Short report

Descriptive epidemiology of breast cancer in Vojvodina

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A R T I C L E  I N F O

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A B S T R A C T

The main aim of our study was to perform the epidemiological analysis of the breast cancer in Autonomous Province of Vojvodina, Republic of Serbia, in 15 years period (1987–2001). Descriptive method was used in epidemiological analysis of the data from the Vojvodina cancer registry. According to our results the breast cancer is the most frequent neoplasm in women in Vojvodina (26.54% of all cancers), and the leading cause of mortality (20.97%).

Introduction

Breast cancer is the major health problem in women worldwide, regarding both its incidence and mortality, which is emphasized by the diagnosis of over one million new cases annually. New Global data for Serbia, released in June 2010, and created according to the Cancer Registry of Vojvodina, Serbia (1998–2002), state that the incidence rate in Serbia is 56.9/100,000, with the mortality rate of 21.9/100,000, classifying the Republic of Serbia among the countries with high incidence and mortality rates.

In Serbia, similarly to other European countries, breast cancer is the most frequent malignancy and the leading cause of cancer-related death in women, with mortality rate of 16.9 in the year 2000. Approximately 3900 new cases of breast cancer are detected in Serbia each year. At present, although Serbia does not have a national screening program, there is a plan to implement mammography screening on the national scale, emphasizing the need for the comprehensive and detailed descriptive epidemiological study of breast cancer in Serbia.

The main aim of our study was to perform the epidemiological study of the breast cancer in Autonomous Province of Vojvodina, Republic of Serbia, in 15 years period (1987–2001), by the analysis of the breast cancer incidence and mortality, in comparison to other neoplasms in women. We also carried out the chronological analysis of the incidence and mortality trends in women in Vojvodina, according to specific and standardized incidence and mortality rates for each year in this 15 years period. To the best of our knowledge, this work is the first comprehensive descriptive epidemiological study of breast cancer incidence and mortality in Serbia, and therefore our objective was to provide the epidemiological data that may be integrated into effective public health policy and practice.

Material and methods

For the epidemiological analysis of breast cancer in Vojvodina, we used the data from the Vojvodina cancer registry, Oncology Institute of Vojvodina. Records of 11989 female patients diagnosed for breast cancer in Vojvodina, during the time period 1987–2001 were studied. Records from the Serbian Republic Institute of Statistics were used as the source of population data. Tumors were coded and classified according to the International Classification of Diseases (ICD-10), tenth revision.

Descriptive method was used in epidemiological analysis. For the epidemiological analysis of breast cancer in Vojvodina, we used the data from the Vojvodina cancer registry, Oncology Institute of Vojvodina. Records of 11989 female patients diagnosed for breast cancer in Vojvodina, during the time period 1987–2001 were studied. Records from the Serbian Republic Institute of Statistics were used as the source of population data. Tumors were coded and classified according to the International Classification of Diseases (ICD-10), tenth revision.
for the year 1991, were used for the calculations of epidemiological data in formulas. For data analysis, we used the standard statistical methods, such as the percentage frequency (or relative frequency) of breast cancer relative to the total cancer frequency in female population, crude and standardized rates of incidence and mortality (standardized rates were calculated according to standardized world population), linear trend of incidence and mortality, correlation coefficient ($r$) i $\chi^2$ test.

Results

According to data showing the total number of breast cancer patients among women in 2001 in Vojvodina, breast cancer is the most frequent neoplasm in women (26.54%), in comparison with other cancer localizations (Fig. 1a). In 2001, breast cancer was the leading cause of mortality from cancer in Vojvodina in women (20.97%) (Fig. 1b), followed by cervical and lung cancer (9% and 7%, respectively).

Our results of chronological analysis of breast cancer in Vojvodina, for the period 1987–2001, are showing that the highest number of breast cancer cases was registered in 2001 and lowest in 1991 (Supplementary Table 1). We have observed the linear trend of the increase in incidence for both crude and standardized incidence rates (Fig. 2a).

The progressive chronological increase in breast cancer incidence rates is observed in our data. The correlation of the increase of the breast cancer incidence with the observed time period in women in Vojvodina is very high, positive, unfavorable and statistically significant for both crude and standardized incidence rates:

$$Y_{st} = 1.3809X + 51.7227; \ r = 0.882; p < 0.001$$

$$Y = 1.8176X + 77.3615; \ r = 0.858; p < 0.001$$

The correlation of the increase of the breast cancer mortality with the observed time period in women in Vojvodina in 1987–2001 is very high, positive, unfavorable and statistically significant for both crude and standardized mortality rates (Fig. 2b).

$$Y_{st} = 0.7107X + 26.1092; \ r = 0.934; p < 0.001$$

$$Y = 1.0236X + 40.9941; \ r = 0.920; p < 0.001$$

The correlation of the increase of the breast cancer mortality with the observed time period in women in Vojvodina in 1987–2001 showed that the specific incidence rate was 77.36/100.000 women. The highest age-specific incidence rate was registered in age group of 70–74 years, whereas the highest number of cases was detected in age group of 60–64 years (Supplementary Table 3). The average age of cases in Vojvodina is 58.89 years (SD = 13.4; CV = 22.76%). Our results of the breast cancer incidence and mortality trends by age groups are shown in Figs. 3 and 4. Within the groups of younger age, in which the breast cancer was not detected in each of the years in a period of 1987–2001, we could calculate neither the incidence, nor the mortality rate trend.

Starting from age group of 30–34 (Fig. 3a), we observed the increasing linear trend of breast cancer incidence. The incidence rate of breast cancer in different age groups in Vojvodina in 1987–2001 may be shown as linear trends in particular age groups,
providing the results shown in Supplementary Table 4. Linear
trends of breast cancer incidence in age groups of 45–49, 50–54,
55–59 and 70–74 are showing the significant increase (Fig. 3b
and c). The correlation of the increase in incidence rate of the breast
cancer in those age groups is high, positive, unfavorable and
statistically significant.

In Vojvodina, during the observed period of 1987–2001,
the total number of deaths due to breast cancer was 6353

Fig. 3. Incidence rates of breast cancer in Vojvodina in period 1987–2001, for age
groups (a) 30–44 (b) 45–59 (c) 60–74 and (d) 75–85 + years.

Fig. 4. Mortality rates of breast cancer in Vojvodina in period 1987–2001, for age
groups (a) 30–44 (b) 45–59 (c) 60–74 and (d) 75–85 + years.
reached 100 per 100,000 person years in the 1990s, similarly to results. The age-standardized breast cancer incidence rates just the age group of 35-39 (Fig. 4a), we observed the increasing linear trend of breast cancer mortality in all age groups, except in age group of 30–34, where we observed the decreasing linear mortality trend. The mortality rate of breast cancer in different age groups in Vojvodina in 1987–2001 may be shown as linear trends in particular age groups, providing the results shown in Supplementary Table 6. Linear trend of breast cancer mortality in age group of 40–44, 55–59 and 70–74 is showing the significant increase (Fig. 4a, b and c). The correlation of the increase in mortality rate of the breast cancer in those age groups is high, positive, unfavorable and statistically significant.

Discussion

Descriptive epidemiology of breast cancer provides the data reflecting the importance of this most common malignancy in women, accounting for 26.5–27.4% of all cancers. The results of our study are in accordance with the international data, showing that the breast cancer is the leading cause of cancer morbidity in women. However, the incidence patterns in Europe are different from our data. According to Boyle et al, the three leading cancer sites in women are breast (20%), colorectal (13.25%) and cervical cancer (9.9%), whereas our data showed the breast, cervical and lung cancer as the most frequent malignancies in Vojvodina.

The results of our study are in accordance with the data from many European countries, showing that the breast cancer is the major health burden in women. Our study showed the higher relative frequency of breast cancer mortality in comparison with European data (20.97% vs. 17.4%). This is an alarming fact regarding the breast cancer epidemiology in Serbia, since the mortality rate is in steady decline in last decades in USA, UK, Austria, Denmark, etc.

The breast cancer incidence rates continue to rise steadily in most European countries. Our results are showing the increased trend of incidence and mortality rate in women in Vojvodina 1987–2001, which was more pronounced for the incidence rate.

Recent and encouraging data of Jemal et al are showing the decrease in breast cancer incidence and mortality in USA. The important decrease in breast cancer mortality rates may be attributed to screening programs, some of the decline in breast-cancer mortality is due to a reduction in breast cancer risk, most of it can probably be attributed to adjunctive systemic therapy and the earlier detection of palpable tumors. According to the results of Botha et al, the incidence rates in 16 European countries are increasing with time in all countries, in three examined age groups of 35–49, 50–64 and 65–74 years. The incidence and mortality rates were higher in age groups of 50–64 and 65–74 years in comparison with the age group of 35–49 years, which is in accordance with our results. The age-standardized breast cancer incidence rates just reached 100 per 100,000 person years in the 1990s, similarly to our results. The incidence rates increase rapidly with age, therefore the breast cancer diagnosis is more likely to be established in older women. The mortality rates analyzed in 16 European countries were higher in age groups of 50–64 and 65–74 years in comparison with the age group of 35–49 years and were consistently below 50 per 100,000 person years, which is in agreement with our data. The highest incidence and mortality rate in our study was observed in women older than 70 years, representing the quarter of all breast cancer cases and deaths. Therefore, the epidemiological data from most European countries correspond to our results of breast cancer incidence and mortality.

Conclusion

According to our results, in Vojvodina in period 1987–2001, the trends of breast cancer crude and standardized incidence and mortality rates in women showed the intensive and unfavorable increase. The linear incidence trend is more unfavorable in comparison with the linear mortality trend. Preventive and screening programs in developed countries resulted in decrease of breast cancer mortality rate, whereas in some European countries, including our study, performed in Vojvodina, Serbia, the mortality trend increases, indicating the urgent need to carry out the national screening program, which may result in early breast cancer detection and therapy.

Conflicts of interest statement

None declared.

Appendix. Supplementary data


References