

MANDATORY CANCER ANTIGEN 15-3 AND CARCINOEMBRYONIC ANTIGEN
FOR SCREENING OF BREAST CANCER: A POLICY BRIEF



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Abstract

Over the last two decades, cancer statistics showed that the most common cancer type among Jordanaian women is breast cancer, which affecting annually more than one thousand women as new cases. Breast cancer remains the third leading cause of cancer type's death among women worldwide, where breast cancer detection among cases occurs at advanced stages. Some of the issues that may contribute to delayed detection are feeling of embarrassment of undergoing mammography and fear of the mammogram radiation effect. Cancer antigen 15-3 and Carcinoembryonic Antigen are considered to be minimally invasive screening tests for breast cancer which are safer. There is no policy that supports mandatory CA 15-3 and CEA tests among Jordanian women as screening tests. Action must be taken to legislate mandatory CA 15-3 tests among Jordanian women. This policy brief is directed to the Medical Jordanian Constitution to promote the importance of mandating a policy about the CA 15-3 and CEA tests; it would help in detecting breast cancer in its early stages and in turn lower the mortality rate.

Keywords: Breast cancer, Health Policy, CA15-3 test, CEA test, Policy Brief, Jordan

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Executive Summary

Breast cancer (BC) often involves the epithelial lining of ducts and lobules, which mainly originate from the tissue of the breast. BC is considered to be a heterogeneous disease with 24 histologic subtypes, the most common subtype is Ductal carcinoma in situ (DCIS), which accounts for 90% of all BC subtypes [6, 16].

The latest statistics of BC in 2022 revealed that the estimated new cases of all subtypes of BC among US women were 287,850, and 51,400 cases of DCIS [5]. The Jordanian women have a higher incidence rate compared to those in developed countries, with a median age of 43-52 years [11, 23]. In Jordan, the incidence rate of BC among Jordanian women is about 38.9%, while the mortality rate is about 24.9% [23].

A delay in breast cancer screening would increase diagnosis with late stages. Some of the reported reasons related to screening approaches

are lack of medical insurance, limited resources to provide universal access to screening mammograms (shortage of specialized radiologists and female trained technicians), embracement of clinical breast examination and mammogram (feeling ashamed and humiliated), painful mammogram experience, and fear to increase possibility to develop BC due to exposure to mammogram ionizing radiation [1, 3, 12, 14]. To overcome these reasons and to enhance the incidence rate of BC screening there should be a health policy that legislates CA 15- 3 and CEA tests instead of mammograms to detect BC.

In Jordan, breast cancer screening guidelines recommend women at the age of 25- 39 years undergo a self-breast exam monthly and clinical breast exam annually, and women at age of 40 years and above undergo a self-breast exam monthly, clinical breast exam annually, and mammography annually [21]. Despite the

importance of these recommendations, their financial cost on the individual annually constitutes a financial burden, especially in the current economic conditions, where the cost of a mammogram is approximately 30 JD in the majority of the hospitals in Jordan. Numerous studies have shown the risks of mammography was radiation exposure which may lead to an increased opportunity to develop BC, especially in women who have a genetic tendency, false positive results, and over diagnosis, which means more tests and follow-up visits, which can be physically and emotionally stressful [8]. Cancer antigen 15-3 (CA15-3) and Carcinoembryonic Antigen (CEA) are tumor markers produced by breast cancer cells, which may use in BC early diagnosis, detection of recurrence, prediction of patients' response to the treatment regimen [4, 7, 9, 19]. The cost of CA15-3 is 20 JD, by comparing the prices of the two examinations, we find that the CA15-3 examination is cheaper than the mammogram [23].

In Jordan, no policy supports mandatory CA15-3 and CEA tests among women as a BC screening test. Action must be taken to legislate mandatory CA15-3 and CEA as a screening tests for BC in Jordan. This policy brief is directed to the Medical Jordanian Constitution to promote the importance of mandating a policy about the CA15-3 and CEA tests; it would help in detecting BC in its early stages and in turn lower the burden of treatment.

The Context of the Problem

BC is the most common cancer affecting women worldwide and has a huge impact on the overall number of cancer death cases. Globally effort is needed to overcome the increasing burden, especially in countries like Jordan, where the incidence and mortality rates are rising rapidly.

As well as, crucial decision-making for breast cancer treatment with improved survival rates is guided by early detection of breast cancer [15]. Serum CA15-3 and CEA remain the most frequently used tumor markers in breast cancer. Serum CA15-3 and CEA represent a cheap, quick, reproducible, noninvasive, and easy test [2, 22].

Despite the high mortality and morbidity rates of breast cancer and its impact on the financial burden on the country, there is no policy regarding this screening test to detect BC among Jordanian women. Depending on all proven facts regarding the importance of CA15-3 and CAE tests in the early detection of BC,

reduction of mortality, and the decreased burden of BC, the Jordanian Medical Constitution should legislate mandatory CA15-3 and CEA tests in Jordan as a screening test for BC.

Policy option(s) & Recommendation for Policymakers

BC is a complex and multidimensional disease that affects women's life and increases the financial burden. Currently, BC is the main type of cancer among women, with high incidence and mortality rates in both developed and developing countries (for example US and Jordan) [17, 23].

Early detection of breast cancer is crucial since the treatment options will be less aggressive, which will reflect on treatment outcomes positively and thus improve the survival rate. BC screening has consisted of breast self-examination, Clinical breast examination, and mammogram. Although the Jordanian government established 2007 a national program to reduce the incidence and mortality rates of BC disease and increase the chance of detecting BC in the early stages [22] thus there is a low screening rate of mammograms due to many reasons such as exposure to radiations annually and a mammogram is expensive. According to the World Bank, Jordan is still suffering from a deteriorating economic situation, especially after the COVID-19 pandemic [18].

A concerning issue regarding the "mandatory CA 15-3 and CEA for screening of BC" policy is that it isn't enforced in Jordanian health settings. Therefore, collaborative efforts are needed to legislate and implement this policy. This policy should state that CA15-3 and CEA are mandatory used as adjunct screening tests for BC, because of their cost-effectiveness. It is worth noting that many studies have proven the effectiveness of CA15-3 and CEA in BC screening [13]. As well as, invented new detection methods for the concentration of CA15-3 and CEA by advanced nanotechnology such as (multi-channel double-gate silicon nanowire field effect transistor biosensors) [10]. These innovations need to be considered when drafting the new policy. Therefore, the following suggestion is recommended:

1. List mandatory CA15-3 and CEA for screening of BC in the Jordanian constitution.
2. Establish the new policy in all national screening centers and hospitals in Jordan.

3. Deduct five piasters from the electricity bills to cover the costs of this important test.
4. Collaborate with Jordanian nanotechnologists such as Dr. Ala'a Ghidan, to create new tools with low cost for the detection of the concentration of CA15-3 and CEA in blood made by Jordanian scientists.
5. Search for a method to generalize the new policy among healthcare providers.
6. All positive results of CA15-3 and CEA must be followed up with mammogram screening.

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Conflict of interest

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