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**BREAST CANCER AS A PUBLIC HEALTH CHALLENGE. EPIDEMIOLOGY OF THE DISEASE AND PREVENTION OF THE RISK FACTORS AMONG WOMEN IN PERIMENOPAUSAL AND POSTMENOPAUSAL AGE**

**Introduction**

Both, in the world and in the European countries, including Poland, breast cancer is a significant public health challenge. According to data from the International Agency for Research on Cancer (IARC), in 2018 there were 2 088 849 cases of breast cancer in the world (ASR/100 000 = 46.3), of which there were as many as 522 513 in Europe alone (ASR/100 000 = 74.4). In Poland, according to the latest data from the National Cancer Registry, in 2016, 18 615 women got breast cancer (ASR/100 000 = 54.1). At present, in most countries an increasing trend is observed in the incidence of breast cancer, especially visible in developing countries. In the case of mortality, the situation is more diverse. In Europe, including Poland, trends in breast cancer mortality have been stable or declining over the past decades. However, in recent years, in some European countries, a rise in mortality has been observed, including Poland. Regardless of the region of the world, breast cancer is most often found in perimenopausal and postmenopausal women, which is why it is such a significant and important group in the context of this disease.

The World Health Organization (WHO) indicates that breast cancer is the most common malignant cancer occurring among women and the second most common in the general population of the world, which makes it a disease that has a strong impact not only on health-related but also social and economic aspects. Moreover, the significant heterogeneity of this disease in terms of biological features often creates difficulties in its treatment. Combining and classifying certain biological features of breast cancer (including the occurrence of steroid receptors expression and HER2 receptors) depending on the age of a woman is a valuable guide for planning primary and secondary prevention.

Many scientific studies have shown that the vast majority of malignant cancers (even more than 90%) are associated with exposure to external factors whose impact is modifiable or possible to be completely eliminated. In the case of breast cancer, a strong correlation was

found between the increased risk of the disease and the occurrence of such factors as, among others: overweight and obesity in postmenopausal women; low physical activity; alcohol consumption or prolonged use of hormone replacement therapy.

However, despite many scientific studies carried out so far, some aspects related to breast cancer have still not been recognized. The complexity of the disease in question, both from the biological and etiological side, forces to devote much more attention to activities related to early detection of breast cancer (screening), but also with the primary prevention of risk factors.

### **Aims of the thesis**

The aim of the work is to analyze issues connected with breast cancer among women in perimenopausal and postmenopausal age (in the age of 45 years old and older) in the following dimensions: epidemiological (mortality), clinical (prevalence of certain biological features) and preventive (women's attitudes and knowledge on breast cancer).

### **Specific objectives**

1. Analysis of the epidemiological trends on breast cancer mortality in 28 European Union countries and 3 non-EU countries - Norway, Switzerland, Russian Federation among women in the perimeopausal and postmenopausal age in the years 1959-2017.
2. To examine the relationship between the age of women and the prevalence of selected biological features of breast cancer affecting the course of treatment (the occurrence of estrogen receptors - ER, progesterone - PgR and human epidermal growth factor receptor type 2 - HER2).
3. Determination of the level of knowledge and identification of the presented attitudes of women in perimenopausal and postmenopausal age, referring to well-known factors increasing the risk of breast cancer.

## **A series of monographs constituting the doctoral thesis**

**Publication I - *Breast cancer mortality trends in Europe among women in perimenopausal and postmenopausal age (45+)***, Archives of Medical Science, DOI: <https://doi.org/10.5114/aoms.2019.85198>, manuscript in print.

The article is a broad epidemiological analysis showing breast cancer mortality trends in the group of women aged 45 and older in 28 European Union countries and in 3 non-EU countries (control group) - in Norway, Russian Federation and Switzerland. The analysis of epidemiological data covers the period of all available years, i.e. 1959-2017.

The study shows a general decreasing trend in mortality in breast cancer in the vast majority of analyzed countries. However, in the four countries - in Croatia, Poland, Romania and Slovakia - in recent years increase in breast cancer mortality has been observed. Moreover, in Bulgaria, a continuation of the growing mortality trend in investigated age group has been proved as well.

**Publication II - *Prevalence of PgR, ER and HER2+ receptors among women with breast cancer by age in Poland***, NOWOTWORY Journal of Oncology 2018, volume 68, number 5–6, 227–231 DOI: 10.5603/NJO.2018.0036.

This work describes the prevalence of estrogen (ER), progesterone (PgR) receptors and the human Epidermal Growth Factor Receptor 2 (HER2) among women with breast cancer, depending on the age of women in the cohort of 735 women aged from 27 to 91 years.

Occurrence of individual receptors or their absence is very important in the planning and course of breast cancer treatment. The study showed a relationship between the growing age of women and the more frequent occurrence of the certain biological features of breast cancer, such as: expression of steroid receptors (PgR, ER) or lack of expression of HER2 receptors. Cancer cells of women with postmenopausal breast cancer have more often demonstrate biological features favorable for the treatment course. At the same time, the study proved more frequent occurrence of more aggressive types of breast cancer (without

the expression of receptors - the so-called three-negative breast cancer) among younger women - aged 27-44.

**Publication III - *Breast cancer risk factors - awareness and attitudes of women in perimenopausal and postmenopausal age (45+) in Poland***, Health Problems of Civilization. 2019. doi:10.5114/hpc.2019.84191.

The aim of the study was to determine the level of knowledge and identification of the presented attitudes of women in perimenopausal and postmenopausal age, referring to well-known factors that increase the risk of breast cancer (including the occurrence of overweight and obesity, alcohol consumption or prolonged use of hormone replacement therapy). The research group consisted of 380 women aged 45 and older who had breast cancer - in the past or at the time of the study, as well as of healthy women who had never had breast cancer.

72% (274) of the respondents assessed their knowledge on breast cancer as good or very good. Nevertheless, the declared high level of knowledge, in a large extent, did not translate into actually presented health attitudes or possessed information.

The results of the study suggest that education in this particular age group of women should be more effective and put more emphasis not only to secondary prevention (screening) but also to primary prevention (risk factors).

## **Conclusions**

Presented works give a broad picture of issues related to the breast cancer among women in perimenopausal and postmenopausal age in epidemiological, clinical and preventive dimension. Joint, multifaceted consideration of aspects related to breast cancer creates opportunities for a better understanding of this disease, and thus more effective influence on reducing its health effects in the most vulnerable group - among women 45+, but also in the general population. It is now known that breast cancer is a disease that environmental factors can contribute to a large extent. Building women's health awareness in this area, in particular among women around the postmenopausal age, where the number of cases is the highest, has significant meaning. The analysis of epidemiological and clinical data has a great value in planning preventive activities. Moreover, the analysis of mortality trends is a powerful source of information illustrating changes in the effectiveness of diagnoses of the disease, as well as showing the adequacy and effectiveness of the implemented treatment regimens. On the

other hand, the analysis of information on women's health attitudes and knowledge allows for better understanding and more reliable deduction from epidemiological data. The research undertaken as part of the implementation of this work is therefore a coherent whole allowing for comprehensive inferences regarding possible causes of breast cancer, changes in epidemiological trends and health attitudes of women. The lack of similar analyzes additionally increases the value of this work as having a great potential for practical application.