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Trends and characteristics of colorectal and breast cancer in Croatia and Osijek-Baranja County

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Summary

This study analyzes long-term trends in incidence and mortality for colorectal cancer (CRC) and breast cancer (BC) at the national and regional (Osijek-Baranya County, OBC) levels. It provides an overview of preventive strategies and screening program outcomes. Data from the Croatian National Cancer Registry and the Osijek-Baranja County Cancer Registry were used to evaluate temporal changes from 2001 to 2023. Trends were assessed by joinpoint regression, expressed as Annual Percent Change (APC) with 95% confidence intervals. The results show a gradual decline in mortality from both cancers since 2010, more pronounced in women for breast cancer, and a moderate decrease in CRC mortality after 2015, particularly in regions with higher screening participation.

KEYWORDS: *colorectal cancer, breast cancer, Croatia, Osijek-Baranya County, incidence, mortality, screening*

INTRODUCTION

Cancer is a leading cause of morbidity and mortality worldwide(1-3). In Croatia, colorectal and breast cancer together account for nearly one-third of all newly diagnosed malignancies(4,5). The Croatian National Cancer Registry (CNCR) continuously monitors cancer incidence and mortality trends, providing essential epidemiological data(4,5). The Osijek-Baranja County (OBC) Cancer Registry provides valuable regional insight, particularly because the area was among the first in Croatia to implement organized cancer prevention activities(6-8).

MATERIALS AND METHODS

Data on incidence and mortality were obtained from the CNCR and the OBC Cancer Registry(4,9). Crude and age-standardized rates per 100,000 population were calculated using the European Standard Population (ESP 2013) demographic model(10). Temporal trends were assessed using joinpoint regression analysis to estimate annual percent change (APC) with corresponding 95% confidence intervals(11,12). Statistical analysis was performed using Microsoft Excel and IBM SPSS Statistics 28.0. A p-value <0.05 was considered statistically significant.

RESULTS

Colorectal Cancer (CRC)

Table 1 and Figures 1 and 2 present the incidence and mortality rates for colorectal cancer

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Table 1.

Incidence and mortality rates of colorectal cancer in Croatia and Osijek-Baranya County, 2001–2023

Year range	Croatia – Incidence rate*	Croatia – Mortality rate*	OBC – Incidence rate*	OBC – Mortality rate*
2001–2005	62.4	36.7	68.9	39.5
2006–2010	65.8	35.9	70.3	37.8
2011–2015	63.5	33.4	67.1	36.1
2016–2020	60.9	31.2	63.5	33.0
2021–2023	58.7	29.8	60.2	31.5

Age-standardized rate per 100,000 (ESP 2013).

Source: Croatian National Cancer Registry; Osijek-Baranya County Cancer Registry.

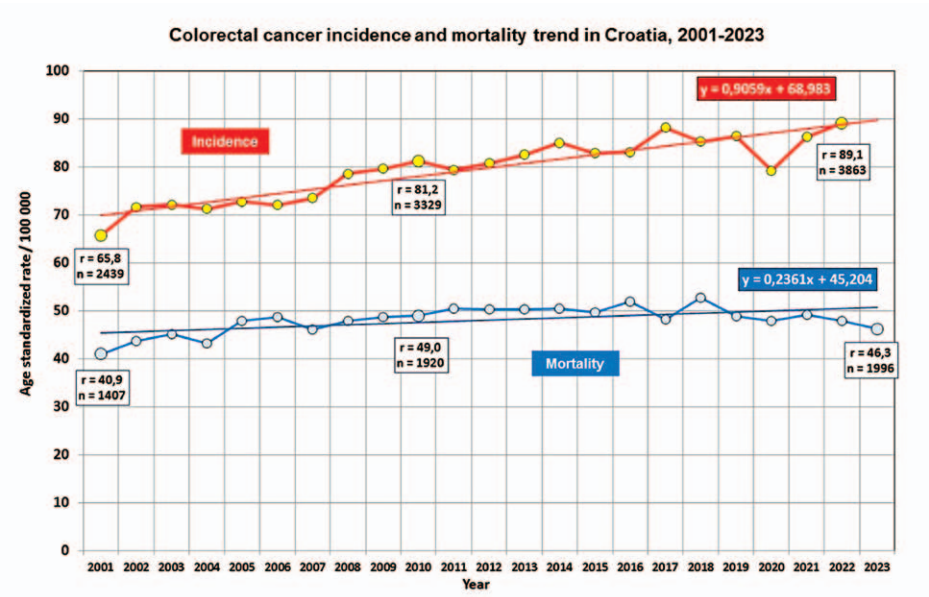

Figure 1. Colorectal cancer incidence and mortality in Croatia, 2001-2023.

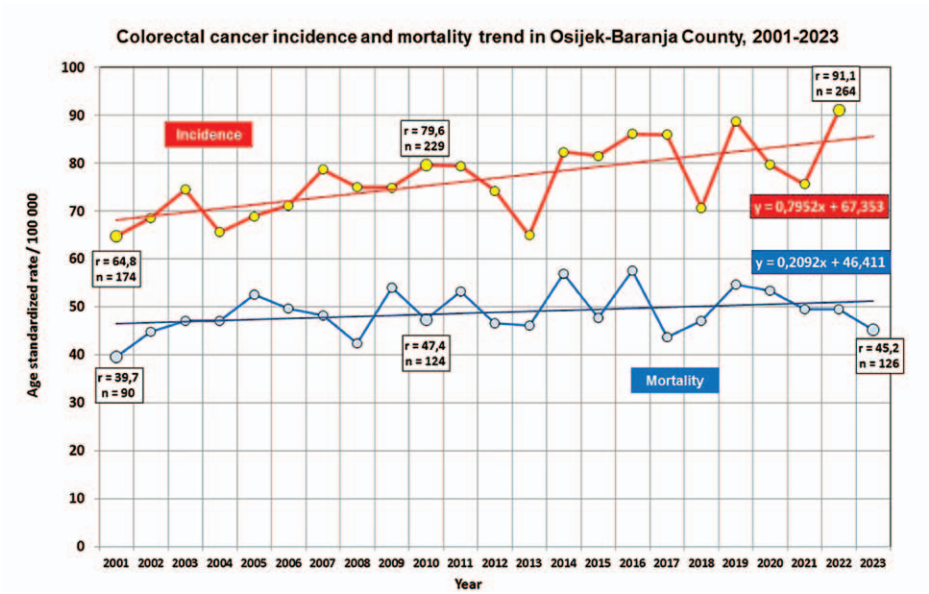

Figure 2. Colorectal cancer incidence and mortality trend in Osijek-Baranja County, 2001-2023.

(CRC) in Croatia and Osijek-Baranya County between 2001 and 2023. Overall, incidence showed moderate growth until 2010, followed by stabilization and a slight decline in both sexes. Mortality decreased steadily after 2015, coinciding with the gradual implementation of the national CRC screening program(13-15).

Breast Cancer (BC)

Table 2 summarizes data for breast cancer (BC) incidence and mortality. Figures 3 and 4 illustrate BC incidence and mortality in Croatia and the Osijek-Baranya County Cancer Registry, respectively. A continuous rise in incidence was observed, partly reflecting improved detection and diagnostic accuracy. Mortality rates, however, showed a downward trend after 2012, indicating better therapeutic outcomes and screening coverage(16-19).

DISCUSSION

The declining mortality trends observed for both colorectal and breast cancers in Croatia align with European patterns(18,20-23). One possible explanation is the organized screening and early detection programs implemented since 2006–2007 (13,15,16,19). The Osijek-Baranja County data are particularly encouraging, as local public health efforts, awareness campaigns, and collaboration with family physicians have produced measurable improvements in screening uptake(9,14,15,24).

The national colorectal cancer screening program, initiated in 2007 (13), experienced logistical challenges in its early years but has since made steady progress. Improved invitation systems, collaboration with general practitioners, and public education campaigns have enhanced participation rates(14,15,25).

Table 2.

Incidence and mortality rates of breast cancer in Croatia and Osijek-Baranya County, 2001–2023

Year range	Croatia – Incidence rate*	Croatia – Mortality rate*	OBC – Incidence rate*	OBC – Mortality rate*
2001–2005	98.5	39.4	95.7	41.2
2006–2010	104.3	38.6	100.9	40.0
2011–2015	109.8	36.1	107.2	38.4
2016–2020	115.6	33.5	112.0	35.1
2021–2023	118.9	31.0	115.3	33.2

Age-standardized rate per 100,000 (ESP 2013).

Source: Croatian National Cancer Registry; Osijek-Baranya County Cancer Registry.

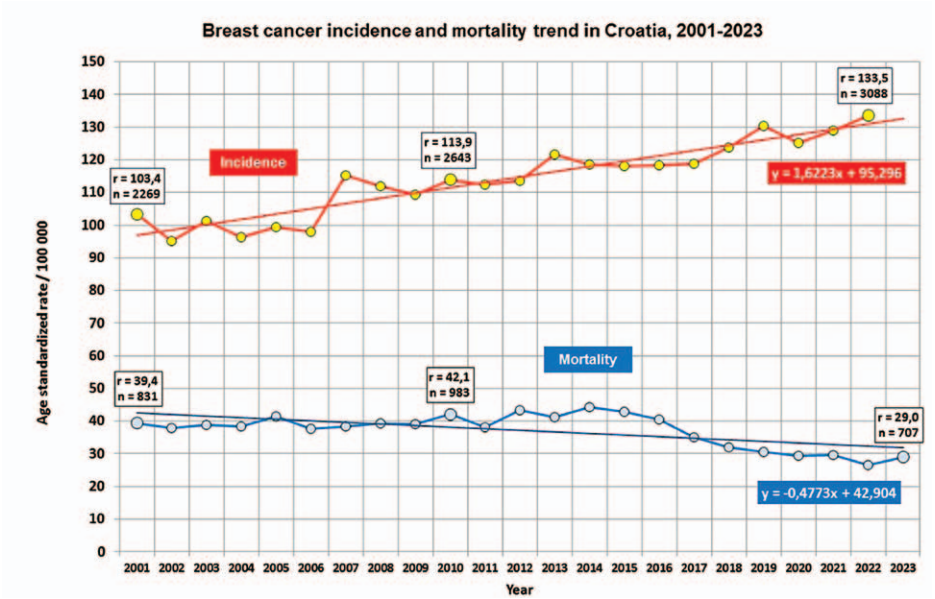

Figure 3. Breast cancer incidence and mortality trend in Croatia, 2001–2023.

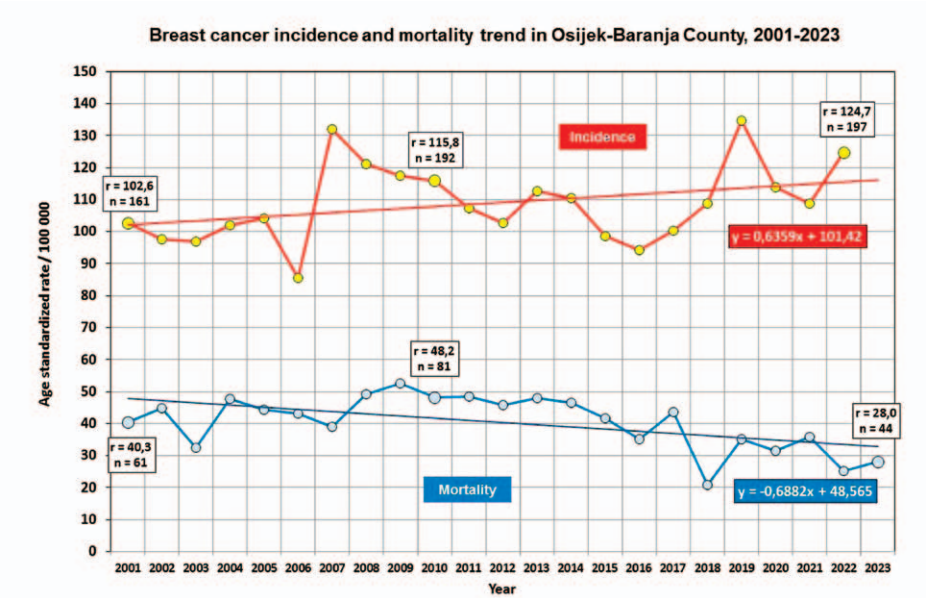

Figure 4. Breast cancer incidence and mortality trend in Osijek-Baranja County, 2001–2023.

Similarly, the national breast cancer screening program launched in 2006(16) achieved nationwide coverage by 2010 and contributed to measurable mortality reductions, especially among women aged 50–69 years(17-19,26).

However, regional disparities persist(5,7,24,25). Counties with lower screening coverage and delayed follow-up continue to exhibit higher mortality rates, suggesting inequalities in healthcare accessibility and diagnostic capacity(5,8,27,28). Sustained efforts are required to improve participation, digital data integration, and registry completeness. The experience of Osijek-Baranja County may serve as a model for community-based prevention, primary care engagement, and cross-sector collaboration(7,8,24).

CONCLUSION

This analysis confirms the importance of organized cancer screening and regional coordination. Both colorectal and breast cancer mortality have declined significantly in Croatia over the past decade, reflecting improvements in early detection, treatment, and public awareness(14,15,17,19).

The Osijek-Baranya County experience underscores the critical role of local initiatives and professional education in achieving measurable public health outcomes. Continued investment in registry quality, digitalization, and intersectoral cooperation will further strengthen national cancer control efforts(7,8,24).

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CONFLICT OF INTEREST

The authors declare no conflict of interest.

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Sažetak

Trendovi i karakteristike raka debelog crijeva i raka dojke u Hrvatskoj i Osječko-Baranjskoj županiji

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Cilj istraživanja bio je analizirati trendove incidencije i mortaliteta raka debelog crijeva (CRC) i raka dojke u Hrvatskoj i Osječko-baranjskoj županiji od 2001. do 2023. godine. Podaci su preuzeti iz Nacionalnog registra za rak i analizirani metodom Regresijska analiza točaka pregiba radi utvrđivanja godišnjih promjena (AAPC). Mortalitet od raka dojke u padu je na nacionalnoj i regionalnoj razini, što se povezuje s provedbom Nacionalnog programa ranog otkrivanja raka dojke. Incidencija raka debelog crijeva i dalje blago raste, dok mortalitet pokazuje znakove stabilizacije nakon uvođenja Nacionalnog programa 2007. godine. Regionalne razlike ukazuju na potrebu veće uključenosti stanovništva, osobito u ruralnim područjima, te jačanja edukacije i uloge obiteljske medicine u programima probira.

KLJUČNE RIJEČI: *rak debelog crijeva, rak dojke, incidencija, mortalitet, trendovi, probir, Hrvatska*