

Differences in results of breast cancer curative treatment between urban/rural female population in Podlaskie Voivodship of Poland before introduction of the National Cancer Control Programme

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Abstract

The aim of the study was to evaluate differences in the results of the curative treatment received by women with breast cancer in urban and rural area in Podlaskie Voivodship in 2001-2002 before the introduction of the National Cancer Control Programme. The analysis was based on 449 women with breast cancer, who received curative treatment in years 2001-2002. Relative 5-year survival rates as function of age and stage among urban and rural women population were calculated. The results showed that survival rates in Podlaskie Voivodship among curatively treated women with breast cancer were 81.9% but they differed between urban and rural areas. Patients living in rural areas had much lower survivals than those living in urban areas at local and regional stage of disease. In all age groups considered in the study survivals in rural areas were lower than in urban ones in which survivals were higher in 55-64 age group. These results indicated the necessity intervention in order to increase the access to the health care system and effectiveness of early detection and also improved treatment standards for more disadvantaged rural areas. These results should be also considered in monitoring of the National Cancer Control Programme introduction in Poland in 2006.

Key words

breast cancer, 5-year relative survival rate, inequalities in health, curative treatment, population based study

INTRODUCTION

Proper diagnosis and treatment of breast cancer should be started without undue delay and in consistence with the standard as an obligatory part of cancer control. It should also be monitored and evaluated [1]. The relative 5-year survival rate is one of the indicators described in the results of cancer treatment in the population [2].

Breast cancer is one of the most common invasive cancers for women worldwide. According to estimates by the World Health Organization (WHO), 1.38 million new cases and 458.367 deaths of breast cancer were registered in the world in 2008 [3]. At the same time in Poland, the National Cancer Registry registered 14,482 new cases of breast cancer in women; standardized incidence ratio – $47.7/10^5$. The number of deaths was 5,255; standardized mortality rate – $14.5/10^5$ [4].

The treatment of most cases of breast cancer is multidisciplinary, incorporating surgery, radiation therapy/RT, and systematic therapy, mainly depending on the advanced stage of the disease. Breast cancer patients are treated with curative, palliative and symptomatic intent. The curative treatment uses therapeutic methods which cure the patient. For patients among whom a cure is not possible, palliative treatment is applied which slows the

progression of the disease, and/or improves the quality of life. symptomatic treatment is a procedure used to eliminate severe symptoms of the disease, using techniques that do not affect the inhibition of its development [5].

The results of breast cancer treatment depend mainly on better detection and, consequently, a higher proportion of women with early stage of the disease, and also a better access to health care services and the effectiveness of oncological treatment [2].

Access to early detection and health care facilities differs between urban and rural communities. People living in rural areas in Poland usually have less access to health care services, and at the same time, less access to effective oncological treatment. It should also be noted that between urban and rural areas there are very important differences in the perception of health and the use of medical recommendations [6, 7].

Taking into consideration the unequal access to the health care system, as well as oncological treatment in urban and rural areas, and the implementation of the National Cancer Control Programme in 2006, the presented study was undertaken. Its aim was to evaluate differences in the results of the curative treatment received by women with breast cancer in urban and rural areas in Podlaskie Voivodship in 2001-2002, before the introduction of the National Cancer Programme.

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MATERIALS AND METHODS

Between 2001-2002, 696 cancer patients were registered in Cancer Register (CR) in Białystok. The cases were coded according to the International Classification of Disease (ICD-10) [8].

Analysis of the results of curatively treated breast cancer women in the Podlaskie Voivodship in 2001-2002 was performed. The study was based on 499 primary, invasive breast cancer cases for which the month of diagnosis, date of the last observation, or the date of death if the patient died within 5 years of diagnosis, were known and were treated with intent to cure.

The age of patients was taken on the basis of the CR data. Data on the stage of the breast cancer, its diagnosis, and information about the treatment assumption were obtained from patients' medical records from the hospitals where they were treated. The data were collected according to the principles recommended in EURO CARE Cohort Survival Study [9].

Place of residence (urban/rural) was determined on the basis of the address of each patient according to the National Official Register of Territorial Division of the Country (TERYT). The urban population was defined if urban official municipal rights were granted. In Podlaskie Voivodship there are 39 towns [10].

Patients were observed during the period of 5 years or until the date of death. Missing data concerning the patient being alive or dead were updated and verified by the Office for Citizen's Affairs and Migration in Białystok with the use of the National Identification Number (PESEL), which guaranteed the right quality of the observation.

Table 1. Characteristics of the patients

Place of residence	Included in analyses		Excluded in analyses			
	Patients with curative treatment	Patients with palliative treatment	Patients with symptomatic treatment	Autopsy or DCO ^a cases	All breast cancer patients in CR in Białystok	
	No. of women	%	No. of women	No. of women	No. of women	No. of women
Urban	367	73.5	57	31	17	473
Rural	132	26.5	41	31	20	223
All cases	499	100.0	98	62	37	696

^a Death certificate only

73.5% of the patients included in analyses were from urban and 26.5% from rural areas (Tab. 1). All breast cancer cases included in the analysis were histologically verified and the stage at diagnosis in compliance with ENCR criteria was known. There were no cases lost to follow-up.

In order to evaluate the stage of the disease a simplified classification recommended by the European Network of Cancer Registries (ENCR) for population registries (localised, regional, metastatic) was applied [11].

5-year relative survival rates were calculated for the Voivodship, and separately for urban and rural women population. The calculations were performed according to the stage at diagnosis, and in the following age groups: 15-44, 45-54, 55-64, 75 and above.

The R software (package *relSurv*) was used to prepare data and to perform statistical analysis [12, 13].

The 5-year relative survival rates were calculated by applying the Hakulinen life-table method [14]. This method is recommended by the WHO for survival analyses based on CR cohorts, which usually consist of the date of the cancer's diagnosis and its complete observation, but does not include information about the cause of death. A specific life-table for the Podlaskie Voivodship was provided by the Central Statistical Office in Warsaw. The calculations of the 5-year survival were carried out if there were at least 20 patients in a group.

Data collection and analysis were in compliance with The Personal Data Protection Act of 29 August 1997 (Journal of Laws, No. 133 item 883, as amended) as well as with the regulations and procedures of the National Cancer Registry.

RESULTS

Table 2 presents the age structure and stage distribution among women who received curative treatment.

The distribution of age groups in the urban and rural areas was similar. In both urban and rural areas the percentage of cases was highest in the age group of 45-54 years. In this group, the incidence for patients living in the urban areas amounted to 36.8%, and for those living in the rural areas – 30.3%. The lowest percentage of cases in urban and rural women was the oldest and respectively was 4.0% and 2.3%.

Table 2. Age and stage distribution of breast cancer patients by place of residence

	Urban		Rural		All cases	
	No. of women	%	No. of women	%	No. of women	%
Age						
15-44	63	17.2	26	19.7	89	17.8
45-54	135	36.8	40	30.3	175	35.1
55-64	88	24.0	32	24.2	120	24.0
65-74	66	18.0	31	23.5	97	19.4
75+	15	4.0	3	2.3	18	3.7
Stage						
Local	147	40.1	51	38.6	198	39.7
Regional	203	55.3	73	55.3	276	55.3
Metastatic	17	4.6	8	6.1	25	5.0

The proportion of localised stage of the disease in urban areas was higher – 40.1% – than among their rural counterparts – 38.6%. The proportion of regional stage of breast cancer was the same in urban and rural areas and amounted to 55.3%. However, metastasis at diagnosis was higher in rural areas: 6.1% vs. 4.6%.

The overall relative 5-year survival rates in Podlaskie Voivodship among women who received curative treatment amounted to 81.9%. There was considerable variation in survival rates between urban and rural areas, 83.5% in urban areas and 77.4% for their rural counterparts. Survival rates in rural areas were lower even if the main prognostic factors, age and stage of disease, were considered (Tab. 3).

The highest survival rates in urban and rural communities were among patients aged 65-74, and respectively amounted

to 88.5% and 84.7%. The lowest survival rates in rural areas appeared among the youngest patients, whereas in urban areas they were the lowest among patients aged 55-64. The biggest disproportion occurred between urban (84.6%) and rural (69.7%) communities among the youngest patients.

There was also a clear correlation between the value of survival rates and the stage of disease. The highest rates appeared if cancer was diagnosed in the local stage of disease, and in Podlaskie Voivodship amounted to 90.7%, but the rates strongly varied between urban and rural women. The 5-year survival rates among women with local stage of disease were 93.5% in urban and 82.4% in rural areas. In the regional stage of the disease, the survival rates amounted to 78.7% and also strongly differed between urban and rural areas. In urban areas, 5-year survival rates were 14.9 percentage points higher than in the rural ones.

Table 3. 5-year relative survival^a rates in urban and rural population by age and stage of breast cancer among women who received curative treatment

	Urban		Rural		All cases	
	No. of women	5-YRS ^b (95% CI)	No. of women	5-YRS ^b (95% CI)	No. of women	5-YRS ^b (95% CI)
Overall	367	83.5 (80.1-87.0)	132	77.4 (71.9-83.4)	499	81.9 (79.0-84.9)
Age						
15-44	63	84.6 (77.3-92.6)	26	69.7 (58.4-83.2)	89	80.3 (73.9-87.3)
45-54	135	82.3 (77.0-88.0)	40	71.1 (61.7-82.0)	175	79.8 (75.1-84.9)
55-64	88	79.9 (73.2-87.2)	32	80.7 (69.9-93.1)	120	80.2 (74.4-86.4)
65-74	66	88.5 (80.6-97.1)	31	84.7 (73.1-98.1)	97	87.7 (81.0-94.9)
75+	15	#	3	#	18	#
Stage						
Local	147	93.5 (89.0-98.2)	51	82.4 (70.4-94.3)	198	90.7 (86.5-95.1)
Regional	203	80.3 (75.8-85.1)	73	65.4 (54.4-76.4)	276	78.7 (74.8-82.9)
Metastatic	17	#	8	#	25	45.3 (37.3-55.1)

^a – in %

^b – 5-year relative survival rate

– not calculated.

DISCUSSION

The effectiveness of actions taken by a health care system in order to improve the tumour curability is one of the determinants of the breast cancer risk in a specific population [2]. The indicator of a relative 5-year survival is an indicator recommended by the International Agency for Research on Cancer (IARC) and the WHO to assess the curability of a tumour [15].

The study of 5-year relative survival rates among women with breast cancer in Podlaskie Voivodship, taking into consideration the treatment, have not been previously conducted. The relative 5-years survival rate in Podlaskie Voivodship among women with breast cancer who received curative treatment amounted to 81.9% and was 8.1 percentage points higher in comparison to the survival rate calculated

for all female patients diagnosed with breast cancer, which amounted to 73.8% in the same period of time [16]. Women with breast cancer who were included in the analysis had favourable prognostic factors for authorizing treatment with the intent to cure. Therefore, it can be expected that 5-year survival rates in this cohort will be significantly higher than in the general population.

According to the EUROCARE-4 study, the European average age-standardised 5-year relative survival among breast cancer women amounted to 79.4%, and ranged from about 80-90% in several Northern European countries to 70% in Central Europe. Poland, with a survival rate of 73.7%, belongs to the countries with one of the lowest survival rates in Europe [17, 18]. It is thought that delay in treatment and limited availability of effective, standard treatment are among the major causes of the low rates for 5-year survival in Poland. The increase in survival rates usually occurs when, as a result of early detection associated with better efficacy of oncological treatment, there is an increase in the proportion of patients with a localized stage of disease [2].

In the study period, there were approximately 1,208,600 inhabitants in Podlaskie Voivodship, including 617,398 women, which amounts to about 51%. More women lived in urban – 371,270 (60.1%) than in rural areas – 246,128 (39.9%) [19]. In Podlaskie Voivodship in 2001-2002, the breast cancer incidence rate was 38.9/10⁵, and incidence rates were markedly higher in urban (47.0/10⁵) than in rural (30.8/10⁵) areas [20].

In the years 2001-2002, women diagnosed with breast cancer who were reported to the Cancer Registry (CR) in Białystok were treated in eight hospitals in the Podlaskie Voivodship and beyond. Besides specialist hospitals, the women were also treated in health care centres which did not have specialized units to treat patients with cancer. In the cohort with the curative treatment the following treatments were used: surgery, chemotherapy, radiotherapy or hormonal therapy. Due to the individual approach to the organization and planning of patients' curative treatments, each of these methods was used alone or in combination in different sequences.

The presented study shows big differences in the results in 2001-2002 of curative treatment among women with breast cancer in urban and rural areas in Podlaskie Voivodship. The relative 5-year survival rate among women in urban areas was 83.5%, while in rural areas it was considerably lower – 77.4%. A particularly unfavourable situation occurred among women in the two youngest age groups in rural areas, i.e. 15-44 and 45-54 years, in which the survival rate was respectively 14.9 and 10.6 percentage points lower in comparison to the female inhabitants of cities.

Population studies have shown that the main factor affecting the results of breast cancer treatment is the stage of the disease at diagnosis [21]. Results of the presented study confirm these underlying findings, and also indicated that women with breast cancer living in rural areas, at each stage of the disease had a poorer prognosis, in spite of the treatment with the same assumptions.

The diversification in values of 5-year survival rates between female inhabitants of urban and rural areas indicates the health inequalities extant in Poland. These inequalities might derive from the worse socio-economic status of the inhabitants of rural areas, which is due mainly to the lower education level and lower incomes [22].

Many studies have shown that the results of breast cancer treatment were strongly associated with socio-economic indicators [23, 24, 25, 26, 27, 28, 29]. People living in socio-economically disadvantaged areas may have poorer access to health care, which may result in delayed diagnosis and poorer treatment. People living in rural areas in Poland usually have less access to health care services, and at the same time, less access to effective oncological treatment [6, 7]. An unequal access to early detection and undue delay in treatment for rural women with breast cancer is also a consequence of their distant location and concentration in urban areas.

In order to explain the reasons for differences in the results of breast cancer curative treatment between urban and rural areas, more population-based studies, including level of knowledge about cancer and life style, access to health services, socio-economic inequalities, etc. are needed. These indicators are basic for the planning and monitoring of effective intervention in the population.

The results obtained indicate the necessity for intervention in order to increase access to the health care system and effectiveness of early detection, as well as improved treatment standards for the more disadvantaged rural areas. They should also be considered in the monitoring of the National Cancer Control Programme introduced in Poland in 2006.

CONCLUSION

The results of the presented study show the following:

- 1) that the results of curative treatment among women with breast cancer in Podlaskie Voivodship varied between urban and rural residents; they were poorer among women living in rural areas.
- 2) that the results show that the worst situation occurred among young women in rural areas, because the 5-year survival rate among this age group was the lowest. This indicates a necessity for health education, preventive activities and intervention in order to increase access to the health care system among young women in rural areas.
- 3) that the results of the study should be used for evaluation of health effects of the National Cancer Control Programme in Podlaskie Voivodship.

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