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.
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 address of the CR. 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 altogether 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 56.4/10⁵ and standardised 38.9/10⁵. 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>
<thead>
<tr>
<th>Table 1. Breast cancer patients characteristic.</th>
<th>No. of women</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>All cases</td>
<td>696</td>
<td>100.0</td>
</tr>
<tr>
<td><strong>Incidence</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>crude</td>
<td>56.4</td>
<td></td>
</tr>
<tr>
<td>standardised</td>
<td>38.9</td>
<td></td>
</tr>
<tr>
<td><strong>Age</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;50</td>
<td>195</td>
<td>28.0</td>
</tr>
<tr>
<td>50–69</td>
<td>349</td>
<td>50.2</td>
</tr>
<tr>
<td>≥70</td>
<td>152</td>
<td>21.8</td>
</tr>
<tr>
<td><strong>Stage</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>local</td>
<td>218</td>
<td>31.3</td>
</tr>
<tr>
<td>regional</td>
<td>347</td>
<td>49.9</td>
</tr>
<tr>
<td>metastatic</td>
<td>83</td>
<td>11.9</td>
</tr>
<tr>
<td>unknown</td>
<td>48</td>
<td>6.9</td>
</tr>
<tr>
<td><strong>Place of living</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>urban</td>
<td>473</td>
<td>68.0</td>
</tr>
<tr>
<td>rural</td>
<td>223</td>
<td>32.0</td>
</tr>
<tr>
<td><strong>Microscopic verification</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>verified</td>
<td>637</td>
<td>91.5</td>
</tr>
<tr>
<td>non-verified</td>
<td>59</td>
<td>8.5</td>
</tr>
</tbody>
</table>

*4 rate per 10⁵*
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 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.

**CONCLUSION**

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.

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**REFERENCES**


