

Knowledge about prevention, risk factors and treatment in women with diagnosed breast cancer. Whether the disease affects their healthy behaviour?

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ABSTRACT

Objective. The assessment of knowledge about prevention and risk factors of women with diagnosed breast cancer.

Material and methods. The study involved 100 women aged from 28 to 82 years (median 56.2 years) who were treated at the Oncology Center in Bydgoszcz in 2014 for breast cancer. Author's original questionnaire containing questions on knowledge about breast cancer as well as environmental and demographic data was used in this research.

Results. Self-examination of a breast was made by 83% of women, 85% of women benefited from invitations for mammography. 56% of women knew how often mammography should be repeated but only 28% knew at what age it should be started. Tumor in a breast (20.5%) and "pulling" nipples (14.4%) were the most frequently reported symptoms of a cancer. In terms of risk factors, genetics (32.2%) and unhealthy lifestyle (16.3%) were the factors pointed by women most often. Every third women indicated only one factor while every four indicated three factors. 69% of the respondents increased their knowledge after falling ill, from the Internet (20.5%) as well as from information leaflets and brochures (16.6%). Women's knowledge about breast cancer was at the edge of low and average levels and the average value was 11.7 points. More knowledge had women with higher education 12.95 points, single 12.9 and young women 12.3.

Conclusions. The knowledge about the disease among women with diagnosed breast cancer was unsatisfactory and did not depend on age, marital status, place of residence, type of work but on education level only. Older and uneducated women had less knowledge, particularly about factors increasing the risk of developing the disease. The Internet, information leaflets and brochures were the primary source of knowledge about the disease, not a doctor or a nurse. Women with breast cancer were aware of the importance of preventive tests. They declared that they can perform self-examination. The most frequently reported symptoms of cancer are tumor and "pulling" nipples.

KEY WORDS: breast cancer, knowledge, prevention

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INTRODUCTION

Breast cancer is an important health and social problem. Currently, it is the most common cancer among women in Poland (where the number of cases continues to grow [1, 2]). Breast cancer is considered to be the most widespread cancer in the world. In 2010 it was diagnosed in nearly 1.5 million of women. The knowledge about healthy behaviours, prevention, risk factors and treatment of breast cancer is important for all women, not just healthy women. The low level of knowledge may contribute to increased risk of disease and delay treatment. Neglecting primary and secondary preventions and symptoms associated with the disease result in late notification to the doctor. It result in worse prognosis associated with advancement, longer treatment and increased costs. Women should know that early detection of breast cancer and early treatment can save lives in many cases.

OBJECTIVE

Assessment of knowledge of women diagnosed with breast cancer about prevention, risk factors and treatment of a disease.

MATERIAL AND METHODS

The study was conducted among 100 women aged from 28 to 82 years (median 56.2) treated for breast cancer at the Oncology Centre in Bydgoszcz from February to May 2014. The author's questionnaire with 33 structured questions was used to achieve predetermined objectives. Five questions were related to environmental and demographic data. Patients were informed about how to fill out the questionnaire and about the possibility to ask questions. Obtaining permission concerning concept of this study from the Bioethics Committee of the Medical College in Bydgoszcz was the only condition for starting research.

An attempt was made to determine whether the level of knowledge of surveyed women depend on selected variables such as age, marital status, place of residence, education and type of work. Mann-Whitney U test, Spearman correlation rank test and Kruskal-Wallis rank test were used for statistical evaluation. The level of significance $p \leq 0.05$ and null hypothesis (H_0) were adopted in this research.

Surveyed women received points for each correct answer to each question according to the categorization. They could get a total of 20 points. Obtaining the appropriate number of points qualified each woman to the one of the following category: low level of knowledge 0–10 points (up to 50%), average level of knowledge 10.1–15 points (up to 75%) and high level of knowledge 15.1–20 points (over 75%). The mean value and standard deviation were calculated. All calculations were performed with Statistica 10.0.

RESULTS

Environmental and demographic data of the surveyed women are summarized in Table 1. Their healthy behaviours are illustrated in Table 2. Knowledge about breast cancer is presented in Table 3. Information on education of women associated with breast cancer are shown in Table 4. Specific conclusions together with assessment of knowledge are shown in Tables 5–7. The summary of data from Table 6 is given below.

TABLE 1.
Environmental and demographic variables.

		n/%
Age	under 40 years	8
	41–50 years	22
	51–60 years	35
	61–70 years	24
	above 70 years	11
Marital status	Single	8
	Married	65
	Widow	16
	Divorced	11
Place of residence	City	76
	Village	24
Education	Primary	7
	Vocational	24
	Secondary	43
	Higher	26
Type of work	White-collar	61
	Blue-collar	39

TABLE 2.

Answers to questions on preventive examinations.

Question	Answer	n/%
Inviting to mammogram	Yes	53/90
	No	6/10
Accepting invitation for preventive examination	Yes	50/85
	No	9/15
Performing breast self-examination	Yes	83
	No	17
Persons indicating performance of preventive examinations	Own initiative	76
	Physician	15
	Nurse	0
	Friends/family member	9

TABLE 3.

Answers to questions on knowledge about breast cancer.

Question	Answer	n/%
Breast cancer as the leading cause of death	Yes	48
	No	52
Annual deaths from breast cancer among women	Below 1 thous.	15
	2–3 thous.	47
	3–4 thous.	22
	Abt. 5 thous.	16
The risk of breast cancer (only women with the disease in the family)	Yes	15
	No	85
The curability of breast cancer diagnosed at an early stage	Yes	99
	No	1
The main method of treatment of breast cancer	Surgery	87
	Chemotherapy	9
	Radiotherapy	4
	Hormonal therapy	0
The need to remove breast in connection with cancer	Yes	14
	No	86
The basic examination used to detect breast cancer	USG	29
	Mammography	67
	Cytology	3
	Angiography	1
Mammography terms	USG of breast	11
	X-ray examination of breast	88
	Breast self-examination	0
	Cytological examination	1
The age of prophylactic mammography	From 30 years	39
	From 40 years	31
	From 50 years	28
	From 60 years	2
Frequency of mammography	Semiannually	3
	Annually	41
	Every 2 years	56
	Every 5 years	0
	Once in a lifetime	0
Age of greatest risk for breast cancer	30–40 years	8
	40–50 years	49
	50–70 years	42
	above 70 years	1

Factors that increase the risk of breast cancer*	Age	22/8
	Sex	38/14
	Genetic factors	89/32
	Contraception	29/10.5
	Early first period	11/4
	Late menopause	7/2.5
	Unhealthy lifestyle	45/16
	Obesity	21/8
	Late first pregnancy	10/4
	Childlessness	11/4
Increased risk of morbidity in relation to not breast feeding	Yes	31
	No	69
Symptoms associated with breast cancer**	Tumor in breast	77/20.5
	Lumps in armpit	44/12
	The difference in breast size	29/8
	Redness and thickening of skin	28/7.5
	Skin changes around nipple	31/8
	Widening veins in breast skin	13/3,5
	Pain, sensitivity to touch	36/10
	Nipple „retraction“	54/14
	Bloody discharge from nipple	42/11
	Ulceration of breast skin	21/6

*More than one answer. 1 factor – 30 women; 2 factors – 19; 3 factors – 24; 4 factors – 14; 5 factors – 6; 8 factors – 4; 9 factors – 1; 10 factors – 1.

**More than one answer. 1 symptom – 30 women; 2 symptoms – 21; 3 symptoms – 9; 4 symptoms – 7; 5 symptoms – 8; 6 symptoms – 4; 7 symptoms – 7; 8 symptoms – 1; 9 symptoms – 3; 10 symptoms – 10.

TABLE 4.

Answers to questions on education about breast cancer.

Question	Answer	n/%
Self-assessment of knowledge about breast cancer prevention	Very good	10
	Good	36
	Average	42
	Requiring supplementation	12
	Unsatisfactory	0
Further exploration of knowledge about disease and its treatment	Yes	69
	No	31
Sources of knowledge about disease*	TV	25/11
	Newspapers and magazines for women	25/11
	Internet	4/20.5
	Family/friends/acquaintances	28/12
	Family doctor/medical staff	27/12
	Literature	32/14
	Information leaflets, brochures	38/17
	Not interested in this	7
Sufficient education about breast cancer prevention in schools, media and doctor's appointment	Yes	26
	No	74
Reducing risk of death from breast cancer due to preventive examinations	Yes	97
	No	3

Breast self-examination	Education and breast examination by gynecologist	Yes	64
		No	36
	Ability to perform breast self-examination	Yes	92
		No	8
	Time of performing breast self-examination	After menstruation	83
		Before menstruation	16
		During menstruation	1

*More than one answer. 1 source – 30 women; 2 sources – 23; 3 sources – 22; 4 sources – 13; 5 sources – 2; 6 sources – 3.

TABLE 5.
General level of knowledge.

Level	n/%
Low (0–10)	24
Average (10.1–15)	67
High (15.1–20)	9

TABLE 6.
Average points of assessment of knowledge on questions and the independent variables*.

No.	Question	Average± SD	%	p				
				Age	Marital status	Place of residence	Education	Type of work
1	Is the breast cancer is the most common cause of death from cancer for women?	0.5 ± 0.5	48	0.4	0.2	0.5	0.2	0.3
2	Do you realize how many women die from breast cancer each year in Poland?	0.2 ± 0.4	16	0.3	0.1	0.1	0.03	0.1
3	Do you know which age group has the highest risk of breast cancer?	0.4 ± 0.5	42	0.3	0.2	0.3	0.1	0.2
4	The basic examination used to detect breast cancer include...	0.6 ± 0.5	62	0.9	0.4	0.3	0.9	0.6
5	Mammography is a...	0.9 ± 0.3	86	0.01	0.1	0.7	0.003	0.4
6	From what age mammogram should be performed prophylactically?	0.3 ± 0.5	28	0.1	0.03	0.2	0.01	0.1
7	How often mammogram should be performed?	0.6 ± 0.5	56	0.2	0.6	0.5	0.9	0.4
12	At what time you should perform breast self-examination?	0.8 ± 0.4	83	0.1	0.7	0.2	0.1	0.1
15	Do you think that preventive examinations reduce risk of death from breast cancer?	1 ± 0.2	97	0.5	0.6	0.1	0.2	0.3
17	Do you think that only women with a family history of detected breast cancer have a highest risk of breast cancer?	0.8 ± 0.4	85	0.6	0.3	0.8	0.3	0.1
21	Please indicate factors increasing the risk of breast cancer.	0.7 ± 0.5	28.3	0.01	0.3	0.2	0.02	0.7
22	Whether breast-feeding increases the risk of morbidity?	0.3 ± 0.5	31	0.3	0.1	0.8	0.3	0.6
23	Please circle alarming symptoms detected during breast self-examination.	0.9 ± 0.8	37.5	0.9	0.1	0.5	0.7	0.6

24	Do you think that lumps under the armpit are a disturbing symptom?	1 ± 0.2	96	0.3	0.4	1	0.4	0.6
26	Do you think that breast cancer detected at an early stage can be cured?	1 ± 0.1	99	0.9	0.2	0.6	0.3	0.2
27	What is the main method of treatment for breast cancer?	0.9 ± 0.3	87	0.5	0.3	0.9	0.7	1
28	Does a diagnosis of cancer always involves the removal of the breast?	0.9 ± 0.3	86	0.9	0.4	0.1	0.1	0.1

*Expected value – 1, questions no.21 and 23 – 2.5 points.

TABLE 7.

Independent variables, level of knowledge and average points.

Variable		n	Level of knowledge n/%			Average points
			Low	Average	High	
Age group	<40 years	8	1/12.5	7/87.5	0/0	11.7
	41–50 years	22	3/14	16/73	3/14	12,3
	51–60 years	35	8/23	23/66	4/11	11.8
	61–70 years	24	9/37.5	13/54	2/8	11.2
	>70 years	11	3/27	8/73	0/0	10.9
Marital status	Single	8	0/0	7/87.5	1/12.5	12.9
	Married	65	18/28	40/61.5	7/11	11.5
	Widow	16	6/37.5	10/62.5	0/0	10.9
	Divorced	11	0/0	10/91	1/9	12.6
Place of residence	Village	24	8/33	14/58	2/8	11
	City	76	16/21	53/70	7/9	11.9
Education	Elementary	7	3/43	3/43	1/14	10.5
	Vocational	24	11/46	9/37.5	4/17	11.2
	Secondary	43	8/19	35/81	0/0	11.3
	Higher	26	2/8	20/77	4/15	12.9
Type of work	White-collar	61	10/16	46/75	5/8	12
	Blue-collar	39	14/36	21/54	4/10	11.1

1. Age had no significant effect on the overall level of knowledge ($p = 0.08$).

Women under 40 years and between 41 and 50 years had the best knowledge about mammography and factors increasing the risk of breast cancer, while women at the age of 61–70 years and above 70 years had the lowest knowledge ($p = 0.01$).

2. Marital status had no effect on the overall level of knowledge ($p = 0.07$).

Only unmarried and divorced women had the best knowledge about age in which the preventive mammography can be done, while widowed women had worst knowledge ($p = 0.03$).

3. There was no difference in general knowledge about breast cancer and prevention between women living in the city and residents of rural areas ($p = 0.39$).
4. Well-educated women were characterized by a high level of knowledge ($p = 0.01$).

The best knowledge about mortality from breast cancer in Poland was found in women in the following order: women with higher, vocational, secondary and primary education. The best knowledge about understanding the concept of “mammography” was found in women in the following order: women with higher education, secondary, vocational and primary education. The age at which the preventive mammograms can be made for the first time was known better by women with higher education, than with secondary, primary and vocational education. On the other hand, the best knowledge about factors increasing the risk of breast cancer was found in women with higher education, than with vocational, secondary and primary education.

There were differences between the responses related to mortality from breast cancer in Poland ($p = 0.03$), understanding of the term “mammogram” ($p = 0.003$), age, from which you should begin preventive mammography ($p = 0.01$) and factors increasing the risk of breast cancer ($p = 0.02$).

5. There were no differences in the general level of knowledge between white-collar and blue-collar workers ($p = 0.2$).

DISCUSSION

It is believed that mammography is the most effective method for breast cancer prevention. Almost all women who were treated for breast cancer were invited to this examination, only a few did not benefit from this opportunity. According to other authors, the percentage of healthy women who have ever had a mammogram is about 50% and only every third respondent use an invitation to the examination [3]. According to our own research, women primarily perform preventive examinations on their own initiative and using an invitation, only a few at the urging of a doctor or loved ones. Other research performed among healthy women showed that only one in four women declared that doctor convinced them about the necessity to perform preventive examinations [4]. In case of secondary prevention the simplest examination used to detect breast cancer is self-examination, which was performed by almost all of our surveyed women. Other authors obtained lower or similar results [5, 6, 7]. Less than half of the respondents were aware that breast cancer is one of the leading causes of death among women. Only a few women knew how many women died because of this reason. Similar results were obtained by others [3]. Almost all surveyed women from Oncology Center in Bydgoszcz were aware that breast cancer occurs not only among women with a family burden. They also had knowledge about the treatment of breast

cancer. Most of them knew that the main method of treatment is surgery and that the removal of a whole breast is not necessary in all cases.

Almost all respondents found their knowledge about prevention as an average or good, only one in ten said that her knowledge needs to be completed. In healthy women knowledge of the subject is worse. More than half of women determined their level of knowledge as medium and one in fourth of women considered it as low [3]. In a study performed in another place, three out of four women assessed their knowledge as insufficient [7]. After getting sick most of them decided to deepen their knowledge about the disease, mostly from the Internet as well as from leaflets and brochures received at the outpatient clinic or hospital. Women who were not treated for cancer derive knowledge mainly from leaflets, newspapers and television [6, 8]. However, most of them expect information about cancer prevention and healthy lifestyle from doctors and nurses. The contribution of health care workers in the education of women is still small [7]. In our institution only one in four women said that education about breast cancer in schools, media and during doctor's appointment is sufficient. In one of studies, surveyed women believed that education about cancer should begin in secondary school [3].

Almost all women stated that they are able to perform breast self-examination and that it should be done after menstruation. However, other studies showed that although the majority of women report the ability to perform breast self-examination, only every second or even every fifth is able to correctly identify the time for performing this examination on a monthly basis [7, 9]. Gynecologist discussed about breast self-examination with more than half of the respondents and examined them. In another group of surveyed women a similar result has been achieved. However, it worries that over one third of women have never heard any encouragement to perform ultrasound or mammography from gynecologist [3]. The respondents were aware of how important it is to perform preventive examinations. Almost all of them had opinion that thanks to this examination they could reduce the risk of death from cancer. In other studies, women were also convinced of the necessity of conducting preventive examination and declare that all kinds of actions and programmes for early detection of breast cancer are necessary [10, 11].

In our own research the vast majority of women believed that mammography is the primary examination for detecting breast cancer. This percentage is very similar to that obtained by others

[3]. Almost all women knew that mammography is based on X-ray examination of a breast.

The programme for early detection of breast cancer includes voluntary mammography performed every two years by healthy women aged 50–69 years. In the course of our own studies it was found that almost half of the respondents had the opinion that mammography is performed from the age of 30, a little less than from the age of 40. The answers about the repetition rate of the examination varied. Only half of the respondents knew that every 2 years. Very similar results were obtained by other authors [3, 12].

Knowledge about risk factors has a great importance for cancer prevention. Most women had opinion that the greatest risk for having a disease exists in the age of 40–50 or 50–70 years. This response may have been due to the fact that women are increasingly aware of the occurrence of cancer in young women. In terms of risk factors, surveyed women pointed out genetic factors and unhealthy lifestyle most often. The early period, childlessness, late first pregnancy, late menopause, obesity and age have almost been ignored. Every one in tenth women pointed out contraception and age. In other studies, the most common mentioned reasons were genetic predisposition, but also smoking, stress and menopause [9, 13, 14]. However, the order of indicated responses was very different and it depended on the sample group. Only few women were aware that the risk factor may also be poor diet, stress, which was emphasized by other authors [15, 16, 17]. Our own research showed that the respondents knowledge on risk factors of breast cancer was insufficient. Every third indicated only one factor, one in four three factors. The results obtained by others are similar [18, 19, 21]. In addition, our respondents did not believe that breastfeeding reduces the risk of developing this disease.

Women pointed out the tumor within the breast, “pulling” nipple, lump in the armpit and bloody discharge from the nipple as a symptom of a developing cancer most often. According to other women lump is also the most common symptom [9, 21]. Enlarged lymph nodes under the arm, bleeding from the nipple or its “pulling” were mentioned subsequently between others symptoms [7, 9]. The average level of knowledge was at the edge of low. Women with an average level of knowledge were the largest group of respondents. High level of knowledge was represented by one in ten women only.

It has been observed that older women who were treated for breast cancer have less knowledge. They have less knowledge abo-

ut factors that increase the risk of developing disease and they understood mammography as radiographic examination. This could be due to the fact that they do not have the need to deepen their knowledge and they were confident that this problem will not touch them in the future. Divorced and unmarried women had the higher level of knowledge than widows. While both residents of towns and villages have knowledge about breast cancer at a similar level.

In general, awareness of women about the prevention of breast cancer is limited. The level of knowledge of nearly half of the respondents aged 30–60 years was assessed as very low (unsatisfactory grade) and other women had very fragmentary knowledge that it did not depend on their age and place of residence [3]. The higher the education level, the higher the level of knowledge. Surveyed women with elementary and vocational education had significantly lower knowledge. They knew less about the risk factors, age from which preventive mammography should be performed and they understood less about the concept of mammography. A significant relationship between education and knowledge about healthy behaviour and specific preventive measures have also been confirmed by studies of other authors [5, 22]. Studies performed in Nigeria showed that women with higher education have more knowledge than women with lower education level [23]. In our study, there were no differences between white-collar and blue-collar workers.

The level of knowledge in the modern world turns out to be one of the determinants of people's healthy beliefs and behaviours. Our own and other authors studies suggested that women's knowledge about breast cancer is inadequate [3, 24].

Therefore, educational campaigns should be promoted among young women in schools to promote primary and secondary prevention, teach breast self-examination, provide knowledge about risk factors and symptoms suggesting presence of cancer. Our own study was performed among a group of women treated for breast cancer. Papers of other authors who studied populations of healthy women mainly were used in discussion. For this reason, these results may vary in favour of women with diagnosed breast cancer. It seems that this group is special, more interested in knowledge about healthy behaviors, prevention, risk factors and treatment of this disease which affected them. It is unsatisfactory that women deepen their knowledge on the subject when they have breast cancer.

CONCLUSION

1. The knowledge about the disease in women diagnosed with breast cancer is not satisfactory and it does not depend on age, marital status, place of residence, type of job but it depends on the level of education only.
2. Older and uneducated women have lowest level of knowledge especially about factors that increase the risk for developing disease.
3. The primary source of knowledge about the disease is still the Internet, flyers and brochures, but not a doctor or nurse.
4. Women with breast cancer are aware of the importance of preventive examinations. They declare that they can perform self-examination.
5. Tumor and "pulling" nipple are most frequently mentioned symptoms of cancer.

References

1. Nowicki A. (red.). Pielęgniarstwo onkologiczne. Termedia, Poznań 2009.
2. Tkaczuk-Wałach J, Sobstyl M, Jakiel G. Rak piersi – znaczenie profilaktyki pierwotnej i wtórnej. *Przegl Menopauz.* 2012; 4: 343-347.
3. Najdyhor E, Krajewska-Kułak E, Krajewska-Ferishah K. Wiedza kobiet i mężczyzn na temat profilaktyki raka. *Ginekol Pol.* 2013; 84: 116-125.
4. Lewandowska A, Mess E, Laufer J. Profilaktyka raka piersi wśród kobiet. *Onkol Pol.* 2013; 3: 131-134.
5. Woźniak I. Wiedza o schorzeniach nowotworowych narządów kobiecych i postawy kobiet wobec badań profilaktycznych. *Probl Pielęg.* 2008; 16: 136-139.
6. Cichońska M, Borek M, Krawczyk W, Maciąg D. Wiedza kobiet w zakresie zapobiegania nowotworom piersi i raka szyjki macicy. *Acta Scient Academiae Ostroviensis.* 2012; 1: 5-25.
7. Paździor A, Stachowska M, Zielińska A. Wiedza kobiet na temat profilaktyki raka piersi. *Nowiny Lek.* 2011; 80: 419-422.
8. Tomczyk E, Olejniczak T, Mróz M. et al. Ocena stanu wiedzy kobiet na temat profilaktyki raka piersi. *Pol Przegl Nauk o Zdr.* 2006; 1: 10-15.
9. Zych B, Marć M, Binkowska-Bury N. Stan wiedzy kobiet po 35 roku życia w zakresie profilaktyki raka piersi. *Przegląd Medyczny Uniwersytetu Rzeszowskiego.* 2006; 1: 27-33.
10. Przysada G, Bojczuk T, Kuźniar A. et al. Poziom wiedzy kobiet na temat profilaktyki i wczesnego rozpoznawania raka piersi. *Young Sports Science of Ukraine.* 2009; 3: 129-136.
11. Webster P, Lecturer S, Austoker J. Women's knowledge about breast cancer risk, and their views of the purpose and implications of breast screening – a questionnaire survey. *J. Public Health.* 2006; 28: 197-202.
12. Florek-Łuszczki M. Poziom wiedzy mieszkanki wsi na temat czynników ryzyka zachorowania na nowotwór piersi oraz zasad profilaktyki. *Med Ogólna.* 2010; 16: 406-415.
13. Mussalam M, Junaibi A, Khan SA. Knowledge and Awareness of breast cancer among university female students in Muscat, Sultanate of Oman – A pilot study. *Journal of Applied Pharm Science.* 2011; 1: 146-149.
14. Alharbi NA, Alshammari MS, Barjas M. et al. Knowledge, awareness, and practices concerning breast cancer among Kuwaiti female school teachers. *Alexandria Journal of Medicine.* 2012; 48: 75-82.
15. Lorenc A. Wiedza kobiet po 40. roku życia o czynnikach ryzyka i profilaktyce raka piersi. *Young Sport Science of Ukraine.* 2012; 4: 59-65.
16. Czezelewska E, Kościańska B, Janczaruk M. et al. Wiedza młodych kobiet na temat roli czynnika dietetycznego w zapobieganiu raka piersi. *Przegląd Medyczny Uniwersytetu Rzeszowskiego i Narodowego Instytutu Leków w Warszawie.* 2011; 2: 212-223.
17. Minler JA. Diet and Cancer: Facts and Controversies. *Nutrition and Cancer.* 2006; 56: 216-224.
18. Nita R, Leśniczak B, Słomska B. et al. Wiedza i zachowania zdrowotne kobiet z województwa łódzkiego w zakresie profilaktyki raka piersi. *Pielęgniarka XXI Wieku.* 2010; 1-2: 5-8.
19. Grunfeld EA, Ramirez AJ, Hunter MS, Richards MA. Women's knowledge and beliefs regarding breast cancer. *Br J Cancer.* 2002; 86: 1373-1378.

20. Leslie NS, Deiriggi P, Gross S. Knowledge, attitudes, and practices surrounding breast cancer screening in educated Appalachian women. *Oncol Nurs Forum*. 2003; 30: 659-667.
21. Sonowiec-Piłat M. Stan wiedzy i zachowania zdrowotne 40-50-letnich mieszkanek Wrocławia odnośnie raka piersi. *Ginekol Prakt*. 2001; 6: 37-44.
22. Mrozewicz A, Dominik A, Huk J. Poziom wiedzy populacji na temat zachowań zdrowotnych na powstawanie chorób nowotworowych. *Zdrowie Publ*. 2007; 117: 342-345.
23. Ibrahim NA, Oludara MA. Socio-demographic factor sand reasons associated with delay in breast cancer presentation: a study in Nigerian women. *The Breast*. 2012; 21: 416-418.
24. Al-Dubai SA, Qureshi AM, Saif-Ali R. et al. Awareness and knowledge of breast cancer and mammography among a group of Malaysian women in Shah Alam. *Asian Pacific J Cancer Prev*. 2011; 12: 2531-2538.

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Andrzej Nowicki: idea & design of the article, writing and the acceptance the manuscript, analysis and interpretation of the data (50%)
Karolina Rusak: clinical data collection, references, writing the manuscript (35%)
Piotr Rhone: statistical analysis, providing access to patients (15%)