

Research Article

Risk Assessment Tool of Breast Cancer and Barriers against Breast Self-Examination among Nurses: An Educational Program

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Purpose. Breast cancer is considered a huge health problem among women all over the world due to its increased mortality rate. Breast cancer deaths are decreased by 28–34% due to improvement in treatment and early detection. In order to detect breast cancer early and provide the best possible therapy, knowledge and awareness are essential. So, this study aimed to assess risk of breast cancer among nurses, the knowledge and practices of breast self-examination (BSE) and determine its barriers, and implement an educational program for them. **Design.** A quasiexperimental research design was used. **Methods.** This study was conducted at two university hospitals (main university hospital and woman's health hospital). A purposive sample of 280 nurses with age more than thirty-five years were included in the study using three tools, namely, structure interview questionnaire, breast cancer risk assessment tool, and a structured breast cancer knowledge and practice questionnaire. Nurses' knowledge and practices regarding breast cancer and BSE were first assessed and then they were provided with two educational courses covering theoretical and practical information. One month after the program ended, the nurses' knowledge and practices were assessed again. **Results.** About 3.2% of the participants have five years high risk of developing breast cancer according the risk assessment tool, the main barriers of do not do BSE did not find any symptoms and scared from finding any abnormality. There was a significant increase in knowledge and practice of breast self-examination posteducation compared to pre-education (73.2 and 98.2%, respectively). Also, there was a statistically significant difference between pre- and postprogram with a *p* value of 0.0001. **Conclusion.** This study concluded that 3.2% of the nurses with high risk of developing breast cancer needed a follow-up; more than half of them do not perform breast self-examination because they think that do not have any symptoms in the breast and the educational program with a significant effect on knowledge and practices of nurses. So, the researchers recommend the nurses need for an empowerment program and support by providing assistance in places of work as done free clinical examination and mammography by female specialist for privacy.

1. Introduction

Breast cancer is one of the most common cancers among women worldwide, especially in developing countries. Mammography, clinical breast examination (CBE), and breast self-examination (BSE) are the three currently advised methods of breast cancer screening. These approaches offer the chance for early detection and can lower mortality by up to 25%. So, the significant roles that women play as wives and mothers in the lives of their families (it is crucial to pay close attention to this) [1]. Breast cancer impacted 2.3 million women globally in 2020, accounting for about 685,000 deaths from the disease. As of the end of 2020, 7.8 million women worldwide have been diagnosed with breast cancer, making it the most common cancer overall (Wild, et al., 2020).

The main risk factors for breast cancer in women include a personal or family history of the disease, certain inherited genetic variations, and biopsy-confirmed hyperplasia. Little tumors are more likely to be in the early stages of the disease since breast cancer is a progressive illness and early discovery improves treatment outcomes and prognosis [2] (see Figure 1).

With an age-adjusted rate of 49.6 cases per 100,000 persons, breast cancer accounts for 18.9% of all cancer cases in Egypt, affecting women more than men (2.2% and 35.1% of all cases) [3]. There will likely be 2.3 million new cases of breast cancer detected worldwide by 2030. Through a 2.5% yearly reduction in the global breast cancer mortality rate, the WHO Global Breast Cancer Initiative (GBCI) seeks to prevent 2.5 million breast cancer deaths globally between 2020 and 2040. A 2.5% annual reduction in breast cancer mortality worldwide would prevent 25% of deaths from the disease among women under 70 by 2030 and 40% by 2040 [4].

Although breast cancer often begins after the age of 45, more young women than ever are affected and the age of beginning is declining. Early identification is crucial since young women's malignancies are typically more aggressive and have shorter survival rates [5].

Breast self-examination (BSE) is the only feasible technique for early detection of breast cancer in developing nations. BSE is still an essential screening technique for the early diagnosis of breast cancer in underdeveloped countries because of its inexpensive cost, widespread availability, and lack of complex technical training [6].

The American Cancer Society also suggests it for early breast cancer detection because it helps women in the following two ways: first, by assisting them in getting acquainted with the feel and appearance of their breasts; second, by helping them identify any changes in their breasts as soon as feasible. BSE increases women's "breast awareness." BSE every month helps a woman become more cognizant of what is typical for her. Globally, there is a significant knowledge-application divide between what is known and how BSE is actually used [7].

Women can take on some ownership and responsibility for their own health promotion by adopting BSE and other healthy practices. The education and practice of BSE among younger women serves as a foundation for health promotion strategies that establish the rules for later-life adherence to mammography screening and clinical breast examination [8].

Women's health nurses should be able to apply scientific evidence to their own clinical practice and should have easy access to evidence-based material. All women should be urged by nurses to actively participate in keeping track of their own breast health. For nurses working with women, it is imperative that they are able to educate women on the normal architecture of the breast, anomalies, breast cancer risk factors, and the benefits, limitations, and risks associated with screening for the disease. By giving women this knowledge, nurses enable them to choose the screening procedures that are most appropriate for their particular circumstances (American Cancer Society, 2017).

1.1. Significance of the Study. Among Egyptian women, 38.8% of all cancer cases are breast cancer, making it the most common malignancy among them. Breast cancer cases are predicted to increase from approximately 22,700 in 2020 to approximately 46,000 in 2050. Breast cancer is second among cancer-related deaths behind liver cancer, with an approximate 11% fatality rate (International Cancer Control Partnership, 2020). More efforts were made to control breast cancer in Egypt following the introduction of the 100 million Healthy Lives national program. A nationwide effort began in 9 governorates in July 2019, and in the following 2 months, it expanded to the remaining 7 governorates (Egyptian State Information Service, 2020).

A systematic review and meta-analysis included 12 studies involving 4129 female healthcare workers and found that the prevalence of breast self-examination was relatively low among healthcare professionals performing breast self-examination practices, with identified factors associated with lower BSE practice, including lack of knowledge about breast cancer and BSE. The finding of this study suggests the need to deploy and strengthen early diagnosis and control strategies with the collaborative work of policymakers, programmers, and other concerned stakeholders. It also suggests that raising breast cancer and breast self-examination awareness through community awareness programs should be provided to promote the level of knowledge. Furthermore, public health disease preventive behaviors (breast self-examination) should be considered as an important and feasible preventive strategy of breast cancer [9].

So, this campaign's primary goals are to evaluate nurses' breast cancer risk, raise awareness of breast cancer, stress the value of early diagnosis, and treat cases that have been diagnosed in accordance with current guidelines. Suspected cases are sent for additional investigations and free of charge treatment for participants.

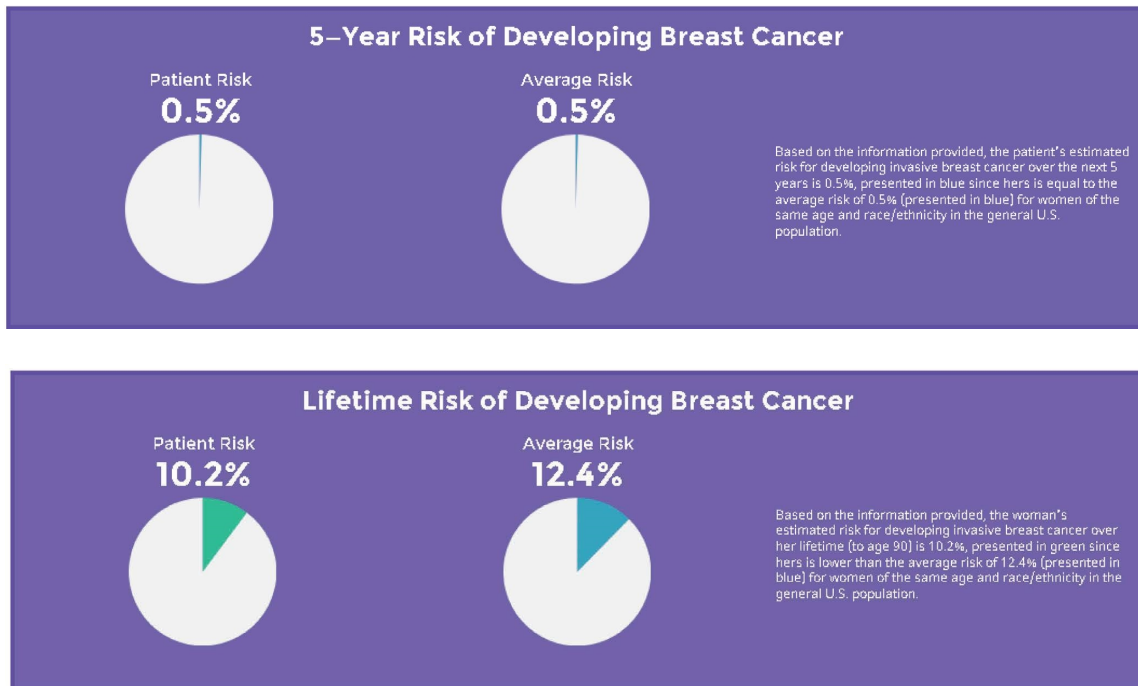


FIGURE 1: Screenshot of the results of the Breast Cancer Risk.

1.2. Aims and Research Questions of the Study

- (1) To assess the risk of breast cancer among nurses (what is the incidence of the risk for breast cancer among nurses?)
- (2) To assess the knowledge and practices of nurses about breast self-examination (what are the levels of knowledge and practices among nurses?)
- (3) To determine the barriers of breast self-examination practice among nurses (what are the barriers of breast self-examination practices among nurses?)
- (4) implement an educational program among nurses (what is the effect of educational program on nurses?)

2. Methods

2.1. Design. Quasiexperimental research design was used for the current study (pre and posttest).

2.2. Setting. This study was conducted at two university hospitals (main university hospital and woman's health hospital), Assiut City, Egypt. Those are affiliated to the Ministry of Higher Education and Scientific Research. Assiut University Hospitals are considered one of the largest educational and therapeutic university hospitals in the Arab Republic of Egypt. The total number of university hospital beds is approximately three thousand, of which 92% are free-cost patients' beds and 8% are private and economic treatment beds. There are contracts with governmental and nongovernmental bodies; the revenues from which are

allocated to spend on the department's needs and incapable patients.

The main university hospital consisted of nine floors, the first floor is administrative and from the second to nine floors are medical and surgical units. The woman's health hospital consisted of six floors, the first floor includes outpatient clinic and administrative part, the second floor is administrative floor, the third floor is postpartum unit, the fourth floor is delivery and intensive care unit, the fifth floor is gynecological unit, and the sixth floor is private unit.

The nursing system in Egypt is mainly a case method in the majority of departments. The payment system of nursing staff determined according to the educational level, for example, the head nurses' (Bachelor's degree) salary ranges between 5000 and 6000 LE, technician nurses' (nursing institute degree) salary ranges between 4000 and 5000 LE, and finally, assistant nurses' (secondary school education) salary ranges between 3000 and 4000 LE; the nurse-to-patient ratio in the setting was 1:6.

Regarding the health insurance support system for nursing personnel, Egypt's healthcare system is pluralistic combining both public and private providers and financers. The largest public healthcare payers are the Health Insurance Organization (HIO) and the Curative Care Organization (CCO). HIO covers 60% of the population and provides basic coverage to employees, students, and widows through their own hospitals and clinics. In the city of Assiut, the Health Insurance Hospital is the only insurance hospital. It provides therapeutic care to more than 2.7 million beneficiaries, with a coverage rate of 56% of its population of 4.72 million people [10]. Nurses are employees so they covered with HIO [11].

2.3. Theoretical and Operational Definitions of the Study Variables

2.3.1. The Breast Cancer Risk Assessment Tool (BCRAT). The breast cancer risk assessment tool is an interactive calculator that estimates a woman's risk of developing breast cancer. Also known as the Gail model, it allows health professionals to estimate a woman's risk of developing invasive breast cancer over the next five years and up to age 90 (lifetime risk). The tool uses a woman's personal medical and reproductive history and the history of breast cancer among her first-degree relatives (mother, sisters, and daughters) to estimate absolute breast cancer risk—her chance or probability of developing invasive breast cancer in a defined age interval [12].

2.3.2. Breast Self-Examination. Breast self-examination was initially proposed as an intuitive, inexpensive, noninvasive, and universally accessible means of promptly identifying early-stage breast neoplasms. Unfortunately, this potential screening tool's positive aspects cannot be considered without the evidence contradictory to its value [13].

2.3.3. Educational Program. Educational program means formal instruction provided to attendees. A coherent set or sequence of educational activities designed and organized to achieve predetermined learning objectives or accomplish a specific set of educational tasks over a sustained period. Within an educational program, educational activities may also be grouped into subcomponents variously described in national contexts as "courses," "modules," "units," and/or subjects. A program may have major components not normally characterized as courses, units, or modules, for example, play-based activities, periods of work experience, research projects, and the preparation of dissertations. Factors to be considered in assessing whether a program is educational include, but are not limited to, the curriculum; whether the entity providing the program, or the instructors, are accredited, certified, or otherwise qualified to provide the program, who the program is presented to, and where and how the program is presented [14].

2.4. Sample Size. A purposive sample of 280 nurses with age more than thirty-five years was included in this study by using the following equation according to the Thompson [15] equation:

$$n = \frac{N \times p(1 - p)}{\left[[N - 1 \times (d^2 \div z^2)] + p(1 - p) \right]}, \quad (1)$$

where N = total patient population size of 2050 nurses including head nurse, nurse, and assistant nurse from all healthcare facilities at Assiut University Hospitals. Z = confidence levels at 0.85 which is equal to 1.96. D = the error ratio = 0.05. p = the property availability ratio and neutral = 0.50.

$$n = \frac{2050 * 0.50(1 - 0.50)}{\left[2050 - 1(0.05^2 \div 1.96^2) \right] + 0.50(1 - 0.50)}. \quad (2)$$

According to the Thompson equation, the total number of nurses was 2050. The sample size was 323.6646994, and this number includes all age groups. As for the target group, whose ages were more than 35 years, there were 270 nurses, and the number reached 280, taking into account any withdrawals during the study.

2.5. Tools of the Study

2.5.1. Tool I: Structure Interview Questionnaire. This tool used to assess nurse's personal data such as hospital name (place of work), age, marital status, educational level, and occupation.

2.5.2. Tool II: The Breast Cancer Risk Assessment Tool. This tool is based on a statistical model known as the Gail model [16], validated by the authors in [17, 18]. Healthcare providers can use this tool to calculate a woman's lifetime risk of invasive breast cancer, as well as her risk of having the disease during the next five years and up to age 90. The age, age at the onset of menstruation, age at the first live birth of a child, number of first-degree relatives (mother, sisters, and daughters) with breast cancer, number of previous breast biopsies (positive or negative), and presence of atypical hyperplasia in a biopsy are all taken into account by this online tool from a woman's personal, medical, and reproductive history. The tool is available online at <https://bcrisktool.cancer.gov/>

(1) Example. If the researcher wants to calculate the breast cancer risk assessment percentage to a White, 39-years-old woman, who does not have a medical history of any breast cancer or of ductal carcinoma in situ (DCIS) or lobular carcinoma in situ (LCIS) or has she received previous radiation therapy to the chest for treatment of Hodgkin lymphoma, or a mutation in either the BRCA1 or BRCA2 gene, or a diagnosis of a genetic syndrome that may be associated with elevated risk of breast cancer, had a breast biopsy with a benign (not cancer) diagnosis, the woman's age at the time of her first menstrual period was 14 or older, the woman's age when she gave birth to her first child was 25–29 years, and has not first-degree relatives (mother, sisters, and daughters) have had breast cancer, the following will be the results.

(2) Scoring System. The tool is an online calculator. The Breast Cancer Risk Assessment Tool (BCRAT) is based on a statistical model known as the Gail model, named after Dr. Mitchell Gail, Senior Investigator in the Biostatistics Branch of the NCI Division of Cancer Epidemiology and Genetics. The tool uses a woman's own personal information to estimate risk of developing invasive breast cancer over specific periods of time, including age, age at the start of menstruation, age at first live birth of a child, number of first-degree relative (mother, sisters, and daughters) with breast

cancer, number of previous breast biopsies (whether positive or negative), and presence of atypical hyperplasia in a biopsy.

Data from the Breast Cancer Detection Demonstration Project (BCDDP), a joint NCI and American Cancer Society breast cancer screening study that involved 280,000 White women aged 35–74 years and from the NCI Surveillance, Epidemiology, and End Results (SEER) Program were used in developing the model.

Estimates for Black/African American women were based on data from the Women's Contraceptive and Reproductive Experiences (CARE) Study and from SEER data. CARE participants included 1,607 women with invasive breast cancer and 1,637 without.

Estimates for Asian and Pacific Islander women in the United States were based on data from the Asian American Breast Cancer Study (AABCS) and SEER data. AABCS participants included 597 Asian and Pacific Islander women with invasive breast cancer and 966 women without breast cancer.

Estimates for Hispanic women were based on the San Francisco Bay Area Breast Cancer Study (SFBCS) and the California Cancer Registry and SEER Program. SFBCS participants included 1,086 women with invasive breast cancer and 1,411 women without breast cancer [16].

The estimated 5-year breast cancer risk assessment classified women as high risk if their risk of breast cancer was greater than 1.66%, as per the Gail model. We calculated the study population's mean 5-year and lifetime risks, and based on whether a subject's risk was lower or higher than the study population mean, we classified them as low or high risk [16, 19].

Reliability of the Breast Cancer Risk Assessment tool: test-retest stability was seen between time 1 and time 3, with $r = 0.87$ for Pearson's correlation coefficient.

2.5.3. Tool III: A Structured Breast Cancer Knowledge and Practice Questionnaire. A structured, pretested, questionnaire developed by the researchers using the recent current national and international literatures. Information was collected focused on nurses' knowledge of breast cancer and breast cancer prevention and practice of breast self-examination and barriers towards BSE practice among nurses, also on clinical breast examination, as well as knowledge about use of mammography.

2.6. Examples of Knowledge Questions

2.6.1. At What Age Should BSE Be Started? It depends on the following factors: (1) from birth, (2) from puberty, (3) from 20 years, (4) from 30 years, (5) after menopause, and (6) no idea.

2.6.2. How Often Should BSE be Done? It depends on the following factors: (1) daily, (2) weekly, (3) monthly, (4) yearly, and (5) no idea.

2.6.3. What Is the Best Time to Do BSE? It depends on the following factors: (1) during menstrual flow, (2) a week after period, (3) during pregnancy, (4) during breast feeding, and (5) no idea.

2.7. Scoring System. Questions were multiple choices, so each correct answer got a score of 2 but incorrect answer got a score of 0. Questions were divided to three parts: Part 1: nurses' knowledge of breast cancer, breast cancer prevention, practice of breast self-examination, and barriers towards BSE practice among nurses (17 questions) of 34 degrees, Part 2: clinical breast examination (5 questions) of 10 degrees, and Part 3: knowledge and use of mammography (6 questions) of 12 degrees. The total score of each category was summed and categorized as satisfactory level (scored more than 50%) and unsatisfactory level (scored 50% or less). The internal consistency of the structured questionnaire on breast cancer knowledge and practice is outstanding, as indicated by the Cronbach's α test result of 0.85.

2.8. Nursing Educational Program about Breast Cancer. This educational program was prepared by the researchers. It has been written in an easy Arabic language with clear illustrations and diagrams including theoretical understanding regarding breast cancer, including definition, causes, symptoms, diagnosis, treatment, prevention, self-examination, BSE knowledge and practice, and mammography knowledge. The researchers used various normal and abnormal breast modules to show the BSE. Under supervision, the participants were permitted to practice BSE on the modules.

2.9. Validity and Reliability of the Study Tools. Prior to the collection of data, a pilot study with 28 nurses (10%) was conducted to assess the clarity, objectivity, relevance, practicality, and applicability of each tool. This pilot investigation indicates that the necessary adjustments were made. The study sample did not include any of the patients who participated in the pilot study.

A panel of five experts—two professors in the field of cancer and three professors of nursing—checked the educational program's face validity by providing each professor with a copy of the research proposal, tools, and educational program (booklet) evaluating it for application ease, comprehensiveness, clarity, and relevance. Only minor adjustments were needed, and those were made appropriately. An odd number of professors were selected to confirm the validity of the tools and program. When three or more professors approved the tools and program contents, they measured what was intended to measure.

2.10. Ethical Considerations. The World Medical Association Declaration of Helsinki (1997) was followed in terms of all research ethics guidelines. Prior to initiating the pilot study and the main research, the Assiut University Ethics Committee granted ethical approval to the nursing faculty (No. 53 at 23/5/2023). The study subject is free to decline

participation at any time or to leave the study at any point for any reason. No health risks will be considered when gathering data on the research issue of privacy. It will be guaranteed to participants that all of their data will be kept in strict confidence.

2.11. Fieldwork

2.11.1. Preparatory Phase. To perform the study, official approval was acquired from the head of Assiut University Hospitals. Once nurses were satisfied regarding confidentiality and the intended use of the material for research, they gave their informed agreement to participate. Arabic, colored brochure included intensive educational program was prepared and printed in hard copies to be provided to nurses.

All selected nurses were agreeing to participate in the study, and there was zero percent of nurses refused to participate especially after explaining the purpose of the study.

2.11.2. Implementation Phase. Data were collected during the period from first of March to July 2022, during morning and afternoon shifts at medical and surgical departments at main Assiut University hospital and woman's health hospital. The general Assiut University hospital includes four main hospitals: a women's health hospital, a children's hospital, the main general hospital (which includes general medical and surgery departments), and a psychiatric health hospital. We chose the nurses working in hospitals aware of breast self-examination because of their natural work to measure barriers to doing breast self-examination first, but we found a lack of knowledge and fear from doing it, so we implemented an educational program to improve nurses' practices and change their attitude. For that, we chose nurses in women's health hospital and main general hospital. Those specific wards were purposefully selected because the working nurses are dealing with patients who diagnosed with breast cancer; so, they had the priority of selection. Nurses were interviewed in small groups (3-4 nurses) for each group by the researchers according to work load at every place. Depending on the nurses' participation and response, the baseline data collection took an average of 20 to 30 minutes. Before beginning the data-gathering process, the nurses were informed of the study's purpose.

Baseline data were collected by researchers as hospital name (place of work), age, marital status, educational level, and occupation by using tool I. The breast cancer risk assessment was measured for every nurse by using the online Gail model by using tool II. Assessment of nurses' knowledge and practice of breast cancer and BSE was measured for every nurse by using tool III. After completing the assessment of all nurses' base line data, the researchers provided the nurses with the educational program to improve knowledge for nurses with insufficient knowledge and practice and re-emphasize the importance of breast self-examination practices for nurses with negative attitude (barriers).

To complete this program of the study, it was divided into two sessions as follows: the first session covered the theoretical portion of the information regarding breast cancer, including its definition, causes, symptoms, detection and treatment options, prevention strategies, when to perform a breast self-examination, and information on mammography. The first session took between 30 and 40 minutes.

The second session included practical part for teaching the nurses how to perform BSE using demonstration and redemonstration on modules. To make sure they understand the precise way to carry out the procedure correctly, nurses were allowed to practice the newly acquired steps while being supervised by the researcher. The second session took between 30 and 45 minutes. An instructional color leaflet written in understandable Arabic was presented to the nurses. To aid in their retention of the instructional program, the researcher included role-play, diagrams, and photographs.

2.11.3. Referral Part. Every nurse was reported by her breast cancer risk assessment percentage and nurses with high-risk percentage and suspicious for any abnormal mass were consulted by specialist works in the diagnostic radiology unit at the University Hospital. There were 9 nurses in high risk for continuous follow-up and 5 nurses suspicious for abnormal mass were referred to radiology specialist during the study.

2.11.4. Follow-Up Phase. After one month after completing the second session, a scheduled meeting was arranged by the researchers for each group of nurses according to their availability at their shifts and department work load to assess their knowledge and practice about breast cancer and BSE.

2.12. Data Analysis. The data collected were examined, coded, tabulated, analyzed, and ready for computer entry. The computer program SPSS version 20 (Armonk, NY: IBM Corp) was used to perform descriptive statistics (i.e., frequencies and percentages, mean, and standard deviation). Chi-square and the independent sample *T*-test were employed to examine the relationship between the two groups. Significance is defined as a *p* value of less than 0.05 [20].

3. Findings

Regarding to personal data, most of the participants were in the mean age (42.8429 ± 7.9164), and 83.2% of them were married. Regarding to educational level and occupation, the majority of nurses have diploma degree and nurses (58.6% and 58.6%), respectively (see Table 1).

Table 2 concluded that the majority of participants had no previous history of breast cancer nor ever had a breast biopsy (94.3% and 96.8%, respectively). Regarding to the woman's age at the time of her first menstrual period, more than half of them (53.9%) were in the age between 12 and 13 years, also the woman's age when she gave birth to her

TABLE 1: Distribution of study sample related to personal data.

Items	(N = 280)	%
Hospital name		
Main hospital	170	6.07
Women's health hospital	110	39.3
Age		
35–45	169	60.4
More than 46	111	39.6
M ± SD	42.8429 ± 7.9164	
Marital status		
Single	23	8.2
Married	233	83.2
Divorced	10	3.6
Widowed	14	5.0
Education level		
Bachelor degree	52	18.6
Diploma	164	58.6
Secondary school	64	22.9
Occupation		
Head nurse	52	18.6
Nurse	164	58.6
Assistant nurse	64	22.9

Note. M: mean; SD: standard deviation; N: total sample size.

first child, most of them (44.3%) were in the age 21–25 years. Also, the participants reported that all of them had no first-degree relatives diagnosed with breast cancer.

Table 3 demonstrates that their statistically significant difference between pre- and postprogram was according to the level of knowledge and practice of breast self-examination, knowledge of clinical breast examination (CBE), and use of mammography with a *p* value (0.0001).

Table 4 shows that regarding to relations between five years risk assessment and personal data, there are statistical differences between five years patient risk and participant's age (*p* value 0.002*, "which means that the older the age, the greater the risk," previous history of breast cancer and participant's age when she gave birth to her first child.

Figure 2: It was revealed that 3.2% of high-risk patients developed breast cancer in the following five years of their lives. In Figure 3, more than half of the participants and their barriers did not do BSE because they did not have any symptoms of breast cancer, followed by a fear of finding any abnormalities. In Figure 4, most participants and their source of information about breast cancer were from the hospital (50%).

4. Discussion

The most common cancer and the second-leading cause of cancer-related deaths in women is breast cancer. BSE, or breast self-examination, is a useful tool for diagnosing this condition [21]. Thus, the objectives of the current study are to evaluate the risk of breast cancer in nurses, evaluate their knowledge of breast self-examination, and identify the obstacles to breast self-examination among nurses.

The female participants in the study group ranged in age from 35 to 45 on average, with almost one third being older than 46. More than half of the women had nursing degrees,

and most of them were married. The fact that fewer than one third of the women in the research group worked as nurse assistants affected their level of skill and behavior.

In the present study, 280 nurses were assessed with respect to breast cancer risk. The nurses with the highest average risk points (ARPs) contingent on the five risk factors assessed, which was developed by the authors in [22], in the study are one third of them having with the third level of risk about age, minority of them with the second level of risk about family history of breast cancer related to second degree relative (aunt grandmother), and the second level of risk with previous breast cancer with previous biopsy. Also, it was determined that the lowest number of nurses had no children with the third level of risk and that the menarche age before 11 years old with third level of risk; these findings are in agreement with the study of the authors in [23], who performed this study on 267 nurses' relatively near to the present study.

Regarding to five-year nurse risk, the findings of the current study revealed that nurses in Women's Health Hospital had eight high-risk cases compared to one in the main hospital, while the majority in both hospitals had low-risk patients Figure 2. These findings were consistent with those of [23] who discovered that the lowest percentage of their study sample had high risk at five years and required routine follow-ups. These results were in conflict with studies that reported a higher risk assessment than the current research, which was conducted by Mahadevaiah et al. [24], with findings of their sample (23.3%). Mortada [25] assessed that according to Egyptian women, 30% of the female sampled had a high chance of developing breast cancer. The variation may result from the use of various risk evaluation tools [12] and various sample sizes.

The most frequent reasons given by nurses for not performing breast self-examination and mammography included more than one participant being informed they had no symptoms, followed by fear of receiving a breast cancer diagnosis, and a minority of them not knowing how to do it Figure 3. These findings do not match with the findings of Heena et al. [26], who carried out their study among female healthcare professionals, which reported that main reasons to avoid breast self-examination, clinical examination, and mammography were no reason for the examination and afraid of the bad results, while in conflict with Alshahrani et al. [27]'s study done on female healthcare workers with the first cause of barriers is unaware of the examination; without any training, it is painful and end with fear of the results. This may be because most of the healthcare workers in this study are younger and have less experience and knowledge is acquired from work rather than from actual study participants. Therefore, it is important to develop open communication behaviors between nurses and the head nurse and carefully listen to nurses' issues [28]. Same ideas with many studies carried out one nonmedical female that the first cause is a poor of knowledge and practices [29–33].

The current research demonstrated that half of the participants had knowledge and habits from working in hospitals, which were followed by the mass media, such as

TABLE 2: Distribution of study sample related to medical history.

Items	(N= 280)	%
(1) Previous history of breast cancer	Yes (9) No (271)	3.2 96.8
(2) Has the woman ever had a breast biopsy	Yes (9) No (271)	3.2 96.8
(3) How many breast biopsies (positive or negative) has the woman had?	0 (271) 1 (9)	96.8 3.2
(4) Has the woman ever had a breast biopsy with atypical hyperplasia	Yes (9) No (271)	3.2 96.8
What was the woman's age at the time of her first menstrual period?		
"7-11	9	3.2
'12-13	151	53.9
14 and more	120	42.9
What was the woman's age when she gave birth to her first child?		
0	30	10.6
15-20	43	15.4
21-25	124	44.3
26-30	77	27.5
31-37	6	2.2
Family history of the woman's has had breast cancer?		
Non	264	94.3
Yes	16	5.7
Frist degree (mother and sister)	5	31.2
Second degree (aunt and grandma)	11	68.8

Note. %: percentage; N: total sample size.

TABLE 3: Comparison between pre- and postprogram according to the level of knowledge and practice of breast self-examination (BES), clinical breast examination (CBE), and use of mammography.

Levels	Study sample (pre) (N= 280)		Study sample (post) (N= 280)		p value
	No	%	No	%	
Knowledge and practice of breast self-examination (BES)					
Satisfactory level	205	73.2	275	98.2	0.0001**
Unsatisfactory level	75	26.8	5	1.8	
Total	280	100.0	280	100.0	
Knowledge of clinical breast self-examination (CBE) and use of mammography					
Satisfactory level	253	90.4	280	100.0	0.0001**
Unsatisfactory level	27	9.6	0	0.0	
Total	280	100.0	280	100.0	

Note. Chi-square test; p: probability value; N: total sample; statistically significant at $p < 0.01$. **: statistically significant.

television and the internet Figure 4. This outcome was consistent with Mahadevaiah et al. [24] and Sarker et al. [33] who claimed that nurses' primary sources of knowledge are health centers or health campaigns, with friends and family coming in second and third, respectively, and social media coming in last. El-Shemy [34] stated that the mass media is the first source of health education, whereas healthcare professionals are the lowest source of knowledge and that there is also a disconnection between Abd-Elaziz et al. [7], which indicated that television was the primary knowledge source, followed by friends and family. This could be as a result of the participants in the present study being of a different age and having worked in hospitals for a shorter period of time, as knowledge gained from these workplaces is increased with increased years of experience.

Regarding knowledge and practices of clinical breast examination and mammography, the present results demonstrated that the nurses have knowledge preprogram and more improved after program with harmony with Heena et al. [26] and Alenezi et al. (2022), who recommended to develop evidence-based and target-oriented educational programs for the healthcare providers which would empower them to educate the community and the importance of early detection and disagree with the study carried out on general population with very low knowledge and practices about all screening test for breast cancer (breast self-examination, clinical breast examination, and mammogram), which were needed for condensed learning programs by Hanson [31], Zare et al. [32], and Sarker et al. [33].

TABLE 4: Relation between personal data, medical history, and five years patient risk.

Personal data and medical history	Five years patient risk unrisky (<i>n</i> = 271)	High risk (<i>n</i> = 9)	<i>p</i> value
Hospital name			
Main hospital (medical surgical departments)	169 (60.4%)	1 (0.4%)	0.002*
Women's health hospital	102 (36.4%)	8 (2.8%)	
Age			
35–45	168 (60.0%)	1 (0.4%)	0.002*
More than 46	103 (36.8%)	8 (2.8%)	
Marital status			
Single	23 (8.2%)	0	0.609
Married	225 (80.4%)	8 (2.8%)	
Divorced	10 (3.6%)	0	
Widowed	13 (4.6%)	1 (0.4%)	
Education level			
Bachelor degree	51 (18.2%)	1 (0.4%)	0.145
Diploma	156 (55.7%)	8 (2.8%)	
Secondary school	64 (22.9%)	0	
Occupation			
Head nurse	51 (18.2%)	1 (0.4%)	0.145
Nurse	156 (55.7%)	8 (2.8%)	
Assistant nurse	64 (22.9%)	0	
Previous history of breast cancer			
Yes	15 (5.4%)	1 (0.4%)	0.416
No	256 (91.4%)	8 (2.8%)	
Has the woman ever had a breast biopsy?			
Yes	8 (2.8%)	1 (0.4%)	
No	263 (93.9%)	8 (2.8%)	
How many breast biopsies (positive or negative) has the woman had?			
0	263 (93.9%)	8 (2.8%)	0.258
1	8 (2.8%)	1 (0.4%)	
Has the woman ever had a breast biopsy with atypical hyperplasia?			
Yes	8 (2.8%)	1 (0.4%)	
No	263 (93.9%)	8 (2.8%)	
What was the woman's age at the time of her first menstrual period?			
7–11	9 (3.2%)	0	0.679
12–13	145 (51.8%)	6 (2.1%)	
14 and more	117 (41.8%)	3 (1.1%)	
What was the woman's age when she gave birth to her first child?			
0	29 (10.4%)	1 (0.4%)	0.0001**
15–20	42 (15.0%)	1 (0.4%)	
21–25	120 (82.9%)	4 (1.4%)	
26–30	75 (26.8%)	2 (0.7%)	
31–37	5 (1.8%)	1 (0.4%)	

p: probability value; *n*: subsample; frequency test. **: statistically significant.

According to the current study, there is a statistically significant difference in knowledge and practice of breast self-examination (BES) between the before and postprogram periods with the majority of them having a satisfactory level after implementation of the program, in line with the effect of the health educational program on improving knowledge and practice. Panczyk et al. [35], who found in a study that only about 1 in 3 nurses had performed BSE in a fully accurate manner, demonstrating the need for ongoing education in this area. This has important implications for nurses as well as for the women they guide and treat. They should also be supported in their efforts to implement teaching programs that will advance their knowledge of

breast self-examination (BES) for the early detection of breast cancer by Abd-Elaziz et al. [36], Ahmed and Shrief [37], El-Shemy and Essa [34], Sarker et al. [33], and et al. [38].

Finally, in the current study, the knowledge and practices affected by the program because the study sample as a part of healthcare personnel, most of them needed re-emphasize on correct information, re-emphasize on the important of doing practices, change nurse's attitude and poor concept about fear of discover any abnormality which consider one of the main barriers towards any methods of breast cancer detection, and need to be understand and support through the referral ways by specialist female doctors.

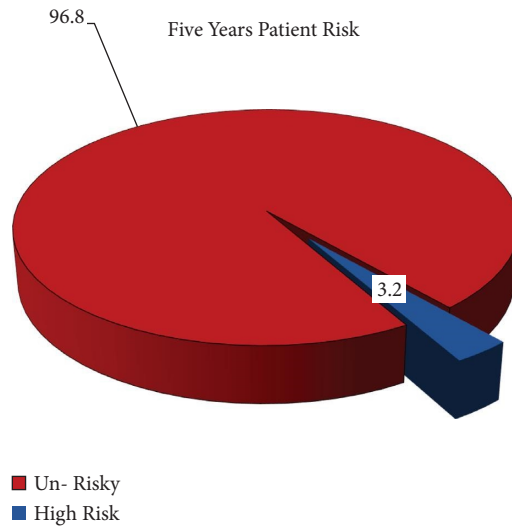


FIGURE 2: Five years patient risk.

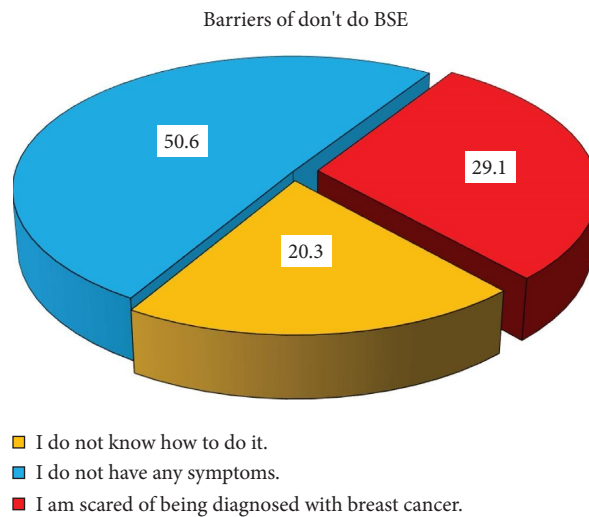


FIGURE 3: Barriers of do not do breast self-examination (BSE).

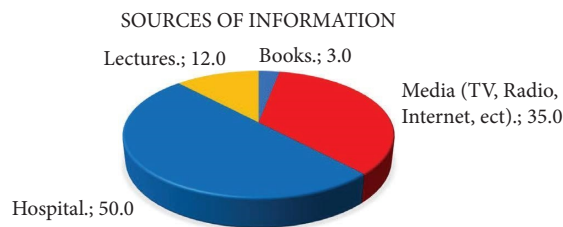


FIGURE 4: Sources of information.

These findings are supported by recent studies from Dechasa et al. [39], Shallo and Boru [40], Dagne et al. [41], and Elias et al. [42], who reported that the practice of BSE was significantly associated with having good knowledge about BSE practice among the respondents. Those with good knowledge about BSE practice are more likely to perform BSE practice as compared to those who have poor

knowledge, which explain that knowledge about the impact of breast cancer and having information on diagnostic methods for breast cancer enable them to perform BSE. Also, female health professionals who had a favorable attitude towards breast self-examination were three times more likely to practice breast self-examination than those who had an unfavorable attitude. Through enough

information about the merits of BSE and its importance to women's health, it will help them to have a good attitude towards BSE practice.

4.1. Limitations. It is important to note some restrictions. Initially, the researchers encounter challenges in enlisting all nurses simultaneously to participate in the training sessions as that would affect patients' care duties and the availability of the staff working in the departments when needed. Second, the researcher has a challenge of implementing the educational program, while waiting the nurses attend the teaching sessions during the workload activities and peak of work. Finally, this study conducted on nursing staff working in two university hospitals out of seven hospitals, which may affect the generalizability of its results.

5. Conclusion

The study concluded that about 3.2% of the nurses with high risk of developing breast cancer needed a follow-up; more than half of them do not perform breast self-examination because they think that do not have any symptoms in the breast followed by scaring to found any abnormality and inadequate knowledge and the educational program have a significant effect on nurses' knowledge and practices and even changed attitude of nurses about barriers through improve the practices of self-examination after the program.

The researchers recommend well-planned and comprehensive educational programs for all women as a vital and cheap tool for screening breast cancer. The educational programs not only focus on providing information because it is one barrier against breast self-examination but also on encouraging regular practice, emphasizing the importance of regular breast self-examinations as a crucial step in the early detection of breast cancer, and encouraging women to make it a habit to perform self-exams monthly.

Re-emphasize women through a follow-up to change their negative attitude of fear and negligence towards themselves and towards practicing breast self-examination. Provide resources for further support (an empowerment program). Offer information on where participants can access additional resources, such as support groups, healthcare providers as referral systems, and mammogram screening services. In addition, more information regarding breast self-examination based on scientific understanding ought to be provided by educational initiatives and the media.

Conduct a longitudinal study to examine the role of digital health technologies, such as mobile apps and wearable devices, in promoting BSE and other preventive health behaviors among nurses. Investigate how these technologies can be effectively utilized to provide personalized reminders, tracking tools, and educational resources to encourage regular BSE practices. Replication of the study by other researchers in different geographical areas to explore

differences that may be found between population and enhance benefits to nurses' personnel [43–45].

Data Availability

The data used to support the findings of this study are available from the corresponding author upon reasonable request.

Additional Points

Accessibility of Information and Resources. This article contains all of the data that were created or examined during the investigation.

Ethical Approval

The authors attest that every procedure was carried out in compliance with all applicable rules and regulations.

Conflicts of Interest

The authors declare that they have no conflicts of interest.

Authors' Contributions

All authors conceived the idea presented in this study. A. WR, M. GT, and A. SA wrote the methods section, conducted the analysis, investigated the data, and prepared the original draft. H. EK, A. AM, O. NN, and M. HMS conducted the analyses, wrote the results section, and reviewed and edited the manuscript. All the authors collaborated on the discussion section. All authors discussed the results and contributed to the final manuscript and the process of writing the paper. All the authors have read and approved the final manuscript.

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