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Original scientific paper

Estimate of Cervical Cancer Incidence and Mortality Rate in Bosnia and Herzegovina

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A B S T R A C T

The exact incidence and mortality rate in Bosnia and Herzegovina are unknown as there are no National Cancer Register. The available data are mostly based on the estimation from neighboring countries. Therefore, the aim of this study was to present the preliminary but more accurate estimates of cervical cancer incidence and mortality rates in Bosnia and Herzegovina. The data on cervical cancer cases in Bosnia and Herzegovina were collected from different sources and varies depending on the size of the city or region. To calculate the crude rates for the period from 2000 to 2008, we used the Bosnian and Herzegovinian population census for 1991. Thus, the crude incidence rate in Sarajevo region is more equable (app. 30.4/100,000 women-year), while in Tuzla Canton it varied from 18.5 in 2005 to 4.8/100,000 in 2000. In Tuzla Canton, in the period 1993–2006, 27.1% of all women with cervical cancer were younger than 30. However, the exact crude incidence in Bosnia and Herzegovina could be even higher. Data from Tuzla Canton showed slight increase in mortality rate in the last 5 years (4.9/100,000), with the peak in 2007 (7.0/100,000). The presented data reflects the situation throughout Bosnia and Herzegovina and underline the necessity of the implementation of cervical cancer register and organized screening program.

Key words: *cervical cancer, incidence, mortality, Bosnia and Herzegovina*

Introduction

Cervical cancer is the second most common cancer in women worldwide, with the majority of cases (~80%) occurring in developing countries[1] where cervical cancer accounts for 15% of female cancers, with a risk before age 65 of 1.5%[2]. Cervical cancer is preventable, but most women in developing countries do not have access to effective screening programs. Despite the sufficient evidence for the effectiveness of screening by cytology in preventing cervical cancer, screening policies vary widely among European countries[3] and incidence is increasing in younger women[4].

Cervical cancer prevention in South-East Europe is hardly documented, in spite of the fact that it encloses the most affected countries of Europe[5]. Opportunistic screening was introduced in regular gynaecological practice in Bosnia and Herzegovina at the same time as in other republics of the former Yugoslavia. However, there are no population based cancer register nor cervical cancer or Pap test database in the country. In addition, there is no plan to establish a proper cervical cancer prevention program in Bosnia and Herzegovina.

According to the Globocan 2002[6] the estimated incidence for cervical cancer in Bosnia and Herzegovina was 18.7/100.000 women-year. In the study from 2007 of Arbyn and co-workers[7], which evaluated the burden of cervical cancer in 11 countries in the South-Eastern part of Europe (Albania, Bosnia and Herzegovina, Bulgaria, Croatia, Cyprus, Greece, FYROM (Former Yugoslavian

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Republic of Macedonia), Moldova, Romania, Serbia and Montenegro, and Slovenia) the cervical cancer incidence in Bosnia and Herzegovina was estimated to be 21.3/100.000 (crude incidence was 26.6/100.000).

Available data from Medline and PubMed about the cervical cancer incidence and mortality in Bosnia and Herzegovina are estimated data based on the incidence and mortality determined in the neighboring countries. The most recent mortality rates of cervical cancer in the study of Arbyn and co-workers[7] were derived from the published vital statistics, stored at the World Health Organisation (WHO) Mortality Database for all countries except Cyprus and Bosnia and Herzegovina. The mortality rate for Bosnia and Herzegovina was estimated by averaging rates from neighboring countries to be 8.0/100.000 (crude rate was 11.1/100. 000)[7].

Thus, the aim of this study is to present the first preliminary but accurate estimates on cervical cancer incidence and mortality rates in Bosnia and Herzegovina from data collected in several regions and cities throughout the country.

Materials and Methods

Data collection

Information about cervical cancer cases in Bosnia and Herzegovina was collected from different sources at hospital's or University clinical center's registries and Institute for Public Health. All cervical cancer cases were biopsy confirmed. The most detailed data was gathered in Tuzla Canton, from University Clinical Centre Tuzla and Institute of Public Health of Tuzla Canton. Only data for cervical cancer (ICD-10 code C53), without data on death associated to »Uterus not otherwise specified« (NOS) (ICD-10 code C55) are presented.

Cases of death from cervical cancer are likely to be overestimates since there are almost one hundred deaths per year from cancer of uterus NOS in Bosnia and Herzegovina and a proportion of these are probably due to cervical cancer as well. To calculate the crude rates for the period 2000–2008, we used the Bosnian and Herzegovinian population census for 1991. The lack of new census in Bosnia and Herzegovina and a number of migrations in post war period made it impossible to calculate the world age-standardized incidence rate.

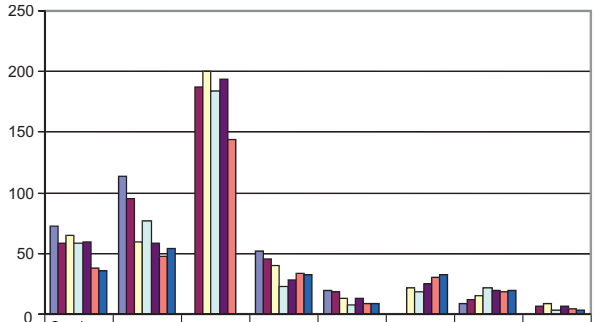
Statistical analysis

Methods of descriptive statistics were used. Crude incidence, as well as mortality rates, were calculated per 100.00 female citizens. Differences between the frequencies among groups were calculated using χ^2 test.

Statistical analyses were performed using GraphPad Prism 5 software (San Diego, California, USA) and probability values of $p<0.01$ were accepted as significant according to Bonferroni correction for 5 tests. Statistically significant differences are presented as: $p<0.05$; $p<0.01$ and $p<0.001$.

Results

As data were collected from various sources, the time period is not uniform (Figure 1).



	Sarajevo Canton **	Tuzla Canton**	Banja Luka**	USK**	Mostar East	Mostar West	Travnik*	Nova Bila *
2000	72	114		52	20		9	
2001	58	95	187	45	18		12	6
2002	65	59	200	40	13	22	15	9
2003	58	77	184	23	8	18	22	3
2004	59	58	194	28	13	25	20	6
2005	38	48	144	34	9	30	18	4
2006	36	54		33	9	33	19	3

*Fig. 1. Number of new cervical cancer cases in different regions and towns in Bosnia and Herzegovina in the period from 2000 to 2006; *data from local hospitals gathered in Travnik, Nova Bila, small towns in the Central Bosnia, and Mostar East and West, respectively; **data from bigger regions, the University Clinical Centers of Sarajevo Canton and the Tuzla Canton, and data from the Clinical Centre and the Regional Hospital of Banja Luka and USK, respectively.*

Figure 1 Number of new cervical cancer cases in different regions and towns in Bosnia and Herzegovina in the period from 2000 to 2006; *data from local hospitals gathered in Travnik, Nova Bila, small towns in the Central Bosnia, and Mostar East and West, respectively; **data from bigger regions, the University Clinical Centers of Sarajevo Canton and the Tuzla Canton, and data from the Clinical Centre and the Regional Hospital of Banja Luka and USK, respectively.

Sarajevo and Tuzla are University Clinical Centers and the biggest regions in Federal part of Bosnia and Herzegovina with 465 000 and 498 549 inhabitants, respectively. Banja Luka is the biggest city in the Republika Srpska of Bosnia and Herzegovina with 195 692 inhabitants and it has a regional Clinical Center. The East and the West Mostar (75 865 inhabitants), Travnik (70 047 inhabitants) and Nova Bila (770 inhabitants) have Hospitals or Regional Medical Center, while USK (Una-Sana Canton) with a Regional Hospital, which is covering several more towns, Bihać, Cazin, Sanski Most and V. Kladuša (together 288 114 inhabitants). The crude incidence rate for cervical cancer is different in the two biggest regions in Bosnia and Herzegovina, Sarajevo and Tuzla (Figure 2).

The most detailed data were for Tuzla Canton, which is the most populated canton in Bosnia and Herzegovina,

TABLE 1
THE AGE DISTRIBUTION OF CERVICAL CANCER CASES AT THE TUZLA CANTON GATHERED FROM THE REGISTRY OF MALIGNANT DISEASES AT THE INSTITUTE OF PUBLIC HEALTH OF THE TUZLA CANTON

Age/year	2000	2001	2002	2003	2004	2005	2006	2007	2008	Total
0–20	1	1	2				1	2	2	9
20–30	3	2	3	4	1	4	2	0	5	24
31–40	25	17	12	10	5	6	5	8	4	92
41–50	30	30	16	29	18	12	19	17	25	196
51–60	22	22	15	17	16	10	13	18	12	145
61–70	26	15	7	9	10	11	10	11	17	116
71–80	6	7	5	6	7	3	3	4	4	45
over 80	1	0	0	1	1	2	1	1	4	11
Total	114	95	59	77	58	48	54	60	72	637

with more than 200,000 women, above the age of 14. Tuzla Canton includes 19 cities with their neighboring villages. The age distribution of cervical cancer in Tuzla Canton was gathered from the registry of malignant diseases of Institute for Public Health of Tuzla Canton (Table 1).

The incidence and mortality rate in Tuzla Canton varied significantly in the period from 2000 to 2008 (Figure 3). Cervical cancer is the most common form of gynaecological malignancy in Tuzla Canton with 48.9% of all female cancers.

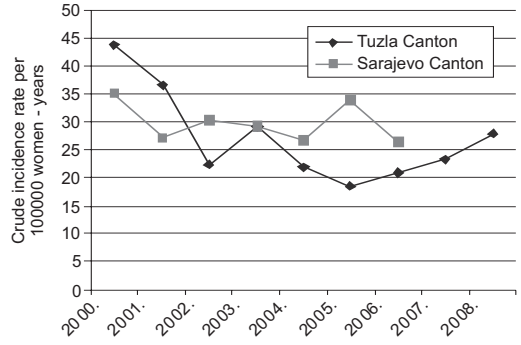


Fig. 2. The crude rate of cervical cancer per 100,000 women-years at Tuzla and Sarajevo Canton in the period from 2000 to 2008.

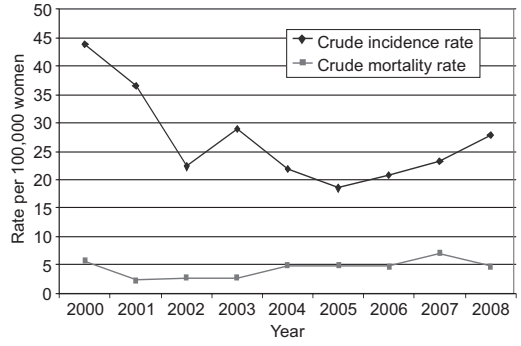


Fig. 3. The crude rate of cervical cancer per 100,000 women-years and mortality rate at Tuzla Canton in the period from 2000 to 2008.

The crude incidence from 2008 year was significantly lower than the incidence 2000 year ($p<0.001$). On the other side, cervical cancer mortalities did not differ between 2000 and 2008 year ($p>0.05$). Only 20.4% women being in an operable stage at the time of diagnosis, while, the rest received the appropriate therapeutic modalities (irradiation, chemotherapy or the combination of both). According to the preliminary data gathered from the population registry until present shows that most of the women diagnosed with the cervical cancer are at the age between 41 to 50, while 1.5% are younger than 20.

Discussion

Cervical cancer still constitutes a considerable public health problem in Europe. The dramatic contrast between West and East European states merits particular attention from the health authorities of the countries concerned and the EU as a whole. The differences within Europe is largely due to the absence of effective cervical screening in Eastern Europe and the implementation of properly organized cervical screening programs which would inevitably have a major impact on this disease. Initiation and sustenance of cervical cytology programs involving the screening of sexually active women annually, or once in every 2–5 years, have resulted in a large decline in cervical cancer incidence and mortality[8]. The situation of cervical cancer prevention in most of the countries of former Yugoslavia is hardly well established, in spite of the fact that opportunistic screening is on since the 1960s.

Serbia and Montenegro had the world-age standardized incidence rate of 27.3/100.000, while Croatia 13.3/100,000 in 2004[6]. Slovenia records the incidence increase since 1994 with the peak in 1996 of 23/100.000[9]. According to the latest report of Globocan 2008, those countries of former Yugoslavia show decline of incidence. Age-standardized incidence rates for Serbia is 20.9; Montenegro 13.0 (separate countries from 2006); Croatia 11.8 and Slovenia 11.1[10]. On the other hand, the developed countries have seen their cervical cancer incidence and mortality rates decline. Cervical cancer incidence has been

less than 10/100,000 women in countries with effective organized screening program, such as Finland and United Kingdom[11].

Bosnia and Herzegovina does not have a population based registry of malignant disease, nor the Pap test database and mostly dispose with data of individual study or cantonal registries. Last population census was at 1991 which affect the statistical analysis. Number of new cases of cervical cancer per year in Bosnia and Herzegovina varies depending on the size of the city or region. The most relevant data close to the real incidence in the country was gathered in Sarajevo Canton and Tuzla Canton, both being the biggest regions in Bosnia and Herzegovina. The crude incidence rate in the Sarajevo Canton is more homogenous, while in the Tuzla Canton varied from 18.5/100.000 in 2005 to 43.8/100.000 in 2000. This wide range could be explained with the fact that Tuzla Canton is the most populated region in Bosnia and Herzegovina and also the region to which gravitates certain number of small towns from east part of country (out of region of Tuzla Canton). According to the recent study in East Europe, based mostly on the estimation from neighboring countries, crude incidence rate for Bosnia and Herzegovina is 26.6[8]. Considering data from this study, the exact crude incidence in the country could be even higher. The highest incidence from the countries of the former Yugoslavia has Serbia with incidence of 32.5–38.1/100.000 women in Belgrade region, but lower in Mačvanski region, 16.6/100.000[12]. Croatia, which is the first Bosnian neighbor in the west, north and south has lower cervical cancer incidence than Bosnia (13.3/100.000 women-years)[13]. Increased incidence and even mortality in young women was first noticed in England and Wales but was subsequently observed in other European countries[14]. The most complete epidemiological data were available for Tuzla Canton. One of the previous studies in this region, as well as this study, showed that the most of the women with cervical cancer were in fifth decade of life with 1.5% of women younger than 20. In the study of Fatušić and co-workers[15,16] (2007) 27.11% of all women with cervical cancer are younger than 30 in period 1993–2006. This high percentage of younger age in incidence rate could be explained with war and post – war period (1993–2000) and diminished motivation in general of women for this type of health control. High incidence in Tuzla Canton, with significant proportion of young women and high percentage of women with advance disease are the consequence of lack of the screening program. Bosnia and Herzegovina has only an opportunistic screening program. Opportunistic or unorganized screening also decrease cervical cancer rates, although not to the extent of organized programs, also this kind of program may not adequately cover the population targeted, sometimes missing those at highest risk[17,16].

Ferlay and co-workers analyzed the cancer incidence and mortality rate in Europe in 2006, for 38 European countries. The most data in this study were obtained from the national cancer registries, annual reports on the website, and civil registration systems recording vital events (births, marriages, deaths). No data were available for Cyprus and Bosnia Herzegovina. The country-specific incidence and mortality rates for these two countries were calculated from the simple average of those of neighboring countries (Greece and Malta; Albania, Macedonia and Serbia and Montenegro, respectively)[6]. High world-age standardized mortality rates (>7.5/100.000 women-years) are observed in 7 countries: FYROM (7.6), Moldova (7.8), Bulgaria (8.0), Bosnia and Herzegovina (8.0), Albania (9.8), Serbia and Montenegro (10.1) and Romania (13.0)[8].

Data from Tuzla Canton showed slight increase in mortality rate in last 5 years, (4.9/100,000 women-years), with the peak in 2007 (7.0/100.000), and then, slight decrease in 2008 (4.7/100.000). Mortality rate in neighboring countries are similar to results we found in Tuzla Canton; Croatia (5.0/100.000) Serbia (7.0/100.000) and Slovenia (5.0/100.000)[18,12]. The explanation for this slight increasing in mortality rate in Tuzla Canton might be the advance disease at the time of diagnosis, but also better reporting of cause of death and more precise coding of cervical cancer instead of uterine cancer NOS.

Summary report of WHO/IQO and IARC Globocan 2008[19,20] reported that the crude incidence rate in Bosnia and Herzegovina is 13.2, almost half of the crude incidence noticed in the work of Arbyn and co-workers. The both results were derived from estimates of incidence in the countries of former Yugoslavia and Southern Europe, which, according to the same source, noticed the decline of the cervical cancer incidence (particularly Serbia and Croatia) (IARC, Globocan, 2008; WHO/IQO, 2010). In the Summary report from WHO/IQO there are not available data from the Bosnia and Herzegovina.

The lowest incidence rate in Europe is in Finland with 4 cases per 100,000 women-years, and with organized cervical cancer screening since early 1960's[21]. The lowest mortality rates, particularly in younger women (age 20–44) in Finland (0.5/100.000) or Sweden (0.9/100.000), were largely due to organized screening[22]. Mortality rates currently observed in Eastern Europe are similar to those observed in Western Europe several decades ago.[23]

Conclusion

The fluctuation of the incidence according to the literature data and this study reflects the situation throughout Bosnia and Herzegovina regarding cervical cancer incidence and mortality. It also indicates the urgent need in the near future to establish a national registry of malignant diseases, the Pap test database within an organized cervical cancer prevention programs as recommended by the European Council Recommendation[22].

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REFERENCES

PARKIN DM, BRAY F, FERLAY J, PISANI P, Estimating the world cancer burden: Globocan 2000. Int J Cancer, 94 (2001) 153. DOI: 10.1002/ijc.1440. — 2. PARKIN M, BRAY F, FERLAY J, PISANI P, CA Cancer J Clin, 55 (2005) 74. Available from: URL: http://caonline.amcancersoc.org/cgi/content/full/55/2/74. — 3. LINOS A, RIZA E, VAN BALLEGOOIJEN M, Eur J Cancer, 36 (2000) 2175. DOI: 10.1038/sj.bjc.6602069. — 4. ANTTILA A, VON KARSA L, AASMAA A, FENDER M, PATNICK J, REBOLJ M, NICULA F, VASS L, VALERIANOVA Z, VOTI L, SAUVAGET C, RONCO G, Eur J Cancer, 45 (2009) 2649. DOI: 10.1016/j.ejca.2009.07.020. — 5. NICULA FA, ANTTILA A, NEAMTIU L, ZAKELJ MP, TACHEZY R, CHIL A, GRCE M, KESIĆ V, Eur J Cancer, 45 (2009) 2679. DOI: 10.1016/j.ejca.2009.07.025. — 6. FERLAY J, AUTIER P, BONIOL M, HEANUE M, COLOMBET M, BOYLE P, Ann Oncol, 18 (2007) 581. DOI: 10.1093/annonc/mdl498. — 7. ARBYN M, PRIMIC-ŽAKELJ M, RAIFU AO, GRCE M, PARASKEVAIDIS E,DIAKOMANOLIS E, KESIĆ V, NICULA FA, SUTEU O, VON KARSA L, Coll Antropol, 31 Suppl 2 (2007) 7. Available from: URL: http://www.hrvatsko-antropolosko-drustvo.hr/. — 8. SANKARANARAYANAN R, BUDUKH AM, RAJKUMAR R, Bull World Health, 10 (2001) 79. Available from: URL: http://www.who.int/bulletin/en/index.html. — 9. SMRKOLJA Š, RAKARA S, MOŽINA A, ERŽENC:/Users/Valdet/Desktop/Radni za rad/CC incidenca u BiH/CC in Slovenia.htm – AFF2 M, Ejog, 117 (2004) 213. — 10. KESIC V, POLJAK M, ROGOVSKAYA S, Cancer Epidemiol Biomarkers Prev, 21 (2012) 1423. DOI: 10.1158/1055-9965.EPI-12-0181. — 11. JASON P, Trent Cancer Registry, the National Cancer Intelligence Network's. Profile of Cervical Cacner in England: Incidence, Mortality and Survival, (2012). Available from: URL: http://www.cancerscreening.nhs.uk/cervical/cervical-cancer-profile.html. — 12. KESIĆ V, JOVIĆEVIĆ-BEKIĆ A, VUJNOVIĆ M, Coll Antropol, 31 Suppl 2 (2007) 31. — 13. ZNAOR A, STRNAD M, Coll Antropol, 31 Suppl 2 (2007) 31. — 14. ARBYN M, RAIFU AO, AUTIER P, FERLAY J, Ann of Oncol, 8 (2007) 1708. DOI: 10.1093/annonc/mdm079. — 15. FATUŠIĆ Z, MUSIĆ A, SINANOVIĆ N, Gynaecologic malignancy in Tuzla Canton, Academy of Science and Arts of Bosnia and Herzegovina, Department of Medical Science, Special publication, 125 (2007) 6. — 16. ANTTILA A, RONCO G, CLIFFORD G, BRAY F, HAKAMA M, ARBYN M, WEI- DERPASS E, Br J Cancer, 91 (2004) 935. DOI: 10.1038/sj.bjc.6602069. — 17. COLEMAN D, DAY NE, DOUGLAS G, FARMERY E, LYNGE E, PHILIP J, SEGNAN N, Eur J Cancer, 29 Suppl 4 (1993) 1. — 18. CROATIAN NATIONAL INSTITUTE OF PUBLIC HEALTH. Cancer incidence in Croatia. Bulletins Croatian National Institute of Public Health Zagreb 1983-2006;No.1-29. Avaliable from: URL: www.cancer-network.de/ cervical/ guidelines /EU_guidelines.doc. — 19. IARC, Globocan 2008. (Specific methodology for Bosnia & Herzegovina: Simple average of the estimated incidence rates from Albania, Macedonia, Serbia, Croatia and Slovenia. Available from: URL: http://globocan.iarc.fr/DataSource_and_methods.asp. — 20. WHO/ICO Information Centre on HPV and Cervical Cancer (HPV Information Centre). Human Papillomavirus and Related Cancers in Bosnia & Herzegovina. Summary Report 2010. Available from: URL: www. who. int/ hpvcentre/statistics. — 21. ANTTILA A, NIEMINEN P, Cervical Cancer Screening Program in Finland with an Example on Implementing Alternative Screening Methods, Coll Antropol, Suppl 2 (2007) 17. Available from: URL: hrcak.srce.hr/file/43324. — 22. LEVI F, LUCCHINI F, NEGRI E, FRANCESCHI S, LA VC, Eur J Cancer, 36 (2000) 2266. DOI: 10.1016/S0959-8049(00)00346-4. — 23. Cancer Trends No 12: Cancers of the cervix and uterus. National Cancer Registry Ireland. (2012). Available from: URL: http://www.ncri.ie/pubs/pubfiles/Cervix-Uterus%20(2).pdf.

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PROCJENA INCIDENCIJE RAKA CERVIKSA I STOPE MORTALITETA U BOSNI I HERCEGOVINI

SAŽETAK

Točna incidencija i stopa mortaliteta u Bosni i Hercegovini se ne zna jer ne postoji nacionalni registar raka. Dostupni podaci temelje na procjeni iz susjednih zemalja. Stoga je cilj ovog istraživanja bio prezentirati preliminarne, ali preciznije procjene incidencije raka vrata maternice i stope smrtnosti u Bosni i Hercegovini. Podaci o slučajevima raka vrata maternice u Bosni i Hercegovini su prikupljeni iz različitih izvora, a variraju ovisno o veličini grada ili regiji. Za izračun grube stope za razdoblje od 2000. do 2008. godine, koristili smo bosanskohercegovački popis stanovništva iz 1991. godine. Dakle, gruba stopa incidencije u regiji Sarajevo je više ujednačena (oko 30,4/100,000 žena-godina), dok u Tuzlanskom kantonu varira od 18,5 u 2005. godini do 4,8/100,000 u 2000. Godini. Na području Tuzlanskog kantona, u razdoblju od 1993. do 2006. 27,1% svih žena s rakom grlića maternice su bile mlađe od 30 godina. Međutim, točna gruba incidencija u Bosni i Hercegovini mogla bi biti čak i veća. Podaci iz Tuzlanskog kantona pokazali su blagi porast stope smrtnosti u posljednjih 5 godina (4,9/100,000), a najviše u 2007. godini (7,0/100,000). Prezentirani podaci odražavaju situaciju na cijelom teritoriju Bosne i Hercegovine te naglašavaju potrebu provedbe registra za rak cerviksa i organiziranog programa pregleda.