%CI)	(-10.5 to -4.8)	(-7.0 to -1.7)	(-2.7 to -0.1)	(-2.1 to -0.8)	(-1.7 to 0.8)	(-2.4 to -1.3)
Ovarian cancer						
AAPC	0.4	0.6	-0.1	+1.3*§	+2.5*¶	+0.8*††
(95%CI)	(-2.5 to 3.4)	(-0.4 to 1.5)	(-0.9 to 0.9)	(0.5 to 2.1)	(1.3 to 3.8)	(0.4 to 1.3)
Other cancers						
AAPC†††	-	0.9	2.8	1.2	1.9	+1.3*
(95%CI)		(-3.6 to 5.5)	(-0.4 to 6.0)	(-0.9 to 3.4)	(-0.3 to 4.1)	(0.1 to 2.6)

Statistically significant trend; †Joinpoint results are not shown for the age subgroups <30, because there were less than 10 cases in any year; average annual percent change; CI-Confidence interval; NOS-Cancer of uterus, part unspecified; other cancers include cancer of vulva, vagina, placenta and of other and unspecified female genital organs. ‡One joinpoint, for all gynaecological cancers in 60-69 years old women: Trend 1 (1991-2000): annual percent change (APC) (95% CI)=-1.1 (-2.3 to 0.0); Trend 2 (2000-2010): APC (95% CI)=+1.2(0.2 to 2.2). §One joinpoint, for ovarian cancer in 60-69 years old women: Trend 1 (1991-2002): (APC) (95% CI)=-0.7 (-2.0 to 0.7); Trend 2 (2002-2010): APC (95% CI)=+4.5*(2.3 to 6.8). ¶One joinpoint, for ovarian cancer in 70 and over years old women: Trend 1 (1991-1998): (APC) (95% CI)=-3.0 (-6.9 to 1.1); Trend 2 (1998-2010): APC (95% CI)=+5.2*(3.3 to 7.1). ††One joinpoint, for ovarian cancer trend in overall: Trend 1 (1991-2002): (APC) (95% CI)=-0.2 (-1.2 to 0.8); Trend 2 (2002-2010): APC (95% CI)=+2.5*(0.9 to 4.1); †††Joinpoint results are not shown for the 30-39 age subgroup, since there were less than 10 cases in any given year.

low rates in Northern America, Australia, some Middle Eastern countries (International Agency for Research on Cancer, 2008). In Europe, low rates are observed in the Scandinavia, Southern and Western Europe, while the highest mortality was observed in Romania and Serbia. A decline in the cervical cancer mortality recorded in most of developed countries, as Sweden (Bergstrom et al., 1999), England (Arbyn and Geys, 2002), Belgium (Bray

et al., 2005). Mortality from invasive cervical cancer in the United States of America decreased significantly in all races in the 2000-2010 period, by -1.3% per year in women younger 50 and decreased by -1.9% in women 50+ years old (Howlader et al., 2013). Downward mortality trend for cervical cancer in the United States of America and West and North European countries is associated with the introduction of an organised mass screening

Strengths and limitations of the study

This study provides the first nationwide estimates of gynaecological cancer mortality in Serbia in the last two decades. Mortality rates were based on the data that cover entire Serbia in general. As always, the important question is the reliability of the causes of death reported in the national statistics. Taking into account timeliness, completeness and coverage, the quality of the registration and classification of causes of death in Serbia was deemed moderate according to the assessment of the World Health Organization (Mathers et al., 2005). The relationship of the observed changes in mortality with some of the postulated risk factors for gynaecological cancers was also assessed.

We had no reliable data on incidence, treatment and survival of gynaecological cancers during the observed period. A further limitation is the lingering question whether and how much the increasing cervical cancer mortality in Serbia could be attributed to the lack of national screening. Finally, the lack of complete and precise data on presence of risk factors for gynaecological cancers occurrence, as and the considerable economic issues and insufficient health education in Serbia, made it impossible to examine their impact on the changes in the mortality.

In conclusion, our results showed the increased trend for cervical cancer, ovarian cancer and other gynaecological cancer mortality in Serbia. These unfavorable mortality trends indicates the extremely urgent need for the systematic improvement of both primary and secondary prevention measures, as well as the need for development of adequate resources and infrastructure for gynaecological cancer control in Serbia.

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