

Brief Report

Breast Cancer Stage Migration in Saudi Arabia: Examining the Influence of Screening

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In 1992, the Saudi Cancer Registry (SCR), a population-based registry, was established under the authority of the Ministry of Health (MOH). In 2014, the SCR was moved to the Saudi Health Council under the department of national registries in the National Center for Health Information. The SCR consists of the main office, which oversees data collection from all over the country through five regional offices to ensure full coverage of all healthcare facilities in the Kingdom. Cancer data are abstracted from patients' medical records based on clinical and/or histopathological diagnosis by SCR-trained cancer registrars.^[1]

Breast cancer is the most common malignancy among women in Saudi Arabia, with 2463 cases diagnosed between January and December of 2017. Breast cancer accounted for 17.7% of all cancers reported in Saudi citizens, and 30.9% of all cancers recorded among women of all ages.^[2] SCR statistics for annual breast cancer incidence (BCI) and the percentage of each stage/year were analyzed to describe the impact of breast cancer screening on improving early-detection rates. Annual reports are available online where data from time points that corresponded to a milestone were extracted.^[1] A total of 10,970 incident breast cancer cases spanning 17 years were included in the analysis; data were graphed and trends were compared. In the SCR, stages were constantly classified as localized, regional, distant, and unknown, described in its own manual (staging is the grouping of cancer cases into broad categories based on the extent of the disease staging according to the Surveillance, Epidemiology, and End Results [SEER] Summary Stage 2000).^[3]

The annual BCI increased by fivefold over 17 years (Fig. 1A). Until 2006–2007, there was a remarkably high percentage of regional stage, followed by a decrease in subsequent years, which was mirrored by a steady increase in localized stage. (Fig. 1B).

The low percentage of early-stage disease in this review during the prescreening era (2001–2006) is likely because of delayed presentation and referral and lack of screening and awareness. Additionally, women aged 40 or older between 2001 to 2006 were born in the 1960s and preceding years when education and schooling for girls were limited, resulting in less self-care and health awareness.^[4] In recent years, the incidence of localized stages has surpassed that of regional stages, and 2007–2008 marked the beginning of stage migration. (Fig. 1B). This considerable shift in stage distribution was caused by a change either in the staging system, which did not occur in this case, or an improvement in breast cancer awareness and screening programs. The breast cancer awareness-raising activity developed with the formation of the national breast cancer awareness program committee in 2003 as a non-profit initiative by the founder of the Zahra Breast Cancer Association, which was established later in 2007.^[5] Several nongovernmental organizations have also founded breast screening programs in different regions of the Kingdom.^[6] Interestingly, several pilot screening projects in different regions (Riyadh, Dammam, Jeddah, and Al-Qassim) were initiated as early as 1997.^[7] All commonly reported low uptake rates and low cancer detection compared with western countries; however, follow-up periods were short, ranging from 2 to 5 years.^[8] In 2012, the MoH initiated a nationwide Breast Cancer Early Detection (BCED) project to promote primary prevention through advertising awareness of modifiable risk factors associated with breast cancer, and secondary prevention through mammography for average-risk women who are > 40 years old.^[9] Designated facilities, including mobile units across the Kingdom equipped with mammograms were made available and accessible free of charge for citizens. October is recognized nationally as the breast cancer awareness month, mirroring the international cancer calendar. Nonetheless, screening facilities are accessible throughout the

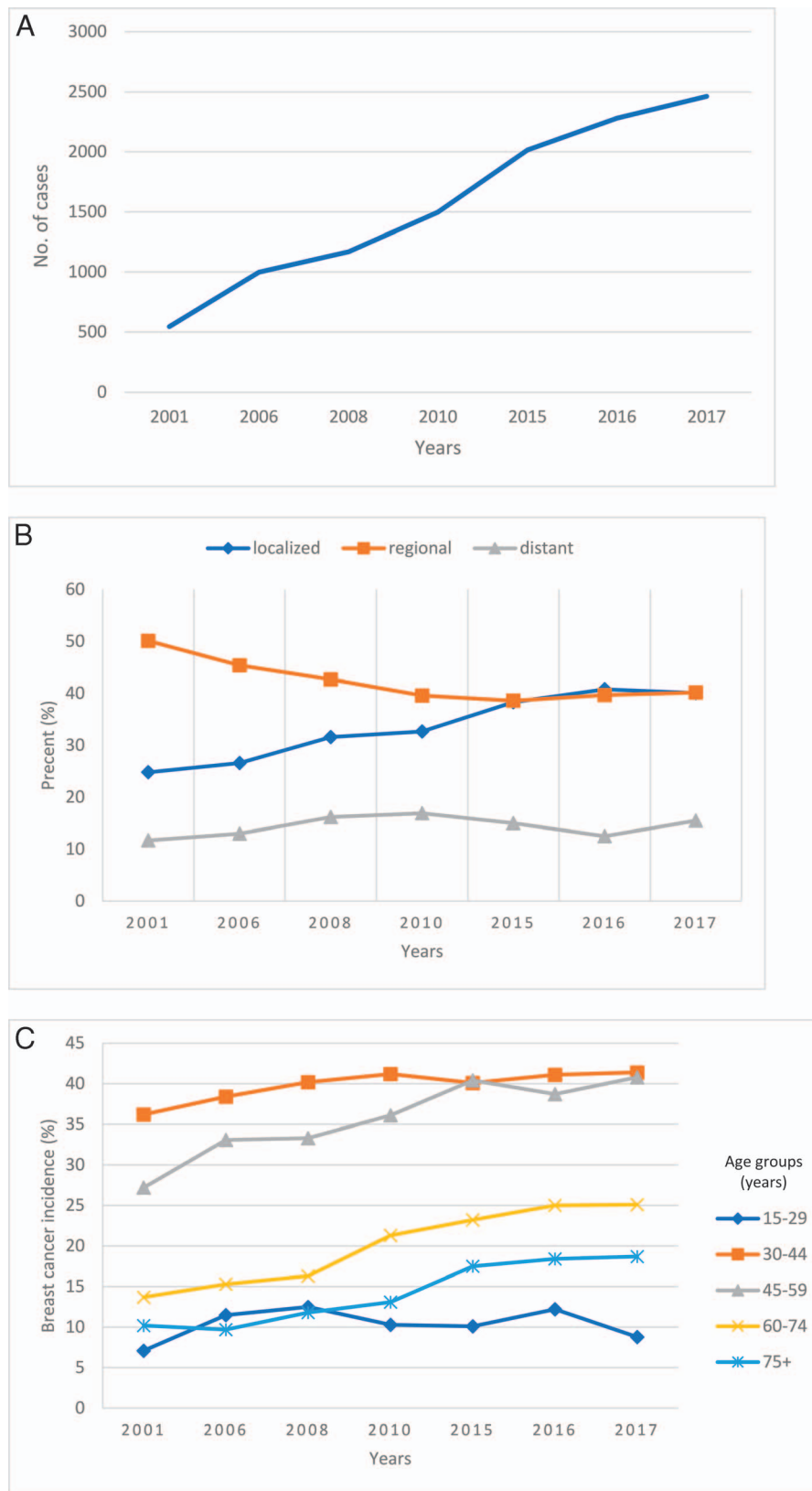


Figure 1. Incidence of breast cancer (all subtypes) from 2001-2017 according to the Saudi Cancer Registry^[1] including total number of cases (A), stage distribution (B), and age groups (C).

year. Other nonprofit governmental and private initiatives for early detection of breast cancer are available, too. Altogether this has resulted in more detection of localized disease that matched with fewer cases of locally advanced disease. Plus, women who were 40 or older in recent years were born in the mid-1970s, when Saudi Arabia was undergoing major modernization and urbanization, which undoubtedly reflected on the population's social, educational, and health-awareness levels.^[10]

In addition to the overall incidence, the SCR reports cancer incidence by age group (Fig. 1C). Instead of using the mean or median age, categorical age groups are used: 15–29, 30–44, 45–59, 60–74, and 75+ years old. A sharp increase in BCI among the target age groups (i.e., the eligible age groups for screening) after the implementation of breast cancer screening should have been observed in comparison with the groups that are less likely to undergo screening (15–30 and 75+ years old) to confirm the potential effect of screening on the observed increased overall incidence. However, the lack of a clear differential BCI increase in the screening-eligible age groups neither confirms nor refutes the impact of screening on increasing BCI. Furthermore, the effect of screening might have been diluted owing to the summing of age groups creating an overlap of the cutoff age for the beginning of screening, as shown in the age group 30–44 (Fig. 1C). On the other hand, the parallel pattern of increase is highly suggestive of overall better health awareness, progress in seeking medical attention, and better accessibility to care even among elderly individuals. The caveat that SCR does not indicate the frequency of breast cancer stage incidence within each age group, which would have allowed for a more precise conclusion if documented. Although the ultimate goal of a breast cancer screening program is to reduce mortality, other benefits such as prescribing less-toxic therapy or intervention cannot be overstated. This advantage can emerge from a stage migration with more localized disease detection, with a subsequent reduction in cost and time necessary for treatments. BCI as reported annually by the SCR can be used to measure screening performance. Another measure is a reduction in mortality, but it may take years to become evident, as it is not

reported consistently and has yet to be included into the SCR. Periodic evaluation of how the screening program is operating in light of new findings or changes in the population is required to ensure that it remains successful and cost-effective. Similarly, verifying the quality and performance of the deployed program is critical to attaining the goal. In general, the observed stage migration is likely to be multifactorial, caused by overall expanding of healthcare resources, including screening, increased health awareness and consciousness, and improved accessibility to care.

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