Early Detection and Diagnosis of Breast Cancer in Women at High Risk

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ABSTRACT:
Introduction. Early detection of breast cancer in women at high risk will improve prognosis and survival. Mammography is considered key within a comprehensive surveillance approach. Consider and identify women with high-risk factors who are more likely to develop breast cancer. Early initiation of screening, between 25 and 30 years of age. Mammography should be performed annually or biannually, depending on the level of risk, complemented by ultrasound and magnetic resonance imaging and biopsy to confirm the diagnosis.
Objective. To describe the methodology used for the early detection and diagnosis of breast cancer in high-risk women using mammography.
Material and methods. Quantitative, descriptive, prospective and correlational study. The sample involved 56 adult women, selected by convenience sampling, from a clinic in Cuernavaca. Data collection was carried out through telephone interviews, using a structured instrument with sociodemographic variables, personal history, and mammography results. The data were processed in Excel and analyzed with SPSS v. 22, applying measures of central tendency and percentages. Informed consent was granted, and institutional approval was granted, in accordance with the General Health Law.
Results. The participants 56 women, most of them married 46.7%, The age groups of 50 to 59 years 38%. Schooling: secondary 42%. They have 2 to 7 children, the highest percentage of 2 to 3 children, 47%. A third perform breast self-examination. By mammogram, 8% have a medium and high probability of breast cancer.
Conclusions. The results of this study may be helpful in promoting breast cancer screening
Keywords: Early detection; Diagnosis; Mammography; Women at risk

INTRODUCTION

Current Breast Cancer Landscape
Breast cancer is a global health problem, and in recent years, cancer incidence and mortality have increased significantly worldwide[1]. Breast cancer caused an estimated 670 000 deaths

globally in 2022. According to the World Health Organization (WHO, 2025), cancer is the second leading cause of death globally. Early detection has become a key strategy for disease control, with mammography being the main recommended method for the timely diagnosis of breast cancer[2].

Worldwide, in 2020, 685,000 women died from breast cancer. By the end of this year, 7.8 million women who had been diagnosed with the disease in the previous 5 years were still alive. This represents 11.7% of all types of cancer, making breast cancer the most prevalent in the world[2].

Breast cancer is a disease that affects women of any age from puberty in all countries of the world, although the highest incidence rates occur in adult women. In 2022, 2.3 million new cases were diagnosed, and 670,000 deaths were recorded globally from this cause[4].

In Mexico, breast cancer is one of the main public health concerns. In 2020, 29,929 new cases and 7,931 deaths were estimated with an incidence rate of 40.5 and a mortality rate of 10.6 per 100,000 women, placing it among those with the highest incidence and mortality from breast cancer (IMSS, 2022, Redaction 2020). It also occupies the 5th. Place among the causes of death in Mexican women[5].

The disease is characterized by the abnormal and uncontrolled growth of cells in the breast tissue that can form malignant tumors capable of spreading to other parts of the body if not treated in time and the risk factors are: aging, obesity, alcohol and tobacco consumption, family history of breast cancer, radiation exposure, reproductive history, hormone treatment, and postmenopause. About half of breast cancer cases correspond to women without any identifiable risk factors except gender and over 40 years of age[6].

Physiopathology

Cancer cells begin to develop inside milk ducts and the lobules that produce breast milk. This problem can be detected in early stages, cancer cells can spread nearby breast tissue, and this produces nodules or thickening and spread to lymph nodes near other organs (metastasis), which can be life-threatening and lethal. Some inherited high-penetrance gene mutations greatly increase the risk of breast cancer, the most dominant being mutations in the BRCA1, BRCA2, and PALB2 genes.

The onset is silent, so early detection is necessary, however, different combinations of symptoms may occur: presence of nodules or thickening of the breast, often without pain, change in the size and shape and appearance of the breast, appearance of dimples, redness, cracks or other changes in the nipple and production of abnormal fluid through the nipple. Protocolo de atención integral[7].

Early Detection Tests

Early detection of cancer can reduce mortality by 20 to 60%. However, early detection of cancer is still unsatisfactory. According to the American Cancer Society's 2019 report, only half of women age 40 and older have had a mammogram, and 32% of women ages 34 to 40 have had a Pap smear and HPV test in the past 5 years, while about 54% of people age 45 and older have been screened for HPV. colon cancer[2-8].

The indication is for women 40 to 44 years of age to be screened with mammogram every year, women 45 to 54 should have a mammogram every year, 55 and older can change the mammogram every 2 years or they can choose to continue it annually screening should continue as long as the woman is in good health and is expected to live at least 10 years more[9-10]. Clinical breast exam and breast self-exam. Diagnosis is based on changes found as breast masses or lumps[8].

Early detection of breast cancer when it is small and has not spread is easier to treat with good results and thus reduce the risk of tumor removal, radiotherapy to reduce the risk of recurrence of surrounding breast tissues, chemotherapy treatment, with hormones or biological products to eliminate cancer cells and prevent spread.

Diagnosis

Breast cancer is a heterogeneous disease that includes a wide range of clinical, radiological and pathological manifestations. The process of diagnosis and treatment of women with breast cancer is essentially multidisciplinary[11].

American Cancer Society, mentions that sometimes breast cancer is found after symptoms appear, but many women with breast cancer do not have symptoms. That's why it's so important to get routine breast cancer screening.

Women at increased risk of developing breast cancer should be evaluated by a geneticist to confirm their history, receive counseling on appropriate treatment, and offer breast cancer screening. Currently, mammography with magnetic resonance imaging is considered the optimal method for the early detection of breast cancer in these women. Although there is no evidence of a benefit in mortality, there is evidence, from surrogate markers, that this intervention is helpful.

The National Institute for Clinical Excellence in the United Kingdom and the American Cancer Society have developed national recommendations. We identified 1134 cases of breast cancer, specifically 251 Inflammatory Breast Cancer (IBC) and 883 carcinoma in situ and/or familial carcinoma (BCS).

The 7-year survival proportions deviated significantly with 92.9% for women with IBC and 96.4% for women with SBC ($p < 0.05$). Women with IBC are diagnosed with significantly higher tumor stages ($p < 0.05$) and have poorer tumor biology on multiple dimensions, e.g., larger tumor size or more often triple negative ($p < 0.05$). Higher breast density (BI-RADS risk ratio of [RR]: 3.293), certain age groups (55-59 years RR: 1.345), and family history of breast cancer (RR: 1.299) were identified as significant risk factors ($p < 0.05$) for the diagnosis of IBC.

Women with MIC had lower overall survival rates than women with CMS, possibly due to more advanced stages at diagnosis. Higher breast density and a family history of breast cancer may encourage healthcare professionals to personalize their screening process [12-13].

Treatment.

Treatment based on the patient's characteristics, type of cancer, and its spread (surgery, radiation therapy, and medication) also depends on the subtype of cancer and the degree of spread from the breast to the lymph nodes (stages II or III) or other parts of the body (stage IV).

To reduce the chance that the cancer will come back (recur), doctors combine treatments that may include: surgery to remove the tumor from the breast, radiation therapy to reduce the risk of recurrence in and around breast tissues, medications to kill cancer cells and prevent spread, including hormone treatments, chemotherapy, or specific biologic treatments that are more effective and better tolerated if started early possible and are taken until the scheme is completed.

Surgery allows only the cancerous tissue to be removed (lumpectomy or partial mastectomy) or the entire breast (total mastectomy). Surgery may also remove lymph nodes to evaluate the tumor's ability to spread, and surgery for invasive cancers is performed. A minor procedure called a sentinel node biopsy is now preferred because it has fewer complications.

Radiation therapy plays an important role in the treatment of breast cancer. In the early stages of breast cancer, radiation therapy can prevent a woman from having to have a mastectomy. In the later stages of the disease, radiation therapy can reduce the risk of recurrence even if a mastectomy has been performed. In the advanced stage of breast cancer, and in some circumstances, radiation therapy can reduce the chance of death from the disease.

Radiation therapy treats residual microscopic tumors that remain in breast tissue or lymph nodes, reducing the chance of recurrence affecting the chest wall. In cases of advanced cancer, the tumor can erode the skin and cause open sores (ulcers) that are not necessarily painful. Women with non-healing breast wounds should seek medical attention for a biopsy.

Initial chemotherapies are introduced. 20th century 1940s–50s and 1970s–80s: Partial mastectomy or lumpectomy emerges as a less invasive alternative. In the 1990s–2000s, studies on hormones and estrogen and progesterone receptors begin.

Medicines to treat breast cancer are selected based on the biological properties of the cancer, which are determined by special tests (determination of tumor markers). Most drugs used against cancer are already on the WHO Model List of Essential Medicines.

Breast cancer treatments, which can be given before ('neoadjuvants') or after ('adjuvants') surgery, are based on the biological subtyping of cancers. Some subtypes of breast cancer are more aggressive than others, including triple-negative (which do not express the estrogen receptor (ER), progesterone receptor (PR), or the HER-2 protein receptor).

Cancer that expresses the estrogen receptor (ER) or progesterone receptor (RP) is likely to respond favorably to endocrine (hormonal) treatments with tamoxifen or aromatase inhibitors. These drugs are given orally for 5 to 10 years and nearly halve the chances of recurrence of "hormone receptor-positive" cancers. Endocrine treatments can cause menopausal symptoms, but they are generally well tolerated.

Cancers that do not express ER or RP are "hormone receptor negative" and should be treated with chemotherapy, unless the tumor is very small. Currently, the chemotherapy regimens available are very effective in reducing the chances of cancer spreading or recurrence and are usually given as outpatient treatment. In general, if there are no complications, chemotherapy for breast cancer does not require hospital admission.

Breast cancer that independently overexpresses a molecule called a HER2/neu oncogene (HER-2 positive) can be treated with specific biologic drugs such as trastuzumab. When specific biologic treatments are given, they are combined with chemotherapy to be effective in killing cancer cells, and the effectiveness of breast cancer treatments depends on adherence to the full course of treatment. Partial treatment reduces the chance of achieving a positive result.

Mammography screening (MCP) programs are crucial for early detection and thus improve survival. Interval breast cancers (MICs) are an important quality criterion and have been linked to increased mortality[13-14].

In this retrospective cohort study, we combined data from the Swiss "donna" MSP with data from cancer registries from 2010 to 2019 to classify cases as MIC or screen-detected breast cancer (CMC). We compared the incidence, tumor characteristics, and survival ratios of women with MIC versus women with CMC. We used a multivariate Poisson regression with robust errors to identify risk factors for the diagnosis of IBC[15].

Advances in diagnostic imaging (mammograms, ultrasounds). Identification of BRCA1 and BRCA2 genes. Use of targeted therapies such as trastuzumab (Herceptin) for HER2+. XXI century. Personalized medicine based on molecular biology. Conservative surgery and less invasive treatments. Immunotherapy and new targeted therapies and increased public awareness, mass screening, and early detection programs[15].

Nursing intervention in the timely detection of breast cancer.

Participation in cancer screening tests is a great challenge, especially in Mexico, due to the high costs for diagnosis, so it is proposed until the final stages, which in turn negatively affects survival and places a heavy burden on health systems. In health systems, early diagnosis of cancer can be hindered by various factors such as lack of knowledge of

screening strategies, fear of breast cancer detection, and lack of services and tests. To this end, the nursing staff is responsible for addressing these obstacles.

Nursing personnel are an important member of the health system in its management for health, health promotion and control of non-communicable diseases such as cancer. The multifaceted role of nursing staff and the interventions directed by them guarantee the early detection of cancer, as it is a job with autonomy for decision-making and the faculty to personalize patient care.

Nursing interventions can contribute to the early detection of cancer through various procedures because it promotes awareness and understanding of cancer, the perception of its threats and early diagnosis through counseling, education and information about cancer detection risks and methods. WHO emphasized the importance of the nurse promoter ensures the prevention and control of diseases, including cancer, in their multi-role nurses intervening in ensuring the detection of cancer[2].

The objective of this work is to write the methodology used for the early detection and diagnosis of breast cancer in women at high risk through the use of mammography, as well as the classification of the results of the Breast Imaging Reporting System (BI-RADS) in women from 40 to 69 years of age.

METHODOLOGY

Study design. A study with a quantitative, descriptive, prospective and correlation approach, aimed at adult women, was carried out in 2024. The research aimed to describe mammographic findings using the BI-RADS classification in women aged 40 to 69 years at high risk of breast cancer.

Population and sample. The population consisted of 56 adult women, patients of a family medicine clinic in Cuernavaca, Morelos, Mexico. Non-probabilistic sampling, for convenience, including only women who agreed to voluntarily participate in the study.

Data collection instruments. A structured instrument was used to collect information, which included sociodemographic variables, relevant personal history, and mammography results obtained using the BI-RADS (Breast Imaging Reporting and Data System) classification system.

Procedure for data collection. The information was collected through telephone interviews, with prior verbal consent of the participants. Women who met the criteria for age and mammography results and who agreed to participate in the study were included.

Statistical analysis. A database was developed in the Microsoft Excel program, which was later exported to the SPSS version 22 statistical software for analysis. Measures of central tendency (mean, median, and mode) as well as percentages were used to describe population characteristics and mammogram findings.

Ethical considerations. The research was approved by the head of nursing of the institution. Informed consent was obtained from all participants, guaranteeing respect for their dignity, privacy, and autonomy. The study was developed in accordance with the provisions of the General Health Law, in its first, second and third articles, which point out the importance of respecting life, human rights, the informed decision of the patient, and maintaining a professional relationship based on mutual respect and recognition of the dignity, values, customs and beliefs of people.

RESULTS

The participants were 56 women, of whom 46.7% were married and 13.3% were single, 30% were single. The age groups of 38 to 49 years 32%, 50 to 59 years 38%, 60 and over

30%. Schooling: primary 30%, secondary 42%, high school and university 28%. Women have 2 to 7 children, and with the highest percentage of 2 to 3 children, 47%. A third mention performing monthly breast self-exams. In mammography, 19% had risk findings, and 7% of the sample had a medium and high probability of breast cancer. Table 1.

Table 1 Mammogram findings in BI-RADS classification n-56

Breast Imaging

BI-RADS System	Percentage
BI-RADS 0	13%
BI-RADS 1	14%
BI-RADS 2	47%
BI-RADS 3	**19%**
BI-RADS 4 B	4%
BI-RADS 4 C	3%
BI-RADS 5 and 6	0

Reporting and Data System. Sample January the October 2023 (BI-RADS).

BI-RADS 0: Incomplete finding. Additional studies (mammography with spot compression, special views or ultrasound) are required.

BI-RADS 1: Negative. No abnormality is observed; normal, symmetrical breasts.

BI-RADS 2: Benign finding. There are no signs of cancer, but non-malignant structures (such as benign calcifications or lymph nodes) are described.

BI-RADS 3: Possibly benign. Very low chance of cancer; Short-term follow-up is recommended (every 6 months until stability is confirmed).

BI-RADS 4: Suspicion of malignancy. Biopsy is suggested.

4A: Low chance of cancer (2–10%). 4B: Moderate probability (10–50%). 4C: High probability (50–95%).

BI-RADS 5: High suspicion of malignancy (>95%). Urgent biopsy and BI-RADS 6: Biopsy-confirmed cancer is recommended. It is used for treatment monitoring.

DISCUSSION

Our results are similar to people's attitudes related to women's attitudes to perform clinical breast examination and mammography. The most common reasons found were no symptoms for clinical examination and mammography. For clinical examinations of 4 or 5-year-old mothers, more than half 52.8%, and for mammography the highest percentage is also 53.6% every 4 or 5 years. The risk factors that indicate breastfeeding less than 6 months 82.8%, exercise at week 75.7% and increased body mass index 56.9%[16].

Similar study Breast cancer detection in Mexico City[10] In a population of women the 40–69 years, 97,779 mammograms were performed. Of these, 94,883 were normal BIRADS 1 and 1,933 were suspicious BIRADS 3–5. Among 436 biopsies, invasive ductal carcinoma was the most frequent finding.

Study in Turkey by Guvenc[17], differs the reasons why women had had mammograms 75.8%, had acquired knowledge about breast cancer and its detection 73.7%, doctors gave information about breast cancer, and the main reasons were family history of breast cancer to obtain the monograph, the authors mention a number of factors that affect women's participation in mammography.

CONCLUSIONS

WHO's Global Breast Cancer Initiative aims to reduce global mortality from this disease by 2.5% per year, which would prevent 2.5 million deaths from breast cancer worldwide between 2020 and 2040. If this target is met, 25% of breast cancer deaths among women under 70 years of age would be avoided by 2030, and by 2040 that proportion would be 40%. The three pillars to achieve this goal are: health promotion for early detection, timely diagnosis and comprehensive management of breast cancer.

Public health education for women so that they can better understand the signs and symptoms of breast cancer and, together with their families, understand the importance of early detection and treatment, would enable many more women to see health professionals when they begin to suspect they have breast cancer. and before any cancer already reaches an advanced stage. This is possible even when mammography screening equipment is not available, which is now common in many countries.

The results of this study may be helpful in promoting breast cancer screening by mammography in México and the world.

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