

## BREAST SELF-EXAMINATION AS A METHOD FOR EARLY DETECTION OF BREAST CANCER BASED ON LITERATURE REVIEW

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**Summary:** Breast cancer is the most common malignancy among women. It is at present the most common cancer standing behind approx. 17.4% of all morbidity and approx. 22.2% of all deaths. Every year in Poland nearly 11,000 new cases of breast cancer are recorded and this number is constantly growing. The main reason for this state of affairs is seen in a small number of screening. It is therefore important to spread knowledge about breast cancer prevention, conducting training in currently available knowledge regarding risk factors as well as the promotion of healthy behaviours of women in the early detection of breast cancer. The simplest examination used to detect cancerous changes is breast self-examination. It helps to detect adverse effects in the breast and increases the chances of their recovery. In accordance with the recommendations of the Polish Gynecological Society regarding the prevention and early diagnosis of changes in the mammary gland, it is recommended that women over the age of 20 should regularly once a month carry out breast self-examination. Women menstruating should perform a test on the second or third day after menstruation, and pregnant women and post-menopausal women should conduct this always on the same day of the month. Breast self-examination should consist of a visual inspection and palpation. The aim of this study is to present the methodology of breast self-examination to detect cancer lesions at an early stage of their development and provide an overview of the results of Polish research on the knowledge of breast self-examination techniques, awareness of women surveyed regarding the age at which breast self-examination should be started, the frequency with which breast examination must be carried out, knowledge of risk factors for breast cancer or symptoms of breast cancer.

**Keywords:** malignancy, risk factors, breast examination

### Introduction

Breast cancer in the nineties was the second most common cancer among Polish women. It is now the most common cancer, responsible for approx. 17.4% of all morbidity and approx. 22.2% of all deaths. Every year in Poland nearly 11,000 new cases of breast cancer are recorded and this number is constantly growing (Zych et al. 2006).

In order to improve the effectiveness of treatment, screening tests that allow to diagnose the disease early in its development were introduced in oncology. In Poland since 2006 women aged 50-69 have been subject to screening mammography and this test is performed at two-year intervals, which is in line with the recommendations of the committee of experts of the EU (Didkowska 2011). Prerequisite for effective screening is mass, long-term nature and high quality of these tests (Humphrey et al. 2002). In countries that have introduced prevention programs, a decrease in mortality by approx. 15% is visible (Nelson et al. 2009). In Poland, reportability among women surveyed is low and in 2011 it amounted to 43.5% (Jokiel 2009).

It is therefore necessary to spread knowledge about the prevention of breast cancer among women, training them on methods targeted at eliminating or reducing risk factors for breast cancer, as well as promoting healthy behaviors, including breast self-examination by women of all ages (Kaczmarek-Borowska et al. 2013, Tood, Stufbergen 2012).

This study is of illustrative nature and it has been written based on a query of Polish and foreign literature. The aim of this study is to present the methodology of breast self-examination, aiming to detect cancer lesions at

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an early stage of their development and provide an overview of the results of Polish research on the knowledge of breast self-examination techniques, awareness of women surveyed regarding the age at which breast self-examination should be started, the frequency with which a breast examination is performed, knowledge of risk factors for breast cancer or symptoms of breast cancer.

### **Risk factors for breast cancer**

Based on numerous studies and long-term observations a number of factors were extracted that contribute to an increased risk of breast cancer (Fitzgibbons et al. 2000). One of the major risk factors predisposing to the development of breast cancer is the female gender, and age (Bouchardy et al. 2007). What is important for determining the risk is also family history and genetic predisposition (Rouzier et al. 2004). An important role in the pathogenesis of malignant tumor growth in breast is played by estrogen. Epidemiological studies confirm that increased exposure to endogenous and exogenous estrogens increases the risk of breast cancer (Narod 2001). Fewer menstrual cycles multiply the risk compared to women whose menarche appeared at a later age and who experienced early menopause (Leung et al. 2008). The age of the first childbirth, especially the first pregnancy after age 30 also has an impact on breast cancer risk (Xue et al. 2007).

Currently, more often the relationship between the risk of cancer and the consumption of carbohydrates is recognized. It has been shown that there is a link between the consumption of products with a high glycemic index (GI), elevated insulin levels and insulin resistance and an increased risk of breast cancer (Jonas 2003). In studies involving 2,569 women with breast cancer a direct relationship between the consumption of carbohydrates with a high GI and the risk of cancer was reported (Tavani et al. 2006).

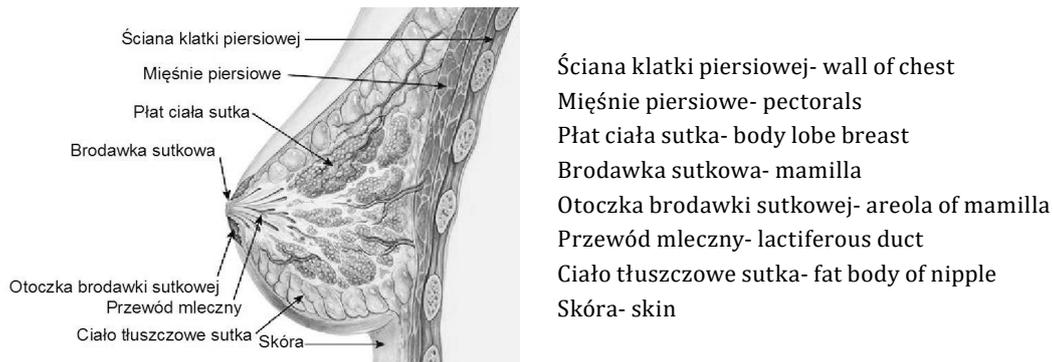
It was also found that there is a link between obesity and the growth of breast cancer, particularly in postmenopausal women (Fair 2007). Several years of observations of a group of 1,500 patients diagnosed with breast cancer showed a significantly increased risk of death when BMI  $\geq 30$  kg / m<sup>2</sup> compared to those with a BMI  $< 25$  kg / m<sup>2</sup> (Dal Maso 2008). A pooled analysis of 8 cohort studies involving 340 thousand women showed an increased risk of breast cancer by 30% for BMI  $\geq 28$  kg / m<sup>2</sup> compared with BMI  $< 21$  kg / m<sup>2</sup> (Zatoński 2012). Researchers (Lorincz, Sukumar 2006) explain this increased amount of estrogen secreted from fat cells, predisposing to breast cancer. This confirms the higher level of sex hormones circulating in the blood of obese women, compared with women with normal body weight and is in women before and after menopause.

Epidemiological studies confirm that alcohol abuse is a risk factor for breast cancer. It has been shown that drinking alcohol in postmenopausal remains in direct correlation with the growth of breast cancer which has not been demonstrated in women who are premenopausal (Singletary, Gapstur 2001). The results of the study indicate a relationship between hormonal state of the body, alcohol consumption and a predisposition to breast cancer (Li Chi et al. 2006). Carcinogenic factor in the case of ethanol the effect of this compound on endogenous steroid hormones, metabolites which lead to the generation of free radicals, either directly damaging DNA (Singletary, Gapstur 2001).

The glycemic index - is defined as average percentage increase in blood of glucose after eating, by a statistically representative group of people, serving contains 50 grams of digestible carbohydrates. The increase in blood sugar when you eat 50 grams of glucose as the base scale (100%). The glycemic index is calculated from the formula: (concentration of glucose in the blood after consumption of a product containing 50 g carbohydrate) / (concentration in blood glucose after ingestion of 50 g glucose) · 100%

### **Anatomy of the breast**

Women's breasts are made from the skin, subcutaneous tissue, blood vessels, lymph vessels and nerves. Located on the chest wall lying at the level of the III to VI or VII rib (Fig.1) They are adjacent to the back surface of the pectoralis major muscle fascia, fascia pectoralis minor and in the side to the front toothed muscle fascia. Inside the breast is composed of the breast gland which consists of 15 -20 tapering lobes of glandular tissue, which are arranged radially around the nipple. Wart is surrounded by a circular shell nipple, characterized by strong pigmentation, where there is an outlet of the modified sebaceous glands, the so called Montgomery glands (Fig.2). A proportion of the female population has an additional piece of mammary gland called the tail of Spence within their armpit. Within the flaps one can distinguish smaller structures called lobules or lobes. They consist of groups of milk-secreting glands surrounded by connective tissue (Tortora, Derrickson 2008).



**Figure 1.** Right Breast Anatomy

Source: [https://commons.wikimedia.org/wiki/File:Breast\\_anatomy\\_normal\\_scheme.png](https://commons.wikimedia.org/wiki/File:Breast_anatomy_normal_scheme.png)

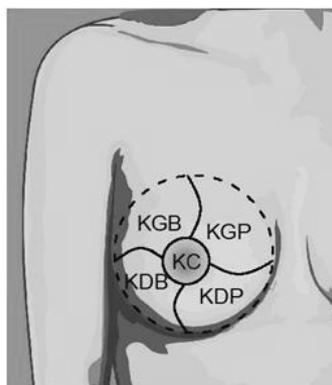
Each lobe contains a milk line, which extends into a bay milk through its outlet on the nipple. These gulfs with sectional order from 5 to 8 mm and an average length of 12 mm end at the base of the nipple stenosis. The areas between lobes of glandular tissue are filled with fat. It also creates a protective layer around the mammary gland (Tortora, Derrickson 2008).



**Figure 2.** Construction of the mammary gland (front view)

Source: own elaboration.

Describing the location of tumors in the breast conventionally divided it into quadrants, respectively central (KC), the top-side (KGB), the upper-medial (KGP), the bottom-side (KDB), the lower-medial (KDP) (Figure 3) .



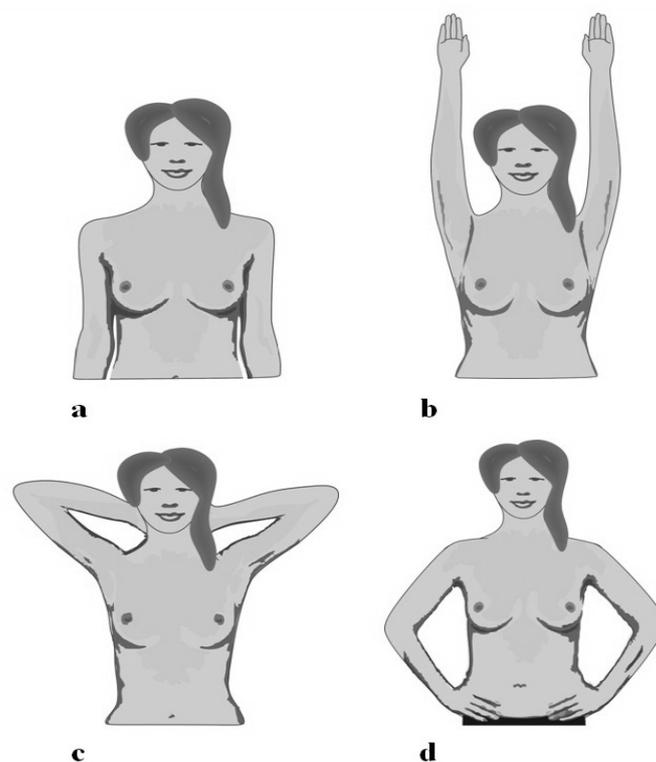
**Figure 3.** Division of breast into quadrants

Source: own elaboration.

### Methodology of breast self-examination

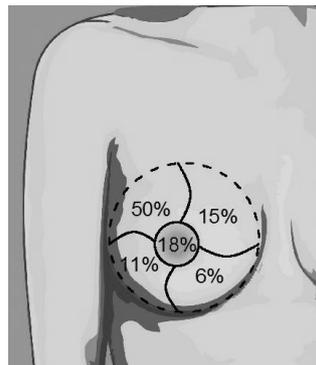
According to the recommendation of Polish Gynaecological Society on prevention and early diagnosis of breast gland changes, it is advised in case of women above 20 years old to do a breast self-examination regularly once a month. Menstruating women should perform the examination on the second or third day after the menstruation, however, pregnant women and women after the menopause should always do it on the same day of a month (Spaczyński 2005).

Self-control of a breast consists of a visual examination and a palpatory examination. The visual examination is done in a standing position in front of a mirror. Woman watching her breast should: hold her upper limbs along the torso (Fig. 4 a), raise her upper limbs (Fig. 4 b), clutch her upper limbs behind the head (Fig. 4 c), rest her upper limbs on hips (Fig. 4 d). During the examination in positions listed above, we examine the outline and symmetry of mammary glands, skin changes such as red marks, ulceration, spreading of hypodermic veins, the decortication or linear skin rupture, the presence of callosities, tubercles or tubercle masses, the retreating of a nipple, the secretion from the nipple a pathological discharge, moving the nipple in relation to the teat line (Lewandowski 2007).



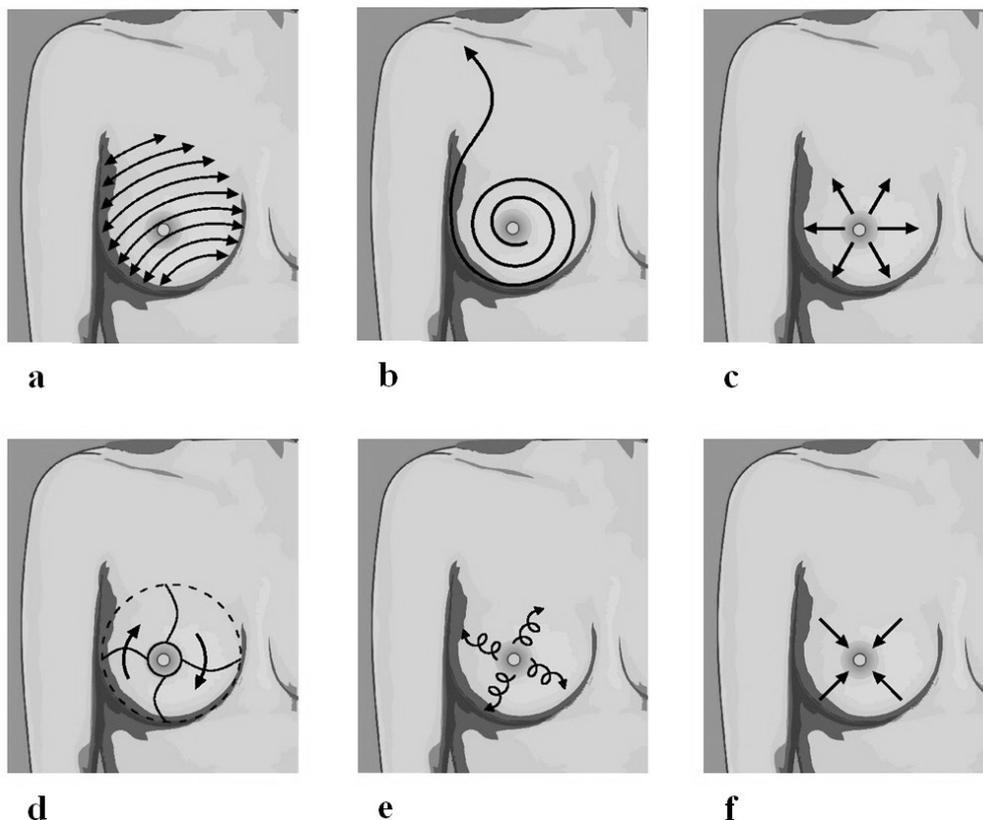
**Figure 4.** The visual assessment of a breast gland  
Source: own elaboration.

The palpatory examination is done in a sitting or lying position. The examination in a lying position is essential to check the quadrants of a breast gland. In 50% cases a breast tumour is found in a superiolateral quadrant. Almost 20% of tumours are located within the limits of a nipple or a nipple areola, 15% in a superioparacentric quadrant, 11% in an inferolateral quadrant. The fewest, only 6% of tumours are located in an inferoparacentric quadrant (Fig. 5). The examination is done by circular movements, pressing the breast flat arranged fingertips II to IV (Lewandowski 2007).



**Figure 5.** The most common localization of a breast tumour  
Source: own elaboration.

During the examination in a sitting position we conduct such movements as: a transverse stroking of a breast gland (Fig. 6 a) and a spiral stroking of the breast gland from the nipple to breast circumference. The right breast we examine in a clockwise direction, the left one - in counter clockwise direction (Fig. 6 b), a radial stroking of the breast gland from the nipple to the breast circumference (Fig. 6 d), a radial chafing of the breast gland from the nipple to the circumference (Fig. 6 e) and the breast gland pressing in order to check the nipple discharge (Fig. 6 f). We finish the examination checking the state of lymph nodes (Lewandowski 2007).



**Figure 6.** Breast self-examination  
Source: own elaboration.

### The review of research results on a breast self-examination

The assessment of women's knowledge on breast self-examination was the subject of numerous research which is shown in the references (Tab. 1). Numerous observations and studies show that the participation of

health service workers in education on a breast cancer prevention is insignificant (Tab. 2). In connection to it, the scheme of the breast self-examination should be widely propagated among women, mainly by GPs.

Indeed the active participation of every woman in the nipple cancer prevention mainly depends on information from doctors (Karczmarek-Borowska et al. 2013).

**Table 1.** The review of studies on the assessment of women's knowledge on breast self-examination

<b>Knowledge of breast self-examination techniques - results of surveys</b>	
<i>Publication</i>	<i>The number of women declaring knowledge of the breast self-examination techniques in %</i>
Mazurkiewicz et al. 2014	100
Karczmarek-Borowska et al. 2013	79
Paździor et al. 2011	60
Nita et al. 2010	88
Przysada et al. 2009	81
Gaworek et al. 2008	61
Zych et al. 2006	94
<b>The awareness of women concerning the age when the breast self-examination should be started - results of surveys</b>	
<i>Publication</i>	<i>The number of women possessing the knowledge of the age when the breast self-examination should be started in %</i>
Karczmarek-Borowska et al. 2013	64
Gaworek et al. 2008	61
Turczak et al. 2006	48
Zych et al. 2006	51
Przestrzelska et al. 2006	12
<b>The frequency with which breast self-examination should be done - results of surveys</b>	
<i>Publication</i>	<i>The number of women possessing the knowledge of the frequency with which breast self-examination should be done in %</i>
Mazurkiewicz et al. 2014	36
Karczmarek-Borowska et al. 2013	69
Paździor et al. 2011	36
Nita et al. 2010	17
Przysada et al. 2009	79
Jokiel 2009	21
Woźniak 2008	28
Turczak et al. 2006	18
Przestrzelska et al. 2006	11
Skórzyńska et al. 2004	87
<b>The knowledge of factors increasing the risk of a breast cancer - results of surveys</b>	
<i>Publication</i>	<i>The number of women having knowledge of factors increasing the risk of a breast cancer in %</i>
Mazurkiewicz et al. 2014	71 - gender
	63 - genetic factors
	48 - unhealthy lifestyle
	37 - overweight
Karczmarek-Borowska et al. 2013	50 - gender
	23 - early menstruation
	13 - first pregnancy at late age
Wdowiak et al. 2013	48 - stimulants
	24 - little physical activity
Sawaryn 2010	80 - childlessness
Nita et al. 2010	75 - genetic factors
	11 - early menstruation

Turczak et al. 2006	4 - first pregnancy at late age
	3 - early menstruation
Zych et al. 2006	53 - stress
	42 - hormonal disorders
	35 - a high animal fat content in a diet
	34 - drinking alcohol
	19 - hormone replacement therapy
<b>The knowledge of symptoms of a breast cancer - results of surveys</b>	
<i>Publication</i>	<i>The number of women having knowledge of the breast cancer symptoms in %</i>
Karczmarek-Borowska et al. 2013	86 - the presence of hard, painful tubercles
	79 - skin changes around the nipple and a discharge from the nipple
	60 - the breast shape changes
Paździor et al. 2011	73 - the presence of tubercles
	40 - the discharge from the nipples
	35 - the enlargement of lymph nodes in the armpit
	22 - the asymmetry and oedema of a breast
Nita et al. 2010	96 - the presence of painful tubercles
	72 - the secretion from the nipple
	61 - the nipple changes
	61 - the breast shape and size changes
Zych et al. 2006	84 - the presence of painful tubercles
	67 - the secretion from the nipple
	33 - the breast arrangement changes
Synowiec-Pilat 2001	76 - the presence of painful tubercles

**Table 2.** The review of studies on sources of knowledge of a breast cancer prevention

<b>The knowledge sources of the breast cancer prevention - results of surveys</b>	
<i>Publication</i>	<i>The knowledge sources of breast cancer prevention in %</i>
Karczmarek-Borowska et al. 2013	79 - media
	65 - women magazines
	28 - a doctor
Wołowski 2012	38 - the internet
	33 -TV
	17 - a doctor
Lewandowska 2011	34 - the internet
	20 - medical literature
	10 - a doctor
Paździor et al. 2011	57 - press
	57 -TV
	19 - a doctor
Tomczyk et al. 2011	84 - mass media
Przysada et al. 2009	77- TV, press, radio, family and acquaintances
	4 - a doctor
Turczak 2006	47 - brochures and leaflets
	30 - media
	22 - a doctor
Zych et al. 2006	61 - leaflets
	57 - press and television
	20 - a doctor

## Summary

The review on conscious prevention of a breast cancer made by authors of this paper shows that vast majority of women in Poland knows a lot about breast self-examination techniques (over 80%), but considerably less women know when this examination should be started and with what frequency it should be done (around 47% and 40% respectively). Large group of women knows about factors increasing the risk of a breast cancer. The childlessness (80%), genetic factors (60%), unhealthy lifestyle, stress, wrong diet, stimulant consumption, overweight (from 37 to 53%) predispose to breast cancer. Among minor factors hormonal disorders (42%), to less physical exercises (24%), early menstruation and first pregnancy in a late age (17 and 9% respectively) are mentioned.

Polish women declare in surveys that they know quite a lot about the breast cancer symptoms. First of all they mention the presence of hard, painful tubercles inside the breast limits (85%) and the discharge from the nipple (64%). Not so often they point to the skin changes around the nipple (60%) and changes of the breast shape and symmetry (60%). More seldom the respondents point to the enlargement of lymph nodes in the armpit (35%).

On the basis of epidemiological studies, the American National Cancer Institute assessed that the risk of a breast cancer is increasing with age (Horner et al. 2009). Incidents of a breast cancer which occur at the age below 35 are estimated at only 1-3% cases. Considerable increase of incidents number of a breast gland cancer takes place after the age of 50. Percentage of women who are reported as ill with this cancer at the age 50-59 is as high as 32% of all the cases (Mamrocka-Mączka 2013).

Healthy behaviours are related to the level of knowledge the society has about the diseases and the methods of their prevention (Dobrzyń et al. 2003). From analysis of available papers and carried out research it follows that the women's stage of knowledge about the breast self-examination requires continuation on a wide scale of information actions in order to cause changes in attitudes to one's own health. The early discovery of pathological changes in a breast gland by women belongs to cheap and simple methods of early diagnosis of cancerous changes and in this way it results in a decrease of the risk of having this cancer and increases the chances of recovering from it. It is noticed that an average diameter of a tumour detected by women who examine their breast on a regular basis is 12 mm, and an accidentally detected tumour in women who never did a self-examination has an average diameter of 40 mm (Karczmarek-Borowska et al. 2013). Studies by Fostera, Constanza (Fostera, Constanza 1984) showed that 5 years survival of patients with a breast cancer was 18% higher in case of women doing a self-control in comparison to women not doing this examination.

In light of research the level of knowledge doesn't depend on age or education. This is why the knowledge about methodology of breast self-examination should be spread, which is a very important element of a cancer prevention.

## Conclusion

The knowledge of the breast cancer prevention should be far more propagated, more trainings on the risk factors ought to be conducted and also women's healthy behaviours in the scope of early breast cancer diagnosis should be promoted, paying special attention to breast self-examination.

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