Impact of Treatment and Socioeconomic Status on Racial Disparities in Survival among Older Women with Breast Cancer

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Background

• Racial/Ethnic disparities in breast cancer mortality in the U.S

• Higher breast cancer mortality in African-Americans than Caucasians attributed to:
  – More aggressive tumors
  – More advanced stage at diagnosis
  – Differences in health insurance and access to care
  – Differences in screening-early detection
  – Differences in receiving optimal treatments
  – Healthcare providers (physicians and hospitals)
  – Socioeconomic status (SES)
Evidence of Racial/Ethnic Disparities in Healthcare

**Consistent Findings**

- Disparities across wide range of diseases and clinical services
- Disparities across clinical settings, including public and private hospitals, teaching and non-teaching hospitals, etc.
- Disparities when clinical factors, such as stage/severity of disease, co-morbidities, and age taken into account
- Since disparities in health care are associated with poor outcomes – they are not acceptable

Evidence of Racial/Ethnic Disparities in Mortality/Survival

**Inconsistent Findings**

- Racial/ethnic disparities remain after controlling for demographic variables, SES, access to care, comorbidities and treatment in several studies

**Whereas**

- Other studies found similar outcomes (survival) between racial/ethnic groups, after controlling for treatment and SES
Study Population and Methods

• Large population-based cohort
  – 35,029 women
  – stage I-III A breast cancer
  – age ≥65
  – identified from the NCI’s SEER-Medicare data
  – 11 SEER regions (covering >14% of the U.S. population)

• Last follow-up: 12/31/2002 with up to 11 years of follow-up

• >98% completeness of case ascertainment (incident cases)

Study Variables

• Outcomes
  – All-cause mortality
  – Breast cancer-specific mortality
  – Time to event (in months from date of diagnosis to date of death or date of death)

• Exposures
  – Demographics (e.g. age, marital status, etc.)
  – Other covariables
  – Comorbidity score adjustment (created from Medicare claims)
  – Stage I-III A
  – Year of diagnosis (1992 to 1999)
  – Geographic areas (11 areas)
  – Race/ethnicity: African-American, Caucasian and Other
  – SES
  – Treatment
Results

• Age
  – Age distribution among racial/ethnic groups (Caucasian, African-American, and Other) similar

• Stage
  – Stage at presentation similar between Caucasian and other races
  – African-Americans more likely than Caucasians to present with stage II (46 vs. 37%) or stage IIIA (6 vs. 3%) breast cancer

• Comorbidity
  – Similar among Caucasians and other races
  – 25% African-Americans score of 2+ compared to 13% of Caucasians

Results

• Treatment
  – Frequency of BCS (with & without radiotherapy), mastectomy, and chemotherapy similar among Caucasians and other races
  – African-Americans less likely to receive radiotherapy along with breast conserving surgery (33% vs. 37%)

• SES
  – African-Americans much more likely to live in census tracts with high poverty (76%) than Caucasians (21%) or other races (38%)
  – There was a similar finding when using SES composite score (poverty, education and income)
Table 1. Hazard ratio of mortality by socioeconomic status

<table>
<thead>
<tr>
<th>SES</th>
<th>Hazard ratio (95% confidence interval) of mortality*</th>
<th>Hazard ratio (95% confidence interval) of mortality*</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>All-cause mortality</td>
<td>Breast cancer-specific mortality</td>
</tr>
<tr>
<td></td>
<td>Model-1</td>
<td>Model-2</td>
</tr>
<tr>
<td>1st (high)</td>
<td>1.0</td>
<td>1.0</td>
</tr>
<tr>
<td>2nd</td>
<td>1.00</td>
<td>1.01</td>
</tr>
<tr>
<td></td>
<td>(0.95-1.06)</td>
<td>(0.96-1.06)</td>
</tr>
<tr>
<td>3rd</td>
<td>1.06</td>
<td>1.07</td>
</tr>
<tr>
<td></td>
<td>(1.01-1.12)</td>
<td>(1.01-1.13)</td>
</tr>
<tr>
<td>4th (low)</td>
<td>1.10</td>
<td>1.11</td>
</tr>
<tr>
<td></td>
<td>(1.04-1.16)</td>
<td>(1.05-1.18)</td>
</tr>
</tbody>
</table>

Models 1/3 adjusted for demographic, tumor and treatment factors. Models 2/4 adjusted for race/ethnicity in addition to these factors.

Table 2. Hazard ratio of mortality by treatment

<table>
<thead>
<tr>
<th>Primary therapy</th>
<th>Hazard ratio (95% confidence interval) of mortality*</th>
<th>Hazard ratio (95% confidence interval) of mortality*</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>All-cause mortality</td>
<td>Breast cancer-specific mortality</td>
</tr>
<tr>
<td></td>
<td>Model-1</td>
<td>Model-2</td>
</tr>
<tr>
<td>BCS only</td>
<td>1.00</td>
<td>1.00</td>
</tr>
<tr>
<td>BCS+ radiotherapy</td>
<td>0.50</td>
<td>0.50</td>
</tr>
<tr>
<td></td>
<td>(0.47-0.53)</td>
<td>(0.47-0.53)</td>
</tr>
<tr>
<td>Mastectomy</td>
<td>0.64</td>
<td>0.64</td>
</tr>
<tr>
<td></td>
<td>(0.61-0.67)</td>
<td>(0.61-0.67)</td>
</tr>
</tbody>
</table>

Models 1/3 adjusted for demographic, tumor and treatment factors. Models 2/4 adjusted for socioeconomic factors in addition to above.
Table 3. Hazard ratio of mortality by race/ethnicity

<table>
<thead>
<tr>
<th>Race/ethnicity</th>
<th>All-cause mortality</th>
<th>Breast cancer-specific mortality</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Model-1</td>
<td>Model-2</td>
</tr>
<tr>
<td>Caucasians</td>
<td>1.00</td>
<td>1.00</td>
</tr>
<tr>
<td>African-Americans</td>
<td>1.09</td>
<td>1.02</td>
</tr>
<tr>
<td></td>
<td>(1.02-1.17)</td>
<td>(0.84-1.10)</td>
</tr>
<tr>
<td>Others</td>
<td>0.84</td>
<td>0.81</td>
</tr>
<tr>
<td></td>
<td>(0.77-0.91)</td>
<td>(0.75-0.88)</td>
</tr>
</tbody>
</table>

Models-1/3 adjusted for demographic variables and tumor factors; Models-2/4 additionally adjusted for treatment and SES

Conclusions and Public Health Implications

- Racial disparity in overall survival with breast cancer between Caucasians and African-Americans was largely explained by differences in treatment and SES.
- Definitive treatment (BCS + radiotherapy or mastectomy) was associated with lower mortality.
- Lower SES appeared to be a major barrier to achieving comparable outcomes for women with cancer.
- Racial differences still existed in breast cancer-specific mortality.
- Important public health implications if we are to achieve the goals of Healthy People 2010
  - minimize disparities in health care and SES
  - modifiable
Strengths

• Large population-based cohort study
  – covering >98% incident cancers
  – pathology confirmed by SEER registries

• Reliable information on:
  – cancer stage and grade
  – primary therapy (surgery and radiation)
  – long-term follow-up on vital status

• Linked with Medicare claims
  – important data on comorbidity – a strong confounder of survival
  – adjuvant chemotherapy data

• Several measures of SES → consistent findings

Limitations

• SES at group level may be imperfect proxy for individual SES
  – ecological fallacy
  – studies shown individual and community level SES in good agreement

• Lack of information on:
  – providers (physicians and hospitals)
  – patient/physician preference on choice of therapy
  – screening practices

• No data on hormonal therapy (e.g. tamoxifen etc.)

• Generalizability to younger women and other regions/countries?
Questions/Comments

Thanks for your attention!