

# IMPACT OF BREAST CANCER SCREENING ON PATIENTS' SURVIVAL RATE: A LITERATURE REVIEW

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## ABSTRACT

Breast cancer is a type of cancer that develops in the breast tissue and is commonly detected, especially in women. Approximately one out of every 10 diagnosed cancer cases is reported as breast cancer. In 2020, there were 2.3 million cases of breast cancer detected, resulting in 685,000 deaths within the same year. Early detection of breast cancer is crucial and can be achieved through various screening programs. These programs utilize different methods, ranging from the simplest and quickest method, which is breast self-examination, to more complex instrument-based methods like mammograms. Screening is the primary tool for detecting breast cancer at an early stage, even before patients experience any symptoms. This early detection allows for more successful and beneficial treatment, increasing the chances of survival and reducing the risk of death from breast cancer. The ultimate goal of breast cancer screening is detecting cancer in its preclinical stage when no symptoms are felt or seen by the patients. This early diagnosis leads to more effective treatment outcomes. According to the American Cancer Society, the 5-year relative survival rate for localized breast cancer, which means cancer has not spread outside the breast, is 99 percent. It's important to note that different screening options are available, and the choice of the right method depends on factors such as a woman's age, the presence of risk factors, and availability. However, screening also carries some risks, including false-positive test results and overdiagnosis of harmless lesions.

**Keywords:** Breast cancer, Early detection, Screening, Mammography, Clinical breast examination, Breast self-examination.

## **Introduction:**

Breast cancer (BC) is a cancer that grows in the breast tissue and is highly detected, especially in women. Every year one out of 10 diagnosed cancer cases are reported as BC (Alkabban & Ferguson, 2022). In 2018, about 2.089 million women proved to have BC globally which increased to 2.3 million in 2020 with 685 000 deaths within the same year (Smolarz et al., 2022; World Health Organization [WHO], 2023). Even though BC is more common in females, it rarely affects men in a percentage (0.5-1%) of the cases (WHO, 2023).

Breast cancer begins when different types of cells in the breast tissue are abnormally multiplied out of control, leading to tumors that can be transmitted to other places of the body if not early detected and treated (Feng et al., 2018). Many risk factors were identified to be related to the increased risk of BC, some are non-modifiable like older age, female sex, family history, and genetic factors. Other factors that are modifiable and related to a person's lifestyle factors like weight gain, alcohol drinking, smoking, and inactive lifestyle (Łukasiewicz et al., 2021). Different options are found to treat patients with BC incorporated surgical excision, radiotherapy, chemotherapy treatment, and hormonal therapy. Choosing the appropriate type of treatment depends on different factors as the size, type, and stage of cancer (Moo et al., 2018). Breast cancer in earlier stages responds more to treatment than those detected in a late stage and leads to an increase in the 5-year survival rate up to 99% if it is detected and treated while it is localized in the same tissue (American Cancer Society [ACS], 2023b). So, prevention is the best way to deal with this disease and early detection is the keystone in preventing further spread and successful treatment (Loomans-Kropp & Umar, 2019). Early detection of BC can be achieved through different programs of screening using different ways that range from the easiest and faster method (Breast self-examination) to more complicated instrument-based methods such as mammograms (Fatouh et al., 2020) This study aimed to review these different methods used for screening and early detection of BC to be well known to physicians and health policymakers.

## **Breast cancer screening:**

Breast cancer is one of the most substantial health issues that distress millions globally. It is a cancer that initiates within the breast tissue and can be spread to other parts and organs leading to a high mortality rate among females. Even with newly developed diagnostic and treatment strategies, it continues increasing in the incidence of BC (Wilkinson & Gathani, 2022). So, researchers need to focus on another way to decrease morbidity and mortality from BC by early detection and screening. Screening is the main tool that benefits in early detection of breast cancer even before patients feel any symptoms, and when better treatment results are possible (Farrell et al., 2020). Breast cancer screening is an important aspect of women's health, so women need to know about it because of its vital role in early detection and curing (Taher, 2022). A lower knowledge level among women about the risk factors, symptoms, and available diagnostic methods for BC may lead to late detection and increase the mortality rate (Rivera-Franco & Leon-Rodriguez, 2018). Women have to be familiar with controllable risk factors that may arise from unhealthy lifestyles so they can avoid decreasing the risk of the disease. Healthcare providers should be aware of the screening methods for BC, so, they can educate the

targeted women and provide them with the required services (Wang et al., 2022). Various screening choices are available and choosing the right one depends on the women's age, the presence of risk factors, and the availability. Yet, screening also puts women at risk because of false-positive test results and overdiagnosis of biologically innocuous lesions (American College of Obstetricians and Gynecologists [ACOG], 2017).

### **The benefit of breast cancer screening to improve survival rate:**

The most important goal for BC screening is to detect cancer in its preclinical stage or when no symptoms are felt or seen by the patients. This can help in the diagnosis at early stages of BC when the treatment is more successful and beneficial (Loud & Murphy, 2017). Leading to an increase in the possibility of survival from cancer and decreasing the chance of dying from it. According to the American Cancer Society, the 5-year relative survival rate for localized breast cancer, cancer that has not spread outside the breast, is 99 percent (ACS, 2023b). Even the results from Randomized, controlled trials suggested decreasing mortality from BC after application of screening programs (Beau et al., 2018). Women who attended mammogram screening schedules had a significant (41%) decrease in their risk of cancer mortality within the next 10 years while those who attended consecutive examinations their risk was decreased by 50% (Duffy et al., 2020; Duffy et al., 2021). A study conducted by the Association of Breast Surgery and the NHS's breast screening program found that women with small, early-stage breast cancers that were detected through screening had the same five-year survival rate as the general public (Mayor, 2008). Additionally, a 20-year experience in a university health institution found that patients diagnosed with mammography had significantly better survival rates versus those diagnosed with symptoms: 5-year survival was 96% versus 86.1% (Maiz et al., 2020). Another study found that mortality from BC was lowered to 30% and the risk of progress was decreased to 40% after the application of the screening program (Trimboli, 2020). Overall, early detection through breast cancer screening can lead to better survival rates.

### **Methods of breast cancer screening:**

- ❖ **Mammography:** It is considered the most familiar X-ray-reliant screening test for BC. It can detect very small tumors that cannot be felt by usual examination, and it can also catch ductal carcinoma in situ (DCIS), in which there is abnormal cells contour the breast duct and may convert to invasive malignancy (Centers for Disease Control and Prevention [CDC], 2023). A previously published article found that the accuracy of mammography in the detection of BC was (89.3%), sensitivity (97%), and specificity (64.5%) (Zeeshan et al., 2018). The American Cancer Society (ACS) recommends that women aged 40 to 44 years have the choice to begin screening with a mammogram every year, while women aged (45 to 54) years old must get mammograms every year. Women from the age 55 years and above should shift to an every 2 years schedule, or they able to test every year (ACS, 2023a; Taher, 2021). The U.S. Preventive Services Task Force (USPSTF) acclaims mammogram screening every 2 years for those

between 50 and 74 years. According to the USPSTF, the starting screening for women less than 50 years old depends on their risk of cancer in addition to considering the possible acquired benefits out of the expected harms (U.S. Preventive Services Task Force [USPSTF], 2023). The American College of Radiology (ACR) and the Society of Breast Imaging (SBI) still recommend annual exams from 40 to 80 for women at medium risk of BC (Imaging Technology News [ITN], 2023). Women with a higher risk need to modify their screening schedule according to their risk factors and their physician's advice.

- ❖ **Clinical Breast Examination (CBE):** It refers to a manual physical examination of the breast done by a healthcare giver to detect any abnormality or mass in the breast tissue (Zafar, 2014). It is considered an easy and relatively cheap alternative screening way for BC in countries where mammography cannot be applicable (Luo et al., 2022). The effectiveness of CBE is varied between women according to their ages, weight, and clinician experience (Luo et al., 2022). Different studies were conducted to assess the sensitivity and specificity of CBE to detect early-stage BC, a systematic review found 40-69% sensitivity which was higher among Asian and younger women. The CBE aids in decreasing 17-47% of advanced cases diagnosis at diagnosis time (Ngan et al., 2020). Another systematic review found that the sensitivity of CBE was 28-36% in community backgrounds and 47-69% in randomized controlled trials while the specificity was 88%. Nevertheless, CBE was not preferred by some countries because it is highly related to false-positive results (Manddrik et al., 2019). However, controversies are still found about the benefit of using CBE in screening BC so different organizations may have varying recommendations regarding CBE. The ACS and the USPSTF do not recommend it yet, while the National Comprehensive Cancer Network (NCCN) suggests it for average-risk women from 25-39 years old every 1-3 years and every year for above 40 women (ACOG, 2017; ACS, 2022a).
- ❖ **Magnetic Resonance Imaging (MRI):** Breast MRI can be operated to screen women with a high risk of BC or used as an additional test with other screening tests like mammography (Radhakrishna et al., 2018). Breast MRI can help patients to define the tumor size and to detect the extent of tumors elsewhere in breast tissue. So, is not recommended as a screening test by itself, due to a higher missing rate in comparison to a mammogram (ACS, 2022b). Using breast MRI for those with low or average risk of BC is still not well established. The functional advantage of MRI in detecting the more aggressive spectrum of disease may be a potential answer to overwhelming the weaknesses of mammography. Thus, MRI screening promptly starts to be thought of in average-risk women (Gao et al., 2021).
- ❖ **Breast Self-Examination (BSE):** It is a procedure by which a woman examines her breasts for any changes or abnormalities that could be a tumor. It is of great importance for women to be aware of the normal shape, size, and texture of their breasts so can notice any unusual changes that may detect the presence of dangerous signs of cancer (Prakash et al., 2022). Women should learn the proper age, way, timing, and position to practice regular and successful BSE for early detection of lumps or other cancer-related changes in the breast (Abd-Elaziz et al., 2021). BSE is no longer recommended for BC screening as previous studies didn't

reveal that it decreases the mortality rate from BC (Huang et al., 2022). However, in developing countries, BSE is still used as a recommended screening method for BC since it is easy, appropriate, confidential personal, harmless, and doesn't necessitate apparatus (Shallo& Boru, 2019).

- ❖ **Breast Ultrasound (US):** A sound wave-reliant test that is used alternative to mammography for screening dense breasts either primarily or in a supplementary with other tests (Thigpen et al., 2018; Wu& Warren, 2022). Numerous systematic reviews have established that breast ultrasound can discover doubtful breast diseases that can't be seen by mammography, with a higher detection rate and diagnostic accuracy (Dan et al., 2023). Mammography and ultrasonography found three more breast cancers per 1,000 women in those with dense breasts than mammography alone did (Glechner et al., 2023). Even though it is a safe, easy, and non-invasive procedure, it is not recommended alone for BC screening because it is more liable for false positive outcomes when compared to mammography (1.5%,  $P = 0.001$ ) (Yang et al., 2020). A recently published article found that breast US had 97% sensitivity, 85% specificity, and 92% accuracy (Azzam et al., 2020).
- ❖ **Advanced technological imaging:** Like digital mammography, tomosynthesis, and molecular breast imaging can generate further prospects for enhancements in both screening and early detection (Nicosia et al., 2023; Hruska, 2017).

**Conclusion:** Breast cancer is a very debilitating disease that affects all over the world and is mainly distributed among women. Early detection and screening by different methods have a crucial role in decreasing mortality. It is recommended to follow the new guidelines for screening women especially those of a higher risk of this disease. Sometimes need to use more than one test to get the best result. It is recommended to increase awareness about the available methods among women in public and healthcare workers. In addition to allocating more funding resources to provide more advanced techniques.

#### **Conflicts of Interest**

The author declares no conflicts of interest.

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