OVARIAN CANCER INCIDENCE TREND IN THE NIŠAVA DISTRICT

Biljana Kocić[1,2], Nataša Rančić[1,2], Mirko Ilić[2], Ilija Kocić[1]

Ovarian cancer represents the third most common gynecological cancer worldwide, and the most lethal one. The aim of the study was to assess ovarian cancer incidence trend in the Nišava District in the period 1999-2017. Descriptive epidemiological method was applied. Data used for analyses were provided by the Cancer Register of the Institute of Public Health Niš and from the Serbian Cancer Registry. Incidence trends were based on crude and age-standardized incidence rates, calculated by the direct method of standardization per 100,000. Ovarian cancer represented 5.1% of all new registered malignant diseases in females with a total of 791 new cases. There were no cases of ovarian cancer registered in females before the age of 15. A statistically significant increasing trend with aging was registered. The average annual crude incidence rate was 22.0/100,000, while the average age-standardized incidence rate was 13.3/100,000. The highest age-standardized incidence rate was registered in 2016 (20.4), while the lowest rate was reported in 2002 (10.1). Ovarian cancer incidence trend, based on crude incidence rates, as well as on age-standardized incidence rates, increased. The highest age-adjusted incidence rates were in the municipalities of Svrljig (18.4) and Gadžin Han (14.0) and the lowest in the municipalities of Merošina (7.4) and Doljevac (9.0). Registration of unfavorable incidence trends of the disease indicate failure in the primary and secondary prevention in the past. It is of vital importance to provide more intensive and comprehensive activities that may lead to the reduction of risk factors and to early detection of the disease.
Acta Medica Medianae 2021;60(1):13-18.

Key words: *ovarian cancer, incidence, trend*

[1]University of Niš, Faculty of Medicine, Niš, Serbia
[2]Institut of Public Health, Department of Epidemiology, Niš, Serbia

Contact: Biljana Kocić
17 Školska St., 18000 Niš, Serbia
E-mail: biljaizzz@yahoo.com

Introduction

Ovarian cancer remains a major health concern worldwide. It represents the third most common gynecological malignancy, after cervical and uterine cancer (1). Asymptomatic growth of the tumor, delayed onset of symptoms, and lack of proper screening lead to its diagnosis in the advanced stages. This cancer is the most lethal gynecological cancer (2). In comparison with breast cancer, it is three times more lethal (3).

The incidence of ovarian cancer varies across the world (4). The findings of a recent study have shown that various factors affect the occurrence of ovarian cancer, from which genetic, environmental and lifestyle factors are among the most important ones (5). Many factors such as pregnancy, lactation, and oral contraceptive pills play a role in reducing the risk of this disease (5).

The aim

The aim of the study was to assess ovarian cancer incidence trend in the Nišava District in the period 1999-2017.

Methods

Descriptive epidemiological method was applied. Data used for analyses were provided by the Cancer Register of the Institute of Public Health Niš and from the Serbian Cancer Registry. Incidence trends were based on crude and age-standardized incidence rates for the period 1999-2017. Standardized rates were calculated by the direct method of standardization (per 100,000), using the world population as the standard.

Results

Ovarian cancer represented 5.1% of all new registered malignant diseases in females.

In the study period, a total of 791 new ovarian cancer cases were registered in the Nišava District. Trend, based on new cases, was increasing ($y = 0.3912x + 37.719$; $R^2 = 0.1036$) (Graph 1).

There were no cases of ovarian cancer registered in females before the age of 15 (Graph 2).

Based on the age-specific incidence rates of ovarian cancer, a statistically significant increasing trend with aging was registered ($y = 2.463x + 5.051$, $R^2 = 0.430$) (Graph 2).
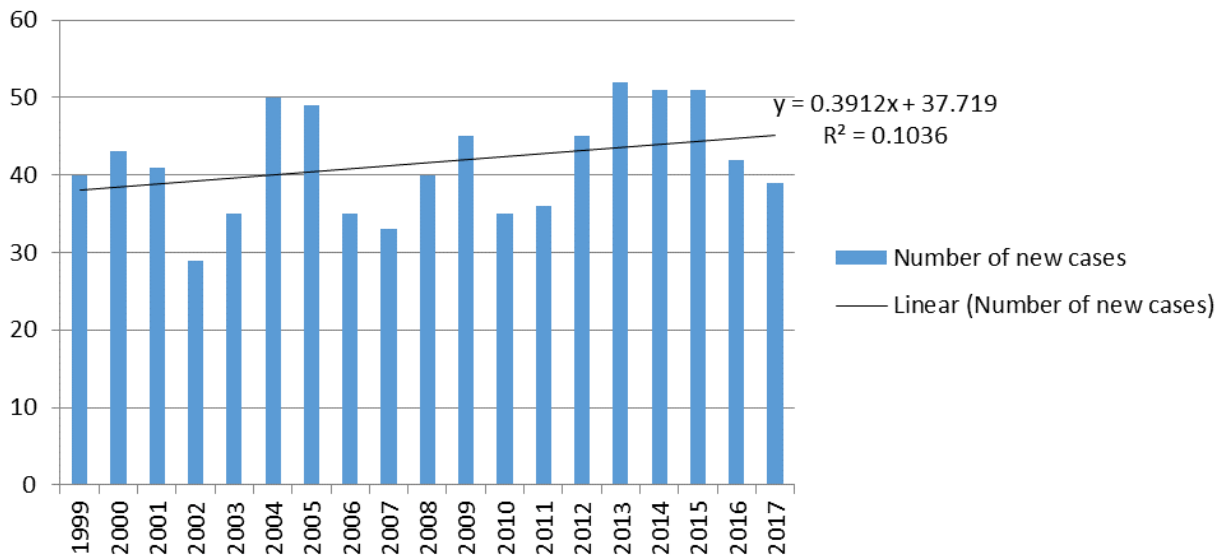
Graph 1. Trend of new ovarian cancer cases in the Nišava District
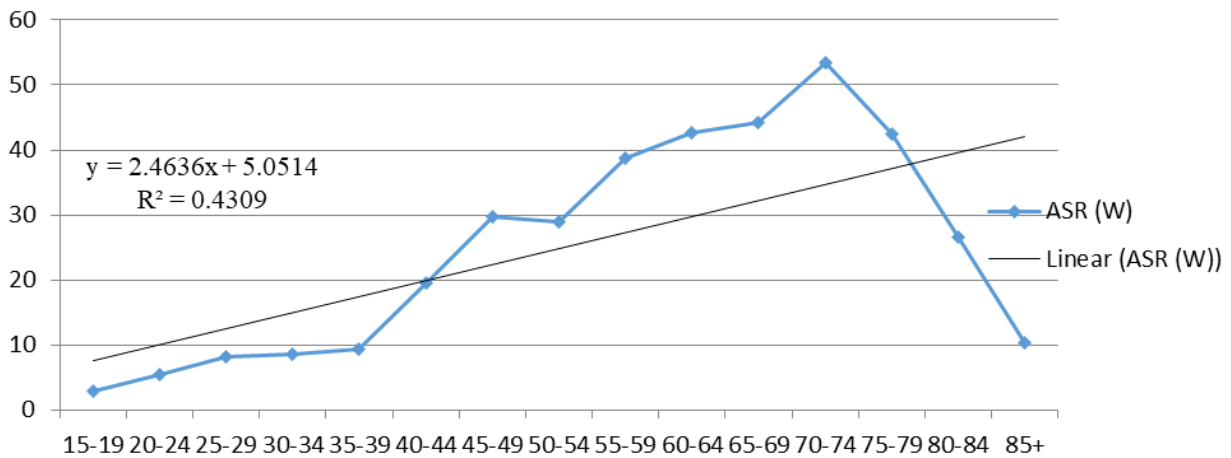
**Graph 2.** The average age-specific incidence rates of ovarian cancer in the Nišava District

The average annual crude incidence rate was 22.0/100,000, while the average age-standardized incidence rate was 13.3/100,000. The highest age-standardized incidence rate was registered in 2016

(20.4), while the lowest rate was reported in 2002 (10.1) (Graph 3).

Ovarian cancer incidence trend, based on crude incidence rates, was increasing ($y = 0.2926x$

+ 19.021; R^2 = 0.2009) (Graph 3). Ovarian cancer incidence trend, based on age-standardized incidence rates, increased slightly (y = 0.1481x + 12.03; R^2 = 0.0911) (Graph 3).

Crude and standardized incidence rates in the municipalities of the Nišava District are presented in Graph 4.
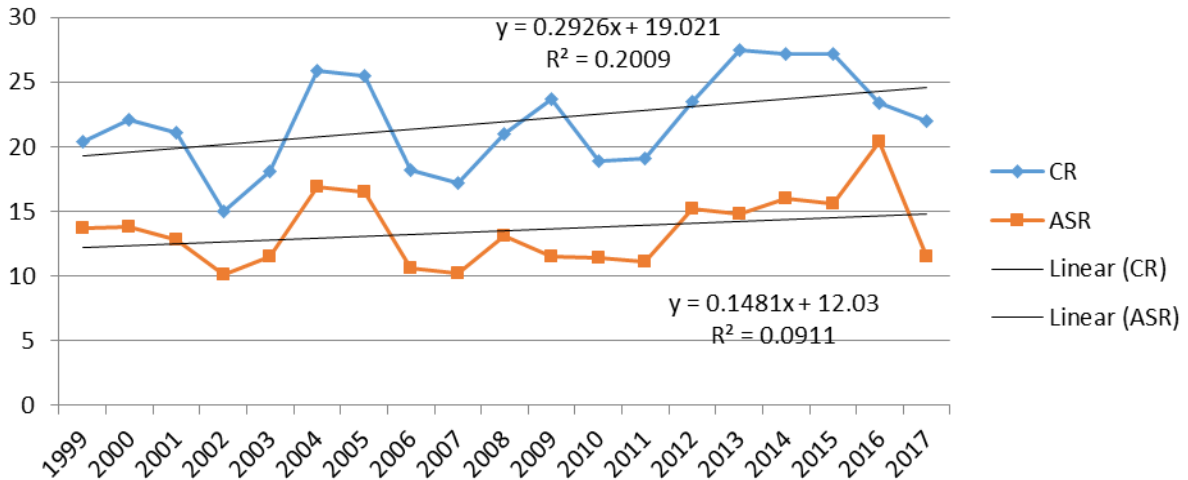
Graph 3. Trend of incidence based on crude and standardized incidence rates in the Nišava District
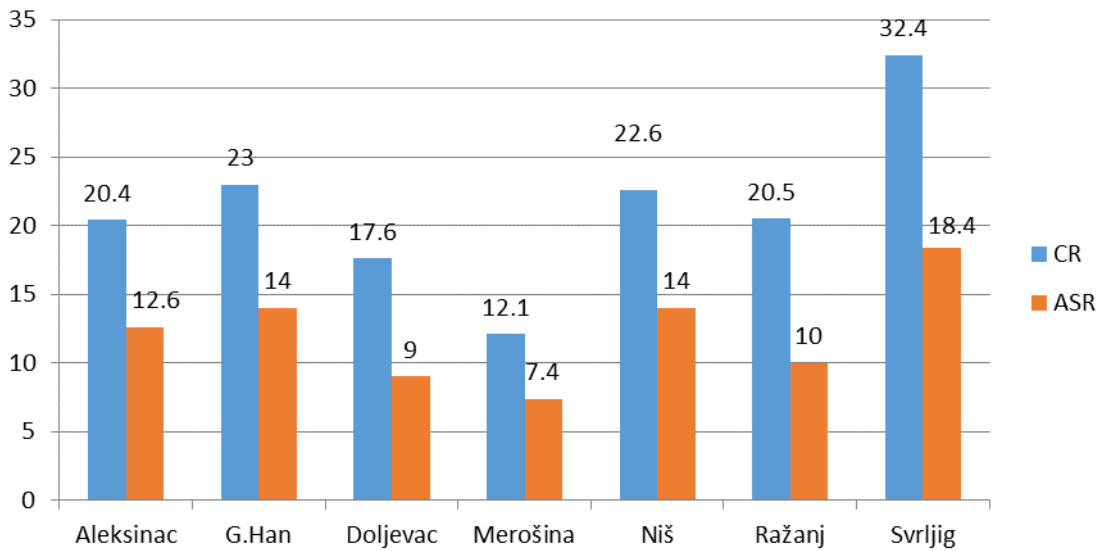
Graph 4. Crude and standardized incidence rates in the municipalities of the Nišava District

The highest age-standardized incidence rates were in the municipalities of Svrljig (18.4) and Gadžin Han (14.0) and the lowest incidence rates were in the municipalities of Merošina (7.4) and

Doljevac (9.0). The age-standardized incidence rate in the municipality of Niš (14.0) was close to the average rate for the Nišava District (13.3).

Discussion

According to Globoccan, 295,414 cases of ovarian cancer were identified in 2018, accounting for 3.4% of all cancer cases in women (1). The Age Standardized Rate (ASR) of ovarian cancer was estimated to be 6.6 in 2018 (1).

The etiology of ovarian cancer is not clear, but certain factors such as a population growth, increased risk factors of cancer, decreased pregnancy and duration of lactation, as well as tubal ligation have led to an upward trend in the incidence of cancer around the world (1, 6).

The incidence trends of ovarian cancer may also be partially influenced by changes in diagnostic facilities and disease classifications, particularly in high-income countries (e.g., echography, CT scan and endoscopy) (7).

The incidence of this cancer is higher among transition countries (2) and approximately 30% of ovarian cancer cases occur in European countries (8). The highest rates of ovarian cancer occur in China (14.60% of all cases), India (11.33% of all cases), and the US (81.8% of all cases) (6). Among the Asian countries, Singapore, Kazakhstan, and Brunei have the highest standardized incidence rate of ovarian cancer (9). The increasing trends may be due to the increased prevalence of smoking, the westernized dietary patterns, obesity, and the decreased prevalence of parity.

According to the findings of this study, during the entire period of observation, ovarian cancer represented 5.1% of all new registered malignant diseases in females with a total of 791 new cases. In 2017, in the Nišava District, ovarian cancer was the seventh most common cancer of all registered cancers in females (4.5%) after breast (26.3%), cervical (7.8%), non-melanoma skin cancer (7.4%), lung, trachea and bronchus (6.7%), uterine (6.5%) and colon cancer (4.8%). During 1999-2013, ovarian cancer was the sixth most common cancer in central Serbia (10). According to Globoccan, ovarian cancer is the seventh most common cancer among women worldwide (1).

The presented results have shown that the average annual crude and average age-standardized incidence rate was higher in the Nišava District compared with central Serbia (10). In 2012, the age-adjusted incidence rate for this malignancy was higher in central Serbia than in Montenegro (12.0), FYRO Macedonia (11.3), Hungary (10.6) and Slovenia (10.3). The age-adjusted incidence rate of ovarian cancer was higher only in Bulgaria compared with central Serbia (11).

Similar to our findings, both crude and age-adjusted incidence rates of ovarian cancer increased in central Serbia (10). In accordance with our results, the incidence of ovarian cancer in central Serbia increased with age and most cases were aged between 40 and 74 years (8). The increasing trends may be partially influenced by population aging and the increased prevalence of risk factors (10, 12).

The results of our study regarding age-adjusted incidence rate in different municipalities of the Nišava District may suggested that women in urban areas have a higher level of health education and visit a gynecologist more frequently than women from suburbs or rural areas, poor households and lower educational status (13, 14). Also, there is significant under-registration of new cases, especially in the smallest municipalities.

Conclusion

Registration of unfavorable incidence trends of the disease indicate failure in the primary and secondary prevention in the past. Considering the heavy burden of ovarian cancer on women's health, public health and cancer prevention specialists should pay more attention to the efficient implementation of preventive measures and health education that may lead to the reduction of risk factors and to early detection of the disease. Although some risk factors cannot be changed, a focus on preventable risk factors may reduce the risk of ovarian cancer (e.g., smoking, obesity, western diet, etc.).

References

1. Bray F, Ferlay J, Soerjomataram I, Siegel RL, Torre LA, Jemal A. Global cancer statistics 2018: GLOBOCAN estimates of incidence and mortality worldwide for 36 cancers in 185 countries. CA Cancer J Clin 2018;68 (6): 394-424. [CrossRef] [PubMed]
2. Coburn S, Bray F, Sherman M, Trabert B. International patterns and trends in ovarian cancer incidence, overall and by histologic subtype. Int J Cancer 2017; 140(11):2451-60. [CrossRef] [PubMed]
3. Yoneda A, Lendorf ME, Couchman JR, Multhaupt HA. Breast and ovarian cancers: a survey and possible roles for the cell surface heparan sulfate proteoglycans. J Histochem Cytochem 2012;60(1):9-21. [CrossRef] [PubMed]
4. Lowe KA, Chia VM, Taylor A, O'Malley C, Kelsh M, Mohamed M, et al. An international assessment of ovarian cancer incidence and mortality. Gynecol Oncol 2013;130(1):107-14. [CrossRef] [PubMed]
5. Momenimovahed Z , Tiznobaik A, Taheri S, Salehiniya H. Ovarian cancer in the world: epidemiology and risk factors. Int J Womens Health 2019;11:287-99. [CrossRef] [PubMed]
6. Isherwood A, Bamford J, Dupuy AV. Ovarian cancer in select EU countries: incidence, treatable populations and sales by key drug class. Rev Epidemiol Sante Publique 2018;66:S286. [CrossRef]
7. Bray F, Loos AH, Tognazzo S, La Vecchia C. Ovarian cancer in Europe: crosssectional trends in incidence and mortality in 28 countries, 1953-2000. Int J Cancer 2005;113(6):977-90. [CrossRef] [PubMed]
8. Rahmani K, Moradi-Lakeh M, Mansori K, Bidokhti F, Asadi-Lari M. Global inequalities in incidence and mortality of ovarian cancer and associated factors: an ecological study. Alzheimers Park Res Ther 2018; 1: 1001.
9. Razi S, Ghoncheh M, Mohammadian-Hafshejani A, Aziznejhad H, Mohammadian M, Salehiniya H. The incidence and mortality of ovarian cancer and their relationship with the human development index in Asia. Cancermedicalscience 2016;10:628. [CrossRef] [PubMed]
10. Antonijevic A, Rancic N, Ilic M, Tiodorovic B, Stojanovic M, Stefanovic J. Incidence and mortality trends of ovarian cancer in central Serbia. JBUON 2017;22(2):508-12. [PubMed]
11. Ferlay J, Steliarova-Foucher E, Lortet-Tieulent J Rosso S, Coebergh JW, Comber H, et al. Cancer incidence and mortality patterns in Europe:estimates for 40 countries in 2012. Eur J Cancer 2013;49:1374-403. [CrossRef] [PubMed]
12. Zhang Y, Luo G, Li M, Guo P, Xiao Y, Ji H, et al. Global patterns and trends in ovarian cancer incidence: age, period and birth cohort analysis. BMC Cancer 2019; 19:984. [CrossRef] [PubMed]
13. Alberg AJ, Moorman PG, Crankshaw S, Wang F, Bandera EV, Barnholtz-Sloan JS, et al. Socioeconomic status in relation to the risk of ovarian cancer in African-American Women:a population-based case-control study. Am J Epidemiol 2016;184(4):274-83. [CrossRef] [PubMed]
14. Praestegaard C, Kjaer SK, Nielsen TS, Jensen SM, Webb PM, Nagle CM, et al. The association between socioeconomic status and tumour stage at diagnosis of ovarian cancer: A pooled analysis of 18 case-control studies. Cancer Epidemiol 2016;41:71-9. [CrossRef] [PubMed]

TREND INCIDENCIJE RAKA JAJNIKA U NIŠAVSKOM OKRUGU

Biljana Kocić[1,2], Nataša Rančić[1,2], Mirko Ilić[2], Ilija Kocić[1]

[1]Univerzitet u Nišu, Medicinski fakultet, Niš, Srbija
[2]Institut za javno zdravlje Niš, Niš, Srbija

Kontakt: Biljana Kocić
Školska 17, 18000 Niš, Srbija
E-mail: biljaizzz@yahoo.com

Rak jajnika je na trećem mestu u svetu po učestalosti i bolest je sa najvećim letalitetom među ginekološkim malignitetima.

Cilj rada bio je da se analizira trend incidencije raka jajnika u Nišavskom okrugu u periodu od 1999. godine do 2017. godine. Primenjen je deskriptivni epidemiološki metod. Izvor podataka bili su Registar za rak Instituta za javno zdravlje Niš i Populacioni registar za rak Srbije. Izračunavan je linearni trend nestandardizovanih i standardizovanih stopa incidencije (na 100.000 žena). Standardizacija je vršena direktnom metodom. U strukturi svih malignih bolesti žena, rak jajnika čini 5,1% sa 791 novoregistrovanim slučajem. Bolest se ne registruje u uzrastu pre 15. godine. Registruje se statistički značajan porast trenda sa uzrastom. Prosečna godišnja nestandardizovana stopa incidencije iznosi 22,0 žene od 100.000 žena, dok standardizovana iznosi 13,3 žena od 100.000 žena. Najviša standardizovana stopa incidencije zabeležena je 2016. godine (20,4), a najniža 2020. godine (10,1). Registruje se porast trenda nestandardizovanih i standardizovanih stopa incidencije. Najviša standardizovana stopa incidencije beleži se u opštinama Svrljig (18,4) i Gadžin Han (14,0) a najniža u opštinama Merošina (7,4) i Doljevac (9,0). Registrovanje nepovoljnog trenda incidencije ovog oboljenja ukazuje na nedovoljno sprovođenje mera primarne i sekundarne prevencije u ranijem periodu, te je neophodno intenzivnije i obuhvatnije sprovoditi ove aktivnosti, koje će redukovati faktore rizika i omogućiti rano otkrivanje bolesti.

Acta Medica Medianae 2021;60(1):13-18.

Ključne reči: *rak jajnika, incidencija, trend*