

Breast cancer in Poland – the urgent need for effective prevention

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A – Study Design, **B** – Data Collection, **C** – Statistical Analysis, **D** – Data Interpretation, **E** – Manuscript Preparation, **F** – Literature Search, **G** – Funds Collection

Summary Breast cancer is the dominant health problem in the female population. In 2020, it was responsible for 23.8% of cancer cases and 15.3% of cancer-related deaths. In the total number of female malignancies, the share of breast cancer is constantly increasing, with the growth rate reaching about 2.2% per year. The risk of breast cancer increases with age, genetic factors, family history, hormonal factors, and lifestyle. Research in the field of psychoneuroimmunology demonstrates the existence of a bidirectional relationship between the nervous and immune systems. Psychological factors that may increase the risk of breast cancer incidence include chronic stress, feelings of helplessness, suppression of emotions (especially anger), external locus of control, anxiety, and depression. The nature of breast cancer symptoms depends on the stage. In the case of this disease, the initial stage is asymptomatic, and any cancerous changes can only be detected during preventive mammography. Early detection and medical intervention greatly increase the chances of a cure. The biggest challenge for the healthcare system is late diagnosis. Identification of the factors affecting women's participation in population-based screening may allow for tailoring health education to the recipient, increasing women's attendance in mammography examinations, and improving the effectiveness of preventive programs, thus reducing breast cancer mortality in the population of Polish women.

Key words: breast neoplasms, epidemiology, risk factors, incidence, mortality.

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Epidemiology

Poland belongs to the group of countries where the risk of breast cancer is high and is characterized by an upward trend [1]. The number of newly registered cases continues to increase, from 12,512 patients in 2000 to 17,647 in 2020 (Figure 1) [2].

Breast cancer is the dominant health problem in the female population, accounting for 23.8% of cancer cases and 15.3% of cancer-related deaths in 2020. Despite increasingly better diagnoses and new treatments, the number of deaths due to breast cancer is still large and growing (1.33 times higher than 10 years ago) [2].

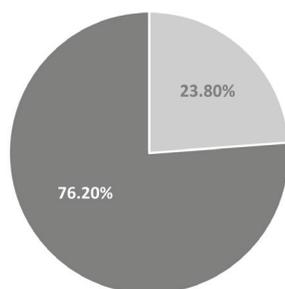
The aging of the Polish population will undoubtedly exacerbate this problem in the future. Breast cancer is the most common cause of death in women aged 60–84, reaching its highest values above the age of 85 when the increased incidence of death from natural causes should also be taken into account. In

addition, the disease is also a cause of premature mortality in women before the age of 65 (Figure 2).

According to the Polish National Cancer Registry, the number of breast cancer cases among Polish women exceeded 20,000 in 2019. The standardized incidence rate in 2019 was 57.21 per 100,000, and the mortality rate was 14.99 per 100,000. In 2020, there was a decrease in incidence, which probably does not reflect the true state of affairs due to the declared COVID-19 pandemic and the resulting limited access to health care and/or patients' anxiety. In the total number of female malignancies, the share of breast cancer is constantly increasing, with the growth rate reaching about 2.2% per year (Figure 3).

The risk of developing the disease increases with age. Most breast cancers are diagnosed in women aged 60–69 (Figure 4). They account for 32.12% of total breast cancers, 8.85% of female neoplasms and 4.45% of total malignancies in the Polish population. The incidence of premenopausal women (20–49 years old) has increased 1.2 times since 2000. The incidence

a. Cancer morbidity among Polish women, 2020



b. Cancer mortality among Polish women, 2020

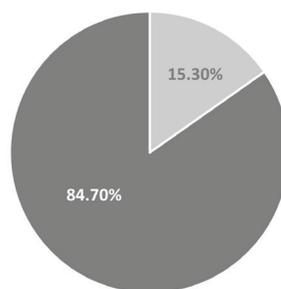


Figure 1. Breast cancer morbidity (a) and mortality (b) among Polish women in 2020 [2]



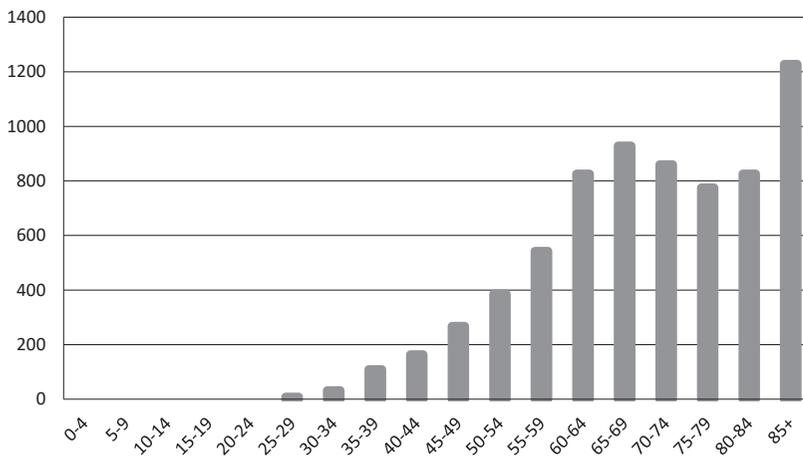


Figure 2. Breast cancer mortality among Polish women by age groups, 2020 [2]

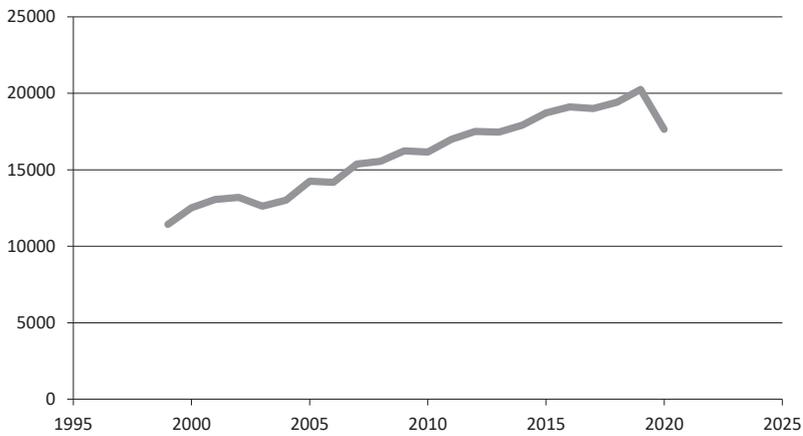


Figure 3. Breast cancer morbidity trends among Polish women in the years 1999–2020 [2]

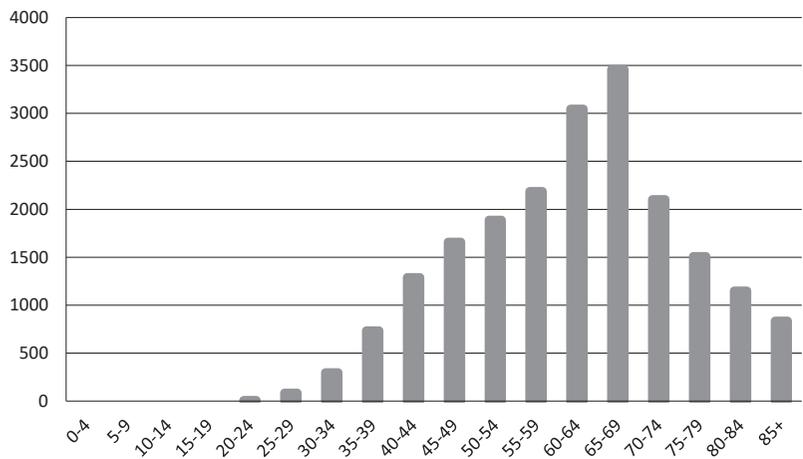


Figure 4. Breast cancer morbidity among Polish women by age groups, 2020 [2]

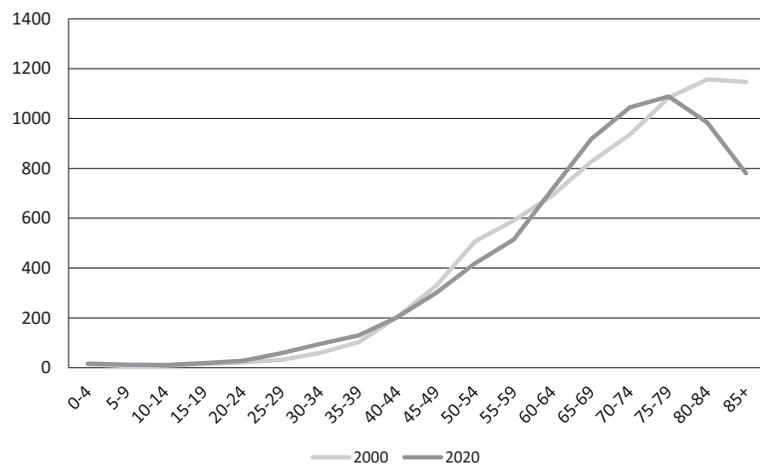


Figure 5. Breast cancer morbidity trends among Polish women in age groups based on the World Standard Population (ASW, Segi's standard) [2]

among women aged 50–69 has increased 1.67 times, but in the 60–69 age bracket alone, the numbers expanded 2.25 times. The largest increase in incidence was seen in women 80–85 years of age \pm 2.78 times (Figure 5) [2].

Risk factors

The etiology of breast cancer is not fully known but many identified factors increase the risk of developing the disease.

Being classified as a high-risk group does not automatically mean that one will be diagnosed with breast cancer, but it is a reason to undertake intensified preventive actions, including eliminating or changing unfavorable lifestyle behaviors. Similarly, the lack of risk factors for breast cancer does not guarantee that the disease will not occur.

The risk of breast cancer increases with age (80% of cases occur after the age of 50). Genetic factors – the presence of mutations in the BRCA1 or BRCA2 gene, family history (the degree of risk depends on the number of cases in the family and the degree of relationship to the affected person), previous treatment for breast cancer, and/or other breast conditions – are responsible for about 10% of breast cancer cases among Polish women. In addition, risk factors include hormonal factors (e.g. early age at menarche or late menopause, late childbirth, lack of lactation), long-term use of hormone replacement therapy, lifestyle (poor nutrition (including a diet rich in unsaturated fats) and obesity), insufficient physical activity, sedentary lifestyle, frequent alcohol consumption, and smoking [3–6].

Morphologically, cancer may be induced by several or even a dozen carcinogenic factors. In addition to genetic or lifestyle factors, there are environmental factors that are intensively studied. Animal studies and epidemiological data provide evidence of periods of vulnerability, such as embryonic implementation, fetal development, puberty, pregnancy and aging, during which the breast is susceptible to exposure to environmental factors. Natarajan et al. point to factors whose contamination can lead to epigenetic changes and subsequently promote the development of cancerous lesions in women's breasts. The factors studied include: water (which may be biologically contaminated, irradiated with uranium, or contain heavy metals), air pollution, and cosmetics (which may contain formaldehyde, aluminum salts, or endocrine disruptors). The researchers emphasize that the above factors have a hypothetical effect on the induction of molecular damage, but for the time being, there is no evidence of their causal impact [7].

Psychological factors are also increasingly being considered in the etiology of cancer diseases. This relationship should not be treated one-dimensionally, but certainly these are factors that, in combination with others, increase the risk of developing the disease. Psychological factors that may increase the risk of breast cancer incidence include chronic stress, feelings of helplessness, suppression of emotions (especially anger), inability to express emotions, external locus of control, anxiety and depression. Research in the field of psychoneuroimmunology demonstrates the existence of a bidirectional relationship between the nervous and immune systems. The brain influences the lymphoid organs in two ways: either through the autonomic nervous system or with the involvement of the hypothalamic-pituitary-adrenal axis. This axis is considered one of the main regulators of the body's response to stress. Chronic stress resulting from situational factors or difficulties in expressing and regulating emotions and helplessness in the long term leads to chronically elevated levels of cortisol and other stress hormones and this, in turn, lowers the body's humoral and cellular immunity. Combined with risk factors like genetic or environmental conditions, they contribute to an increased risk of developing breast cancer. So far, in the numerous preventive interactions for breast cancer, the least attention has been paid to potential psychological factors, and this may prove to be an important

link in primary and secondary prevention. Women who present lower levels of stress, have an inner sense of control, and a high sense of agency are more likely to come in for preventive screenings and if they have breast cancer they are better able to cope with the disease [8–11].

Importance of the health problem for society

Breast cancer has for many years been the most commonly diagnosed type of cancer among Polish women and the second most common cause of death from oncological causes [2]. Simultaneously, it is also a global problem – accounting for the most diagnoses and deaths from oncological causes among women worldwide. In countries with high awareness of cancer prevention and quality of health care, breast cancer is mostly a chronic disease, while in countries with low awareness and quality, it is mostly a fatal disease [12]. Age-standardized mortality rates in 2020 for breast cancer in Poland were 41.8, while the average for European countries was 32.9. In comparison, the average for Western Europe was 36.6, Southern Europe was 29.7, Northern Europe was 31.7, and for Eastern Europe, this was 31.7. Higher breast cancer mortality rates than Poland can be seen in: Slovakia (43.8), Montenegro (49.3) and Serbia (50.9) [13].

Early detection and medical intervention significantly increase the chances of a cure. The symptoms of breast cancer vary depending on the stage – the initial stage is asymptomatic, while the first physical symptoms appear at an advanced stage. Any early cancerous changes can only be detected with imaging studies. However, the biggest challenge for the healthcare system is late diagnosis. Invasive breast cancer is associated with costly treatment. Depending on the clinical stage, this is surgical treatment (breast amputation), radiation therapy, or systemic treatment (chemotherapy, hormone therapy). National cancer programs are considered the most effective way to reduce the mortality and improve the results of cancer treatment. The programs are financed from the state budget and include: population-based screening programs, the purchase of modern diagnostic and treatment equipment, and educational activities for the public and medical personnel. These projects are complemented by local programs financed by local government units.

Breast cancer and the negative consequences of the disease impair not only the physical and social functioning of patients and their relatives but also, due to the scale of the incidence and the importance of this cancer, negatively affect the economics of the healthcare system and economic phenomena more generally – the cost of treatment and diagnosis, sickness absenteeism at work, treatment-related rehabilitation benefits, disability pensions. Among others, in Poland, breast cancer is increasingly becoming a problem for premenopausal women – fully active in family, professional, and social life. Therefore, efforts aimed at preventing and treating breast cancer have become one of the biggest healthcare challenges worldwide [14].

Prevention

The Polish healthcare system is focused on taking actions related to cancer prevention.

One of the measures taken by the Ministry of Health to reduce the burden of cancer is the National Cancer Control Program, which aims to stop the increase in cancer cases in the Polish population, achieve average European standards in the early detection of oncological diseases, and improve access to the most effective treatment methods [15]. In 2006, a population-based breast cancer screening program was introduced, which was addressed to women 50–69 years of age who 1) have not had a mammogram in the last two years, 2) have received a personalized invitation for re-examination after 12 months due to the following risk factors: breast cancer among family members

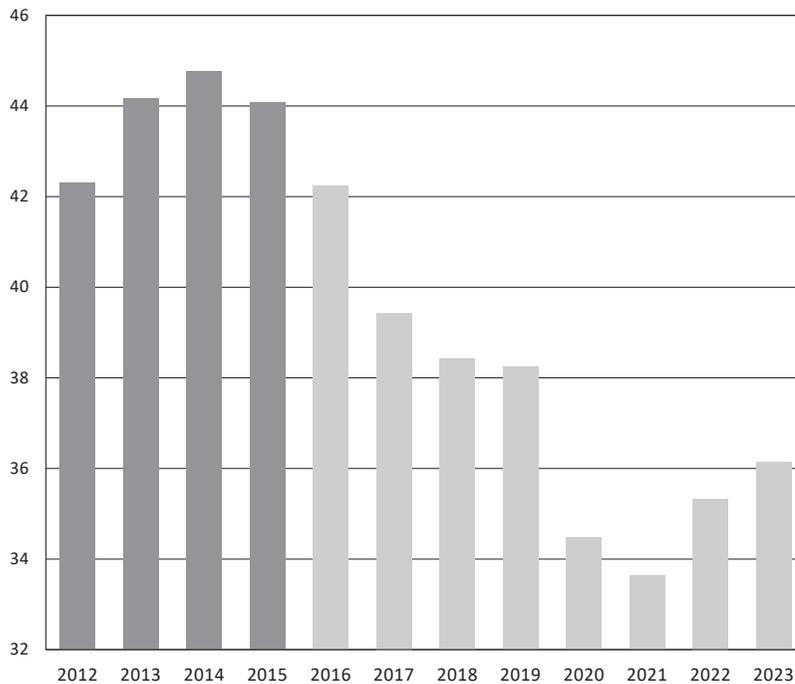


Figure 6. Breast cancer screening coverage (%) during the implementation of mailed invitations by the Ministry of Health (dark grey) and during the implementation of the population-based screening programme (light grey)

(mother, sister, daughter), mutation in the BRCA1 and/or BRCA2 genes [16].

On February 4, 2020, the Council of Ministers adopted a resolution on the National Cancer Strategy. This is a multi-year program for 2020–2023, introducing comprehensive changes in Polish oncology. The strategy is a response to the increase in the incidence of cancer in Poland, and among its most important goals are to increase the number of people surviving five years after completing cancer therapy and to reduce the cancer incidence. Patients' quality of life during and after oncology treatment is also expected to improve. Investment in the patient will increase accessibility to screening, improve its quality and increase the involvement of primary care and occupational health specialists in improving participation in screening programs. On November 1, 2023, the Regulation of the Minister of Health of October 5, 2023, amending the regulation on guaranteed benefits in the field of health programs, came into force. Under it, there was a change in the availability of the population-based breast cancer screening program – currently mammography examinations are performed every 24 months in women 45–74 of age [17–19].

Between the years 2012 and 2015, Poland had a system of individual invitations to breast cancer preventive examinations, but due to the decreasing number of participating women, the Ministry of Health considered the initiative costly and insufficiently effective and, as a result, closed the program [20]. After the cessation of the initiative, the attendance in population-based screening (mammography) steadily declined. In 2019, it reached 38.25%. In 2020–2021, a drastic decrease in the tests performed was caused by the COVID-19 pandemic. However, since 2022, a few percent increase in participation can be seen (Figure 6).

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References

1. Ciuba A, Wnuk K, Nitsch-Osuch A, et al. Health Care Accessibility and Breast Cancer Mortality in Europe. *Int. J Environ Res Public Health* 2022; 19(20): 13605, doi: 10.3390/ijerph192013605.
2. [Reports of the Polish National Cancer Registry] [cited 16.10.2023]. Available from URL: <https://onkologia.org.pl/pl/raporty> (in Polish).
3. Łukasiewicz S, Czeczulewski M, Forma A, et al. Breast Cancer-Epidemiology, Risk Factors, Classification, Prognostic Markers, and Current Treatment Strategies – An Updated Review. *Cancers* (Basel) 2021; 13(17): 4287, doi: 10.3390/cancers13174287.

For population-based screening programs to be effective, they must be long-term, high-quality, and massive (covering at least 70% of the population).

In addition to large nationwide initiatives, there are also smaller local, regional or private efforts to promote breast cancer prevention. These include World Cancer Day when cancer centers offer free preventive tests, including mammography for insured women 50–69 years of age. Both cancer centers and non-governmental organizations that conduct health education workshops and trainings focus on teaching breast self-examination, rising women's awareness of the reality of cancer, and informing them of the importance of regular screening and the benefits of early treatment. In addition, around October, many different corporations (clothing brands, cosmetic companies, insurance agencies, etc.) promote Pink October to raise awareness of breast cancer.

Conclusions

Breast cancer continues to be a serious and, what is worse, growing social and economic problem. Based on the conclusions from the above-cited data, it is advisable to look for factors that influence women's awareness and motivation to lead a healthy lifestyle, including participation in screening. In addition, it is worth considering changing the way of reaching health promotion recipients. Psychological education may be a factor in increasing women's attendance in population-based screening. Identification of the above factors may allow for tailoring health education to the recipient, increasing women's participation in mammography examinations, and improving the effectiveness of preventive programs, and thus reducing breast cancer mortality in the population of Polish women.

4. Kashyap D, Pal D, Sharma R, et al. Global Increase in Breast Cancer Incidence: Risk Factors and Preventive Measures. *Biomed Res Int* 2022; 2022: 9605439, doi: 10.1155/2022/9605439.
5. Britt KL, Cuzick J, Phillips KA. Key steps for effective breast cancer prevention. *Nat Rev Cancer* 2020; 20(8): 417–436, doi: 10.1038/s41568-020-0266-x.
6. Juvanmardi F, Rahmani J, Ghiasi F, et al. The Association between the Preservative Agents in Foods and the Risk of Breast Cancer. *Nutrition and Cancer* 2019; 71(8): 1229–1240, doi: 10.1080/01635581.2019.1608266.
7. Natarajan R, Aljaber D, Au D, et al. Environmental Exposures during Puberty: Window of Breast Cancer Risk and Epigenetic Damage. *Int J Environ Res Public Health* 2020; 17(2): 493, doi: 10.3390/ijerph17020493.
8. Rolińska A, Furmaga J, Czyżewski W. Wpływ stresu na układ odpornościowy w przebiegu choroby nowotworowej z perspektywy biomedycznej. *Psychoonkologia* 2017; 21(2): 58–65, doi: 10.5114/pson.2017.71381 (in Polish).
9. Antonova L, Aronson K, Mueller CR. Stress and breast cancer: from epidemiology to molecular biology. *Breast Cancer Res* 2011; 13(2): 208, doi: 10.1186/bcr2836.
10. Chiriac VF, Baban A, Dumitrascu DL. Psychological stress and breast cancer incidence: a systematic review. *Clujul Med* 2018; 91(1): 18–26, doi: 10.15386/cjmed-924.
11. Helmer SM, Krämer A, Mikolajczyk RT. Health-related locus of control and health behaviour among university students in North Rhine Westphalia, Germany. *BMC Res Notes* 2012; 5: 703, doi: 10.1186/1756-0500-5-703.
12. World Health Organization. Breast Cancer [cited 16.10.2023]. Available from URL: <https://www.who.int/news-room/fact-sheets/detail/breast-cancer>.
13. Dyba T, Randi G, Bray F, et al. The European cancer burden in 2020: Incidence and mortality estimates for 40 countries and 25 major cancers. *Eur J Cancer* 2021; 157: 308–347, doi: 10.1016/j.ejca.2021.07.039.
14. Smaga A, Mikułowska M, Komorowska A, et al. Rak piersi w Polsce – leczenie i inwestycja. Warszawa: Sequence HC Partners Sp. z o. o., Uczelnia Łazarskiego; 2014. Available from URL: <https://www.pexps.pl/files/upload/files/Rak-piersi-w-Polsce.pdf> (in Polish).
15. [Act of July 1, 2005 on Establishing a Multiannual Program “National Cancer Control Program”] (Dz.U. 05.143.1200) (in Polish).
16. [Breast Cancer Population-based screening program. Ministry of Health] [cited 16.10.2023]. Available from URL: <https://www.gov.pl/web/zdrowie/program-profilaktyki-raka-piersi-mammografia-> (in Polish).
17. [National Cancer Strategy [cited 25.11.2023]. Available from URL: <https://www.gov.pl/web/zdrowie/narodowa-strategia-onkologiczna-nso> (in Polish).
18. [Changes in the implementation of Breast and Cervical Cancer Prevention Programs] [cited 25.11.2023]. Available from URL: <https://profilaktykarakania.nio.gov.pl/szanowni-panstwo-3/> (in Polish).
19. [Regulation of the Minister of Health of October 5, 2023 amending the regulation on guaranteed benefits in the field of health programs] (Dz.U. 2023 poz. 2167). Available from URL: <https://isap.sejm.gov.pl/isap.nsf/DocDetails.xsp?id=WDU20230002167> (in Polish).
20. [Population-based screening coverage. National Health Fund] [cited 16.10.2023]. Available from URL: <https://www.nfz.gov.pl/dla-pacjenta/programy-profilaktyczne/dane-o-realizacji-programow/> (in Polish).

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