KNOWLEDGE AND BARRIERS TO EARLY DETECTION OF BREAST CANCER AMONG FEMALE PRIMARY CARE PATIENTS IN SERBIA

Milena Šantrić Milićević[1], Ana Djurin[2], Zorica Terzić-Šupić[1], Jovana Todorović[1], Dejan Nikolić[3], Ivan Soldatović[4]

[1]Faculty of Medicine, Institute of Social Medicine, University of Belgrade, Belgrade, Serbia
[2]Primary Healthcare Centre of Kikinda, Kikinda, Serbia
[3]University Children's Hospital, Faculty of Medicine, University of Belgrade, Belgrade, Serbia
[4]Faculty of Medicine, Institute for Statistics and Medical Informatics, University of Belgrade, Belgrade, Serbia

SUMMARY

Objectives: Breast cancer is the leading cause of cancer mortality among women in Serbia and accounts for 22.8% of total cancer mortality in 2018. This study assessed the knowledge and barriers to early detection of breast cancer in women.

Methods: In March 2019, at the Primary Healthcare Centre Kikinda, Serbia, a 22-item questionnaire was distributed to a series of patients (N = 403, response rate 91.8%) to assess the odds ratio (OR) and 95% confidence interval (CI) between variables explaining knowledge of breast cancer symptoms and risk factors and barriers to screening, and four types of early detection of breast cancer.

Results: The majority of patients (85.4%) know that a lump in a breast is a common symptom of breast cancer and that a family history of breast cancer is a risk factor (80.1%); 63.8% of respondents aged ≥ 30 years self-examined their breasts in the past month, 39.1% of patients aged ≥ 40 years had clinical, while 34.4% had ultrasound breast examination in the past year, and 51.1% of patients aged ≥ 50 years had mammography once in the past two years. Patients aged ≥ 40 years retired and those with a positive family history were 84% and 63% less likely not to undergo a clinical breast examination in the past year. Participants over 40 years of age who reported a lack of funds were 2.46 times more likely to miss a clinical breast examination than those who did not have that barrier. Among participants aged 50–69 years, the likelihood of not receiving the mammography increases by 2.82 with an increase in wealth status and it was 65% lower for those who lack information about the available treatment.

Conclusion: Women under the age of 50 rarely practice breast cancer screening. Study findings can be used to improve breast cancer screening at the primary level.

Key words: breast cancer, early detection, knowledge, practice, primary healthcare centre, Serbia

INTRODUCTION

Breast cancer is a major public health issue causing 16% of all cancer deaths among women (1). More than 15 million disability-adjusted life-years (DALY) are associated with breast cancer annually, of which 95% are years of life lost (YLL), and 5% are years lived with disability (YLD). Based on YLL, it ranks fifth among cancers in various locations (2). Breast cancer morbidity and mortality, YLL, YLD, and DALY in women in Serbia are higher compared to the neighbouring countries (3, 4). The biggest concern in Serbia is the late stage of breast cancer diagnosis, which contributes to increased mortality (5). In Serbia, the National Programme for Early Detection of Breast Cancer (hereinafter the National Programme) was first established in 2009, and it was revised in 2013 (5). At that time, the National Breast Cancer Expert Committee was created with the main function of developing and promoting cancer control strategies (5). The implementation of the National Programme is decentralized to the municipal level, making the primary healthcare centre in the municipality responsible for organizing and providing programme activities in the country (6). These activities include, inter alia, keeping records of the coverage of the target population invited to the screening, the response rate, and the reasons for non-response (e.g., invitation received but non-response, change of home address, etc.) or rejection to participate in screening, and screening coverage of the target population (6). According to the latest information, organized mammography has covered 16% of the target population in Serbia (5). Breast cancer is the leading cause of cancer mortality in women in Serbia and accounts for 22.8% of total cancer mortality in 2018 (5). The standardized incidence rate of breast cancer in Serbia in 2018 was 75.3/100,000, and it is increasing annually (7).

Timely diagnosis and appropriate treatment are crucial for reducing breast cancer mortality (1). Methods used for early detection of breast cancer include breast self-examination, clinical breast examination, breast ultrasound, and mammography (1,

8). Women over the age of 30 are advised to have monthly breast self-examinations and an annual clinical and ultrasound breast examination, while women aged 50–69 should have an additional mammogram every two years (8). Countries with properly implemented early detection procedures have a higher incidence but lower mortality from breast cancer (9). Ten years of experience from the United Kingdom show that organized screening could reduce mortality by 30% (9). However, some studies found no beneficial effects of breast self-examination or that it can do more harm than good (10). A recent review (11) suggests that people in countries with slow technological progress may benefit from breast self-examination and clinical breast examination. However, they are no longer recommended by several international organizations.

Factors associated with non-screening are lack of knowledge about how often the examination should be performed and lack of knowledge about its importance, especially for detecting lesions in the absence of symptoms (12). Women with a higher level of knowledge about breast cancer and screening procedures will more often follow the recommendations of experts (12), which is essential for cancer control. Insufficient knowledge of risk factors can be a significant barrier to the early detection of breast cancer in Europe; therefore, there is a need for more evidence on women who need to be involved in the early detection of breast cancer (13).

The aim of this study was to assess the knowledge and barriers to early detection of breast cancer in women visiting a gynaecologist at a primary care centre.

MATERIALS AND METHODS

Study Design

The cross-sectional study design was used to assess knowledge and barriers to early detection of breast cancer among patients in primary health care in Serbia. The study was conducted among women who visited their gynaecologist at Kikinda Primary Healthcare Centre (PHC), Serbia, from 16–20 March 2019. Prior to the study, the PHC committee chaired by the PHC director gave ethical approval for the purpose of the study and the questionnaire, distribution of the 22-item questionnaire, and distribution of the findings.

Study Participants

The study target group was a series of patients visiting gynaecologists in PHC working in both shifts of the one-week study period. The inclusion criteria in the study were patients/clients of the female sex, visiting gynaecologists in the primary care in the study period, and anonymous voluntary participation in the study upon given informed consent. Exclusion criteria: females younger than 15 years old, female patients visiting other physicians in the PHC. All participants received written and oral information about the study method and objectives, after which they gave their consent to participate in the survey on a voluntary and anonymous basis. We had only one type of survey instrument for all women regardless of age and other socioeconomic characteristics. In this way, all women who voluntarily and anonymously agreed to participate in the survey were recruited to complete the survey questionnaire. In total, 403 female patients participated in the study (91.8% response rate).

Study Instrument

A multiple response questionnaire was designed based on similar studies (14–16) and structured according to the National Guidelines for Good Clinical Practice for the Diagnosis and Treatment of Breast Cancer (hereinafter the National Guidelines) (8).

Independent variables included patients' socioeconomic characteristics (age, having children, number of children, marital status, place of residence, educational level, employment status, wealth status quintiles, and family history of breast cancer), knowledge (knowledge of four most common breast cancer symptoms and ten risk factors as well as about the methods for breast cancer examination in Serbia), and thirteen barriers, i.e., potential reasons for not practicing examinations for early detection of breast cancer as mentioned in the relevant literature (for example, lack of adequate information, lack of time, lack of funding for treatment, lack of confidence in available treatment, lack of social support, fear, etc.).

The final set of questions addressed participants' practice regarding early detection of breast cancer, such as monthly breast self-examination, annual ultrasound and clinical examination, and biannual mammography, which was evaluated as dichotomous outcome variables in the study (yes/no).

Statistical Analysis

For the statistical analysis of the collected data, we applied the recommendations from the National Guidelines (8), according to which a special examination and assessment of accompanying factors for early detection of breast cancer in women of certain age groups are recommended. For statistical interpretation, we analysed data for the three groups of patients following the division of patients according to the age in the National Guidelines (8), so the study results are presented for patients of age 30 or more, patients of age 40 or more, patients of age 50 or more.

Statistical analyses were performed using descriptive and analytical statistics. Differences in participants' socioeconomic characteristics, knowledge of breast cancer symptoms, risk factors, and screening, as well as barriers to early detection of breast cancer were assessed using the Chi-square test and Fisher's exact test (set at $p < 0.05$). Only variables that were found to be statistically significant were entered into the multivariate logistic regression analysis. Multivariate logistic regression analysis – the odds ratio (OR) and 95% confidence interval (CI) was used to assess potential predictors among 45 independent variables for four outcome variables (self-examination, clinical breast examination, ultrasound, mammography). Multicollinearity diagnostics between 45 independent variables were performed by examination of VIF values. All VIF values were in the optimal range (1–10, in our study, all VIF values were between 1.5 and 2.1). All analyses were performed using the Statistical Package for the Social Sciences, SPSS 24.

RESULTS

In the group of studied patients at an average age of 41.6 ± 14.8 years, many have children (74.9%), live in marriage (76.2%), in urban areas (74.2%), have average wealth status (80.4%), 12 years of education (57.8%), and employment (55.3%), and

Table 1. *Study participants' socioeconomic characteristics, knowledge of symptoms and risk factors for breast cancer, female patients in the primary healthcare centre in Serbia in 2019 (N = 403)*

Variables		Patients n (%)
Socioeconomic characteristics		
Age (years)	< 30	105 (26.1)
	30–39	83 (20.6)
	40–49	82 (20.3)
	50–59	78 (19.4)
	60+	55 (13.6)
Children	No	101 (25.1)
	Yes	302 (74.9)
Number of children	1	104 (34.4)
	2	160 (53.0)
	3+	38 (12.8)
Marital status	Single	63 (15.6)
	Married	307 (76.2)
	Divorced	16 (4.0)
	Widowed	17 (4.2)
Place of residence	Urban	299 (74.2)
	Rural	104 (25.8)
Education	<8 years	73 (18.1)
	8–12 years	233 (57.8)
	> 12 years	97 (24.1)
Employment status	Unemployed	120 (29.8)
	Employed	223 (55.3)
	Retired	60 (14.9)
Wealth status quintiles	Lowest	10 (2.5)
	Low	48 (11.9)
	Average	324 (80.4)
	Higher	19 (4.7)
	Highest	2 (0.5)
Family history of breast cancer	Yes	68 (16.9)
	No	329 (81.6)
	I do not know	6 (1.5)
Knowledge of symptoms of breast cancer		
Lump in a breast	Yes	344 (85.4)
	No	59 (14.6)
The change in shape of breast or nipple	Yes	248 (61.5)
	No	155 (38.5)
Ulceration or edema of breast	Yes	190 (47.1)
	No	213 (52.9)
Bloody nipple discharge	Yes	235 (58.3)
	No	168 (41.7)

Variables		Patients n (%)
Knowledge of risk factors for breast cancer		
Age – years	Yes	107 (26.6)
	No/I do not know	296 (73.4)
Early menarche	Yes	38 (9.4)
	No/I do not know	365 (90.6)
Late menopause	Yes	46 (11.4)
	No/I do not know	357 (88.6)
Family history of breast cancer	Yes	323 (80.1)
	No/I do not know	80 (19.9)
Not having children	Yes	50 (12.4)
	No/I do not know	353 (87.6)
No breastfeeding	Yes	64 (15.9)
	No/I do not know	339 (84.1)
Use of contraceptives	Yes	92 (22.9)
	No/I do not know	311 (77.1)
Tobacco smoking	Yes	200 (49.6)
	No/I do not know	203 (50.4)
Alcohol consumption	Yes	140 (34.7)
	No/I do not know	263 (65.3)
Ionizing radiation	Yes	148 (36.7)
	No/I do not know	255 (63.3)
Awareness of early detection methods of breast cancer		
Breast self-examination is necessary	Yes	363 (90.1)
	No/I do not know	140 (9.9)
Breast self-examination should be practiced each month	Yes	313 (77.7)
	No/I do not know	190 (22.3)
Clinical breast examination is necessary	Yes	309 (76.7)
	No/I do not know	194 (23.3)
Clinical breast examination should be received once a year	Yes	278 (69.0)
	No/I do not know	125 (31.0)
Ultrasound breast examination is necessary	Yes	272 (67.5)
	No/I do not know	131 (32.5)
Ultrasound breast examination should be received once a year	Yes	225 (55.8)
	No/I do not know	178 (44.2)
Mammography is necessary at certain age	Yes	230 (57.1)
	No/I do not know	173 (42.9)
Mammography should be received according to indications	Yes	142 (35.2)
	No/I do not know	361 (64.8)
At certain age, mammography should be received once in two years	Yes	153 (38.0)
	No/I do not know	250 (62.0)

Variables		Patients n (%)
Barriers to early detection of breast cancer		
Unfamiliar with breast diseases in general	Yes	228 (56.6)
	No	175 (43.4)
Lack of time	Yes	136 (33.7)
	No	267 (66.3)
Fear of examination and/or treatment	Yes	334 (82.9)
	No	69 (17.1)
Lack of confidence in physicians	Yes	26 (6.5)
	No	377 (93.5)
Lack of confidence in available treatments	Yes	64 (15.9)
	No	339 (84.1)
Lack of funding for treatment	Yes	164 (40.7)
	No	239 (59.3)
Lack of information about treatment	Yes	110 (27.3)
	No	293 (72.7)
Lack of social support	Yes	84 (20.8)
	No	319 (79.2)
Not knowing a women who survived the disease	Yes	47 (11.7)
	No	356 (88.3)
Fear of losing a breast	Yes	185 (45.9)
	No	218 (54.1)
Belief of being too old for treatment	Yes	35 (8.7)
	No	368 (91.3)
Does not want to receive treatment	Yes	48 (11.9)
	No	355 (88.1)
Other[a]	Yes	17 (4.2)
	No	386 (95.8)

[a]Other – e.g., physician did not recommend; I am too young for breast examination; breast is removed due to cancer; I had ultrasound in private practice; I have no problems; the waiting time is too long for me

no positive family history of breast cancer (81.6%) (Table 1). Patients have a moderate to low knowledge of symptoms and risk factors, given their correct answers, but the majority know that a lump in a breast is a common symptom of breast cancer (85.4%) and that a family history of breast cancer is a risk factor (80.1%). Study participants in large percentage are aware of the guidelines on early detection methods of breast cancer such as breast self-examination, clinical and ultrasound examination and the mammography (Table 1). Many patients also think that women do not practice breast cancer screening because they are afraid of examination and treatment (82.9%), or do not know about breast diseases in general (56.6%). For some, fear of losing breast (45.9%) or lack of funding for treatment (40.7%) may be additional barriers to breast cancer early detection.

Table 2 shows that 63.8% of respondents aged 30 or more years self-examined their breasts in the past month, 39.1% of patients aged 40 or more years had clinical, while 34.4% had ultrasound breast examination in the past year, and 51.1% of patients aged 50 or more years had mammography once in the past two years. For the majority, those practices vary across age of patients, whether they have children, place of residence, employment status, and wealth status quintiles (Table 2). Those without children compared to those with children significantly frequently performed clinical breast examination (p=0.019) and ultrasound (p=0.006). Patients living in rural areas compared to those living in urban areas significantly frequently did not perform clinical breast examination (p=0.026) and ultrasound (p=0.008). Retired patients performed frequently clinical breast examination (p<0.001), ultrasound (p = 0.008) and mammography (p = 0.004). Furthermore, those with a positive family history of breast cancer significantly more frequently performed breast self-examination (p=0.032).

In the health practice of Serbia, as well as in our study for patients aged 50 and over, mammography is usually organized together with other examinations (ultrasound, clinical examination of the breast, and self-examination, for example, mammography every other year, ultrasound and clinical examination of the breast once or twice a year, and self-examination every month. In our study, in the group of patients aged 40 and over, fewer patients underwent ultrasound or clinical breast examination than in the group of women aged 50 and over who also underwent mammography (Table 2), probably because the majority of the first group consisted of women over the age of 50. According to these findings, early detection of breast cancer is a rare examination in women younger than 50.

Breast self-examination was significantly often performed in the group of patients with knowledge of symptoms such as breast lump (p=0.030), a change in the shape of the breast or nipple (p<0.001), ulceration or oedema of the breast (p<0.001), and bloody nipple discharge (p < 0.001). Furthermore, clinical breast examination and ultrasound were significantly rarely performed in the group of patients with a lack of knowledge of symptoms such as a change in the shape of the breast or nipple (p=0.024 and p=0.003, respectively), ulceration or oedema of the breast (p=0.014 and p=0.001, respectively), and bloody nipple discharge (p=0.020 and p=0.001, respectively) (Table 3).

Breast self-examination was significantly often performed in the group of patients with knowledge of risk factors such as age (p=0.037), family history of breast cancer (p<0.001), tobacco smoking (p = 0.002), and alcohol consumption (p=0.009). Clinical breast examination was significantly frequently performed in the group of patients with knowledge of risk factors such as early menarche (p=0.042), late menarche (p=0.045), not having children (p=0.010), and use of contraceptives (p=0.034). Ultrasound examination was significantly frequently performed in the group of patients with knowledge that late menarche is a risk factor (p=0.003), while it was significantly rarely performed among patients with a lack of knowledge of risk factors, including a family history of breast cancer (p=0.026), not having children (p=0.023), use of contraceptives (p=0.016), and alcohol consumption (p=0.003) (Table 3).

Regarding barriers, patients who reported unfamiliarity with breast diseases in general (p=0.027), lack information about available treatment (p=0.019), and those who have not met breast cancer survivors (p=0.029) significantly more often performed breast self-examination than their counterparts. Likewise, those who reported not wanting to be treated for breast cancer (p=0.024) often underwent clinical breast examination. It is interesting that patients who had no barriers, such as unfamiliarity with breast

Table 2. *Female patients' socioeconomic characteristics according to their practice for early detection of breast cancer, primary healthcare centre in Serbia in 2019*

Socioeconomic characteristics	Early detection of breast cancer, n (%)											
	Breast self-examination (patients of age 30 or more years n=298)			Clinical breast examination (patients of age 40 or more years n=215)			Ultrasound (patients of age 40 or more years n=215)			Mammography (patients of age 50 or more years n=133)		
	Yes	No	p-value	Yes	No	p-value	Yes	No	p-value	Yes	No	p-value
Age (years), total	190 (63.8)	108 (36.2)	0.018	84 (39.1)	131 (60.9)	<0.001	74 (34.4)	141 (65.6)	<0.001	68 (51.1)	65 (48.9)	0.310
30–39	51 (61.4)	32 (38.6)		n.a.	n.a.		n.a.	n.a.		n.a.	n.a.	
40–49	46 (56.1)	36 (43.9)		14 (17.1)	68 (82.9)		12 (14.6)	70 (85.4)		n.a.	n.a.	
50–59	61 (78.2)	17 (21.8)		42 (53.8)	36 (46.2)		43 (55.1)	35 (44.9)		37 (47.4)	41 (52.6)	
60+	32 (58.2)	23 (41.8)		28 (50.9)	27 (49.1)		19 (34.5)	36 (65.5)		31 (56.4)	24 (43.6)	
Children			0.421			0.019			0.006			0.093
No	22 (57.9)	16 (42.1)		8 (72.7)	3 (27.3)		8 (72.7)	3 (27.3)		7 (77.8)	2 (22.2)	
Yes	168 (64.6)	92 (35.4)		76 (37.3)	128 (62.7)		66 (32.4)	138 (67.6)		56 (48.7)	59 (51.3)	
Number of children			0.044			0.404			0.079			0.401
1	50 (66.7)	25 (33.3)		14 (28.0)	36 (72.0)		15 (30.0)	35 (70.0)		7 (38.9)	11 (61.1)	
2	101 (66.4)	51 (33.6)		50 (39.1)	78 (60.9)		41 (32.0)	87 (68.0)		40 (48.8)	42 (51.2)	
3	17 (58.6)	12 (41.4)		10 (45.5)	12 (54.5)		8 (36.4)	14 (63.6)		7 (53.8)	6 (46.2)	
4	0 (0)	4 (100.0)		2 (50.0)	2 (50.0)		2 (50.0)	2 (50.0)		2 (100.0)	0 (0)	
Marital status			0.235			0.333			0.208			0.868
Single	12 (63.2)	7 (36.8)		4 (44.4)	5 (55.6)		5 (55.6)	4 (44.4)		5 (62.5)	3 (37.5)	
Married	161 (64.9)	87 (35.1)		66 (36.9)	113 (63.1)		59 (33.0)	120 (67.0)		50 (50.0)	50 (50.0)	
Divorced	10 (71.4)	4 (28.6)		7 (63.6)	4 (36.40)		6 (54.5)	5 (45.5)		3 (42.9)	4 (57.1)	
Widowed	7 (41.2)	10 (58.8)		7 (43.8)	9 (56.3)		4 (25.0)	12 (75.0)		5 (55.6)	4 (44.4)	
Place of residence			0.763			0.026			0.008			0.348
Urban	142 (64.3)	79 (35.7)		67 (43.8)	86 (56.2)		61 (39.9)	92 (60.1)		52 (53.6)	45 (46.4)	
Rural	48 (62.3)	29 (37.7)		17 (27.4)	45 (72.6)		13 (21.0)	49 (79.0)		16 (44.4)	20 (55.6)	
Education			0.191			0.132			0.188			0.296
<8 years	31 (53.4)	27 (46.6)		16 (32.7)	33 (67.3)		13 (22.4)	36 (73.5)		19 (61.3)	12 (38.7)	
8–12 years	110 (66.3)	56 (33.7)		47 (37.3)	79 (62.7)		43 (34.1)	83 (65.9)		30 (44.8)	37 (55.2)	
>12 years	49 (66.2)	25 (33.8)		21 (52.5)	19 (47.5)		18 (34.4)	22 (65.6)		14 (53.8)	12 (46.2)	

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Table 2. Female patients' socioeconomic characteristics according to their practice for early detection of breast cancer, primary healthcare centre in Serbia in 2019

Socioeconomic characteristics	Early detection of breast cancer n (%)											
	Breast self-examination (patients of age 30 or more years n=298)			Clinical breast examination (patients of age 40 or more years n=215)			Ultrasound (patients of age 40 or more years n=215)			Mammography (patients of age 50 or more years n=133)		
	Yes	No	p-value	Yes	No	p-value	Yes	No	p-value	Yes	No	p-value
Employment status												
Unemployed	37 (53.6)	32 (46.4)	0.123	8 (19.5)	33 (80.5)	<0.001	7 (17.1)	34 (82.9)	0.008	10 (47.6)	11 (52.4)	0.004
Employed	38 (64.4)	21 (35.6)		41 (35.0)	76 (65.0)		40 (34.2)	77 (65.8)		20 (36.4)	35 (63.6)	
Retired	115 (67.6)	55 (32.4)		35 (61.4)	22 (38.6)		27 (47.4)	30 (54.6)		33 (68.8)	15 (31.3)	
Wealth status quintiles												
Lowest	3 (42.9)	4 (57.1)	0.274	2 (33.3)	4 (66.7)	0.173	2 (33.3)	4 (66.7)	0.277	3 (100.0)	0 (0)	0.019
Low	25 (61.0)	16 (39.0)		19 (55.9)	15 (44.1)		17 (50.0)	17 (50.0)		17 (73.9)	6 (26.1)	
Average	151 (63.7)	86 (36.3)		58 (34.9)	108 (65.1)		51 (30.7)	115 (69.3)		41 (44.6)	51 (55.4)	
Higher	10 (90.9)	1 (9.1)		4 (57.1)	3 (42.9)		3 (42.9)	4 (57.1)		2 (33.3)	4 (66.7)	
Highest	1 (50.0)	1 (50.0)		1 (50.0)	1 (50.0)		1 (50.0)	1 (50.0)				
Family history of breast cancer												
Yes	44 (77.2)	13 (22.8)	0.032	20 (51.3)	19 (48.7)	0.084	18 (46.2)	21 (53.8)	0.088	11 (55.0)	9 (45.0)	0.682
No	144 (60.3)	95 (39.7)		64 (36.4)	112 (63.6)		56 (31.8)	120 (68.2)		52 (50.0)	52 (50.0)	
I do not know	2 (100.0)	0 (0)		0 (0)	0 (0)		(0)	0 (0)		0 (0)	0 (0)	

n.a. – not available

Table 3. *Female patients' knowledge of breast cancer symptoms and risk factors according to their practice for breast cancer early detection, the primary healthcare centre of Serbia in 2019*

Knowledge		Early detection of breast cancer, n (%)											
		Breast self-examination (patients of age 30 or more years n = 298)			Clinical breast examination (patients of age 40 or more years n = 215)			Ultrasound (patients of age 40 or more years n = 215)			Mammography (patients of age 50 or more years n = 133)		
		Yes	No	p	Yes	No	p	Yes	No	p	Yes	No	p
Knowledge of symptoms	**Breast lump**												
	Yes	166 (66.4)	84 (33.6)	0.030	69 (38.5)	110 (61.5)	0.726	63 (35.2)	116 (64.6)	0.593	44 (45.4)	53 (54.6)	0.022
	No	24 (50.0)	24 (50.0)		15 (41.7)	21 (58.3)		11 (30.6)	25 (69.4)		19 (70.4)	8 (29.6)	
	A change in shape of breast or nipple												
	Yes	141 (71.2)	57 (28.8)	<0.001	66 (44.0)	84 (56.0)	0.024	61 (40.7)	89(59.3)	0.003	42 (48.8)	44 (51.2)	0.509
	No	49 (49.0)	51 (51.0)		18 (27.7)	47 (72.3)		163 (20.0)	52 (80.0)		21 (55.3)	17 (44.7)	
	Ulceration or edema of breast												
	Yes	111 (75.0)	37 (25.0)	<0.001	51 (47.2)	57 (52.8)	0.014	49 (45.4)	59 (54.6)	0.001	32 (50.0)	32 (50.0)	0.853
	No	79 (52.7)	71 (47.3)		33 (30.8)	74 (69.2)		25 (23.4)	82 (76.6)		31 (51.7)	29 (48.3)	
	Bloody nipple discharge												
	Yes	135 (72.2)	52 (27.8)	<0.001	63 (44.7)	78 (55.3)	0.020	60 (42.6)	81 (57.4)	0.001	42 (51.2)	40 (48.8)	0.898
	No	55 (49.5)	56 (50.5)		21 (28.4)	53 (71.6)		14 (18.9)	60 (81.1)		21 (50.0)	21 (50.0)	
Knowledge of risk factors	**Age**												
	Yes	56 (73.7)	20 (26.3)	0.037	25 (43.9)	32 (56.1)	0.387	21 (36.8)	36 (63.2)	0.653	14 (45.2)	17 (54.8)	0.468
	No	134 (60.4)	88 (39.6)		59 (37.3)	99 (62.7)		53 (33.5)	105 (66.5)		49 (52.7)	44 (47.3)	
	Early menarche												
	Yes	20 (69.0)	9 (31.0)	0.539	13 (59.1)	9 (40.9)	0.042	11 (50.0)	11 (50.0)	0.104	8 (61.5)	5 (38.5)	0.413
	No	170 (63.2)	99 (36.8)		71 (36.8)	122 (63.2)		63 (32.6)	130 (67.4)		55 (49.5)	56 (50.5)	
	Late menopause												
	Yes	18 (60.0)	12 (40.0)	0.652	11 (61.1)	7 (38.9)	0.045	12 (66.7)	6 (33.3)	0.003	7 (58.3)	5 (41.7)	0.583
	No	172 (64.2)	96 (35.8)		73 (37.1)	124 (62.9)		62 (31.5)	135 (68.5)		56 (50.0)	56 (50.0)	
	Family history of breast cancer												
	Yes	166 (70.3)	70 (29.7)	<0.001	71 (40.8)	103 (59.2)	0.283	66 (37.9)	108 (62.1)	0.026	46 (46.5)	53 (53.5)	0.054
	No	24 (38.7)	38 (61.3)		13 (31.7)	28 (68.3)		8 (19.5)	33 (80.5)		17 (68.0)	8 (32.0)	
	Not having children												
	Yes	22 (64.7)	12 (35.3)	0.745	17 (65.4)	9 (34.6)	0.010	15 (57.7)	11 (42.3)	0.023	11 (64.7)	6 (35.3)	0.290
	No	167 (63.5)	96 (36.5)		67 (35.6)	121 (64.4)		59 (31.4)	129 (68.6)		52 (49.1)	54 (50.9)	
	No breastfeeding												
	Yes	30 (65.2)	16 (34.8)	0.823	15 (48.4)	16 (51.6)	0.250	15 (48.4)	16 (51.6)	0.077	11 (50.0)	11 (50.0)	0.934
	No	160 (63.5)	92 (36.5)		69 (37.5)	115 (62.5)		59 (32.1)	125 (67.9)		52 (51.0)	50 (49.0)	
	Use of contraceptives												
	Yes	49 (72.1)	19 (27.9)	0.158	28 (51.9)	26 (48.1)	0.034	26 (48.1)	28 (51.9)	0.016	19 (54.3)	16 (45.7)	0.530
	No	140 (61.1)	89 (38.9)		55 (34.4)	105 (65.6)		47 (29.4)	113 (70.6)		43 (48.9)	45 (51.1)	
	Tobacco smoking												
	Yes	101 (73.2)	37 (26.8)	0.002	36 (34.6)	68 (65.4)	0.195	36 (34.6)	68 (65.4)	0.953	27 (44.3)	34 (55.7)	0.151
	No	89 (55.6)	71 (44.4)		48 (43.2)	63 (56.8)		38 (34.2)	73 (65.8)		36 (57.1)	27 (42.9)	
	Alcohol consumption												
	Yes	74 (74.0)	26 (26.0)	0.009	36 (47.4)	40 (52.6)	0.065	36 (47.4)	40 (52.6)	0.003	25 (50.0)	25 (50.0)	0.883
	No	116 (58.6)	82 (41.4)		48 (34.5)	91 (65.5)		38 (27.3)	101 (72.7)		38 (51.4)	36 (48.6)	
	Ionizing radiation												
	Yes	74 (69.8)	32 (30.2)	0.106	35 (43.2)	49 (36.6)	0.333	31 (38.3)	50 (61.7)	0.355	19 (40.4)	28 (59.6)	0.071
	No	116 (60.4)	76 (39.6)		46 (56.8)	85 (63.4)		43 (32.1)	91 (67.9)		44 (57.1)	33 (42.9)	

Table 4. Female patients' practice and barriers to early detection of breast cancer, primary healthcare centre in Serbia in 2019

		Early detection of breast cancer, n (%)										
Barriers		Breast self-examination (patients of age 30 or more years n=298)			Clinical breast examination (patients of age 40 or more years n=215)			Ultrasound (patients of age 40 or more years n=215)			Mammography (patients of age 50 or more years n=124)		
		Yes	No	p-value	Yes	No	p-value	Yes	No	p-value	Yes	No	p-value
Unfamiliar with breast diseases in general	Yes	108 (69.7)	47 (30.3)	0.027	47 (43.9)	60 (56.1)	0.146	48 (44.9)	59 (55.1)	0.001	32 (52.4)	29 (47.6)	0.587
	No	82 (57.3)	61 (42.7)		37 (34.2)	71 (65.8)		26 (24.1)	82 (75.9)		29 (47.6)	32 (52.4)	
Lack of time	Yes	70 (68.0)	33 (32)	0.273	29 (40.9)	42 (59.1)	0.708	32 (45.1)	39 (54.9)	0.021	21 (51.2)	20 (48.8)	0.848
	No	120 (61.5)	75 (38.5)		55 (38.2)	89 (61.8)		42 (29.2)	102 (70.8)		40 (49.4)	41 (50.6)	
Fear of examination and/or treatment	Yes	154 (63.4)	89 (36.6)	0.772	66 (38.8)	104 (61.2)	0.886	63 (37.1)	107 (62.9)	0.113	46 (49.5)	47 (50.5)	0.832
	No	36 (65.4)	19 (34.6)		18 (40.0)	27 (60.0)		11 (34.5)	34 (75.5)		15 (51.7)	14 (48.3)	
Lack of confidence in physicians	Yes	12 (80.0)	3 (20.0)	0.179	5 (50.0)	5 (50.0)	0.517[a]	5 (50.0)	5 (50.0)	0.318[a]	2 (33.3)	4 (66.7)	0.680[a]
	No	178 (62.9)	105 (37.1)		79 (38.6)	126 (61.4)		69 (33.7)	136 (66.3)		59 (50.8)	57 (49.2)	
Lack of confidence in available treatments	Yes	26 (61.9)	16 (38.1)	0.787	17 (54.8)	14 (45.2)	0.052	15 (48.4)	16 (51.6)	0.077	9 (47.4)	10 (52.6)	0.803
	No	164 (64.1)	92 (35.9)		67 (36.4)	117 (63.6)		59 (33.9)	125 (66.1)		52 (50.5)	51 (49.5)	
Lack of funding for treatment	Yes	65 (64.3)	36 (35.7)	0.878	30 (49.2)	31 (50.8)	0.056	27 (44.3)	34 (55.7)	0.056	15 (41.7)	21 (58.3)	0.234
	No	125 (63.4)	72 (36.6)		54 (35.1)	100 (64.9)		47 (30.5)	107 (69.5)		46 (53.5)	40 (46.5)	
Lack of information about treatment	Yes	65 (73.9)	23 (26.1)	0.019	24 (43.6)	31 (56.4)	0.421	23 (41.8)	32 (58.2)	0.181	20 (62.5)	12 (37.5)	0.100
	No	125 (59.5)	85 (40.5)		60 (37.5)	100 (62.5)		51 (31.9)	109 (68.1)		41 (45.6)	49 (54.4)	
Lack of social support	Yes	42 (73.7)	15 (26.3)	0.083	16 (41.0)	23 (59.0)	0.782	18 (46.2)	21 (53.8)	0.088	11 (50.0)	11 (50.0)	1.000
	No	148 (61.4)	93 (38.6)		68 (38.6)	108 (61.4)		56 (31.8)	120 (68.2)		50 (50.0)	50 (50.00)	
Not knowing a women who survived the disease	Yes	26 (81.2)	6 (18.8)	0.029	10 (47.6)	11 (52.4)	0.398	10 (47.6)	11 (52.4)	0.180	7 (53.9)	6 (46.1)	0.769
	No	164 (61.6)	102 (38.4)		74 (38.2)	120 (61.8)		64 (33.0)	130 (67.0)		54 (44.4)	55 (55.6)	
Fear of losing a breast	Yes	84 (65.6)	44 (34.4)	0.561	36 (42.9)	48 (57.1)	0.362	35 (41.7)	49 (58.3)	0.073	22 (48.8)	24 (51.2)	0.709
	No	106 (62.3)	64 (37.7)		48 (36.7)	83 (63.3)		39 (29.8)	92 (70.2)		39 (51.3)	37 (48.7)	
Belief of being too old for treatment	Yes	12 (52.2)	11 (47.8)	0.229	4 (40.0)	6 (60.0)	1.000[a]	4 (40.0)	6 (60.0)	0.740[a]	4 (66.7)	2 (33.3)	0.680
	No	178 (64.7)	97 (35.3)		80 (39.0)	125 (61.0)		70 (34.2)	135 (65.8)		57 (49.1)	59 (50.9)	
Does not want to receive treatment	Yes	24 (68.6)	11 (31.4)	0.528	11 (64.7)	6 (35.3)	0.024	10 (58.8)	7 (41.2)	0.027	8 (61.5)	5 (38.5)	0.379
	No	166 (63.1)	97 (36.9)		73 (36.9)	125 (63.1)		64 (32.3)	134 (67.7)		53 (48.6)	56 (51.4)	
Other	Yes	13 (86.7)	2 (13.3)	0.058	4 (40.0)	6 (60.0)	1.000[a]	3 (30.0)	7 (70.0)	1.000[a]	4 (44.4)	5 (55.6)	1.000
	No	177 (62.5)	106 (37.5)		80 (39.0)	125 (61.0)		71 (34.6)	134 (65.4)		57 (50.4)	56 (49.6)	

[a]Fisher's exact test

Table 5. Multivariate logistic regression analyses of independent variables for a female patient non-practicing early detection of breast cancer as outcome variables, primary healthcare centre in Serbia in 2019

Independent variables	Non-practicing early detection of breast cancer OR (95% CI)			
	Breast self-examination (patients of age 30 or more years n = 298)	Clinical breast examination (patients of age 40 or more years n = 215)	Ultrasound (patients of age 40 or more years n = 215)	Mammography (patients of age 50 or more years n = 124)
Socioeconomic characteristics				
Age (continuous)	0.84 (0.65–1.09)	0.56 (0.30–1.02)	0.54 (0.27–1.070	–
Children (continuous)	–	0.34 (0.71–15.64)	5.58 (1.08–28.89)	–
Education (continuous)	–	0.64 (0.37–1.08)	0.78 (0.46–1.39)	–
Employment status				
Unemployed (ref.)	1.00	1.00	1.00	1.00
Employed	–	0.41 (0.14–1.19)	0.31 (0.09–1.08)	1.09 (0.35–3.46)
Retired	–	0.16 (0.04–0.58)	0.21 (0.05–0.90)	0.35 (0.11–1.14)
Wealth quintiles (continuous)	–	–	–	2.82 (1.22–6.52)
Family history of breast cancer	0.44 (0.21–0.92)	0.37 (0.15–0.92)	0.32 (0.12–0.82)	–
Have knowledge of the following symptoms (Outcome 1 = No)				
Lump in a breast		–	–	2.16 (0.74–6.28)
Changes to the breast shape/areola shape		0.78 (0.29–2.07)	1.14 (0.38–3.42)	–
Ulceration or edema of a breast	0.95 (0.43–2.10)	0.76 (0.31–1.86)	0.48 (0.18–1.26)	–
Bloody nipple discharge	1.03 (0.52–2.03)	0.68 (0.26–1.75)	0.53 (0.18–1.54)	–
Have knowledge of the following risk factors (Outcome 1 = No)				
Age	1.02 (0.51–2.02)	–	–	–
Family history of breast cancer	0.40 (0.19–0.82)	–	1.07 (0.34–3.39)	1.42 (0.43–4.68)
Early menarche	–	0.68 (0.19–2.38)	–	–
Late menopause	–	0.88 (0.20–3.78)	0.24 (0.06–1.05)	–
Not having kids	–	–	0.60 (0.15–2.40)	–
Not breastfeeding	–	–	2.14 (0.58–7.93)	–
Use of oral contraceptives or hormonal replacement therapy	–	1.02 (0.41–2.55)	0.89 (0.35–2.26)	–
Smoking	0.59 (0.29–1.19)	–	–	–
Alcohol consumption	0.85 (0.38–1.91)	1.00 (0.44–2.28)	0.78 (0.35-1.74)	–
Ionizing radiation	1.51 (0.74–3.05)	1.11 (0.49–2.54)	–	1.51 (0.63–3.59)
Have barriers to early detection of breast cancer (Outcome 1 = No)				
Unfamiliar with breast diseases	0.59 (0.34–1.02)	–	0.42 (0.20–0.91)	–
Lack of time	–	–	0.51 (0.28–1.14)	–
Lack of confidence in available treatments	–	1.15 (0.49–2.28)	–	–
Lack of funding for treatment	–	2.46 (1.10–5.35)	0.67 (0.27–1.63)	–
Lack of available information about the treatment	0.74 (0.37–1.47)	–	–	0.35 (0.14–0.90)
Lack of social support	1.16 (0.53–2.53)	–	0.69 (0.26–1.80)	–
Not knowing the women who survived the disease	0.62 (0.21–1.80)	–	–	–
Fear of losing a breast	–	–	0.59 (0.26–1.33)	–
Does not want to receive treatment	–	1.99 (0.52–7.70)	0.96 (0.22–4.08)	–
Other	0.42 (0.08–2.17)	–	–	–

OR – odds ratio; CI – confidence interval

diseases in general (p=0.001), lack of time (p=0.021), and not knowing the women who survived the disease (p=0.027), rarely had an ultrasound examination (Table 4).

Participants over the age of 30 will be 56% and 60% less likely to fail breast self-examination if they have a family history of breast cancer and know that a positive cancer history is a risk factor for breast cancer, respectively (Table 5). Interestingly, no statistical difference was found between the patient groups in the frequency of "fear of examination and/or treatment" for all study outcomes, and the largest was for the outcome of "self-examination".

Patients with a family history of breast cancer and knowledge of the family history of breast cancer were 56% and 60% less likely than their counterparts not to practice breast self-examination, respectively. In a group of patients aged 40 years and older, retired patients and those with a positive family history of breast cancer were 84% and 63% less likely not to undergo a clinical breast examination in the past year (Table 5). Participants over 40 years of age who reported a lack of funds for treatment were 2.46 times more likely to miss a clinical breast examination than those who did not have that barrier (Table 5).

Participants over 40 years of age with children were 5.58 times more likely not to undergo ultrasound breast examination than those without children, but 79%, 68%, and 58% are less likely if they are retired, have a positive family history of breast cancer, and if they lack knowledge on the breast diseases in general, respectively, than their counterparts (Table 5).

Among participants aged 50–69 years, the likelihood of not receiving the mammography examination increased by 2.82 with an increase in wealth status and was 65% lower for those who lack information about the available treatment (Table 5).

DISCUSSION

Breast cancer is a worldwide public health problem that has a devastatingly low rate of early detection in low- and middle-income countries for many reasons. The focus of this study was on awareness and barriers to early detection of breast cancer in women in Serbia attending a primary care centre where they have undergone screening.

The main findings of the study show that breast screening practices differ significantly depending on the patients' age, place of residence, employment and wealth status, whether they have children, knowledge of symptoms and risk factors, and barriers to early detection of breast cancer. These differences, together with factors contributing to non-practicing breast examination, appear to be similar in different contexts and patterns, indicating the need for international collaborative efforts to remove individual, organizational and systemic barriers to the early detection and quality treatment of women with breast cancer (14–21).

The symptom of breast cancer that was recognized by most of our participants was a lump in the breast, which was also the most commonly recognized symptom of breast cancer in women in the literature (1, 10, 12–16, 22–24). However, although more than half of the participants reported having breast self-examination in the last month, less than a quarter of participants had a clinical breast examination and/or ultrasound examination in the past

year, and the percentage was even lower for mammography, as in the last two years less than one fifth of our participants reported having mammography. Other researchers also showed that good knowledge was not necessarily associated with regular breast self-examination and that about one third of participants in their study did not have breast self-examination at all and that nearly two-thirds of them never had a mammography (24).

Our participants lack knowledge about many risk factors for developing breast cancer, especially modifiable risk factors such as smoking tobacco or alcohol consumption, and only a positive family history of breast cancer is highly recognized as a risk factor. A low level of recognition of lifestyle characteristics as a risk factor for breast cancer has also been observed earlier (14–16, 22–24). However, the better the knowledge about breast disease and treatment, the better the screening practices (14–16, 22–25).

In addition to the lack of knowledge, fear of examination, fear of treatment, and loss of breast are present among those not-practicing breast examinations. In previous studies, fear has been described as multidimensional, from the prospect of an unpredictable enemy to the fear of death (26). There is still no strong consensus on the effects of cancer fear on screening behaviour because in some cases, emotions may be a barrier to seeking counselling (27), while in others, increased levels of fear are associated with earlier seeking help (28). Nevertheless, the results of this study may inform health education and early detection at the primary health care level. They emphasize the need to strengthen the role of physicians in providing information, education, counselling, and motivating patients for early detection of breast cancer.

The astonishing result is that a large percentage of patients do not undergo early detection of breast cancer, despite the fact that they know they have breast cancer in a family. However, regression modelling shows that patients with a positive family history of breast cancer are unlikely to miss a clinical and ultrasound examination, which is consistent with the study findings in other settings (12). This result may encourage policymaking practices, as a 40% reduction in the risk of death can be fully attributed to earlier diagnosis and better compliance with screening (29). Accordingly, a randomized controlled trial by Alizadeh-Sabeg et al. (30) stated that motivational interviewing has a positive impact on breast cancer screening behaviour in rural women.

Of similar value is the other finding in our study that a lack of treatment information was unlikely a barrier to receiving mammography. But patients who have stated that they do not have the financial resources for the treatment of breast cancer were more likely not to have a clinical breast examination. Conventional cancer therapy in Serbia includes many biological medicinal products included in the national list of medicines (immunological drugs, blood and blood products, gene therapy products, and bioengineered drugs) (31) provided to patients via national health insurance coverage with certain routes of administration. In accordance with the Serbian Law on Medical Products and Medical Devices (32), the most expensive drugs (such as interferon, monoclonal antibodies, proteasome inhibitors, erythropoietin, etc.) are prescribed according to specific prescribing rules and obtained for certain indications and under specific conditions (31). Reimbursement of targeted therapy remains an extremely big challenge in Serbia because less per capita is spent on health than in well-developed countries, and a significant part of total

health spending is out-of-pocket spending (33). In this study, we did not make a difference between the types of treatment available in Serbia and in other countries or whether a treatment is covered via obligatory versus private health insurance. Our study indicates that higher wealth status is significantly associated with not receiving mammography examinations in the last two years in the public primary healthcare centre. This finding may reflect the situation that many wealthier women prefer to use private practice due to strict rules for scheduling appointments for mammography or ultrasound screening in public primary healthcare centres (34). Therefore, as in other settings (25), it is expected that women of average and higher wealth status may be more likely to have mammography screening. In addition, women with children were more than five times more likely to have had no ultrasound examination last year, probably for the same reasons as a long wait at a public primary healthcare centre. This could also explain the finding that retired women in our study were less likely to have no ultrasound examination because they have more time to wait. Due to random selection, the age structure of the study participants does not fully correspond to the female contingent population of Serbia. For example, in the study, only a quarter of women were aged 50–69, while in the female population of Serbia, their share was approximately 28%, according to the Census (35). Further research should be conducted to systematically include a larger sample of all women eligible for mammography screening as a potentially interesting group in an international context.

In order to enable optimal results of breast cancer screening and early treatment at the primary health care level, it is necessary to improve the planning and organization of early detection of breast cancer. The government decree currently stipulates that specialist breast examinations cover 23% of health insurers aged 50–69 each year in public primary health care centres (36), while it is even lower at the secondary and tertiary levels of health care in the public sector (37). Serbia has made great efforts to eliminate waiting times (33), and future research is relevant to improve equal access to the health workforce and breast cancer prevention technology at the primary care level. Timely detection of breast cancer is a key to reducing mortality and raising knowledge can help improve screening coverage (38). In that regard, study findings can be used to improve breast cancer screening at the primary level.

The cross-sectional design of the study does not allow the establishment of cause-and-effect relationships between the variables, but this study contributes to a better understanding of the barriers to early detection of breast cancer. This study evidence on awareness and practices for breast cancer screening also supports the use of health promotion and education resources to improve attendance at early detection leading to an improved prognosis. Due to the structure of wealth status of patients in our sample, the study results either imply that funding for breast cancer treatment is very important for participating in the early detection of breast cancer or that wealthier patients may not prefer the use of primary care services in the public sector. In that regard, there is a need to conduct research on a representative sample of the female population and analyse the costs and benefits of early detection of breast cancer in Serbia.

As the selection of women is not representative (women from one centre) and due to the recruitment of women who participated in the gynaecological examination, there was probably a bias in the selection (women who regularly go to the gynaecologist for examination are probably different from the general population). The coverage of the screening programme in Serbia is less than 20%, but the coverage in the study was 50%. Thus, the results of the study are likely to suffer from overstatement and underestimation and should not be generalized to the population of Serbia. Instead, the results of the study can be taken into account for orientation purposes to inform key authorities and all health promotion stakeholders about breast cancer prevention programmes, as well as about further steps to be taken to reduce barriers and increase the participation of the target population groups in the early detection of breast cancer in Serbia.

CONCLUSION

In conclusion, insufficient knowledge of breast cancer, symptoms, and risk factors, as well as fear and lack of financial resources for treatment were barriers to early breast cancer screening at the primary health care centre. Health promotion activities such as motivational intervention and health education need to be strengthened to improve knowledge and reduce fear in women, while better planning and organization for equal access to health workforce and technology are needed to support optimal screening results in primary healthcare centres, which will eventually lead to early treatment and a better quality of life and greater survival rates among women with breast cancer.

Conflict of Interests

None declared

Adherence to Ethical Standards

The study was approved by the Ethical Committee chaired by the Director of the Primary Healthcare Centre of Kikinda, Serbia, on March 13, 2019.

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