ORIGINAL ARTICLES AAEM

Ann Agric Environ Med 2010, 17, 159–162

DIFFERENCES IN BREAST CANCER INCIDENCE AND STAGE DISTRIBUTION BETWEEN URBAN AND RURAL FEMALE POPULATION IN PODLASKIE VOIVODSHIP, POLAND IN YEARS 2001–2002

Michalina Krzyżak[1], Dominik Maślach[1], Marzena Juczewska[2], Wiesław Lasota[3], Daniel Rabczenko[4], Jerzy T. Marcinkowski[5], Andrzej Szpak[1]

[1]Department of Public Health, Medical University of Bialystok, Białystok, Poland
[2]Maria Skłodowska-Curie Bialystok Oncology Centre, Białystok, Poland
[3]Department of Lung Cancer and Thoracic Tumours, Maria Skłodowska-Curie Cancer Centre and Institute of Oncology, Warsaw, Poland
[4]National Institute of Public Health-National Institute of Hygiene, Centre for Monitoring and Analyses of Population Health Status and Health Care System, Warsaw, Poland
[5]Department of Hygiene, Medical University of Poznań, Poland

Krzyżak M, Maślach D, Juczewska M, Lasota W, Rabczenko D, Marcinkowski JT, Szpak A: Differences in breast cancer incidence and stage distribution between urban and rural female population in Podlaskie Voivodship, Poland in years 2001–2002. *Ann Agric Environ Med* 2010, **17**, 159–162.

Abstract: The aim of the study was to evaluate differences in breast cancer incidence and stage of disease between the urban and rural female population in Podlaskie Voivodship in 2001–2002, before the introduction of the Population Screening Programme in 2006. Analysis was based on 696 breast cancer cases diagnosed in years 2001–2002 and registered in the CR in Białystok (Voivodship Cancer Registry). An average annual number of incidence, as well as crude and standardised incidence rates, were calculated. Age-specific incidence rates for 5-year age groups were also calculated and grouped as follows: <50, 50–69, ≥70 years old. Incidence differences related to place of residence: urban or rural, were presented with the use of u/r (urban/rural) ratio. In order to evaluate the stage of disease, a simplified classification recommended by ENCR (European Network of Cancer Registries) for population registries (localised, regional, metastatic) was applied. The breast cancer incidence rate in the urban population was higher than in rural areas with u/r ratio amounting to 1.4. The highest incidence and largely marked differences between urban and rural areas were among women aged 50–69 years with the u/r ratio amounting to 1.8. Overall, the proportion of stage localised in Podlaskie Voivodship was 33.1% and differed between urban and rural areas. The proportion of localised cancer was higher in urban areas, but patients were younger when compared to those living in rural areas. Knowledge of differences in incidence and breast cancer stage in urban and rural women investigated in this research, together with other epidemiological indicators, should be used for monitoring the Population Screening Programmes in these populations.

Address for correspondence: Michalina Krzyżak, Medical University of Bialystok, Department of Public Health, I Armii Wojska Polskiego 2/2, 15-103 Białystok, Poland. E-mail: m.krzyzak@umwb.edu.pl

Key words: breast cancer, incidence, stage of disease, inequalities in health, urban and rural population.

INTRODUCTION

Variation in female breast cancer incidence and stage distribution between urban and rural areas is one of the inequalities in the health of the Polish population. They are mainly related to exposure to risk factors that have changed due to different trends in lifestyle in different populations [8, 12, 16, 23]. The other reason was the disproportion at the beginning of century in the rising frequency of mammography performed spontaneously for early cancer detection.

Received: 7 March 2010
Accepted: 31 May 2010

The early period of implementation of organised population screening programme normally leads to an increase in breast cancer incidence due to the detection of symptomless and prevalent cases, and shifts the stage distribution toward the early diagnosis and younger age of the patients [6]. As could be expected from experiences in other countries, since the screening has become well-established, the 'wave' in rising incidence caused by prevalent cases will disappear and the preceding trend in incidence will continue. A visible benefit of effective screening would be a substantial rise in the proportion of early cases, followed by a marked decrease in mortality trends [3].

Such a health effect generated by population screening can be evaluated only if based on high quality population Cancer Registry (CR) data. The majority of European CRs collect basic information on incidence only. Collecting information about the stage of disease is optional, therefore data are usually incomplete and insufficient for the evaluation of screening effectiveness [13]. For that reason, a specific approach to data collection is necessary.

It is expected that the Population Screening Programme in Podlaskie Voivodship implemented in 2006 within the frame of the National Cancer Control Programme [20], will soon bring expected advantageous health effects.

In 2001–2002, there were approximately 1,208,600 inhabitants in Podlaskie Voivodship, including 617,399 women, which amounts to about 51%. More women lived in urban – 371,270 (60.1%) than in rural areas – 246,128 (39.9%) [18].

The aim of the study was to analyse the differences in breast cancer incidence among urban and rural women, including their age and stage distribution before the Population Screening Programme was implemented in the region.

The usefulness of this study is the concept for providing basic information to allow for further health effects monitored by the Programme.

MATERIALS AND METHODS

The analysis was based on 696 women diagnosed with breast cancer during 2001–2002 and registered in the CR in Białystok. Cases were coded according to the International Classification of Disease (ICD-10) [7]. Place of residence (urban – rural) was determined on the basis of the address of patients obtained from the National Official Register of Territorial Division of the Country – TERYT. Urban population was defined if urban official municipal rights were granted. In Podlaskie Voivodship there are 39 towns [19].

Age of patients was calculated on the basis of the CR data. Incomplete data on stage were provided or verified on the basis of patients' medical records from the hospitals where they were treated.

An annual number of new cancer cases was calculated alltogether and separately for urban and rural populations. Incidence rates: crude, age-specific and standardised, according to the world population, were also calculated and expressed per 100,000 persons at risk with the application of methodology recommended by the IARC (International Agency for Research on Cancer) [4].

Incidence differences related to place of residence were presented with the use of u/r ratio.

In order to evaluate the differences in stage distribution, a simplified classification recommended by the ENCR for population registries (localised, regional, metastatic) was used [5, 22].

Stage distribution was presented according to age groups: <50, 50–69, ≥70 years old, and place of residence: urban – rural.

Data collection and analysis was 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

Patients characteristics are summarised in Table 1. In years 2001–2002 there were 696 new breast cancer cases in Podlaskie Voivodship registered in the CR in Białystok. The crude rate was $56.4/10^5$ and standardised $38.9/10^5$. Breast cancer diagnosis was microscopically confirmed in 91.5% of cases. The majority, that is 473 (68%) of breast cancer patients, live in urban, and the rest, 223 (32%), in rural areas. Overall, half of the women were in the age group 50–69 years old. Stage data completeness reached 93.1%. Stage distribution was as follows: localised 31.3%, regional 49.9% and metastatic 11.9%.

Table 1. Breast cancer patients characteristic.

	No. of women	%
All cases	696	100.0
Incidence[a]		
crude	56.4	
standardised	38.9	
Age		
<50	195	28.0
50–69	349	50.2
≥70	152	21.8
Stage		
local	218	31.3
regional	347	49.9
metastatic	83	11.9
unknown	48	6.9
Place of living		
urban	473	68.0
rural	223	32.0
Microscopic verification		
verified	637	91.5
non-verified	59	8.5

[a] rate per 10^5

Table 2. Breast cancer incidence[a] by place of living.

	urban	rural	u/r ratio[b]
Total			
crude	63.7	45.3	1.4
standardised	47.0	30.8	nc[c]
Age-specific			
<50	26.4	17.4	1.5
50–69	173.2	97.3	1.8
≥70	126.1	87.2	1.4

[a] rate per 10^5, [b] urban/rural ratio, [c] not calculated

Table 3. Stage distribution in urban and rural areas.

	urban		rural	
	No. of women	%	No. of women	%
Stage				
local	159	35.5	59	29.5
regional	243	52.4	104	52.0
metastatic	46	10.3	37	18.5
all[a]	448	100.0	200	100.0

[a] all women with known stage of disease at diagnosis

Table 4. Age distribution in urban and rural areas.

	urban		rural	
	No. of women	%	No. of women	%
Age				
<50	141	29.8	54	24.2
50–69	250	52.9	99	44.4
≥70	82	17.3	70	31.4
all cases	473	100.0	223	100.0

As it can be seen in Table 2, incidence rates were markedly higher in urban than in rural areas, and amounted respectively to: urban – $47.0/10^5$ (crude $63.7/10^5$), rural $30.8/10^5$ (crude $45.3/10^5$); u/r ratio was 1.4.

The largest differences between urban and rural areas could be observed in the age group 50–69, which is reflected by the u/r ratio which amounted to 1.8.

Differences between urban and rural areas can also be seen if the stage is considered. The proportion of localised stage was 35.5% in urban and 29.5% in rural women (Tab. 3). Even more than half of the women were diagnosed in regional stage at disease in both urban and rural areas (52.4% *vs* 52.0%).

Women in the 50–69 age group constituted the majority in both populations, and the proportion was 52.9% in urban and 44.4% rural areas. As Table 4 shows, urban female patients were younger.

The percentage of women below the age of 70 was higher in urban areas than in rural ones, and respectively amounted to 29.8% *vs* 24.2%. In contrast, the percentage of older women, 70 years old and above, was almost twice as high in urban (31.4%) than in rural areas (17.3%).

DISCUSSION

Breast cancer risk is strongly related to the life style determined by socio-economic status [9, 14], therefore it could be considered as one of the health inequalities. These phenomena can be very well observed across Europe [2, 15]. Therefore, estimated standardised incidence rates vary from below $40/10^5$ in Belarus and the Russian Federation, to above $90/10^5$ in Belgium and France, and above $100/10^5$ in the US [4]. Poland, with the incidence $44.2/10^5$ in 2006, belongs to the countries of relatively low breast cancer risk, while a considerable variation between Polish regions exists, reaching even $54.8/10^5$ in Warsaw-city [21]. The highest incidence in the regions is associated with density of urbanisation and better socio-economic status.

Podlaskie Voivodship with an incidence of $38.9/10^5$ is characterised in Poland by rather low breast cancer risk.

Poland has a long tradition of cancer registration, which started in the early 50s within the framework of the second National Cancer Programme in Poland [11]. Besides the others, monitoring of cancer trends in so-called Selected Areas was one of the aims of the Programme. Well-known studies were conducted from 1963–1996 in the cities of Warsaw and Krakow and their former typically rural surrounding areas [10, 24]. The study conducted in Warsaw region provided the data on trend in u/r ratio which during that time decreased from 2.4 to 1.7 in 1995. The results of the study showed that differences were slowly disappearing at that period of time, mainly due to the incidence risk increasing faster in rural than in urban areas. More recent studies conducted at the turn of the twentieth century in Krakow region and Lower Silesia resulted in such values, respectively 1.6 and 1.4 [1, 17].

The u/r ratio equal to 1.4 calculated in Podlaskie Voivodship a little later was not very different from the above findings, suggesting that the trends are similar.

In Podlaskie Voivodship, the differentiation in the oldest age group ≥70 still remained smaller if compared to the younger one, which may suggest that those women were less affected by the change of risk factors related to the lifestyle. This effect is even more visible when age group distribution in urban and rural areas is considered. On the contrary, the u/r ratio and age distribution suggest more risk increasing faster in younger women in towns.

The proportion of locally advanced cancer in Podlaskie Voivodship was low and amounted to 31.3%. The proportion was considerably higher in urban population, which may suggest a higher awareness of cancer and better access to mammography, leading to earlier diagnosis.

As mentioned in Introduction, the Population Screening Programme was implemented in Podlaskie Voivodship, therefore an increase in incidence, and obvious shifting to the early stages of breast cancer and younger population,

can be expected soon. It can be also presumed that most of the health inequalities related to cancer between urban and rural areas will disappear.

CONCLUSSION

1. There are noticeable differences in breast cancer incidence risk in Podlaskie Voivodship; moreover, considering the age distribution, it seems to be a dynamic process and the younger population is becoming at higher risk.
2. The proportion of early breast cancer in Podlaskie Voivodship is low, and also related to place of residence, adversely to the rural population.
3. The urban-rural differentiation in breast cancer incidence and stage distribution should be considered as the appearances of health inequalities in the Polish population.

Acknowledgements

We thank Ewa Brdak for her help and advice with the English. The study has been supported by Ministry of Science and Higher Education grant No. N404 161437.

REFERENCES

1. Bębenek M, Pudełko M, Błaszczyk J: Breast cancer incidence and mortality in Lower Silesia (Poland) between 1984 and 2003 – trends and perspectives. *Cent Eur J Med* 2007, **2**, 208–215.
2. Carlsen K, Høybye MT, Dalton SO, Tjønneland A: Social inequality and incidence of and survival from breast cancer in a population-based study in Denmark, 1994–2003. *Eur J Cancer* 2008, **44**, 1996–2002.
3. Coleman MP, Alexe DM, Albreht T, McKee M: *Responding to the challenge of Cancer in Europe*. Institute of Public Health of the Republic of Slovenia, Ljubljana 2008.
4. Curado MP, Edwards B, Shin HR, Storm H, Ferlay J, Heanue M, Boyle P: *Cancer Incidence in Five Continents*. Vol. IX. IARC Scientific Publication No. 160. International Agency for Research on Cancer, Lyon 2007.
5. Esteban D, Whelan S, Laudico A: *Rejestracja zachorowań na nowotwory złośliwe. Podręcznik dla personelu rejestrów nowotworowych*. Centrum Onkologii Instytut im. M. Skłodowskiej-Curie, Warszawa 2002.
6. Hakama M, Coleman MP, Alexe DM, Auvinen A: Cancer screening. **In:** Coleman MP (Ed): *Responding to the challenge of cancer in Europe*, 69–92. Institute of Public Health of the Republic of Slovenia, Ljubljana 2008.
7. *International Statistical Classification of Diseases and Health Related Problems: tenth revision.* 2nd edition, World Health Organization, Geneva 2004.
8. Kilford J: Could hormonal influences and lifestyle factors affect the risk of developing breast cancer? *Radiography* 2003, **9**, 291–299.
9. Kogevinas M, Pearce N, Susser M, Boffetta P: *Social Inequalities and Cancer.* IARC Scientific Publication No. 138. International Agency for Research on Cancer, Lyon 1997.
10. Koszarawski T, Gadomska H, Wronkowski Z, Romejko M: *Epidemiologia nowotworów złośliwych w Warszawie i wybranych terenach wiejskich w latach 1963–1972. Zachorowania na nowotwory złośliwe w Polsce – prognozy*. Instytut Onkologii im. M. Skłodowskiej-Curie w Warszawie, Zakład Organizacji Walki z Rakiem i Epidemiologii, Warszawa 1975.
11. Koszarawski T, Wronkowski Z: The National Cancer Program in Poland. Principles and results. *Arch Geschwulstforsch* 1980, **6**, 576–587.
12. Maniecka-Bryła I, Bryła M: Niwelowanie nierówności w zdrowiu w Polsce w okresie transformacji systemowej. *Zdr Publ* 2009, **2**, 132–138.
13. Micheli A, Baili P: Information on cancer. **In:** Coleman MP (Ed): *Responding to the challenge of cancer in Europe*, 177–189. Institute of Public Health of the Republic of Slovenia, Ljubljana 2008.
14. Newman LA, Martin IK: Disparities in breast cancer. *Curr Probl Cancer* 2007, **31**, 134–56.
15. Ocaña-Riola R, Sánchez-Cantalejo C, Rosell J, Sánchez-Cantalejo E, Daponte A: Socio-economic level, farming activities and risk of cancer in small areas of Southern Spain. *Eur J Epidemiol* 2004, **19**, 643–50.
16. Panasiuk L, Wdowiak L, Paprzycki P, Lukas W: Occurrence of overweight and obesity among adult rural population in Eastern Poland. Relationship between obesity and selected socio-economic factors. *Ann Agric Environ Med* 2008, **15**, 149–152.
17. Rachtan J, Sokołowska A, Geleta M, Molong Ł: Zachorowalność na nowotwory złośliwe piersi u kobiet w województwie małopolskim w latach 1999–2001. *Współcz Onkol* 2008, **9**, 425–428.
18. Urząd Statystyczny w Białymstoku: *Rocznik Statystyczny Województwa Podlaskiego 2002*. Urząd Statystyczny w Białymstoku, Białystok 2003.
19. TERYT Krajowy Rejestr Urzędowy Podziału Terytorialnego Kraju [Internet]. Główny Urząd Statystyczny [cited 2010 Feb 15]. Available from: http://www.stat.gov.pl/broker/access/definitionTree.jspa
20. Ustawa z dnia 1 lipca 2005 r. o ustanowieniu programu wieloletniego „Narodowy program zwalczania chorób nowotworowych". Dz.U. z 2005 r. Nr 143, poz. 1200.
21. Wojciechowska U, Didkowska J, Zatoński W: *Nowotwory złośliwe w Polsce w 2006 roku*. Centrum Onkologii Instytut im. M. Skłodowskiej-Curie, Warszawa 2008.
22. Wojciechowska U, Didkowska J, Zatoński W: *Rejestracja nowotworów złośliwych. Zasady i metody*. Centrum Onkologii Instytut im. M. Skłodowskiej-Curie, Warszawa 2007.
23. Wojtyniak B, Goryński P: *Stan zdrowia ludności Polsk*i. Narodowy Instytut Zdrowia Publicznego – Państwowy Zakład Higieny, Warszawa 2008.
24. Wronkowski Z, Zwierko M, Romejko M: *Epidemiology of cancer in Warsaw and Selected Rural Areas 1996*. Warsaw Cancer Registry, The M. Skłodowska-Curie Memorial Cancer Center and Institute of Oncology, Warsaw 2008.