Jasiura Adam, Dera Izabela, Szlachcic Karolina, Gorzel Mateusz, Zmonarska Joanna. Breast cancer screening programmes in selected European countries and Poland. Journal of Education, Health and Sport. 2021;11(7):11-21. eISSN 2391-8306. DOI http://dx.doi.org/10.12775/JEHS.2021.11.07.001
https://apcz.umk.pl/czasopisma/index.php/JEHS/article/view/JEHS.2021.11.07.001
https://zenodo.org/record/5068851

The journal has had 5 points in Ministry of Science and Higher Education parametric evaluation. § 8. 2) and § 12. 1. 2) 22.02.2019.

Received: 06.06.2021. Revised: 15.06.2021. Accepted: 04.07.2021.

Breast cancer screening programmes in selected European countries and Poland

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Abstract

Breast neoplasms are the most common malignant tumors among women. In recent years breast cancer incidence rate has increased. Due to this fact the European Union presents evidence-based guidelines on breast cancer screening and diagnosis. Recommended and commonly used screening test is mammography. The effectiveness of prophylaxis is measured by a decrease in breast cancer mortality rate. Detailed recommendations in EU member countries differ from those presented by the EU institutions. This paper compares the screening programme in Poland to screening programmes in other EU members. The evaluation considers compliance with European screening guidelines and changes in mortality rates since the introduction of the screening programs. General guidelines in Poland are close to European ones. However, some Polish health centers still use analog mammography instead of recommended digital mammography. Furthermore, mortality rate changes in Poland maintain on a constant level due to women's reluctant participation in screening tests.

Key words: breast neoplasms; mass screening; mammography; public health

Introduction

Breast cancer is the most commonly diagnosed malignancy in the female population worldwide. According to the data of the International Agency for Research on Cancer, the incidence of breast cancer in 2018 was 11.6%. It is the second most common cancer-related cause of death after lung cancer [1]. In 2013, the incidence of breast cancer in Poland was 21.9%, and it still continues to increase. It is associated with a mortality rate of approx. 13 percent. Mortality can be significantly reduced by introducing appropriate screening programs that enable early detection of cancer and efficient implementation of an appropriate treatment. The mammogram has become a screening test used to detect breast lesions. Its sensitivity in post-menopausal women reaches as much as 90-95% [2]. Prevention programmes for early detection of breast cancer have already been implemented in many European countries, including Poland, where the programme was established in 2007. The success of the screening programmes depends not only on a well-functioning health care system, but also on many other factors – including proper health education, which in turn has a significant impact on the number of patients undergoing preventive mammography. The aim of this paper is to present programmes of secondary breast cancer prevention in selected European countries and Poland.

Mammography as a breast cancer screening test

Mammography is the only method used in breast cancer screening tests [3]. It makes it possible to detect lesions at an early stage and rapidly implement adequate treatment. Therefore, it has a significant impact on reducing mortality in women with cancer [4]. After conducting 8 randomized studies that concerned mammography screening and involved more than 600,000 women aged 50-69, Gotzche and Nilsen estimated that screening tests conducted on a regular basis could reduce mortality by 10 to even 25% [5].

A study conducted by the International Agency for Research on Cancer also revealed that there was a significant decrease in mortality after 20 years of conducting mammography in the group of women aged 50 to 69 [6].

Screening programmes aimed at early detection of breast cancer have been implemented in many countries around the globe. The usefulness of mammography as a screening test for breast cancer began to be a subject of discussion already in the mid-20th century. In 1963, researchers from New York initiated the Health Insurance Plan of Greater New York Breast Cancer Screening Trial - a randomized study aimed at evaluating the impact of mammography on reducing mortality related to breast cancer. Results of the analysis of data obtained after 20 years of conducting the study became the basis for the guidelines concerning the performance of screening tests for breast cancer in women with the use of mammography, developed by the American Cancer Society, the U.S. Preventative Task Force, the World Health Organization and the National Cancer Institute [7].

The implementation of breast cancer screening programmes in Europe

The work on the first breast cancer screening programme in Europe started in the late 70s. In 1977 the trial began in two counties of Sweden: Kopparberg and Östergötland [8,9]. From 1977 to 1984 more than 134 thousand women aged from 40 to74 took part in the research. They were divided into two groups. The experimental group had mammography every 2-3 years in opposition to the control group which did not have any tests. The results in 1984 revealed a 31% decrease in the mortality rate of breast cancer in the experimental group compared to the control group [10]. Due to the promising results of the trial the National Board of Health and Welfare of Sweden implemented the mammography test as a screening method of breast cancer for women in the tested age group of 40-74 year old. In 1986 Sweden had started a screening programme which in 1997 was eventually available around the whole country [11]. At that time screening in the Netherlands (1989) and United Kingdom (1990) also gained recognition [12,14]. Simultaneously the European Community gave attention to the problem of breast cancer. In 1986 a committee of experts set out a pilot scheme of breast cancer prophylaxis in community countries. The plan outlined the reduction of mortality rates due to breast cancer by 15% by the year 2000 [14,15]. First countries to take part in this pilot programme were Belgium, Denmark, France, Greece, Ireland, Luxemburg, Portugal and Spain. The results in the year 2000 revealed a 10% drop of estimated mortality rate with the highest decline in Luxemburg (24%) [14].

European guidelines on breast cancer screening and diagnosis

Over the years the programme of European Community was gradually improved based on the latest research and technologies. The European Union also constituted a new body - European Commission Initiative on Breast Cancer (ECIBC). Its main purpose is to provide evidence-based guidelines on breast cancer prophylaxis and diagnosis to all of the countries of the EU. The Commission reports to the research agency of the EU – Joint Research Center (JRC) [16]. Published guidelines are dedicated to women with average risk of breast cancer and recommend the use of mammography as screening test. The strictest recommendation includes women aged from 50 to 69 and suggests getting mammography every 2 years.

Recommendation for remaining age groups is characterized by the low certainty of evidence. They involve mammography screening every 2-3 years for 45-50 year olds and every 3 years for 70-74 year olds [16]. As a standard, the digital mammography is done in four projections - two mediolateral oblique (MLO) views and two craniocaudal (CC) views for every breast. Images ought to be evaluated by two radiologists independently. The result is classified in five degree scale R1-R5, where R1 means no abnormalities and R5 is high probability of cancer [18].

Current ECIBC guidelines do not recommend the digital breast tomosynthesis (DBT) as standard complementary test in screening. However, DBT can be a part of the follow-up after revealing a suspected lesion. Compared to mammography the DBT is volumetric technique - an image is a fusion of a dozen of two-dimensional projections obtained by different X-ray tube angles. A three-dimensional image can be converted into a two-dimensional image which makes it easy to collate with regular mammography scans [16,18] The European Society of Breast Imaging (EUSOBI) approved this method as part of screening [17]. DBT is expected to be a standard technique used in breast cancer screening. It is estimated that detection of malignant tumors by mammography with DBT compared to standard methods is 30-40% more effective. Additionally, the dose of radiation in both procedures is similar and does not exceed reference value [6,17].

High density of the mammary gland makes mammography images difficult to evaluate. The sensitivity of mammography in a group of patients with "dense breast" is low (21-22%) [6]. Nevertheless, ECIBC guidelines do not recommend any additional tests for women with dense gland texture, normal mammography results or lack of breast cancer symptoms. For those patients it can be suggested to diversify the diagnostic process by manual or automatic ultrasonography of the breast, magnetic resonance imaging with contrast, digital mammography with enhanced contrast and molecular tests. More trials are needed to find an appropriate screening method for this group [16,19]. Although, for now EUSOBI encourages use of direct digital mammography as prophylaxis [6].

Control tests should be more frequent for patients with high risk of breast cancer. Magnetic resonance imaging is the most sensitive screening tool appropriate for this group [20-22]. For the women with BRCA1 or BRCA2 mutation the recommendations of European Society for Medical Oncology (ESMO) suggest prophylactic clinical examination every 6-12 months starting from the age 10-25 years before the youngest breast cancer diagnosis in the family. Furthermore, annual MRI is recommended from the age of 25 and combined with annual mammography from the age of 30. Comparable screening tests are proposed to patients with p53 mutation causing Li Fraumeni syndrome, PTEN gene mutation leading to Cowden syndrome, EPCAM, MLH1, MSH2, MSH6 and PMS2 genes mutations responsible for Lynch syndrome, STK11 gene mutation connected with Peutz–Jeghers syndrome and also PALB2, CHEK2, CDH1 genes mutations [20,23]. The High Risk Ontario Breast Screening Program from 2011 to 2015 examined more than 8 thousand women undergoing MRI and mammography tests and made additional recommendations based on the age and risk as the criteria. The results indicate that the age limit for high risk patients to MRI screening can be moved to age 30-39 and mammography can be added at age 50-69, due to the indications, that only for this age group detection rate increase in comparison with MRI itself [24].

The use of MRI for screening the women with moderate risk of breast cancer is also considered [25]. Simulations show benefits of this solution and the cost saving over the time despite high initial costs [26].

Detailed recommendations differ in particular member countries of European Union. Out of 27 EU members only in Bulgaria, Greece and Slovakia screening from breast cancer is not conducted. In every country the screening method used is mammography and in 16 of them digital mammography completely replaced the analog type. Screening programmes are most frequently dedicated to women at the age of 50-69. The Netherlands, France, some regions of Italy and Portugal have an upper age limit of 74-75. The lowest age limit of 45 is established in Austria, Czech Republic, Hungary, regions of Italy and Portugal. Suggested interval between screening tests is 2 years in the majority of EU members, only Malta recommends a 3 year interval and annual mammography is established in Italy. National screening programmes are funded from the government budget, aside from Belgium and Portugal where the government partially covers the cost of screening [27,28].

Breast cancer screening programme in Poland

In Poland, the Population Programme for Early Detection of Cancer was introduced in 2007. It targets women aged 50 to 69 who have not had a mammogram within the last two years, and those who have received a written indication to undergo a mammogram again after 12 months due to additional breast cancer risk factors [29].

Despite the introduction of screening tests for early detection of breast cancer in Poland, the 5-year survival rate is still significantly below the European average, i.e. 81.6% According to the EUROCARE-5 data for the years 2000-2007, the rate in Poland is 71.6% [30]. It is also alarming that the Polish 5-year survival rate in the years 2000-2007 was lower than in the years 1995-1997 – according to the EUROCARE-4 data, it was 73.7%t at the time (the European average for the said years was 79%) [31]. The lower 5-year survival rate, compared with the European average, may stem from inadequate knowledge about preventive measures, reluctance to undergo screening tests, as well as failure of the health care services to promptly implement adequate treatment [32].

At present, the duration of the screening programme in Poland is too short, and the number of the performed mammograms is too low to observe any noticeable effects thereof in epidemiological data. However, studies that attempt to evaluate the effectiveness of the programme over the several years of its operation are emerging.

Piotr Woźniacki and Jarosław Skokowski analysed the effects of the screening tests in the Pomeranian Province. The non-randomized retrospective study involved a group of 643 women aged 50-69, with invasive or in situ breast cancer and without symptoms (no palpable lump in the breast), who were patients at the Department of Surgical Oncology at the Medical University of Gdańsk. The participants were divided into two groups: group A, comprising 238 women who participated in the National Screening Programme for Breast Cancer in the years 2007-2010, and group B, which was composed of 405 women who did not undergo the screening tests.

The aim of the study was to evaluate the impact of the National Breast Cancer Prevention Programme on the advancement of cancer (AJCC staging) in women with this type of cancer. In group A, among women diagnosed in the year 2007, in 3.8% of cases stage 0 cancer (in situ) was observed, stage 1 cancer – in 38.5%of cases, stage 2 – in 40.4% of cases, and stage 3 – in 8% of cases. In the same group, in the year 2010, the percentage of stage 0 cancers increased significantly – to 17.3%, stage 1 cancers – to 48.2%, stage 2 cancers – to 22.2% and stage 3 cancers – to 11.1%. In group B, the following data were obtained (in 2007 and 2010, respectively): stage 0: 5.6% and 14.4%, I: 33.7% and 36.1%, II: 41.1% and 33.3%, III: 16.8% and 10.8% [32]. Unfortunately, due to the small size of the group and the lack of randomization, firm conclusions cannot be drawn on the basis of the provided percentage results. We can only hope that the higher percentage of stage 0 and 1 cancers detected in group A in 2010, compared with the 2010 data from group B, is caused by the introduction and participation of women in the National Breast Cancer Prevention Programme. There is no doubt, however, that a randomized study involving a larger group of patients and covering a longer period of time is necessary to confirm the thesis.

Participation rate in breast cancer screening programmes

Effectiveness of screening is directly related to the percentage of women who take part in the programme. In 2016 the highest participation rate in the age group of 50-69 was observed in Denmark - 83.5%. Rates above 80% were also reached in Finland, Netherlands and Slovenia. Cyprus, Croatia and Belgium noted the lowest rate at less than 50% [9].

Invitations to take part in free mammogram screenings sent to women of the said age are intended to encourage their participation in screening tests in Poland. Unfortunately, only 42.67% of the 2,690,000 invited women accepted the invitation, and in the year 2014, when 749,920 invitations were sent out, only 29.14% of women presented for the test. The percentage in 2015was even lower – 20.88% [33]. In addition, to facilitate access to screening for women, "mammobuses" – mobile mammography laboratories – were introduced. Their schedule is published on the website of the National Health Fund. Any woman eligible for the National Breast Cancer Early Detection Programme can undergo the examination in a mobile laboratory [34].

Despite the presented methods aimed at increasing the percentage of women who undergo preventive tests on a regular basis, the number of Polish women coming in for a free mammogram remains at a low level. In the period from 2012 to 2015, only approximately 44% of women in the eligible population underwent mammogram tests every year. Despite the expected increase in the interest in the screening tests, population coverage as of December 1 in the years 2016 to 2020 was below 40% [33]. It may be the reason for the failure of the National Breast Cancer Prevention Program. Its aim, i.e. reduction of breast cancer mortality in women, can be achieved when at least 70% of the population undergo the tests [35]. The data presented here indicate that there is a need to seek other ways to increase public awareness with regard to secondary prevention of breast cancer and encourage participation in the examinations.

Public awareness of breast cancer prevention

Society should be aware that screening examinations are necessary. It is an extremely important factor, without which prevention programmes cannot operate properly. In the case of cancers as common as breast cancer, educating the public about prevention programs seems to be even more important. The impact of increasing awareness and knowledge about screening tests on increased participation of women in prevention programs is mentioned in numerous publications from, among others, Sweden, Great Britain and Poland [36,37].

Unfortunately, data presented in studies concerning knowledge about breast cancer prevention in Poland over the years are not optimistic. A 2012 study involving 100 women aged 48 to 60, residing in Chełm and its surrounding area, revealed that only 12% of the participants underwent preventive screenings for breast cancer on a regular basis. Interestingly, all ladies agreed with the statement that an early diagnosis increases the chances of curing the disease. According to the respondents, this factor was even more important than adequate treatment, which came in the second place (69% of votes). Most women stated that their knowledge regarding breast cancer prevention was average [38].

The analysis of a study concerning women's knowledge about breast cancer prevention in selected socio-demographic conditions, conducted in 2014 on a group of 144 women residing in Przytyk, revealed that only 50.7% of the respondents had sufficient knowledge about breast cancer and its prevention. It was estimated that 38.9% of the participants had insufficient knowledge, and the level of knowledge was good in only 10.4%t of the respondents. None of the participants had a “very good” level of knowledge according to the adopted criteria [39].

Data obtained from a 2011 study involving 100 female patients (mostly at a perimenopausal age) and 100 patients from the Provincial Specialist Hospital in Biała Podlaska are concerning. The collected information indicates that only 47% of the study participants received an invitation to a free mammogram, with as many as 68% not accepting it. The most important obstacle to prevention activities according to the respondents was the lack of knowledge (65% of women and men). Most respondents stated that their level of knowledge was "average” [40].

The presented data indicate that the public must be continuously educated about breast cancer prevention. Perhaps raising the level of awareness will result in increasing the number of women undergoing mammograms on a regular basis, and thus result in an increase in the cure rate of one of the most common malignancies in the female population.

Summary and conclusion

Standards of secondary prophylaxis for breast cancer in Poland in regards to the covered age group and intervals between tests are similar to European recommendations. However, the type of used devices is different. EUSOBI recommends use of digital mammography only, though in Poland there are still a lot of analog devices. The Central Coordinating Center as part of coordination and monitoring of the quality of screening evaluated 385 mammographs in 2020 and found that 93 of them were analog. That is 24% of all available devices which are different from recommended devices [17,40].

High participation rate allows reaching high efficiency of screening. Survey results presented above show that Polish women are aware of screening benefits, despite the fact they do not want to take part in prophylaxis [38-40]. Participation rate in Poland from 2012 to 2015 oscillated between 20-40%, meanwhile in most European countries rates were in the range of 50% to 80% [9,33]. Reluctance to screening tests is based on social, psychological, economical and organizational causes. The main arguments against participating in the screening are "I think I'm healthy" or "I'm afraid of the result". Based on those statements, it is clear that further education about breast cancer is needed. Its aim should be to reduce concerns and stereotypes about cancer and give information about new methods of treatment. Despite screening being free, the cost of transport to medical facilities is still a limitation for some women. “Mammobus” is the first step in a way to resolve the problem [35].

Main indicator of a successful screening programme is a decrease in the mortality rate. That index in the EU since first screening programmes in the 90s to 2000 year dropped by 40%. In Poland the effectiveness of screening is impossible to estimate due to the low participation rate. Analysis from 2015 found that in Poland the mortality rate due to breast cancer increased, contrary to most European Union members where a decreasing trend was noted. One of the reasons for that fact could be the relatively short duration of the programme in Poland (about 8 years) in comparison to some EU countries (about 25 years) and smaller experience of diagnosticians in Poland. Author of the report indicates that the cause of Polish bad statistics could also be low efficiency of the healthcare system [6,32,41].

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