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Research paper

Trends in breast cancer incidence and mortality, clinical diagnosis and treatment in the light of the contemporary demographic changes in Germany and Poland, 2006–2016

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Abstract

Introduction: Trends in cancer incidence and mortality are determined by contemporary demographic processes. Breast cancer in women is a particular threat. In Germany, the chances of survival after the diagnosis of cancer are among the highest in Europe. The understanding of the latest trends in breast cancer incidence and mortality in Germany and the presentation of the latest screening options, treatment and prevention methods can be used to improve the control of breast cancer in the future.

Aim: The aim of the research was to present trends in cancer incidence and mortality, with particular emphasis on breast cancer in women in Germany and Poland on the background of contemporary demographic changes relating to the process of population ageing in 2006–2016. The clinical diagnostic process, the treatment of breast cancer and potential risk factors and prevention methods were described.

Material and methods: In the publication the basic statistical indicators have been applied: absolute numbers, percentages, crude rates, age-standardized rates, and demographic aging index.

Results and discussion: The cancer mortality in Poland was much higher than in Germany, which is associated with the low five-year survival rate of cancer patients in Poland. The breast cancer was characterized by the highest dynamics in incidence growth with a persistent mortality level.

Conclusions: Over the last two decades, breast cancer outcomes of patients have improved significantly due to highly individualized breast cancer therapies and the development of breast cancer treatment options such as immunotherapy, hormone receptor-based therapy and HER2 status-based therapy. The main risk factors are age, hormonal situation and inherited risk genes.

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1. INTRODUCTION

Trends in cancer incidence and mortality, that have been observed for many years, are determined by contemporary demographic processes. A characteristic feature of processes in highly developed countries is the decrease in population mortality, which contributes to the increase in the share of the population in older age groups (over 65 years) and to the extension of the life expectancy of the population.[1] Increasing the share of the elderly population also affects the increase in the incidence of diseases of the modern civilization, i.e. cancer, which lead to growing economic and health problems of the German and Polish society.[2] Both in Germany and Poland the number of cancer cases, which belong to the main causes of deaths, is increasing.[3] The most common cancer in women is breast cancer, which accounts for about 20% of all cancers. The incidence of new cancer cases is higher in Germany, however, the cancer mortality is higher in Poland. In Germany, the chances of survival after the diagnosis of cancer are among the highest in Europe. Therefore, the understanding of the latest trends in breast cancer incidence and mortality in Germany and the presentation of the latest breast cancer screening options, treatment and prevention methods can be used to improve the prevention and the control of breast cancer in the future.[4]

2. AIM

The aim of the research was to present and discuss trends in cancer incidence and mortality, with particular emphasis on breast cancer in women in Germany and Poland on the background of contemporary demographic changes relating to the process of population ageing in 2006–2016.

3. MATERIAL AND METHODS

To present contemporary demographic changes the following indicators were used: life expectancy, share of the elderly (over 65 years), mortality rate by sex and individual age groups and the demographic aging index. To present the status of cancer incidence and mortality, the following statistical indicators have been applied:[5,6] the crude cancer incidence and the mortality rate, the standardized cancer incidence and the mortality rate, the death rate by sex and age, the cumulative risk of morbidity, death and relative survival. The indicators were developed on the basis of data from Cancer in Germany and the Polish National Cancer Registry.[7] The spatial analysis concerned federal states in Germany and voivodeships in Poland.

4. RESULTS

4.1. Demographic changes

In 2006–2016, the life expectancy of the population increased by almost 1 year in Germany (from 79.9 to 80.7 years) and by 2 years in Poland (from 75.3 to 77.5 years), with an average life expectancy of 80.9 years in the European Union.[8] The difference between the average life expectancy of men and women decreased from 5.2 to 4.8 years in Germany and from 8.8 to 8.2 years in Poland. An important element to characterize the aging process of a population is the old-age

Table 1. Demographic aging index (R_{oa}) in Germany and Poland, 2006–2016 (in percentages).

Federal state	2006	2016	2006–2016	Voivodeship	2006	2016	2006–2016
	65 years and more		R_{oa}		65 years and more		R_{oa}
Schleswig-Holstein	20.4	22.7	3.8	Dolnośląskie	13.6	17.0	3.7
Hamburg	18.6	18.5	–1.0	Kujawsko-Pomorskie	12.4	15.9	4.9
Niedersachsen	20.0	21.6	3.2	Lubelskie	14.4	16.9	4.3
Bremen	20.8	21.1	0.0	Lubuskie	11.8	15.5	4.7
Nordrhein-Westfalen	19.7	20.7	2.2	Łódzkie	15.0	18.3	3.8
Hessen	19.3	20.4	1.8	Małopolskie	13.4	15.7	3.4
Rheinland-Pfalz	20.1	21.2	2.5	Mazowieckie	14.6	16.7	1.7
Baden-Württemberg	18.7	19.9	2.5	Opolskie	14.0	17.1	4.5
Bayern	18.9	20.1	2.6	Podkarpackie	13.0	15.4	4.7
Saarland	21.6	23.1	2.7	Podlaskie	14.6	16.5	3.8
Berlin	17.9	19.2	–0.6	Pomorskie	12.1	15.3	3.7
Brandenburg	10.7	23.7	0.8	Śląskie	13.6	17.3	3.9
Mecklenburg-Vorpommern	20.6	23.6	1.0	Świętokrzyskie	14.9	17.8	4.7
Sachsen	23.1	25.5	–0.2	Warmińsko-Mazurskie	11.7	14.7	4.9
Sachsen-Anhalt	22.5	25.6	1.1	Wielkopolskie	11.9	15.2	3.8
Thüringen	21.6	24.8	1.1	Zachodniopomorskie	12.2	16.2	5.3
Germany	19.8	21.2	1.9	Poland	13.4	16.4	3.3

Source: Own elaboration based on Statistics Poland,[8] Statistisches Bundesamt.[9]

rate, which is defined by the share of the population over the age of 65 in the total population.[10] In 2016, the old-age rate was definitely higher in Germany than in Poland (21.2% vs. 16.4%).[11,12] The higher the indicator value, the more intensive the aging processes occur in a population. In Poland (3.3) a higher value of the R_{oa} was recorded than in Germany (1.9). It shows the advanced aging process of the Polish population, which is largely influenced by an increase in the share of the older population by 3.0% and a decrease in the share of the very young population by 0.8%. The spatial distribution of the old-age rate is presented in Table 1.

4.2. Trends in cancer

In 2006–2016, Germany noted more dynamics in cancer incidence than in cancer mortality. The incidence rates (per 100 000 population) of new cancer cases increased from 518 to 596 (13%) and was more dynamic among women than men (16% vs. 11%). In the same period, the mortality rate increased from 256 to 279 (8%) and was more dynamic among men than women (9% vs. 7%). In Poland, the dynamics of cancer incidence and mortality were much higher than in Germany. In 2006–2016, the incidence rates of new cancer patients increased from 331 to 427 (13%), and greater dynamics were observed among women than men (14% vs. 12%). The mortality rate increased from 240 to 260 (8%) and was characterized by higher growth dynamics among women than men (10% vs. 6%) (Figure 1). In 2016, the crude incidence rate was higher among men both in Germany and Poland (636.7 vs. 443.9 cases per 100 000 population). The crude incidence rate trend line from the years 2006–2016 has got a rising character, which means an increase in the cancer incidence in the society (Figure 2). The spatial distribution of the shows a great similarity with the share of the older population (Table 2). An analysis of the deaths by individual age groups shows that every second detected cancer death occurred in the age group over 65 years. Its share was very high and had an amount of 75.8% in Poland and 77.6% in Germany.

4.3. Breast cancer incidence and mortality in women

An increase in the breast cancer incidence can be observed in the female population. In 2006–2016, breast cancer was

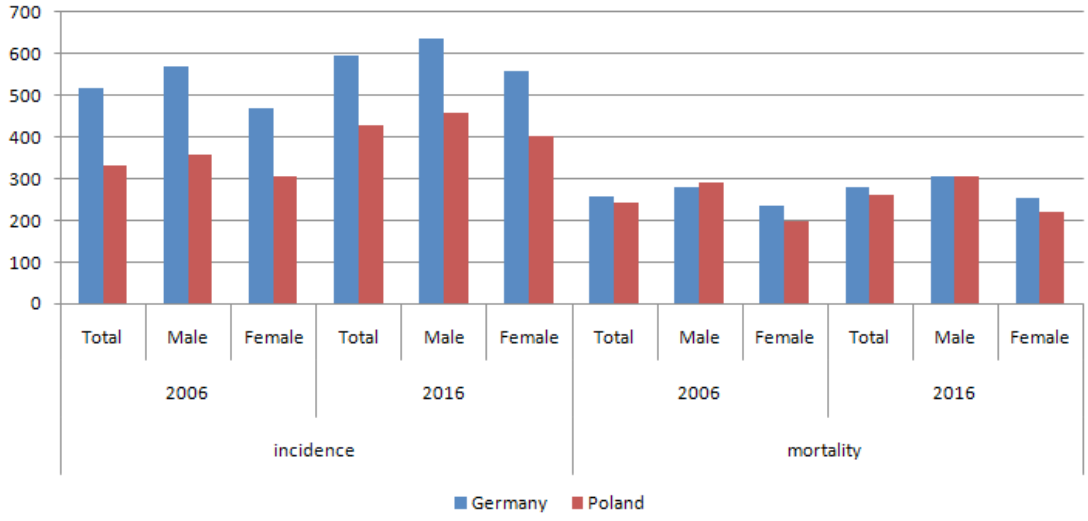

Figure 1. Cancer incidence and mortality by sex in Germany and Poland in 2006 and 2016, per 100 000 population. Own eleboration based on Statistics Poland[8] and Statistisches Bundesamt.[9]

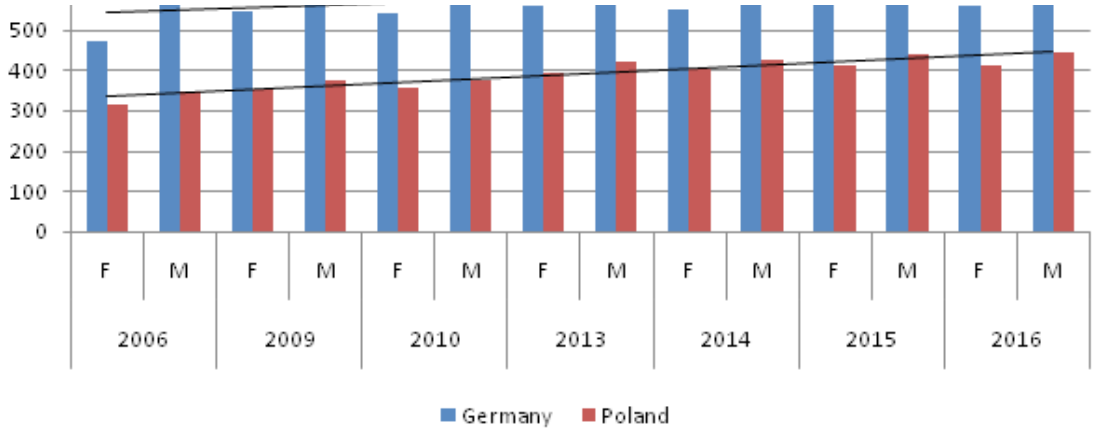

Figure 2. Crude cancer incidence rate by sex in Germany and Poland in 2006–2016, per 100 000 population. Own elaboration based on Polish National Cancer Registry,[13] Cancer in Germany.[14]

Table 2. Cancer mortality rate by sex and age in Germany and Poland in 2016 (per 100 000 population).

Federal state	Total	Male	Female	Voivodeship	Total	Male	Female
Schleswig-Holstein	312	347	279	Dolnośląskie	287	321	253
Hamburg	258	276	242	Kujawsko-Pomorskie	271	307	236
Niedersachsen	288	320	256	Lubelskie	244	291	197
Bremen	286	300	272	Lubuskie	257	307	206
Nordrhein-Westfalen	301	328	274	Łódzkie	287	324	250
Hessen	255	279	231	Małopolskie	241	274	209
Rheinland-Pfalz	283	311	256	Mazowieckie	262	295	229
Baden-Württemberg	235	252	217	Opolskie	203	236	171
Bayern	244	265	224	Podkarpackie	215	249	182
Saarland	327	357	297	Podlaskie	246	281	212
Berlin	262	288	237	Pomorskie	264	298	229
Brandenburg	325	375	277	Śląskie	283	318	248
Mecklenburg-Vorpommern	337	386	289	Świętokrzyskie	280	328	232
Sachsen	313	351	275	Warmińsko-Mazurskie	263	303	224
Sachsen-Anhalt	355	409	303	Wielkopolskie	254	288	220
Thüringen	318	363	273	Zachodniopomorskie	269	304	235
Germany	280	307	252	Poland	261	297	225

Source: Own elaboration based on Statistics Poland[8] and Statistisches Bundesamt.[9]

Table 3. Number of cases and deaths of breast by women in Poland in 2016–2016.

Voivodeship	Cases of cancer breast				Deaths	
	Number		Dynamic	%	Number	%
	2006	2016	2006=100 pkt	2016	2016	2016
Dolnośląskie	1204	1673	139.0	24.5	526	13.8
Kujawsko-Pomorskie	821	1108	135.0	22.8	360	14.2
Lubelskie	722	968	134.1	21.4	303	14.0
Lubuskie	354	451	127.4	21.8	152	14.1
Łódzkie	1064	1541	144.8	25.4	450	13.8
Małopolskie	1067	1360	127.5	21.1	557	15.3
Mazowieckie	1823	2423	132.9	24.6	992	15.5
Opolskie	339	455	134.2	22.4	139	15.8
Podkarpackie	555	722	130.1	24.9	289	14.6
Podlaskie	354	522	147.5	24.9	156	12.1
Pomorskie	681	1149	168.7	20.9	356	13.1
Śląskie	1667	2175	130.5	22.4	893	15.1
Świętokrzyskie	398	576	144.7	19.6	204	13.7
Warmińsko-Mazurskie	410	691	168.5	22.0	223	13.6
Wielkopolskie	1266	1937	153.0	24.4	636	16.2
Zachodniopomorskie	597	864	144.7	23.5	257	12.5
Poland	13322	18615	139.7	22.8	6493	14.2

Source: Own elaboration based on Statistics Poland[8] and Polish National Cancer Registry.[13]

characterized by the highest dynamics in incidence growth with a persistent mortality level. In 2016, 492,000 people developed cancer in Germany, of which a high amount was diagnosed with breast cancer (68 900 cases). The share of women with breast cancer was higher in Germany (29.5%) than in Poland (26.6%). In 2006–2016, the breast cancer incidence rate in women increased in Germany until 2010, when it reached its highest value (31.2%), after which it decreased by 0.2% by 2016. In Poland, an increase in the breast cancer incidence rate was observed from 21.5% in 2006 to 22.8% in 2016, the growth dynamics had a value of 1.3%. Similarly, the number of breast cancer cases in women in-

creased in Germany until 2009 (73 340 cases), after which it decreased to 68 950 cases in 2016. In Poland, the number of breast cancer cases in women increased from 13 322 cases to 18 615 cases in 2016 (39.7%) (Table 3). A woman's risk of developing breast cancer is largely related to age. Based on the graph of breast cancer incidence in women in Poland (Figure 3), it can be seen that while in 2006 a younger age group of women (50–60 years) had the highest probability of developing breast cancer, in 2016, the higher risk of developing breast cancer shifted to the group of the post-working age (60–70 years). However, it is alarming that the dynamics of breast cancer incidence fell on a very young age group of women (the number of cases counted over 1000 women) at the age of 40–55 years, (over 2000 women) at the age of 55–60 years and (over 3000 women) at the age of 60–65 years. Similarly, the risk of death from breast cancer shifted to older age groups from 55–60 years to 60–70 years in 2006 and later to 85 and more years of age. In 2006–2016, the number of breast cancer deaths in women was clearly higher in Germany, however, Poland had higher dynamics in breast cancer deaths. The number of deaths increased from 5212 to 6493 women in Poland (25%), in Germany from 17 286 to 18 570 women (7%). The graph of the raw mortality rate in Poland showed a slight decrease in the number of deaths in 2010 and then an increase by 2016. Similarly, the graph of the raw mortality rate in Germany has got a rising character with a slight decrease in 2010 (Figure 4). It should be emphasized that a very important indicator for the staging of the disease (cancer) is the 5- and 10-year survival rate, e.g.: the percentage of cancer patients who lived up to 5 and 10 years after the diagnosis of cancer. In Poland, the 5-year survival rates of patients diagnosed with cancer in 2008–2010 were 41% among men and 56% among women. One of the highest survival rates occurs in women with breast cancer, mostly diagnosed at an early stage of cancer development. According to the report, in Poland the percentage of patients who lived up to 5years after the diagnosis of breast cancer was 79%, being on the third place after thyroid cancer and Hodgkin's lymphoma. In Germany, the 5-year survival rate prognosis for women with breast cancer (diagnosed in 2015–2016) was 80% and varied regionally from 82% to 72%, while the 10-year survival rate prognosis was 66% (Figure 5).

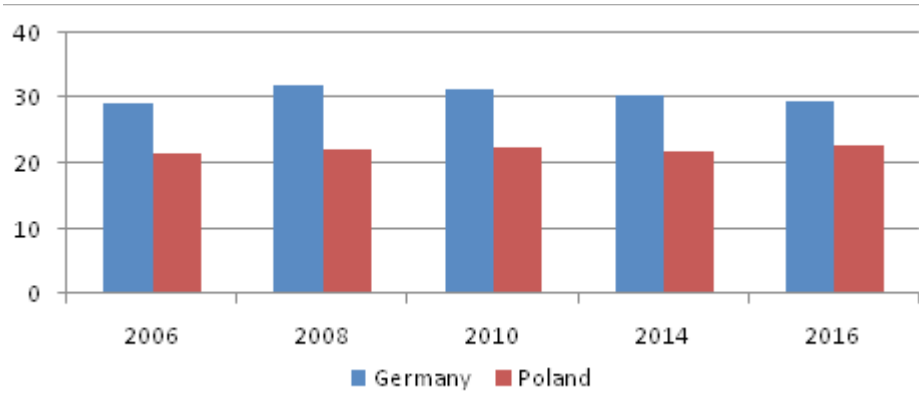

Figure 3. Percentage of women with breast cancer in Germany and Poland in 2006–2016. Own elaboration based on Polish National Cancer Registry,[36] Cancer in Germany.[37]

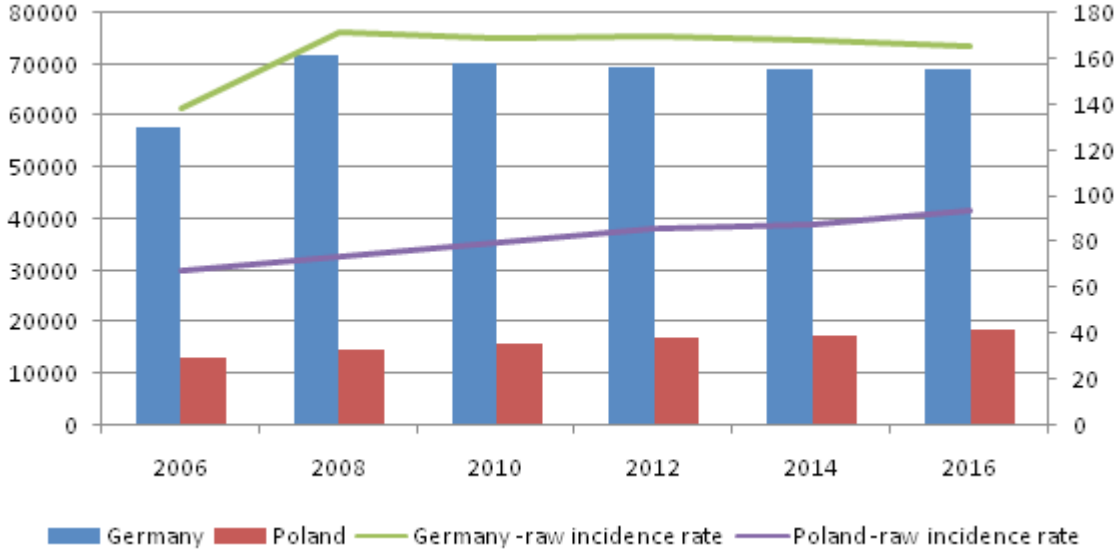

Figure 4. Breast cancer incidence of women in Germany and Poland in 2006–2016. Own elaboration based on Polish National Cancer Registry[13] and Cancer in Germany.[14]

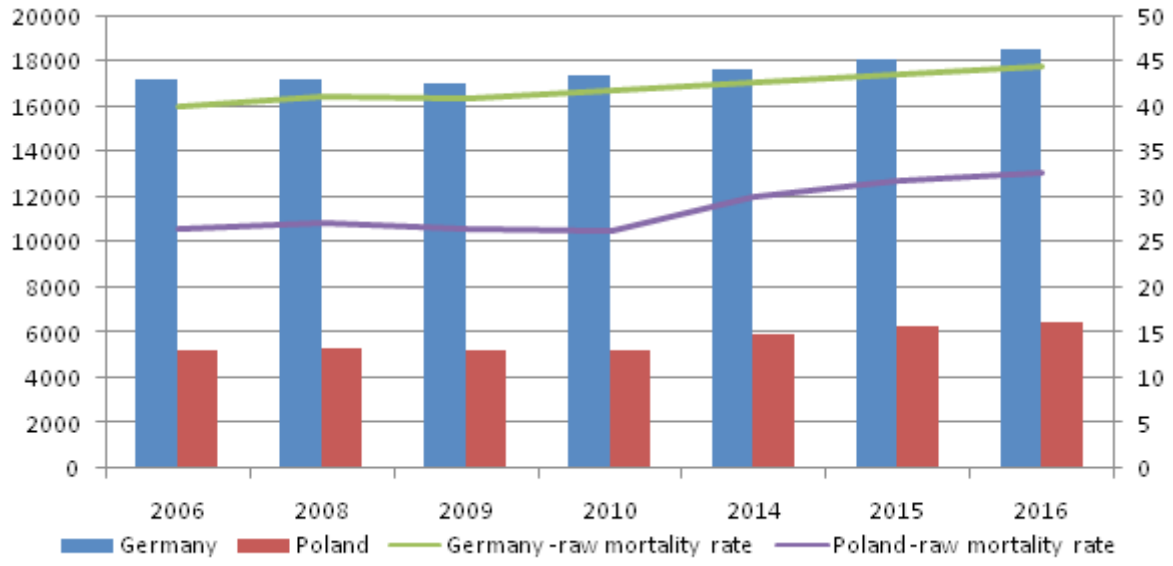

Figure 5. Mortality of women with breast cancer in Germany and Poland in 2006–2016. Own elaboration based on Polish National Cancer Registry[13] and Cancer in Germany.[14]

5. DISCUSSION

5.1. Clinical diagnosis of breast cancer

For breast cancer screening, several medical examinations are used to determine whether breast cancer actually exists and how far it has spread. First, this includes a medical anamnesis and a physical examination, including particularly the breast and the axiliary region. Afterwards, an ultrasound of the breasts as first screening method is recommended for women under the age of 40, women with dense breasts, high-risk patients or women who cannot have MRI, according to the German Medical Guidelines and the Association of the Scientific Medical Societies in Germany. Women aged 40 and older will be led to a mammography as first imaging exam.[15,16] A new screening and examination method is the addition of digital breast tomosynthesis to a conventional full-field digital mammography examination.[17] In addition to mammography, MRI can be used for higher-risk patients and an unclear diagnosis. MRI has got a higher sensitivity for malignancies than mammography or ultrasound.[18] An MRI is only recommended in Germany, if the passed examinations haven't led to satisfactory or evident examination results, e.g.: negative biopsy result and positive ultrasound scan for malignancy. Breast MRI can be also obtained in women who have a lifetime risk of breast cancer of greater than 20%, in patients receiving neoadjuvant chemotherapy to assess the responses and can be an aid in surgical planning.[19] PET scans, chest X-rays, CT and bone scans are utilized for the staging of the disease. They can also be used to monitor the response of the future therapy as well as for the surveillance of a breast cancer survivor.[20] The National German Cancer Society (Deutsche Krebsgesellschaft) strongly recommends a CT and bone scintigraphy, if a breast cancer patient is suspected to have metastases in the lungs, liver or bones. The guidelines stress that a PET or a combined PET/CT should only be considered in exceptional cases. When breast cancer patients are planned to be treated with a chemotherapy or with antibodies, metastases should also be ruled out with the aidof a CT and bone scan. To ensure the findings and to determine the characteristics of the breast tissue and potential infiltrated lymph nodes, biopsies of the tumor and tissue samples are collected and analyzed in the pathologic laboratory under a microscope with immunohistochemical staining. The diseased tissue of the patient is collected by core biopsy, fine-needle aspiration or surgical excision. The morphologic diagnosis of the breast cancer begins with a description of histology and grading of the tissue samples. Surgical margin assessment and lymph node assessment follow. Moreover, molecular tests are conducted to characterize the breast cancer. Important features are the assessment of estrogen and progesterone receptors, HER-2 receptors and the gene expression profiling of the sample cells. Ancillary immunohistochemical tests ensue as well. The size of the tumor must be determined with careful clinical and pathologic correlation.[21] An important part of the pathologic characterization of the tumor is the use of predictive tumor markers. The critical treatment decisions for cancer patients are based on the protein expression assays that are independent of tumor morphologic characteristics.[22] Next generation sequencing is used to find new targets for individualized and precision therapy schemes in the genome of the cancer. To assess for multiple genes (21 in oncotype) of the tumor, DNA microarrays and reverse transcription – polymerase chain reaction assays are introduced.Furthermore, proliferation related genes such as Ki-67, are used to predict the risk of recurrence in early-stage breast cancer. Problems are the often heterogenicity of tumors, in which only the molecular aspects of the cells in the biopsy are analyzed.[23]

The Polish Oncological Guidelines[24] recommend the same diagnostic imaging and pathologic examination

methods for the screening of breast cancer in women as in Germany. However, the guidelines emphasize that women should undergo mammography and ultrasound under the age of 35 and a galactography (contrast-assisted mammography) in the case of fluid running out of a nipple. In Poland, a newly introduced screening method is the elastography, an ultrasound to assess the elasticity of a tumor. The degree of hardness of the examined tissue is described with a corresponding color and evaluated according to the Tsukuba scale. An important part for the prognosis of the development of the breast cancer is also the genetic analysis of a potential mutation in the genes of BRCA1, BRCA2, p53 and ATM as well as the assessment of the histological grade of the breast tissue samples according to the Richardson-Bloom scale.[25]

5.2. Treatment of patients with breast cancer

In modern western medicine, treatment for breast cancer is preceded by a staging and evaluation process. The two key goals of those steps are the determination of a treatment goal, either curative or palliative, and the assessment of the malignant growth for personalized treatment vectors. Breast cancer therapy is highly individualized.[26] The main methods for staging are the evaluation of the tumor size, as well as a histological examination of the malignancy and sentinel lymph nodes, which tend to be the first site for metastasis. With the most common staging system, the TNM system, the progression of the disease is determined by the size of the main tumor (T), the involvement of the sentinel nodes (N), and further metastasis (M).[27] In curative treatment, the first choice is usually surgery. In most cases surgery is followed by chemotherapy, which may be combined with hormone receptor-based therapy and/or immunotherapy. Radiation therapy is a third category of treatment options. All three categories are also utilized in palliative care. Surgical therapy focuses on removing the tumor, any metastasis, and susceptible lymph nodes. During surgery, the affected tissue is excised with a safety margin around the tumor or metastasis to reduce the risk of a recidive cancer. Previously, the most common surgical approach was total mastectomy. In recent years, partial mastectomies with the following reconstruction of the breast have emerged as treatment of choice.[28] Drug therapy including chemotherapy, hormone receptor-based therapy and immunotherapy is rarely used on its own in curative therapy, also this may be changing. Chemotherapy can be utilized either before surgery to reduce the size of the tumor thus making it easier to remove and/or after surgery to decrease the chance of recidive disease. Hormone based therapy is used in patients whose tumors prove susceptible in laboratory analysis. In these tests the dependence of the tumor on sex hormones like estrogen and progesterone is quantified by different methods. About 80% of breast cancers prove estrogen positive. If a tumor is tested positive, this knowledge can be applied by administering drugs which target the cancer cells hormone receptors.[29] Radiotherapy works by applying ionizing radiation on the cancer cells. This is done either directly through photons or with charged particles. The radiation can either applied externally through radiotherapy machines or internally with liquid or solid drugs. By damaging the DNA of the cancer cells, they are either destroyed or their ability to replicate is impaired. Due to their short cell cycle, malignant cells are especially vulnerable to DNA damage. Breast cancers are routinely tested for an excess of HER-2, a protein overexpressed in about 30% of breast cancers. A positive result indicates a more aggressive tumor and a higher chance of recurrence. Despite this the prognosis can be better, due to the emergence of drug therapies which target HER-2. Unfortunately, many side effects are common in all types of cancer treatment. In recent decades especially, great efforts are being made to prevent and mitigate those side effects. To do so, surgery techniques have been adjusted and after care devices such as elastic sleeves for lymph compression have been introduced. Radiotherapy has evolved so the radiation can be better targeted on malignant tissue and the dosage reduced. Side effects of chemotherapy are routinely managed by preventively administering antiemetic drugs and drugs to reduce the risk of infection.[30] Despite all those measures, side effects remain the norm.

In Poland, the breast cancer therapy is highly individualized as in Germany. Although only patients with advanced stage I and stage II breast cancer are eligible for surgical treatment. The most frequently performed surgical procedure is modified breast amputation using the Pateymethod. Breast Conserving Treatment (BCT) is only possible if the tumor is not larger than 3 cm, if the excision of the tumor may be realized with the required safety margin and if a good cosmetic effect is expected. Pregnancy, collagenosis, BRCA1 and BRCA2 mutations and multifocal or multicentre breast cancer should be ruled out as potential contraindications, when it comes to surgical treatment. If the advanced stage of the breast cancer does not allow for a BCT, it is possible to apply an initial (adjuvant) treatment, usually based on chemotherapy. As a result of this procedure, the tumor size may be reduced or the tumor may disappear completely. In this situation, it is extremely important to mark the place with a specific marker where the tumor was originally located for potential following surgery and/or radiotherapy.

In recent years, breast cancer therapy in Poland has reached the same medical standards and new treatment options as in Germany. However, due to the different health insurance systems, a lower number of specialized breast cancer treatment units, and the question of therapy costs, a lower number of patients in Poland may obtain the same innovative treatment options as in Germany.[31]

5.3. Breast cancer risk factors and prevention methods

Due to the multitude of possible risk factors it is impossible to determine a single cause for breast cancer. The risk of breast cancer is predominant in women, although it also affects men, and varies with age. The following presented risk factors are the most common associated with breast cancer development according to the Deutsches Krebsforschung-

szentrum. Information that can be derived from large studies on a woman's risk of illness show that age, hormonal situation, lifestyle, and possibly genetic factors are among the most important determinants. Assuming a life expectancy of 80 years, every woman has a lifetime risk of about one in eight to develop breast cancer. However, the risk of developing breast cancer is not the same in every phase of life by the German Center for Cancer Registry: At the age of 35, one in 110 women develops breast cancer in the next ten years. By age 65 the number goes up to one in 30 women.[32] Hormones also play a major role in the development of breast cancer. Most breast cancer patients have tumor cells which are stimulated by hormones like estrogen. The hormone levels can only be partially influenced by keeping a healthy weight and breastfeeding. This also includes to avoid hormone replacement therapy during the menopause. However, the hormone levels of a woman are genetically determined as innate factors. Early menarche and a late menopause are considered to increase the risk, by extending the period of hormonal fluctuations. Family planning has got an indirect effect on the hormone levels. The higher the number of pregnancies of a woman and the longer the breastfeeding periods, the lower is her breast cancer risk.[33] The prolonged use of the contraceptive pill and hormone replacement therapy for menopause symptoms have a risk-increasing effect.[34]

Many studies concentrate on the influence that lifestyle may have on the development of breast cancer. There is no evidence for an effect of different diets internationally. Phytoestrogens in food are still being discussed as either a risk or protective factor.[35] Lack of exercise and obesity increases the risk before but especially after menopause. Regular exercise seems to have a protective effect.[36] The American Cancer Society states that women who have one alcoholic drink a day have a risk increase between 7% and 10% compared with non-drinkers, while women who have two to three drinks a day have about a 20% higher risk than non-drinkers. There is evidence for a risk-increasing effect of active and passive smoking before menopause. Environmental factors play a far smaller role in breast cancer. Despite much research a causality is not established. Stress or depression are still being discussed to have an impact on breast cancer. Specific genes can lead to familial recurrently appearing breast and ovarian cancer. The breast cancer genes BRCA1 and BRCA2 significantly increase the risk of breast cancer. They are present in 5%–10% of breast cancer patients. In Germany, women with genetic risk factors can access wide screening options and can opt for preventive surgery. Breast tissue and benign breast changes also have an impact as risk factors in breast cancer. Women with very dense breast tissue have an increased risk of breast cancer. Radiation also increases the breast cancer risk.[37]

6. CONCLUSIONS

(1) The spatial diversity of the cancer mortality is largely a consequence of the distribution of the age structure of the population.
(2) The spatial distribution of the cancer death rates shows a great similarity with the share of the older population.
(3) The main risk factors of breast cancer are age, hormonal situation, lifestyle, inherited breast cancer risk genes (BRCA1 and BRCA2) and dense breast tissue.
(4) US, mammography and CT remain the most important and sensitive imaging methods for breast cancer. New pathologic examinations such as genetic analysis, estrogen receptor and HER2 status are used to be an aid in the planning of an individualized breast cancer therapy scheme.

Conflicts of interest
None.

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None declared.

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