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Original article

Changes in the pattern of breast cancer burden among African American women: evidence based on 29 states and District of Columbia during 1998 to 2010

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ABSTRACT

Purpose: Assessment of breast cancer (BC) pattern in individual states with respect to ethnicity.
Methods: Population-based cancer registries from the Cancer Incidence in Five Continents databases (1998–2007) supplemented with Surveillance, Epidemiology, and End Results data from 2008 to 2010 were used.
Results: The age-specific burden showed a clear convergence of BC burden among African American (AA) and Caucasian American (CA) in most states. This was primarily because of a decrease in the BC rate among CA aged 50 years or older and an increase among AA of the same age group. The 2003–2007/1998–2002 rate ratio for CA was 0.91 (95% confidence interval [CI], 0.90–0.91) in the South, whereas it was 1.06 (95% CI, 1.04–1.08) for AA. This convergence was confirmed in states with available data for the period 2008 to 2010. The AA/CA rate ratio among women aged younger than 40 years was 0.99 (95% CI, 0.99–1.04) in the Northeast, 1.29 (95% CI, 1.25–1.33) in the South, and 1.10 (95% CI, 1.04–1.17) in the West. This pattern correlates with the estrogen receptor positive and progesterone receptor positive pattern. The strongest disparity in estrogen receptor negative was observed in Louisiana which with Detroit, have had the highest rates of estrogen receptor negative.
Conclusions: The changes in postmenopausal hormone use and mammography screening might have played a role in the observed convergence.

Introduction

African-American women (AA) experience an overall lower breast cancer (BC) burden compared with that of Caucasian-American women (CA), but have the highest mortality burden [1,2]. It has been suggested that this higher mortality is partially due to a lower socioeconomic status, which prevents AA from routine mammography screening [3–5]. However, a recent study revealed that mammography screening among AA is higher than among CA, with an average of 64% for AA aged 40 years or older versus 59% for CA [1]. A study published in 2006 assessing BC trend in the United States by ethnicity reported that increases in BC incidence rate were limited to CA aged 50 years or older, and that the incidence rate for AA of the same age range was stable [6]. A different study analyzing data from 2006 to 2010 from different databases (including Surveillance, Epidemiology, and End Results (SEER) Program, National Cancer Registry, and North American Association of Central Cancer Registries) reports that BC incidence rates among AA and CA aged 50 to 59 years were similar [1].

Although the burden of BC has been historically higher among CA compared with other ethnicities, and that AA are known to have the highest burden of early onset BC, the recent changes in mammography and postmenopausal hormone use might have changed the pattern of BC across these two ethnic groups. Furthermore, some risk factors related to reproductive life or anthropometric factors are modifiable and might not have the same prevalence and impact on the different ethnicities and states of the United States. To have a more accurate picture of the evolution of BC burden and to identity potential variations specific to some states or regions within the United States, we have used the database from the Cancer Incidence in Five Continents (CI5) for the period 1998 to 2007 completed by SEER database 2008 to 2010 to assess the

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pattern of BC based on ethnicity, state, and region. In most of the cancer registries included in CI5s, AA and CA are the two ethnicities with the most completed information. Only the states of California and New Mexico have information on Hispanic; however, AA data are not included in this last (New Mexico). For this reason, the present work was restricted to AA and CA.

Methods

Databases and study populations

The study design has been described in details elsewhere [7]. Only cancer registries with available information on both AA and CA were included in the present study. Data on 29 states and the District of Columbia with available information with respect to AA and CA both non-Hispanic were extracted from the volume IX and X of the CI5 which compile data for 5-year periods each; 1998 to 2002 (CI5-IX) and 2003 to 2007 (CI5-X) published in 2007 and 2013, respectively. Figure 1 shows the map of the individual states included in the study grouped by region defined by the US Census Bureau. Of these 29 states and the DC, only 15 states had information available regarding ethnicity from 1998 through 2007.

These data were completed by SEER data for the period 2008 to 2010. However, SEER has 20 registries among which only eight at the state level. Among the registries at the state level, only two are included in the registries covered by the CI5, Louisiana and New Jersey. Therefore, to represent the four regions of our study, the state of New Jersey was used to represent the Northeast, Louisiana for the South, Detroit (Michigan) for the Midwest, and San Francisco and Los Angeles combined for California in the West were used. Greater California was not included in California because it became a SEER registry in 2000, and thus does not contain data for 1998 and 1999. Due to Hurricane Katrina, data from 2005 for Louisiana were excluded from the study. Taking in consideration this last repartition of SEER data, we have at last assessed the pattern of hormonal receptor status over three periods; 1998 to 2002/2000 to 2002, 2003 to 2007, and 2008 to 2010.

Statistical analysis and modeling

Statistical analysis and modeling have being described in our previous work on corpus uteri cancer [7]. Population denominators were derived from the US Census Bureau and showed strong differences when stratified by ethnicity (Fig. S1). Age-standardized rates (ASR) were then adjusted to the world-standard population. To minimizes the tendency of overestimate cancer burden in older age groups with inherently low denominators, and thus provided more accurate calculations of cancer burden distribution across different age groups, we have model the expected number of BC cases in which the age-specific rates were adjusted to the world-standard population [7]. We elected not to use the US standard population for normalization, so that further comparisons with other countries could be performed in future studies. The rate ratio (RR) and 95% confidence interval (CI) were calculated with respect to ethnicity, age group, state, and region. Three age groups were used: younger than 40, 40 to 49, and 50 years or older. All statistical analyses were conducted using Stata.12 software (StataCorp LP, College Station, TX).

Results

ASR and RRs for different study periods (1998–2002 vs. 2003–2007; 2003–2007 vs. 2008–2010)

The present study analyzed 555,403 BC cases for the period 1998 to 2002 (493,721 CA and 61,682 AA); 775,316 cases for the period 2003 to 2007 (686,992 CA and 88,324 AA); and 72,621 cases for the period 2008 to 2010 (60,096 CA and 12,525 AA). The study included 15 states and the District of Columbia for the period 1998 to 2002,

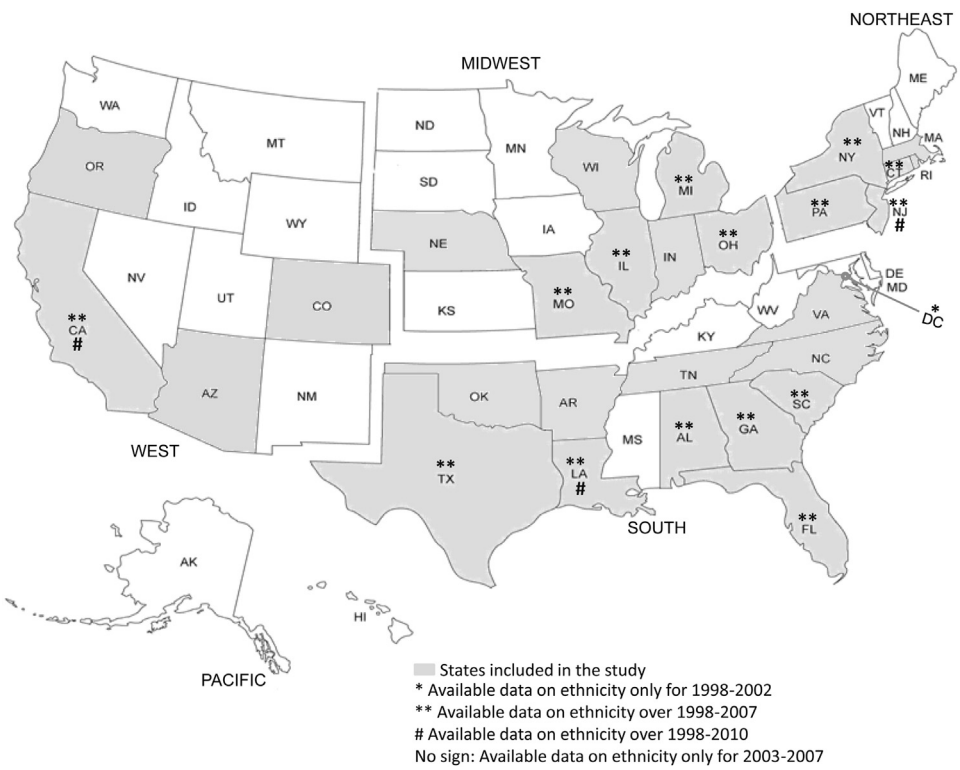

Fig. 1. Geographic distribution of states included in the present study.