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ORIGINAL ARTICLE

Selected breast cancer risk factors and early detection of the neoplasm in women from Lublin region attending screening program in St. John's Cancer Center, years 2005–2006

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Abstract

Introduction and objective. In Poland, consulting is offered to women about risk factors of breast cancer, breast symptoms and early cancer detection. Study aims were to evaluate the correlation between some risk factors and women's attendance to breast checkups, and to assess links between risk factors and detection of early breast cancer.

Materials and methods. The study involved 8014 women aged 50–69 years, participating in breast cancer screening program. The frequency of breast checkups (mammography, CBE and BSE) and occurrence of breast cancer risk factors in studied women were evaluated as well as clinical stage of detected tumors. Odds ratios were used to compare relative odds of breast cancer with exposure to risk factors.

Results. 47.11% studied women had regularly undergone MMG, 30.82% had CBE within the previous year, 14.26% regularly performed BSE. The incidence of risk factors varied from 2.94% (menarche at ≤ 11 years) to 12.38% (current use of HRT). In 47.82% women, no evidence of studied risk factors was found. Women with history of breast biopsies and current users of HRT had MMG, CBE and BSE significantly more often ($p<0.0001$). 29.27% early breast cancers (pTis, pT1abN0) were found among 82 detected tumors. Relative odds of breast cancer occurrence in women without the risk factors were significantly lower (OR = 0.55, 95% CI [0.35; 0.86]). Only nulliparous women had significantly higher odds of early breast cancer (OR = 7.37, 95% CI [1.32; 41.17]).

Conclusions. Women using HRT and women after breast biopsy were significantly more likely to attend breast checkups. There were no significant links between most risk factors and odds of early stages of breast cancer. Women should have preventive checkups irrespective of their breast cancer risk factors.

Key words

breast cancer, risk factors, early detection of cancer, stage of disease, mass screening

INTRODUCTION

In Poland, for over a dozen years, programs have been in operation aiming at raising the women's awareness of the growing risk of breast cancer and improving the results of treatment of this neoplasm. These activities have been initially concentrated on providing women with information on breast cancer risk factors and popularization of the methods of early detection of the neoplasm – mainly breast self-examination (BSE).

The number of women undergone clinical breast examination (CBE) has been increased with the introduction of obligatory breast examination in all hospitalized women [1]. "The Program of Model Screening for Breast Cancer and Cervical Cancer in Poland" was introduced in the years 1999–2000 [2]. In 2004, The Early Breast Cancer Detection Program was initiated, financed by the National Health Fund. The milestone in the Program development was enactment, by the Polish Parliament, of a new law of 1 July 2005, about the National Cancer Control Program [3].

The main purpose of the program is to decrease the mortality of women due to breast cancer. Some of the program's important goals are also raising the awareness of women concerning breast cancer prophylactics, increasing the percentage of breast neoplasms detected in the early stage of advancement, decreasing the costs of breast neoplasms treatment and introducing a nationwide standard in breasts lesions diagnostics [4].

The criteria for the evaluation of the quality of the program execution were adapted from the "European guidelines for quality assurance in breast cancer screening and diagnosis". The basic indicators for the evaluation of a screening program are the percentage of coverage and demand indicator (the percentage of women undergoing evaluation after being invited to participate in the program, the desired level > 75%). Some of the indicators, which allow for indirect evaluation of the screening program's influence on the decrease of mortality, are the percentage of detected invasive neoplasms without lymph nodes metastasis or the percentage of detected invasive neoplasms with sizes ≤ 10 mm [5].

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The program was initially directed towards women aged 50–59 years, and since 2006, the population of women aged 60–69 has also been included in the prophylactic activities. Mammographic examinations was routinely performed every two years. In women with identified breast cancer risk factors, mammography was supposed to be performed every year. The identification of this group of women was based on a standardized questionnaire filled in before mammographic examination. The questionnaire contained questions concerning breast cancer risk factors and earlier breast examinations: screening mammography, CBE, and BSE [4].

The results of many epidemiological studies as well as the results of laboratory tests indicate significant role of estrogens in the occurrence of this neoplasm [6]. Furthermore, numerous life-style factors increasing risk of breast cancer have been identified, that can explain the convergence of breast cancer incidence among immigrants' daughters [7].

The well-established risk factors for breast cancer are: age, family history of breast cancer, especially breast cancer in first-degree relatives, hormonal/reproductive factors, personal breast history (including breast biopsies), and breast density. All these factors are associated with significantly increased risk of breast cancer but, other than age, the family history of breast cancer is the most important of them (for the development of disease) [8, 9]. Some others, such as obesity, physical inactivity, alcohol intake, or smoking before first childbirth have a smaller but significant effect on breast cancer risk [9, 10, 11]. It should be emphasized that these modifiable risk factors are interesting for women possibly reducing their risk of breast cancer and for clinicians and policy makers possibly reducing population incidence rates [12, 13]. It should be also noted, that the prevalence of known risk factors do not exceeds fifty percent and many breast cancers develop despite the absence of risk factors [14].

There are some efforts to identify women at higher risk in the general population and introduce such approach as part of national breast screening programs [15]. In women with highest risk levels such strategies as intensive surveillance, a special methods of breast screening (breast MRI), chemoprevention or prophylactic bilateral mastectomy are discussed [16, 17, 18]. Some of their risk factors are incorporate in risk models, to help women in assessing their own risk of developing breast cancer [19].

OBJECTIVES

The aim of the study was to evaluate the correlation between the occurrence of selected breast cancer risk factors and the frequency of prophylactic testing (mammography, CBE and BSE), as well as the degree of advancement of breast cancer detected in women from Lublin region.

MATERIAL AND METHODS

The study covered healthy women taking part in the Breast Cancer Prevention Program realized within the scope of the contract with the National Health Fund in the Cancer Prevention and Health Promotion Centre of the St. John's Cancer Center in Lublin in the years 2005–2006.

Two-view (oblique and craniocaudal) screening mammography was performed in 8014 women – 5641 women (70.40%) aged 50–59 years and 2086 women (29,60%) aged 60–69 years (mean age 57.2 years, median 56.0 years). These groups represented 3.68% of women in Lublin Voivodeship aged 50–69 (total 153 430 as of 31 XII 2005) and 2.10% of women aged 60–69 (total 99 267 as of 31 XII 2005) [20].

Almost half of the women examined (48.60%) lived in Lublin City (city > 100 K residents) and 23.40% in rural areas. Women participating in the study, living in Lublin, represented 8.92% of the population of women aged 50–59 years (total 29 656 as of 31 XII 2005) and 7.00% of the population of women aged 60–69 years (total 17 844 as of 31 XII 2005) [20]. Characteristics of the study group concerning their age and place of residence was presented in Table 1.

Table 1. Patients characteristic according to age and place of residence

Place of residence		Age group				Altogether
		50–54 y.	55–59 y.	60–64 y.	65–69 y.	
rural	n	648	702	355	170	1875
	Row %	*34.56*	*37.44*	*18.93*	*9.07*	*100.00*
	Col %	*23.47*	*24.38*	*23.42*	*19.84*	*23.40*
town up to 20K residents	n	248	279	117	49	693
	Row %	*35.79*	*40.26*	*16.88*	*7.07*	*100.00*
	Col %	*8.98*	*9.69*	*7.72*	*5.72*	*8.65*
town up to 100K residents	n	603	515	277	156	1551
	Row %	*38.88*	*33.20*	*17.86*	*10.06*	*100.00*
	Col %	*21.84*	*17.88*	*18.27*	*18.20*	*19.35*
city > 100K residents	n	1262	1384	767	482	3895
	Row %	*32.40*	*35.53*	*19.69*	*12.37*	*100.00*
	Col %	*45.71*	*48.06*	*50.59*	*56.24*	*48.60*
Altogether	N	2761	2880	1516	857	8014
	Row %	*34.45*	*35.94*	*18.92*	*10.69*	*100.00*
	Col %	*100.00*	*100.00*	*100.00*	*100.00*	*100.00*

All women answered the questions contained in the standardized questionnaire, including family history of breast cancer, age at menarche, age at first live birth, age at menopause, hormone replacement therapy use, history of treatment for benign breast lesions, breast symptoms and earlier breast examinations: screening mammography, CBE and BSE, before current mammographic examination. All data have been recorded in medical files traditionally and in digital form, using database in MS Access. These data included also descriptions of mammography in the BIRADS classification, according to the standard adopted for the breast cancer prevention program.

Women with positive result of screening mammography (BIRADS 3,4,5 and 0 result) were additionally examined in the breast outpatient clinic in the Neoplasm Prevention and Health Promotion Centre. Female who were diagnosed with breast cancer were treated at the Department of Surgical Oncology of the St. John's Cancer Center

On the basis of medical documentation, data were gathered concerning the incidence of known risk factors that have the greatest impact on the risk of breast cancer, such as: first-degree relatives with breast cancer, age at menarche, age at first live birth, nulliparity, age at menopause, hormone replacement therapy (HRT) use, breast biopsies, and breast density The number of mammography examinations in the past, year of last mammographic test, CBE in the last year,

and frequency of performing BSE within this group have been assessed based on the answers provided in the questionnaire. Data on the clinical stage of detected breast cancers were obtained from the medical records of patients. To evaluate the clinical stage of detected cancer TNM classification by the AJCC [21] and classification recommended by the ENCR for population registries (localised, regional, metastatic) [22] were used.

The analysis of the gathered data was performed using Statistica 8.1. StatSoft Inc. software. The descriptive characteristics of the variables was prepared using the basic statistics module. The correlations between the analyzed variables were established on the basis of Spearman's rank correlation index. The significance of the observed differences was verified using U-Mann-Whitney tests. Additionally, based on the odds ratio (OR), relative probability value variability ranges of the analyzed features were established, whose statistical significance was evaluated on the basis of χ^2 statistics value. All the calculations were performed for the confidence interval CI = 95%. The results of the analysis were presented in tables.

RESULTS

On the basis of the assessment of data from tests performed by women in the past, it was found that for 4318 studied women (53.88%) the current mammography was a subsequent screening mammography – the women had their previous mammographic examination within the previous two years. 3775 women (47.11%) regularly attended mammography, i.e. had at least two mammography examinations in the past and the latest one within the previous two years.

CBE was performed in 2470 (30.82%) women within the previous year. Most of the women had their breasts examined by a doctor regardless of their mammographic examination. Within the whole group of 8014 analyzed patients, there was a group of 864 women (10.78%), who had both CBE and mammography performed within the previous year.

Data concerning the frequency of preventive examinations of the breasts in women visiting the Cancer Prevention and Health Promotion Centre, according to age group and place of residence was presented in Table 2. Female aged 65–69 years reported regularly for breasts checkups (mammography, CBE) less frequently than the others, as well as less frequently performed regular BSE (9.33%). Women living in Lublin were the group most frequently attending regular mammography examinations (49.96%), while women living in smaller cities most often went to their doctors for CBE within the previous year (46.94%). They also most often reported that they regularly performed BSE (18.37%), while women living in rural areas were the least likely to perform self-tests (11.09%).

Analyzing the correlation between the variables using Spearman's rank correlation test, it was found that the number of mammography examinations performed in the past was correlated with patients' age (R = 0.055, $p < 0.05$), and the place of their residence (R = 0.167, $p < 0.05$). Regular performance of screening mammography was also significantly correlated with the age of women (R = 0.055, $p < 0.05$) and the place of their residence (R = 0.071, $p < 0.05$).

Most women who visited St. John's Cancer Center for preventive mammographic examination also performed BSE (79,86%). However, regular BSE was only performed by 1143 patients (14.26%), while 5257 patients (65.60%) irregularly examined their own breasts. Almost one fifth of the studied women (19.84%) did not have any experience with BSE.

Table 2. Breast checkups in the past in women attended screening program, years 2005–2006, depending on the age and place of residence

Age group/ Place of residence		Type of examination			Altogether
		Mammography regularly	CBE in last year	BSE regularly	
50–54 years	n	1113	884	445	2761
	Row%	*40.31*	*32.02*	*16.12*	*100.00*
55–59 years	n	1540	862	398	2880
	Row%	*53.47*	*29.93*	*13.82*	*100.00*
60–64 years	n	767	472	220	1516
	Row%	*50.59*	*31.13*	*14.51*	*100.00*
65–69 years	n	355	252	80	857
	Row%	*41.42*	*29.40*	*9.33*	*100.00*
Rural	n	769	635	208	1875
	Row%	*41.01*	*33.87*	*11.09*	*100.00*
town up to 20K residents	n	294	229	103	693
	Row%	*42.42*	*33.04*	14.86	*100.00*
town up to 100K residents	n	766	467	242	1551
	Row%	*36.73*	*46.94*	*18.37*	*100.00*
city > 100K residents	n	1946	1139	590	3895
	Row%	*49.96*	*29.24*	*15.15*	*100.00*
Altogether	N	3775	2470	1143	8014
	Row%	*47.11*	*30.82*	*14.26*	*100.00*

The percentage of women regularly performing BSE differed significant between age groups (U-Mann-Whitney test, Z values from 2.151 to 3.088, p from 0.002 to 0.031). Smaller, but significant differences in the frequency of regular BSE were also found between groups of women residing in rural areas or small towns and the ones living in the city of Lublin (Z = –2.349, $p = 0.019$, and Z = –2.606, $p = 0.009$ respectively).

Among women who regularly performed BSE, 78.22% had at least two mammography examinations in the past, while in women who did not examine their breasts – this group included 53.14% patients. The difference was significant ($\chi^2 = 59.75$, $p < 0.0001$).

Positive correlation between BSE and voluntarily undergoing mammography was also confirmed by Spearman's rank correlation test (R = 0.125, $p < 0.05$).

Among examined women, 4182 (52.18%) were patients, in whom there occurred at least one of the analyzed risk factors.

The occurrence of breast cancer in first-degree relatives was confirmed in 559 subjects (6.98%) – in 3.29% patients breast cancer occurred only in their mothers, in 3.38% – in their sisters, and in 24 patients – both in their mothers and sisters. In 375 women (4.68%) breast cancer occurred in other relatives. Altogether, the occurrence of cancer was identified in the families of 934 examined women (11.65%).

The analysis of the number of affected relatives and the age of occurrence of the disease showed that 41 (0.51%) patients could be included in the group of high risk of hereditary breast cancer. They were qualified for clinical evaluation in the "Healthcare program for families with high hereditary risk of breast/ovary cancer".

In 233 patients out of 7919 study subjects (2.94%), menarche occurred by the age of 11 (inclusive), while in 2913 subjects (36.50%) – at the age of 15 or later (min. = 9 years, max. = 18 years, x = 14.25 years, M_e = 14 years, SD = 1.55).

The number of women, in whom menopause occurred at the age higher than 54 years, was 896 (11.38%). In 596 women (7.57%) menopause occurred by the age of 45 (min. = 31 years, max. = 65 years, x = 50.18 years, M_e = 50 years, SD = 3.97).

The question concerning the age of giving birth for the first time was answered by 7980 women (99.58%) – among these, 729 women (9.10%) had not given birth, and 531 patients (6.63%) gave birth to their first child at the age of over 29 years.

The next analyzed risk factor was the use of hormonal replacement therapy (HRT). The majority – 4969 study subjects (62.00%) declared that they had never used HRT. Only 992 women (12.38%) were currently using hormonal substitution, and 2053 women (25.62%) had used HRT in the past.

Biopsies or surgical procedures performed in the past in the region of mammary glands were identified in 475 women (5.93%).

The last of the analyzed risk factors was determined on the basis of radiological evaluation of breast density. High mammographic breast density – with dominant component of glandular breast tissue texture was observed in 272 (3.39%) subjects.

The differences in the frequency of prophylactic examinations in the past were analyzed considering the occurrence of the above mentioned risk factors in the studied women. Women currently using HRT and those who underwent biopsies or surgical procedures due to benign breast lesions decided to have a mammographic examination, as well as CBE in the last year, and regularly self-examined their breasts, more frequently than others. Also women whose relatives had breast cancer and those who had menopause past 54 years of age more frequently attended mammographic examinations. Significance of the observed differences was evaluated using χ^2 test, and the results were presented in Table 3.

The obtained results were additionally verified by performing Spearman's rank correlation test. Among all the analyzed risk factors, the use of HRT was the most strongly correlated with the frequency of mammographic examinations (R = 0.191, $p < 0.05$).

In the study group 82 breast neoplasms were detected (1.02%). The majority of patients (52 women, 63.41%) had breast cancers in localized stage according to ENCR classification. None of them had metastatic breast cancer. 46 women (56.10%) had breast cancers in clinical stage I according to UICC/AJCC classification. Preinvasive (clinical stage 0) breast cancer was found in 6 patients (7.32%). Breast neoplasms in clinical stage II or higher jointly constituted 30 cases (36.59%). Invasive breast cancers without lymph nodes metastasis (pN0) were found in 53 patients (64.63%), while early breast tumors up to 1 cm in diameter and without lymph nodes involvement were found in only 18 patients (21.95%).

The odds ratios (OR) for particular risk factors in women with breast cancers was calculated. Exposures to most of risk factors were associated with higher odds of occurrence of breast cancer (without nulliparity), as it was shown in Table 4. However differences were not significant, possibly due to small number of analyzed breast cancer cases.

Table 3. History of breast checkups in women who attended the screening program in the years 2005–2006, depending on the selected risk factors of breast cancer

Risk factor			Type of examination: Mammography regularly	CBE in last year	BSE regularly	Altogether
breast cancer in first-degree relatives	yes	n	289	186	84	559
		Row%	*51.70*	*33.27*	*15.03*	*100.00*
	no	n	3486	2284	1059	7455
		Row%	*46.76*	*30.64*	*14.21*	*100.00*
	p		*0.02*	*NS*	*NS*	*n/a*
age at menarche ≤ 11 years	yes	n	119	74	38	233
		Row%	*51.07*	*31.76*	*16.31*	*100,00*
	no	n	3619	2370	1095	7686
		Row%	*45.16*	*30.84*	*14.25*	*100,00*
	p		*NS*	*NS*	*NS*	*n/a*
age at menopause > 54 years	yes	n	487	292	130	894
		Row%	*54.47*	*32.66*	*14.54*	*100.00*
	no	n	3192	2101	991	6977
		Row%	*45.75*	*30.11*	*14.20*	*100.00*
	p		*< 0.0001*	*NS*	*NS*	*n/a*
nulliparity	yes	n	342	227	116	729
		Row%	*46.91*	*31.14*	*15.91*	*100.00*
	no	n	3419	2232	1021	7251
		Row%	*47.15*	*30.78*	*14.08*	*100.00*
	p		*NS*	*NS*	*NS*	*n/a*
current use of HRT	yes	n	527	355	208	992
		Row%	*53.13*	*35.79*	*20.97*	*100.00*
	no	n	3248	2115	935	7022
		Row%	*46.25*	*30.12*	*13.32*	*100.00*
	p		*< 0.0001*	*0.0003*	*< 0.0001*	*n/a*
history of breast biopsies	yes	n	282	200	104	475
		Row%	*59.37*	*42.11*	*21.89*	*100.00*
	no	n	3483	2265	1034	7507
		Row%	*46.4*	*30.17*	*13.77*	*100.00*
	p		*< 0.0001*	*< 0.0001*	*< 0.0001*	*n/a*
high mammographic breast density	yes	n	115	92	56	272
		Row%	*42.28*	*33.82*	*20.59*	*100.00*
	no	n	3646	2369	1082	7711
		Row%	*47.28*	*30.72*	*14.03*	*100.00*
	p		*NS*	*NS*	*0.002*	*n/a*

The probability of detection of breast cancer in women without any risk factor was 1.8 times lower than in women burdened with at least one of the aforementioned risk factors (OR = 0.55, 95% CI [0.35; 0.86], $p = 0.008$).

No significant differences were also found between the frequency of detection of breast cancers in clinical stages 0 and I, or invasive breast cancer without lymph node metastases, and the presence of particular risk factors. Only in the group of nulliparous patients, there was noted a five-times higher probability of detecting early breast cancer (pT1abN0) than in other patients (OR = 5.81, 95% CI [1.17; 28.94]), however, the p value for χ^2 test did reach the assumed statistical significance threshold after turning to the analysis

Table 4. Odds ratios of developing breast cancer in women exposed to the selected risk factors of breast cancer within the study group

Risk factor		Breast cancer		OR [95% CI]	*p*
		yes	no		
breast cancer in first-degree relatives	yes	9	550	1.65 [0.82; 3.33]	*0.226*
	no	73	7382		
age at menarche ≤ 11 years	yes	5	228	2.17 [0.87; 5.41]	*0.170*
	no	77	7609		
age at menopause > 54 years	yes	14	880	1.64 [0.92; 2.93]	*0.130*
	no	67	6910		
age at first live birth > 29 years	yes	7	524	1.33 [0.61; 2.90]	*0.619*
	no	74	7375		
nulliparity	yes	7	722	0.94 [0.43; 2.05]	*0.969*
	no	74	7177		
current use of HRT	yes	12	980	1.22 [0.66; 2.25]	*0.649*
	no	70	6952		
history of breast biopsies	yes	7	468	1.48 [0.68; 3.23]	*0.447*
	no	75	7432		
high mammographic breast density	yes	4	268	1.46 [0.53; 4.02]	*0.665*
	no	78	7633		
no risk factors	yes	32	4150	0.55 [0.35; 0.86]	*0.008*
	no	50	3582		

Table 5. Odds ratios of detecting early clinical stages of breast neoplasms in women exposed to the selected risk factors of breast cancer within the study group

Risk factor		Early breast cancer stages *		OR	*p*
		yes	no	[95% CI]	
breast cancer in first-degree relatives	yes	3	6	1.24 [0.28; 5.42]	*0.917*
	no	21	52		
age at menarche ≤ 11 years	yes	1	4	0.59 [0.06; 5.54]	*0.970*
	no	23	54		
age at menopause > 54 years	yes	3	11	0.61 [0.15; 2.42]	*0,699*
	no	21	47		
age at first live birth > 29 years	yes	1	6	0.38 [0.04; 3.31]	*0.634*
	no	23	52		
nulliparity	yes	5	2	7.37 [1.32; 41.17]	*0.033*
	no	19	56		
current use of HRT	yes	5	7	1.92 [0.54; 6.78]	*0.498*
	no	19	51		
history of breast biopsies	yes	3	4	1.93 [0.40; 9.40]	*0.695*
	no	21	54		
high mammographic breast density	yes	2	2	2.55 [0.34; 19.21]	*0.711*
	no	22	56		
no risk factors	yes	16	34	1.41 [0.52; 3.82]	*0.497*
	no	8	24		

* – pTis and pT1abN0 by UICC/ AJCC TNM classification

preinvasive cancer cases ($p = 0.061$ vs. 0.033 respectively) – as it was presented in Table 5.

Additionally, we performed an analysis of correlation between the stage of progression of neoplasms detected in the study group and the presence of breast cancer risk factors, using Spearman's rank correlation test. Also in this case, no statistically significant results were obtained, which could point out the existence of correlation between the stage of progression of breast cancer and the presence of the discussed breast cancer risk factors, however, this could be due to small number patients with breast cancer in the study.

DISCUSSION

A factor most closely associated with the risk of breast cancer is age. It is considered that the probability of contracting this type of neoplasm among women in their early 70s is 30 times higher than in women in their early 20s [23].

Data concerning the frequency of occurrence of other breast cancer risk factors vary in medical literature – generally the particular risk factors are found in approximately 5 to 50 percent women [14]. In the presented material particular risk factors was found in 3 to 12 percent of examined women. The most frequent ones were: current use of HRT – above 12% subjects (altogether HRT was used, either currently or in the past, by 38% subjects), and in above 11% women – menopause in age over 54 years. In nearly half of the studied women, none of the analyzed breast cancer risk factors was found.

Other authors of studies carried out in Poland reported similar results. Kaczmarek reported, on the basis of results of a study involving 7183 women aged 35–65 years, that in 10% of them menopause occurred later than at the age of 55, while 6.6% subjects used HRT in the perimenopausal period [24].

Similar data concerning HRT usage were reported by Bińkowska – 7% study subjects [25]. While, in the Polish Breast Cancer Study carried out among patients from Warsaw and Łódź, higher percentage of HRT usage was observed – 23% women with breast cancer and 18% women from control group used hormonal substitution at some time after menopause. However, current usage at the time of the study was reported in only 7% study group patients and in 4% control group patients [26].

The authors of the aforementioned study also observed the occurrence of breast cancer among the first-degree relatives of 6% patients from control group and 10% patients diagnosed with breast cancer [26]. In our study, breast cancer occurred in close relatives (mother or/ and sister) of 7% of patients, and in subsequent 5% subjects – in other relatives. Among women surveyed by PBS/GDA opinion poll center – 5% declared that they decided to have mammography because of incidence of breast cancer in their family [27]. The frequency of occurrence of high and very high risk of hereditary breast cancer in Polish population is estimated to be 0.5–1%, the same result as in our study group (0.5%) [28].

In the presented study, nulliparity was the feature of 9% subjects, and in 28% who have children, the first childbirth took place after the age of 24 years. In demographic data gathered by Kaczmarek, 6.5% of women in postmenopausal age were nulliparous and 30% gave birth for the first time at the age of > 24 years [29]. While in the Polish Breast Cancer Study nulliparity was found to be more frequent – in 14% patients with breast cancer and 11% control group members [26].

Quite numerous group of patients (6%) in our study consisted of women who had undergone biopsy or surgical procedures due to benign lesions in their breasts. In the already quoted clinical control study, a history of fine needle aspiration biopsies was reported by 10% of breast cancer patients and 6% of control group subjects [26].

In the present study, an analysis of life-style risk factors has not been included. So called "westernized life-style" can be the explanation for the increasing incidences of breast cancer, observed especially among immigrants [7]. Older age at giving birth to a first child and fewer children are some of them. Others, such as diet, obesity, lack of physical activity, alcohol consumption, or smoking are modifiable risk factors. Some of them frequently occur in Poland [30]. The health education programs concerning these factors and methods of their modification could be implemented as preventative measures.

It would also be desirable for women with breast cancer risk factors to undergo regular prophylactic breast checkups, especially mammographic examinations. In the study population, similar correlation was demonstrated in women with family history of breast cancer, in women who had menopause past the age of 54 years, in women currently using HRT and those who underwent breasts biopsy in the past. The results of studies carried out in Poland and outside confirmed that women who were currently using or who had been using HRT in the past decided to have a mammographic examination more frequently [31, 32, 33]. In presented study HRT usage was the factor most highly correlated with the frequency of mammographic examinations.

Analyzing the probability of occurrence of particular risk factors in patients with detected breast neoplasms in the presented study, varied values of odds ratio (OR) were observed, but the obtained results were not significant in any case. It could have been due to small number of breast cancer cases in the study. However, it should be noted that significant decrease in occurrence of breast cancer has been observed in studied women without any of the analyzed risk factor. Other studies have shown that models including parity, menopausal hormone therapy use, age at first live birth, menopausal status, age at menopause, family history of breast or ovarian cancer, benign breast disease/biopsies, alcohol consumption, and body mass index (BMI) can predict absolute risks for breast cancer and may assist in clinical decision-making [19].

The frequency of detection of breast neoplasms of both 0 and I clinical stage, early breast cancers as well as cancers without lymph node metastasis was also not significantly different regarding the presence of the analyzed risk factors. Only nulliparous women have had significantly higher likelihood of early breast cancer occurrence (pTis and pT1abN0).

In the already mentioned Polish Breast Cancer Study significantly higher probability of occurrence of breast tumors of up to 2 cm in diameter was observed in relation to the age of giving birth for the first time and the number of live births, the presence of obesity as well as current HRT usage. The probability of occurrence of breast cancer without lymph node metastasis (pN0) was statistically significantly correlated with the age of giving birth for the first time and obesity [26].

In presented analysis, most of patients with breast cancers detected in screening program, had favorable prognosis due to early clinical stage at diagnosis. Based on data of Cancer Registry in Bialystok, Maślach announced that in Podlaskie Voivodship of Poland in the years 2002–2004 (before introduction of the National Cancer Control Program) the proportion of localised stage of breast cancer was 38.6% to 40.1% in rural and urban areas, respectively, in women aged above 15 years [34]. In presented study the proportion of localized cases was much higher (61.9%), and this seems to be the benefit of the participation of studied women in breast cancer screening program. Better proportion of early clinical stages of breast cancer should lead to a decrease in mortality trends, taking account of availability of optimal treatment for patients [35, 36].

CONCLUSIONS

Well-established risk factors of breast cancer were observed in about half of the studied women. Women currently using HRT, or women who underwent breast biopsy in the past decided to undergo mammography, visited doctors for breast examination and regularly self-examined their breasts, significantly more frequently.

In the analyzed material no significant correlations were found between the occurrence of risk factors and the detection of early clinical stages of breast cancer. However in women participating in breast cancer screening program was found favorable proportion of localised stage of this neoplasm.

Women exposed to discussed risk factors are more vulnerable to breast cancer, however significant differences in breast cancer occurrence have not been proven.

Women aged 50–69 years should undergo preventive mammography irrespective of the presence of risk factors. All women should be informed about risk factors of breast cancer to make more balanced decision about participation in screening and beneficial lifestyle changes.

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