

■ **Original Article**

Two years' observational study of racial difference of breast cancer in patients presenting to a tertiary care hospital serving indigent population

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Abstract

Background: Breast cancer is the most common malignancy after non-melanoma skin cancers and second highest cause of cancer deaths (after lung cancer) in females. **Objective:** To assess racial difference of breast cancer in patients presenting to a tertiary care hospital serving indigent population. **Methods:** Medical records of 119 Caucasians and 146 African American women with pathologically proven breast cancer who were admitted in a tertiary care hospital serving the indigent population from January 2004 to December 2006 were reviewed retrospectively. Analysis of Variance was performed for within and between group differences using SPSS 19. **Results:** Our study showed that mean age of cancer diagnosis was much earlier (47.6 years) in white women whose second degree relatives have breast cancer than those women whose first degree relatives have breast cancer (58.6 years). However, in the black women this difference was not observed (p value for white is 0.002 but for black it was 0.94). **Conclusion:** Family history of women with breast cancer in this study showed history of breast cancer in a second degree female relative increased the risk of breast cancer in white women; positive history was associated with earlier age of onset of the disease. We suggest future studies should look into genetic and biological markers in the second generation family members for increased risk of breast cancer.

Keywords: Breast cancer, racial difference, mammography, socioeconomic status, first degree relatives, second degree relatives

Introduction

Regardless of their racial or ethnic origin or heritage, all women are at risk of developing breast cancer. Variations in breast carcinoma incidence rates among different races suggest that etiologic factors differ in their biologic expression and impact on disease outcome. Although African American (AAW) women have worse breast cancer mortality than their Caucasian counterparts, their incidence is less than the whites. The reason for this disparity is not clear. Their socioeconomic status may account for this

difference because lower socioeconomic status may contribute to decreased access to mammographic screening.¹ Some investigators argued that there may be intrinsic biologic differences in the breast cancer between African-American and Caucasian women (AAW presents with high-grade tumors).^{2,3} Breast cancers with a triple negative tumor (TNT) subtype (as defined by lacking protein expression of estrogen receptor (ER), progesterone receptor (PR), and human epidermal growth factor receptor 2 (HER2)) preclude the use of available targeted therapies, thereby contributing to poor outcome (and survival) observed among AAW in comparison to white women.³ There is heterogeneity regarding diagnostic follow-up and treatment between racial groups.^{4,5}

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This heterogeneity may be due to subconscious physician bias, patient compliance, or lack of access or resources.⁶ Lin⁷ et al observed that the triple negative category of breast cancers in the Chinese population exhibits a different pattern of relapse, which indicates that different organotropism may be due to the different intrinsic subtypes based on the site-specific spread pattern in different subgroups and therefore they claimed that a better knowledge of the triple negative category is warranted for efficacious systemic regimens to decrease and/or delay the relapse hazard.⁷

Results

We found a significant difference in the age of diagnosis of breast cancer between Caucasian and African American women admitted at a single tertiary care institution which caters to the indigent population (Table 1). Although we did not collect the socioeconomic status of these patients directly, some evidence points that the apparent difference between the races in our study like in the previous studies may have been due to differences in socioeconomic status inherent in whites and blacks in the US.

Table 1: Age of Breast Cancer Diagnosis by Type of Family History for Caucasian and African American Women

	Caucasian			p-value*	African American		
	n	Mean \pm Std Dev	p-value		n	Mean \pm Std Dev	p-value
Family History of Breast Cancer							
None	93	56.7 \pm 8.8		<0.000	11		
First Degree (Mother or Sister)	14	58.6 \pm 7.3		<0.000	3	48.9 \pm 11.9	
Second Degree (Aunt or Cousin)	12	47.6 \pm 8.6 **	0.002	0.69	25	48.2 \pm 8.0	
	11			<0.000	8	45.6 \pm 12.9	0.94
Overall	9	56.1 \pm 9.0		1	14	48.6 \pm 11.4	

** post hoc analysis indicates this group is different than the others among subjects of the same race ($p \leq 0.002$)

* Difference between Caucasian and African American Women

Paper chart of 119 Caucasians and 146 AAWs with pathologically proven breast cancer who were admitted in EA Conway from January 2004 to December 2006 were reviewed by the lead author. As you can see from Table 1, 113 AAWs and 93 white women had no documented family history of breast cancer. Conversely, 33 out of 146 (22.60%) AAWs and 26 out of 119 (21.85%) Caucasian women had documented positive family history of breast cancer. There was a statistically significant racial difference between white and black women with regards to age of diagnosis of breast cancer for entire cohort, for those without any family history of breast cancer and for those with first degree

relatives who have breast cancer ($p = <0.05$) but there was no racial difference at the age of diagnosis of breast cancer among those whose second degree relatives have breast cancer ($p = 0.69$).

The striking difference in family history was that breast cancer diagnosis in the second degree relative was at a much earlier age than the first degree relative in white women with breast cancer but this age discrepancy in breast cancer diagnosis was not observed in black women with breast cancer. Mortality data was not available from the chart review and therefore racial comparison of mortality from breast cancer was not possible.

Discussion

Over the course of one's lifetime, approximately 1 in 8 U.S. women will develop invasive breast cancer.⁸ African-American women are slightly less likely to develop breast cancer than their Caucasian counterparts. However, in young women (if you take the women under 45), breast cancer is less common in Caucasian women than in African-American women. Nevertheless, there are more deaths from breast cancer in African-American women than white women. Breast cancer incidence and mortality are lower in Hispanic, Asian and Native-American women. Risk of breast cancer approximately doubles in women with a positive family history of breast cancer in her first degree relative (mother, sister, daughter).⁸ About 15% of women have a positive family history of breast cancer.⁸ Approximately 5-10% of breast cancers are linked to gene mutations inherited from one's mother or father (most common mutations are in BRCA1 and BRCA2 genes).⁸ These mutations carry up to an 80% risk of developing a breast cancer (during the lifetime), and breast cancer develops at a younger age.⁸ Additionally, there is an increased risk of developing ovarian cancer with these mutations.

Although incidence of breast cancer may be lower in AAW than white women but mortality from breast cancer is higher in AAW than in Caucasians (vide supra) probably because of cultural factors, socioeconomic factors and most importantly poor access to health care particularly mammography. Since black women are more obese than their white counterparts, one study found out that obesity played some part (30%) in the racial difference at breast cancer diagnosis; however the conclusion of the study was that even after adjustment for obesity, the racial difference in stage of breast cancer at diagnosis still persists.⁹ Two studies^{10,11} showed that in later years there is a higher incidence of breast cancer in white women than the black women. We observed a statistically significant racial difference among black and white women presenting to EA Conway Medical Center with regards to age at diagnosis. Overall (those with and without positive family history of breast cancer) the mean age at diagnosis of breast cancer for white women was 56.1 +9.0 but for black women it was 48.6 + 11.4 with a statistically significant difference (p value of < 0.05) between

these two cohorts. The age difference was also significant (p value < 0.05) between these two races for those without the family history of breast cancer and those with a family history of breast cancer where first degree relative had the disease.

Access to mammography is same to AAW as for Caucasians after age 65 in the US. The study published by Anderson et al confirms that the age-related crossover in breast cancer incidence rates between black and white ethnic groups is a robust age-specific effect that is independent of period and cohort effects.¹¹ System-level barriers to mammography and heavy smoking were associated with lower mammography use among both Caucasian and AAW. Personal-experience barriers to mammography and no physician recommendation also were independently associated with mammography use among white women in this study.¹⁰

Compliance with appointment keeping and alleviating reasons for noncompliance must be considered as factors in breast cancer survival as missed appointments was a determinant of both advanced stage and shorter survival.¹²

Important factors affecting breast carcinoma development are reproductive experience, genetics and the environment, effects of endogenous and exogenous hormones, the change in immune status and host vulnerability. Additionally, socioeconomic differences, cultural dynamics and behavioral characteristics across population subgroups modulate how biologic disease is expressed among different races and ethnic groups. These interactions contribute to the observed variations not only in the incidence but also in mortality and survival of breast cancer. Much more advanced stage of breast carcinoma at diagnosis in racial/ethnic subgroups, especially among women from African American, Hispanic, American Indian, and native Hawaiian cultures have been reported.¹³ These authors' emphasis is focused on directing the public health measures to the societal influences that impact breast carcinoma development, as well as augmenting recognition of the need for culturally appropriate, broad-based behavioral changes at the community level.¹³ Social and economic factors have been associated in the

literature predominantly with cancer mortality and survival. When socioeconomic status (SES) is considered, certain studies suggest that racial disparities in breast carcinoma are smaller than when social and economic factors are examined alone, but these disparities still persist.¹⁴

Boyer-Chammard et al¹⁵ found no difference between Asians and non-Hispanic whites in overall and cancer-related survival. These results show that stage of disease, age at diagnosis, histologic features and treatment for breast cancer differed among racial/ethnic groups. In addition, AAW and Hispanic women with breast cancer had a higher risk of mortality in comparison to non-Hispanic white women, even after controlling for prognostic factors. They emphasize the necessity of improved screening and access to appropriate treatment among minority women for breast cancer.¹⁵

Our study showed that for a white woman with an aunt or a cousin with breast cancer, mean age of cancer occurrence is earlier (47.6 years) as opposed to if the white woman who had a mother or sister with breast cancer (58.6 years). However, in the black population this discrepancy is not observed (p value for white is 0.002 but for black it was 0.94). This finding has not been reported in the literature. This discrepancy defies a logical explanation except perhaps perception of breast cancer risk is heightened in women of same age (aunt and cousin may be of same age) and therefore they were screened by mammography as opposed to mothers (perhaps older sisters although most sisters are of just a few years older or younger) who often are 20 plus years older than the study subjects.

Limitations of the study include small sample size and non-availability of statistical data on mortality and socioeconomic status. Another important limitation was the fact that age difference between first and second degree relative was not available.

Conclusion

Racial variation in breast cancer suggests differences in etiologic factors for the biologic expression of disease may impact the disease outcome. An interesting observation that was obvious from our study should be confirmed in prospective large scale

studies and if confirmed attention should be focused not only to first degree relatives but also to second degree relatives because family history of breast cancer in a second degree relative may increase the risk of breast cancer at an earlier age particularly in white women. Future studies should also look into genetic and biological markers in the second generation family members for increased risk of breast cancer.

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