Sociodemographic Predictors of Non-Receipt of Guidelines-Concordant Chemotherapy among Locoregional Breast Cancer Patients Under Age 70 Years

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Background

• In 1999, Institute of Medicine (IOM) published the report *Ensuring Quality Cancer Care*

“… for many Americans with cancer, there is a wide gulf between what could be constructed as the ideal and the reality of their experience with cancer care…”
Background

• In the report, IOM recommended more research to measure and improve the quality of cancer care.

• In 2000, IOM further recommended enhancing cancer registries for assessing quality of cancer care.

• Cancer registries do not have complete data on adjuvant chemotherapy from routine data collections due to the lack of adequate resources.

• Assessing the quality of cancer care has relied on data from
  - National Cancer Database
  - Medical claims such as Medicare, Medicaid
  - Patterns of Care (PoC) studies

• Publications on the dissemination of guidelines-recommended adjuvant chemotherapy for breast cancer are scarce.

• Most publications focus on racial differences. The impact of socioeconomic factors on receipt of adjuvant chemotherapy has not been studied thoroughly.
Background

The NCCN Guidelines for systemic adjuvant therapy specify in a footnote:

There are insufficient data to make chemotherapy recommendations for those over 70 yrs old. Treatment should be individualized with consideration of comorbid conditions.

Objectives

- To examine the dissemination of guideline-recommended adjuvant chemotherapy for breast cancer in the community among women under age 70 years
- To identify sociodemographic predictors of non-receipt of guideline-concordant adjuvant chemotherapy.
Methods

Data sources:
- CDC-NPCR PoC study
- 7 cancer registries (CA, GA, KT, LA, NC, MN, and WI)

Medical record abstraction:
- hospitals
- non-hospital settings such as free-standing ambulatory centers, radiation facilities

Physician verification:

Eligibility criteria
- women aged 20-69 years
- localized or regional breast cancer diagnosed in 2004
- microscopically confirmed
- received surgery
- no autopsy or death certificate case
- excluded Paget’s disease, mesothelioma, Kaposi’s sarcoma, lymphoma cases as well as histologies that were not specified in the NCCN guidelines such as inflammatory breast cancer.

NCCN Guidelines (1.2003 v) for Adjuvant Chemotherapy for Invasive Breast Cancers
Guidelines-Concordant Chemotherapy

- Received or not received adjuvant chemotherapy (Yes/No) according to the NCCN guidelines

<table>
<thead>
<tr>
<th>Guidelines-Recommended</th>
<th>Received</th>
<th>Chemotherapy</th>
<th>No chemotherapy</th>
<th>Consider</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>Guideline care</td>
<td>Over treated</td>
<td>Excluded</td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>Under treated</td>
<td>Guideline care</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Explanatory Variables of Interest

- Race/ethnicity: non-Hispanic White, Black, AI/AN, and API Hispanic
- Insurance:
  - Private incl. Medicare plus private insurance
  - Medicare/other public (TRICARE, other military insurance, Veterans Affairs, Indian Health Services)
  - Medicaid
  - None
  - Unknown

Explanatory Variables of Interest

- Census-tract poverty
  - low: <20% of persons with income below the federal poverty level
  - high: >20%
- Census-tract education
  - high: <25% of adults (≥ 25 years old) with less than a high-school education
  - low: ≥25%
Explanatory Variables of Interest

- Hospital CoC status
  - Yes, CoC-accredited cancer program
  - No
  - Others (which CoC status does not apply)
- CoC status was grouped based on the facility where the patient received breast cancer surgery; most referrals made by surgeon.
- Received surgery at a non-CoC hospital or surgical center, but receiving adjuvant therapy or consultations at CoC hospitals were grouped in the CoC group.

Clinical Explanatory Variables

- Clinical variables specified in the NCCN guidelines
  - regional lymph node status
  - histology type
  - tumor size
  - tumor grade
  - Estrogen/progesterone receptor status
- Comorbidity collected using ACE-27 by Piccirillo et al:
  None, mild, moderate, severe, and unknown.
Data Analysis

- Chi-square test: the association of individual variables with non-receipt of guidelines-concordant chemotherapy.
- Multiple logistic regression: the association of sociodemographic factors with non-receipt of guidelines-concordant chemotherapy adjusting for other factors.
- All statistics were weighted to reflect the populations from which the sample was drawn.
- SAS Procedures for survey data analysis

Results

- 4,452 cases included
- Most cases were white (73%), privately insured (72%), 82% residing in low poverty areas, 68% in high education areas, and 53% treated at CoC hospitals.

Receipt of Guidelines-Concordant Chemotherapy

<table>
<thead>
<tr>
<th>Received</th>
<th>Guidelines Recommended</th>
<th>Chemotherapy</th>
<th>No chemotherapy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td></td>
<td>62.6%</td>
<td>0.67%</td>
</tr>
<tr>
<td>No</td>
<td></td>
<td>22.8%</td>
<td>13.9%</td>
</tr>
</tbody>
</table>
### % of Women Not Receiving Guidelines-Concordant Chemotherapy

<table>
<thead>
<tr>
<th>Total case count</th>
<th>Weighted % not receiving</th>
</tr>
</thead>
<tbody>
<tr>
<td>All patients</td>
<td>23.5</td>
</tr>
<tr>
<td>Age (yr)</td>
<td>p&lt;0.01</td>
</tr>
<tr>
<td>&lt;40</td>
<td>9.8</td>
</tr>
<tr>
<td>40-49</td>
<td>14.6</td>
</tr>
<tr>
<td>50-64</td>
<td>25.9</td>
</tr>
<tr>
<td>65-69</td>
<td>42.5</td>
</tr>
</tbody>
</table>

### % of Women Not Receiving Guidelines-Concordant Chemotherapy by Race

<table>
<thead>
<tr>
<th>Total case count</th>
<th>Weighted % not receiving</th>
</tr>
</thead>
<tbody>
<tr>
<td>White</td>
<td>23.9</td>
</tr>
<tr>
<td>Black</td>
<td>21.0</td>
</tr>
<tr>
<td>Hispanic</td>
<td>21.3</td>
</tr>
<tr>
<td>API</td>
<td>20.2</td>
</tr>
<tr>
<td>AI/AN</td>
<td>11.8</td>
</tr>
</tbody>
</table>

### % of Women Not Receiving Guidelines-Concordant Chemotherapy by Insurance

<table>
<thead>
<tr>
<th>Total case count</th>
<th>Weighted % not receiving</th>
</tr>
</thead>
<tbody>
<tr>
<td>Private</td>
<td>21.6</td>
</tr>
<tr>
<td>Medicare/other public</td>
<td>33.1</td>
</tr>
<tr>
<td>Medicaid only</td>
<td>27.4</td>
</tr>
<tr>
<td>None</td>
<td>20.6</td>
</tr>
<tr>
<td>Unknown</td>
<td>22.1</td>
</tr>
</tbody>
</table>

### % of Women Not Receiving Guidelines-Concordant Chemotherapy by Census poverty

<table>
<thead>
<tr>
<th>Total case count</th>
<th>Weighted % not receiving</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low</td>
<td>22.2</td>
</tr>
<tr>
<td>High</td>
<td>29.2</td>
</tr>
</tbody>
</table>

### % of Women Not Receiving Guidelines-Concordant Chemotherapy by Census education

<table>
<thead>
<tr>
<th>Total case count</th>
<th>Weighted % not receiving</th>
</tr>
</thead>
<tbody>
<tr>
<td>High</td>
<td>22.0</td>
</tr>
<tr>
<td>Low</td>
<td>26.7</td>
</tr>
</tbody>
</table>

### % of Women Not Receiving Guidelines-Concordant Chemotherapy by CoC hospital

<table>
<thead>
<tr>
<th>Total case count</th>
<th>Weighted % not receiving</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>21.1</td>
</tr>
<tr>
<td>No</td>
<td>27.7</td>
</tr>
<tr>
<td>Other</td>
<td>21.1</td>
</tr>
</tbody>
</table>
Multiple logistic regression - chemotherapy

- After adjusting for age and clinical factors and/or other variables, race/ethnicity was not associated with receipt of guidelines-concordant chemotherapy significantly.

<table>
<thead>
<tr>
<th>Insurance</th>
<th>Adj. Model I $^1$</th>
<th>Adj. Model II $^2$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Private</td>
<td>1.00</td>
<td>1.00</td>
</tr>
<tr>
<td>Medicare/other public</td>
<td>1.08 (0.75-1.56)</td>
<td>1.14 (0.80-1.63)</td>
</tr>
<tr>
<td>Medicaid only</td>
<td>1.56 (1.14-2.13)</td>
<td>1.56 (1.12-2.16)</td>
</tr>
<tr>
<td>None</td>
<td>1.38 (0.67-2.81)</td>
<td>1.30 (0.64-2.63)</td>
</tr>
<tr>
<td>Unknown</td>
<td>0.88 (0.53-1.48)</td>
<td>0.92 (0.54-1.57)</td>
</tr>
</tbody>
</table>

1 Adjusting for age, registry, and clinical variables (i.e., lymph node, histology, tumor size, grade, estrogen/progesterone receptor status, and comorbidity).
2 Adjusting for all other socio-demographic variables listed in addition to age, registry, and clinical variables above.

<table>
<thead>
<tr>
<th>Census poverty</th>
<th>Adj. Model I $^1$</th>
<th>Adj. Model II $^2$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low</td>
<td>1.00</td>
<td>1.00</td>
</tr>
<tr>
<td>High</td>
<td>1.43 (1.13-1.83)</td>
<td>1.46 (1.07-1.99)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Census education</th>
<th>Adj. Model I $^1$</th>
<th>Adj. Model II $^2$</th>
</tr>
</thead>
<tbody>
<tr>
<td>High</td>
<td>1.00</td>
<td>1.00</td>
</tr>
<tr>
<td>Low</td>
<td>1.15 (0.92-1.45)</td>
<td>0.92 (0.70-1.21)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CoC hospital</th>
<th>Adj. Model I $^1$</th>
<th>Adj. Model II $^2$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>1.00</td>
<td>1.00</td>
</tr>
<tr>
<td>No</td>
<td>1.42 (1.12-1.80)</td>
<td>1.43 (1.13-1.82)</td>
</tr>
<tr>
<td>Other</td>
<td>0.50 (0.15-1.63)</td>
<td>0.51 (0.15-1.74)</td>
</tr>
</tbody>
</table>
Discussion – Medicaid and guideline chemotherapy

- Medicaid insured women were less likely to receive guidelines-concordant chemotherapy.
- Poor, more likely to have comorbidities; the differences persisted adjusting for age and clinical and other sociodemographic factors.
- Other underlying factors pertaining to Medicaid status: transportation, family support, perspective of chemotherapy, communication issues, etc.

Discussion – Area SES and guideline chemotherapy

- Living in high poverty and low education areas was associated with a lower use of guidelines-concordant chemotherapy adjusting age and clinical variables.
- Low-income and less-educated women may not communicate well with physicians.
- Other contributing factors: family support, transportation, perspective of chemotherapy, etc.

Discussion – CoC status and guideline chemotherapy

- Women treated at CoC hospitals were more likely to receive guideline-concordant care.
  - Multispecialty approach
  - Comprehensive care
  - Commitment to ongoing monitoring and improvement of care
  - Fewer barriers to obtaining oncology consultations
Discussion

• Strengths
  - large sample size
  - population-based design
  - inclusion of major racial/ethnic groups
  - inclusion of NPCR registries

Limitations

- diagnosis year: 2004
- did not have detailed information on use of chemotherapy
- non-individual level contextual binary SES covariates
- small sample size for AI/AN, API, and Hispanic
- no information for subgroups of API and Hispanic

Conclusions

• Guidelines-recommended adjuvant chemotherapy for breast cancer are not disseminated proportionally among women under age 70 years in the community.
• Socioeconomically disadvantaged and medically under-served women are less likely to receive guidelines-concordant adjuvant chemotherapy.
• Identifying the underlying causes for the lack of guidelines-concordant chemotherapy may lead to target interventions to reduce disparities and improve prognosis across all populations.
Future Directions

- IOM report in 2009 “Initial National Priorities for Comparative Effectiveness Research”
- Identifies what works best for which patients under what circumstances.
  - guidelines-concordant
  - survival
  - patient-reported health-related quality of life

References


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Thank You!

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