Original Article

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Factors Related to the Knowledge and Practice of Breast Self-Examination: A Cross-Sectional Study

Renata Apatić[1,2], Robert Lovrić[2]

[1]Faculty of Medicine Osijek, Josip Juraj Strossmayer University of Osijek, Osijek, Croatia
[2]Nursing Institute "Prof. Radivoje Radić", Faculty of Dental Medicine and Health Osijek, Josip Juraj Strossmayer University of Osijek, Osijek, Croatia

ABSTRACT

Objective: Identification of the factors associated with knowledge and practice of breast self-examination (BSE).

Materials and Methods: The online survey method was used to collect data. Questions were based on an analysis of the literature and instruments used to study BSE awareness, knowledge, and practices. The study included 3536 participants, aged 18 to 71 years.

Results: Most participants (62.9%) believed they were not at risk of developing a breast cancer (BC). In the sample 459 (19%) reported they perform a BSE once a month after cessation of menstruation. The reason given for not performing the BSE by 521 (46.8%) was that they forgot, while 363 (32.6%) indicated they did not know how to perform a BSE. The mean ± standard deviation value of responses to the knowledge questions (response range 0–5) was 1.04±0.63. Almost all participants (98.6%) believed that BSE is important for the early detection of BC and that BSE awareness can be increased (96.9%).

Conclusion: Lack of comprehensive knowledge of BSE and low prevalence of regular BSE practice were observed. Education, profession, experience with BC, "not" performing BSE, and attitudes toward the importance of BSE in the early detection of BC were associated with knowledge of BSE.

Keywords: Breast self-examination; early detection of cancer; nursing; women

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Key Points

- This study offers insight into the triad of interactive factors – knowledge, attitude, and practice of breast self-examination (BSE) among Croatian women.
- BSE knowledge is related to the level of education, profession, previous experience with breast cancer, BSE practice, and attitudes toward the importance of BSE in the early detection of breast cancer.
- While the knowledge and regular practice of BSE were poor, awareness was high.

Introduction

Breast cancer (BC) is the leading cause of cancer death in women (1). At the end of 2020, there were 7.8 million women diagnosed with BC in the past five years, making it the most prevalent cancer worldwide (2).

BC incidence and mortality in Croatia are higher than in the rest of Europe (3). In Croatia, BC is the primary source of cancer and accounts for a quarter of all cancers in women (4). Although one in eleven women in Croatia is already at risk of BC, a further increase in newly diagnosed cases is expected in the future (4).

Mammography, clinical breast examination, and breast self-examination (BSE) are the commonly recommended screening methods (5). With an increasing number of studies influencing screening guidelines, the benefit of BSE has become controversial. Šašková and Pavlišta (6) reported no impact of BSE on mortality, while other studies suggest that regular BSE is associated with early detection of BC (5, 7, 8), a reduction in BC mortality (8), and improvement in survival (5).

Nearly 60% of BC deaths affect low- and middle-income countries, where access to diagnostic and curative facilities is problematic, and screening programs are underdeveloped or nonexistent (8, 9). For example, in India, the introduction of annual mammography screening currently seems unattainable (10), while in most Nigerian villages, access to health services, especially comprehensive diagnostic services, is low, if not completely impossible (11).

Corresponding Author:
Robert Lovrić; rlovric@fdmz.hr

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Hassan et al. (7) presented BSE as a highly available screening method with low cost.

Studies on BSE practices and attitudes have shown that the rate of this screening, as well as knowledge of BSE, is low among women of different ages (12, 13). Kalliguddi et al. (14) reported that the mean ± standard deviation (SD) score for the knowledge of BSE was 18.17±2.90 when the response range was 0–30, which could be defined as moderate knowledge, while only 0.5% of the study participants had good knowledge. Accordingly, the mean score for BSE was 19.11±5.08 with a response range 0–35, which is classified as poor practice.

Nurses are crucial in educating women about BC, so their experience and knowledge of BSE are needed. Furthermore, nurses' confidence and positive attitudes about the importance of BSE for the early detection of BC can increase the effectiveness of a BSE education intervention. These factors not only affect nurses' engagement in the education of women but may also have a positive impact on teaching BSE and encouraging women to perform it (15).

According to the first part of Orem's Self-Care Deficit Theory (16), the theory of self-care, women need to focus on activities to sustain life, health, and well-being. Therefore, individual self-health empowerment, spreading breast health awareness, and regular BSE as part of self-care can be crucial for the early detection of anomalies (9, 17). Some factors may influence the knowledge and practice of BSE in women, such as age (17), family history of BC, literacy, marital status, profession, and access to BSE information (18).

The aim of this study was to provide a deeper insight into the level of knowledge, attitudes, and practice of BSE among Croatian women. The study also sought to assess the correlation between knowledge levels and a) the attitudes, b) the frequency of BSE practice, and c) the sociodemographic and other characteristics of participants (age, education level, profession, and experience with BC).

While related studies worldwide (19, 20), in Europe (21, 22), and Croatia (3) are limited to a specific university, city, or population, this study includes Croatian women of different ages, education levels, and professions regardless of residence.

Materials and Methods

Design

The cross-sectional study was conducted in Croatia, from March 12 to April 10, 2021, within a higher education institution offering a 5-year degree program for nurses.

Instrument

An anonymous questionnaire designed for this study was used. It was based on an extensive analysis of the literature and instruments for examining awareness, knowledge, and BSE practice (18, 19, 23, 24) and the authors' experience in primary health care and women's health care. Preliminary interviews with five physicians and five nurses employed in gynecological clinics contributed to the initial design of the instrument. The validity of the content of the questions was validated by an expert committee, consisting of a psychology professor, a methodologist, two professors, and one nurse with an MA with experience in women's health care. Ethical validation of included questions was confirmed by a medical ethics/clinical bioethics and deontology professor. After content validation, the clarity of the questions was rated by five randomly selected female volunteers, who did not participate in the main study. The introductory part of the questionnaire contained a description of all study details (purpose, design, instructions on study anonymity, researchers' information and contact, and guidelines for completing the questionnaire). The first part of the questionnaire addressed the general characteristics of participants: age, education, profession, experience with BC, and their perception of BC risk. The second part consisted of 11 questions (closed, single/multiple-choice, and open) related to the participants' source of information and knowledge about BSE and BSE practice. The time limit for responding to knowledge questions (closed, single/multiple-choice) was 30 seconds, and for open-ended questions, one minute. The time limit was determined, based on TIMSS 2015 Item Writing Process and Guidelines (25), according to which the allocated time to complete the multiple-choice item is one minute or less, while other questions require 1-3 minutes. The absence of a time limit in studies may affect the objectivity of participant's knowledge assessment. Therefore, this method minimized the possibility of using other sources of knowledge (books, the internet, social media, etc.). There was no time limit for responding to the other questions included. The total score for variable BSE knowledge was formed as the sum of the participant's answers to five questions measuring BSE knowledge. For each question, the participant could receive one point if she answered correctly, or zero if she answered the question incorrectly (response range 0–5).

Participants

This study included 3536 Croatian women. The inclusion criteria for the study were age (≥18 years), voluntary participation, and a completed questionnaire. The criteria also implied that the participants were active members of two online women's groups on social networks. Furthermore, the criteria for selecting these groups implied a controlled female membership and group administrators' permission to conduct this study. The groups' focus is on health promotion and the exchange of knowledge and health experiences among women. The groups included nine thousand women of different ages and professions.

Data Collection

An online survey (Google Forms) was used to collect the research data. A link to the questionnaire was sent to potential participants via the joint e-platform of the two online groups. After describing the details of the study and before activating the link, the researchers obtained permission from the administrators to access the groups and conduct the study. Online data collection was used to minimize potential risks and maintain greater confidentiality of participants.

Ethical Considerations

Participation in the study was voluntary, and participants could withdraw from the study without penalty. In the introductory part of the questionnaire, participants were informed about study details and ethical aspects. Completing and sending the questionnaire to the researchers implied the participants' voluntary consent to take part in the study and the processing of their data. The data from the questionnaire ensured complete anonymity and it cannot be used to compromise the participants' identity.

Statistical Analysis

Descriptive statistics were performed for nominal variables and data are presented as count and percentages. Numerical data are presented as arithmetic mean and standard deviation. The Shapiro-Wilk test was

used to test the normality of the distribution of numeric variables. Differences in numeric variables between two independent groups were tested with Student's t-test, and between multiple independent groups with ANOVA. Differences in variables between multiple dependent groups were tested with ANOVA for repeated measurements, using multiple comparisons of arithmetic means in the dependent groups, and post-hoc analysis was tested by the Games-Howell test. Pearson's correlation coefficient was calculated to quantify the association between two normally distributed numeric variables. The statistical significance level was 0.05. The results were analyzed using IBM SPSS, version 24.0 (IBM Inc., Armonk, NY, USA).

Results

Sociodemographic Data and BC Risk Perception

This study included 3536 participants aged 18–71 years, with a mean age of 33.4±9.86 years. Approximately half of the participants, 1790 (50.6%), attained secondary education. Over a quarter (904, 25.6%) participants were health care professionals (Table 1).

Table 1. Participants' sociodemographic data and BC risk perception

Characteristics	n (%)
Age (years)	
18–19	90 (2.5)
20–29	1362 (38.5)
30–39	1099 (31.1)
40–49	748 (21.2)
50–59	214 (6.1)
60+	23 (0.6)
Education	
Primary	44 (1.2)
Secondary	1790 (50.6)
BA	792 (22.4)
MA	845 (23.9)
PhD	65 (1.9)
Profession	
Health professionals	904 (25.6)
Non-health professionals	2632 (74.4)
Experience with BC	
Personal	55 (1.6)
Family	936 (26.5)
Friend	663 (18.7)
No experience	1882 (53.2)
BC risk perception	
At risk, diagnosed with BC	35 (1)
At risk, afraid of possible diagnosis	833 (23.5)
At risk, not afraid of possible diagnosis	445 (12.6)
Not at risk	2223 (62.9)

BC: breast cancer

More than half, 1882 (53.2%), reported having no experience with BC. Most participants, 2223 (62.9%), believed they were not at risk of developing BC (Table 1).

Sources of BSE Information

Social media, television, and/or radio were reported as the main sources of information about BSE by 2338 (66.1%) of participants. Concerningly, 41 (1.2%) participants had never heard of BSE (Figure 1).

BSE Practice

In this study, 2423 (68.5%) participants reported performing BSE. As reasons for not performing BSE, 521 (14.7%) reported forgetting, while 363 (10.3%) reported that they did not know how (Table 2).

Awareness and Knowledge of BSE

Observing any visible breast lump as an important step in BSE was acknowledged by 3161 (89.4%) participants. As a correct answer, 2911 (82.3%) respondents referred to palpating the breast by circular movements in a clockwise direction, while 111 (3.1%) stated that firm pressure should be applied. Almost all participants, 3366 (95.2%), indicated that lymph nodes should be preferably palpated in the armpit during BSE (Table 3). The mean ± SD value of responses to the knowledge questions was 1.04±0.63 with the range 0–5.

The results show no statistically significant correlation between age and knowledge of BSE (r = 0.00; p = 0.95). However, there is a significant positive correlation between the level of education and knowledge of BSE (r = 0.06, p<0.01). Perhaps unsurprisingly, health professionals had significantly better knowledge of BSE than the other participants [t (1432.844) = -6.644, p<0.01].

The results show significant differences in knowledge between participants with different experiences with BC [F (3, 3532 = 7.072; p<0.01], thus participants with no experience of BC (M = 1.00, SD = 0.626) showed a significantly poorer knowledge of BSE than participants with a family member (M = 1.08, SD = 0.625), friend (M = 1.12, SD = 0.642), or themselves (M = 1.09, SD = 0.646) having been diagnosed with BC. The participants who performed BSE had significantly better knowledge of BSE than participants who did not perform BSE [t (2411.557) = 7.319, p<0.01].

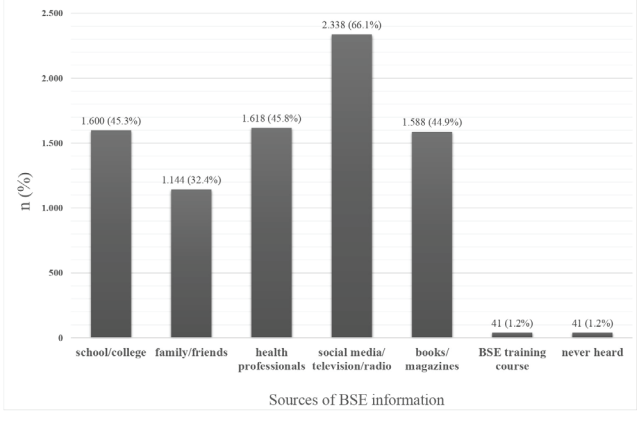

Figure 1. Sources of BSE information among participants

BSE: breast self-examination

The majority, 3488 (98.6%), consider BSE important for the early detection of BC. Participants considering this have significantly better knowledge of BSE than participants who consider the opposite [t (3534) = 2.092, p = 0.03]. As many as 2828 (80%) participants believed BSE awareness can be increased by integrating BSE content into educational curriculums, while 110 (3.1%) participants believed there was no need to increase BSE awareness (Figure 2).

Discussion and Conclusion

In this study, some participants under 20 years of age reported performing BSE, suggesting that younger participants are aware of the importance of BSE for the early detection of BC. BC in women younger than 40 years is rare, affecting between 4–6% (26), and less than 0.2% of all BCs are detected in women younger than 20 years old (27). However, young women are also more likely to have tumors with negative clinicopathologic features including higher histologic grade and more lymph node positivity (26), and consequently tend to be diagnosed at more advanced disease stages (27), contributing to a less favorable prognosis than older women (26). According to Desreux (28), most recommended screening strategies for young women are not proven efficient in terms of BC mortality, making organized population screening inefficient in women under the age of 40. BSE may be a solution to this problem.

Approximately half of the participants, 50.6%, have secondary education, which similar to an earlier survey conducted in Croatia in 2021 (29), showing that over 60% of the Croatian population, and between 55% and 65% of women, have secondary education (29).

In the present study, 62.9% of the participants believed they were not at risk of BC. Previous studies examining women's perception of BC risk and its accuracy showed that 65.7–80% of women classified in the "increased – high risk" group underestimated their BC risk (30). According to Kartal et al. (30), women who believe that family history is a minor contributor to BC risk significantly underestimate their risk. Therefore, the knowledge gap about risk factors for BC may affect risk perception.

The internet has greatly improved access to information. Social media, television and/or radio were cited as the main source of BSE information by 66.1% of the participants, which is comparable to a study from the United Arab Emirates (UAE) (57.2%) (19). In contrast, only 19.9% of women in the UAE (19) associated BSE information with a university, while 45.2% of women in this study indicated school/university as the source of BSE information. This may indicate differences in education systems. Moretti et al. (31) reported that women in Brazil perform most health searches on the internet. Hence, women have access to information about BC and screening methods and consequently

Table 2. BSE practice

Characteristics	n (%)
Performing BSE	
Yes	2423 (68.5)
No	1113 (31.5)
Frequency of BSE	
Up to five times a year	1182 (33.4)
Few days after cessation of menstruation	459 (13)
Once a week	428 (12.1)
Few days before menstruation	285 (8.1)
Any time during the month	61(1.7)
Reasons for not performing BSE	
Forgetting	521 (14.7)
Don't know how	363 (10.3)
Too young	81 (2.3)
Not interested	70 (2)
Not sure of its ability to detect a breast cancer	52 (1.5)
Fear of positive finding	26 (0.7)

BSE: breast self-examination

Table 3. Participants' knowledge of BSE

Characteristics	n (%)
Visual examination while performing BSE includes looking	
At your breasts in the mirror	1738 (49.2)
For dimpling or puckering of the skin	1937 (54.8)
At your breasts while lying on the bed	1105 (31.3)
For any visible lumps	3161 (89.4)
For nipple discharge	2761 (78.1)
For changes in nipple appearance, position, or an inverted nipple	2535 (71.7)
At breast position on the chest	784 (22.2)
Manual inspection while performing BSE includes	
A pattern: circular movements in a clockwise direction	2911 (82.3)
A pattern: dividing the breast into quadrants	704 (19.9)
Light pressure	564 (16)
Medium pressure	2328 (65.8)
Firm pressure	111 (3.1)
Using the entire length of the fingers	1107 (31.3)
Using all fingers of one hand	1442 (40.8)
While performing BSE, the right breast is palpated with	
Right hand	202 (5.7)
Left hand	2822 (79.8)
Both hands	512 (14.5)
While performing BSE, lymph nodes are palpated	
In the neck area	956 (27)
In the elbow area	46 (1.3)
In the armpit area	3366 (95.2)
In the collarbone area	1165 (32.9)
Between the breasts	554 (15.7)
BSE should be performed	
While having a bath	2157 (61)
While lying on the bed	1162 (32.9)
While standing	2561 (72.4)
In half-lying position	174 (4.9)

BSE: breast self-examination

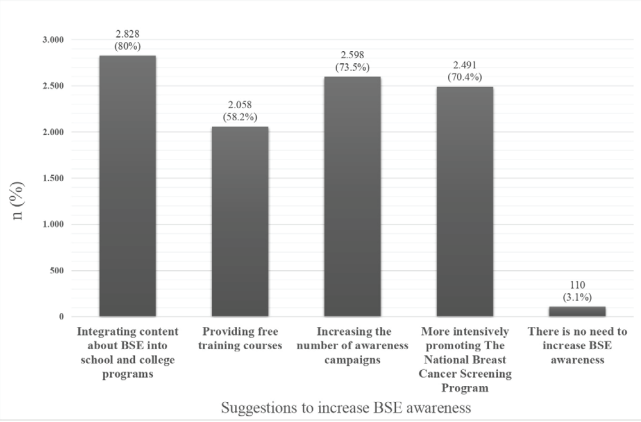

Figure 2. Suggestions to increase awareness about the importance of BSE

BSE: breast self-examination

become more aware of the importance of BSE in the early detection of BC. It appears they lack the motivation to perform it regularly.

Despite the benefits of BSE, numerous studies have shown that the screening rate is low among women of different ages. In the present study, 31.5% of participants reported that they did not perform BSE. In a study conducted among high school students in Turkey, 73% of participants did not perform BSE (12). Similar results were observed in studies among female students in Egypt (92.6%) (32), the UAE (77.3%) (33), among health care professionals in North West Ethiopia (67.5%) (20) and women of different ages in Ghana (72.5%) (13). According to Dinas et al. (22), 33–43% of women perform BSE every month. In this study, only 13% of participants perform BSE every month and at the right time (after menstruation) (34). If we disregard the right timing, 22.8% of participants in this study perform BSE monthly, more than 17.9% in Africa (8), 15.2% in Vietnam (18), and 19.6% in the UAE (19). However, more women are reported to perform regular BSE in Russia (32%), Malaysia (41%), and Poland (56.7%) (8). Although BSE is the most affordable option for the early detection of BC (8), most women in the present study did not perform BSE at the recommended frequency or at all.

As the main reason for not performing BSE, 14.7% of participants reported "forgetting", which is more than in Egypt (5.9%) (32) but less than in the UAE (28.8%) (19). Moreover, 10.3% of participants don't know how to perform BSE, which is less than 32.4% in the UAE (19) and 47.7% in Egypt (32). A study conducted in Ghana reported that 61% of participants did not know anything about BSE and were not taught how to perform it (13). On a positive note, only 2% of women in the present study reported having no interest in BSE, compared to 35% in the study conducted in Egypt (32) and 20.7% in the study conducted in the UAE (19). This question provided the option to write a response (if none of the offered suited), so some participants reported they do not practice BSE because they have annual mammograms or their gynecologist performs a clinical breast examination. Despite having reached the recommended age for mammography screening, women still self-detected abnormalities that led to a BC diagnosis (11). Moreover, most early breast tumors are self-discovered, and most early self-discoveries are because of BSE (11).

According to the mean of the responses, the participants in the present study have insufficient knowledge of BSE. Poor BSE knowledge has been observed in other studies (11, 13). However, in the present study, participants with a higher level of education also had better knowledge of BSE, which can be explained by longer-term "exposure" to specific contents during formal and/or non-formal education. In previous studies, there was also a significant correlation between the level of education and knowledge of BC (13), as well as between the level of education and knowledge on how to perform BSE (17). In a study conducted among Iranian healthcare professionals, the level of education was significantly associated with the practice of BSE (35).

Nurses play an important role in health care by defining women's BC information needs and teaching them how to perform BSE. BSE is an evidence-based practice and thus nurses should be trained in proper BSE techniques and be a primary resource for the patient to demonstrate and evaluate adherence to BSE. The health care professionals in this study had significantly more knowledge of BSE than other participants, due to their "exposure" to content about BC and BSE during education, but also because of their duty to promote health and motivate patients to participate in screening programs for the early detection of BC. Some studies suggest that health care professionals have a satisfactory knowledge of BSE (34, 36), while others indicate that their knowledge and behaviors need development (21, 24, 35). In these studies, many deficiencies concerning beginning age (24), timing (21, 24), frequency (21, 24), BSE techniques (21, 24), and practice after menopause (24) were found.

The present study found that participants with no experience of BC showed significantly poorer knowledge of BSE than participants with some experience (personal, family, friend). This could be due to getting information from a close person diagnosed with BC, their better awareness of the severity of the disease, and the importance of BSE in noticing changes at an early stage. However, regarding the correlation between the family history of BC and BSE practice, there have been studies with conflicting results. While Dagne et al. (20) revealed a correlation between the family history of BC and BSE performance, Karayurt et al. (12) showed no correlation. A study in North West Ethiopia found that women with a family history of BC were 6.5 times more likely to practice BSE than women without it (20).

The expected result was that participants practicing BSE had significantly more knowledge of BSE than participants not performing BSE. In the UAE (33) and Iran (35), the knowledge of participants who performed BSE was significantly higher than that of participants who did not perform BSE. In North West Ethiopia, women with better knowledge of BSE were 5.74 times more likely to practice BSE than those who did not know about BSE (20).

The majority of participants in the present study believed that BSE practice was important for the early detection of BC and that BSE awareness should be increased. These findings indicate high awareness and positive attitude, which are important predictors of acquiring new health education knowledge and skills. Therefore, this study related participants' attitudes toward the importance of BSE for the early detection of BC to the knowledge of BSE.

Relevance for Clinical Practice

In the future, it will be important to improve BSE knowledge and to target all age groups in BSE educational programs in Croatia. It is necessary to adopt or develop appropriate and proven educational and capacity-building measures to inform and educate women about BSE. Comparisons with similar studies indicate that the need to

raise awareness of BSE among women is almost global. Since nurses are primarily involved in cancer prevention, education, and patient care, the focus should be on their knowledge and ability to perform BSE. Therefore, providing BSE education programs will be critical to improving nurses' confidence, knowledge, implementation, and delivery of BSE. The results of this study should prompt new comparative national and global studies.

Study Limitations

Some weaknesses of this study should be noted. First, the data were collected using an online survey (non-contact). However, the time limit for responding to knowledge questions was maintained. This method mitigated the limitation of the study and allowed for a more objective assessment of the participants' knowledge. Second, the results collected on individual questions represent self-reported behaviors that risk participants having provided socially desirable responses. According to the psychological literature, this bias represents a general weakness of survey research, especially if the survey contains sensitive questions about participants' opinions, attitudes, or behaviors.

The results of this study showed a lack of comprehensive knowledge of BSE among Croatian women. Education, profession, experience with BC, not performing BSE, and attitude towards the importance of BSE in the early detection of BC were significantly correlated with knowledge of BSE. The prevalence of regular BSE practice was very low. However, most participants believed BSE was important for the early detection of BC and also believed that BSE awareness can be increased.

Ethics Committee Approval: Participation in the study was voluntary, and the participants could withdraw from the study without penalty. In the introductory part of the questionnaire, the participants were informed about the study details and ethical aspects.

Informed Consent: Completing and sending the questionnaire to the researchers implied the participants' voluntary consent to take part in the study and the processing of their data.

Peer-review: Externally peer-reviewed.

Authorship Contributions

Concept: R.A., R.L.; Design: R.A., R.L.; Data Collection or Processing: R.A.; Analysis or Interpretation: R.A., R.L.; Literature Search: R.A.; Writing: R.A., R.L.

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