Socioeconomic Disparities in Patient-Reported Pre- and Post-Treatment Sexual Functions for Localized Prostate Cancer

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Background

- Prostate cancer is the most commonly diagnosed cancer among American men; ~233K new cases in 2014.\textsuperscript{1}

- 78% of prostate cancers are localized disease at diagnosis in the U.S. 5-year relative survival rate (all stages) is 100%.\textsuperscript{2}

- The evaluation of the effectiveness of treatment for prostate cancer has shifted to health-related quality of life (HRQOL).

- Sexual dysfunction is one of the most common side effects of prostate cancer treatment; it has significantly impacted on HRQOL.

- Many studies that examined the impact of prostate cancer treatment on sexual function lack baseline data.\textsuperscript{1}

- Data from prostate cancer screening populations suggests lower SES\textsuperscript{2} men are more likely to have sexual dysfunction:\textsuperscript{3-5}
  - erectile dysfunction
  - ejaculatory and orgasmic dysfunction
  - psychosexual impairment (reduced sexual desire)

- Treatment impact on sexual function cannot be appropriately assessed without baseline data on sexual function.

Objectives

- Examine socioeconomic (SES) disparities in self-reported pre- and post-treatment sexual functions for localized prostate cancer patients.

- Identify factors that contribute to SES disparities in sexual function decline after treatment.

\textsuperscript{1}Cancer Facts & Figures 2014. Atlanta, ACS 2014.
\textsuperscript{2}Socioeconomic Status
Methods

- **Data source**
  - Comparative Effectiveness Analysis of Surgery and Radiation for Localized Prostate Cancer (CEASAR) study\(^1\) surveys
    - Baseline ≤4 months after diagnosis: 44% response rate
    - follow-up ≤ 6 months after baseline: 88% response rate

- **Eligibility criteria:**
  - Age < 80 years old, Speak English, Louisiana resident, consent to participate
  - Biopsy-proven prostate adenocarcinoma
  - Clinically localized disease (PSA ≤ 50 ng/ml)

\(^1\)AHRQ funded study of Comparative Effectiveness Analysis of Surgery and Radiation for Localized Prostate Cancer (CEASAR) led by Dr. Penson at the Vanderbilt University Medical Center; four SEER registries participated in this study in 2010-2013.

Methods

- **Questions for sexual functions\(^1\) (during the last 4 weeks. For the baseline, prior to any treatment) based on EPIC-26\(^2\) items 57-58**

<table>
<thead>
<tr>
<th>Your ability to have an erection?</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Your ability to reach orgasm (climax)?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

\(^1\) Including sexual bother (item 68).
\(^2\) Expanded Prostate Cancer Index Composite (Wei JT, 2000)

Methods

- **Questions (EPIC\(^1\) items 59-60) for sexual functions (cont.)**

How would you describe the usual QUALITY of your erections during the last 4 weeks?

- None at all ........................................ 1
- Not firm enough for any sexual activity .................. 2
- Firm enough for masturbation and foreplay only .......... 3 (Circle one number)
- Firm enough for intercourse ................................ 4

How would you describe the FREQUENCY of your erections during the last 4 weeks?

- I NEVER had an erection when I wanted one ............ 1
- I had an erection LESS THAN HALF the time I wanted one 2
- I had an erection ABOUT HALF the time I wanted one ... 3 (Circle one number)
- I had an erection MORE THAN HALF the time I wanted one 4
- I had an erection WHENEVER I wanted one ............. 5

\(^1\) Expanded Prostate Cancer Index Composite (Wei JT, 2000)
### Methods

**Sexual function scores**

- Summary score for each patient is the mean of the recoded scores of all questions ranging 0-100; the higher summary score represents the better sexual function.

<table>
<thead>
<tr>
<th>Response value</th>
<th>Recode (items 57-60, 64)</th>
<th>Recode (item 68)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0</td>
<td>100</td>
</tr>
<tr>
<td>2</td>
<td>25</td>
<td>75</td>
</tr>
<tr>
<td>3</td>
<td>50</td>
<td>50</td>
</tr>
<tr>
<td>4</td>
<td>75</td>
<td>25</td>
</tr>
<tr>
<td>5</td>
<td>100</td>
<td>0</td>
</tr>
</tbody>
</table>

### Methods

- SES from 6-month survey (except age)
  - Age diagnosis (yrs.): < 65, 65-74, 75/+
  - Race: white, black
  - Household income: ≤ $30K, >$30K-$50K, >$50K
  - Education: High school (HS) or less, HS graduate or some college, college graduate or higher
  - Insurance: Private, Public (Medicare, VA Health Care, et al), None/Medicaid, Unknown
- Treatment from 6-month survey: surgery, radiation, hormone, watchful waiting/active surveillance/no treatment

### Results

- 676 localized prostate cancer patients.
  - 90% under age 75, 81% whites, 45% income >$50K, 52% high school graduate/some college, 61% private insurance, and 6% no insurance/Medicaid
- Poor or very poor sexual function: 4
  - baseline: 36%
  - follow-up (6 months after the baseline): 70%
- The overall summary scores for the sexual function:
  - baseline survey: 58.3
  - Follow-up survey: 32.9

Based on response to the EPIC: At question 64. Overall, how would you rate your ability to function sexually during the last 4 weeks?
Pre- and Post-Treatment Sexual Function Summary Scores for Localized Prostate Cancer Cases in Louisiana, 2010-2012

Association of SES Factors with More Decline in Sexual Function after Treatment. Localized Prostate Cancers Diagnosed in Louisiana. 2010-2012

<table>
<thead>
<tr>
<th>Factors</th>
<th>Co-efficient of Linear Regression Models</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Crude model¹</td>
</tr>
<tr>
<td>Age</td>
<td></td>
</tr>
<tr>
<td>&lt;65</td>
<td>-19.9</td>
</tr>
<tr>
<td>65-74</td>
<td>-7.1</td>
</tr>
<tr>
<td>≥75</td>
<td>Ref</td>
</tr>
<tr>
<td>Race</td>
<td></td>
</tr>
<tr>
<td>White</td>
<td>-1.6</td>
</tr>
<tr>
<td>Black</td>
<td>Ref</td>
</tr>
<tr>
<td>Income</td>
<td></td>
</tr>
<tr>
<td>&lt;=$10K</td>
<td>Ref</td>
</tr>
<tr>
<td>$10K-$50K</td>
<td>-4.5</td>
</tr>
<tr>
<td>&gt;$50K</td>
<td>-12.4</td>
</tr>
</tbody>
</table>

1 Predictor alone;  2 Adjusted for all SES predictors (age, race, income, education and insurance) together
3 Adjusted for all SES predictors (age, race, income, education and insurance) and treatment

Highlighted in red: p<0.05
Percent Distribution of Treatment Type by SES for Localized Prostate Cancers Diagnosed in Louisiana, 2010-2012

<table>
<thead>
<tr>
<th>Factors</th>
<th>Surgery 1%</th>
<th>Radiation 2%</th>
<th>Hormone 3%</th>
<th>No Tx 4%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;65</td>
<td>70.0</td>
<td>17.7</td>
<td>0.5</td>
<td>12.3</td>
</tr>
<tr>
<td>65-74</td>
<td>41.8</td>
<td>35.4</td>
<td>1.0</td>
<td>21.8</td>
</tr>
<tr>
<td>&gt;=75</td>
<td>5.1</td>
<td>56.4</td>
<td>12.8</td>
<td>25.6</td>
</tr>
<tr>
<td>Race</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>White</td>
<td>51.3</td>
<td>27.7</td>
<td>2.1</td>
<td>17.0</td>
</tr>
<tr>
<td>Black</td>
<td>45.8</td>
<td>33.7</td>
<td>0</td>
<td>20.5</td>
</tr>
<tr>
<td>Income</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;= $30K</td>
<td>39.1</td>
<td>40.0</td>
<td>3.6</td>
<td>17.3</td>
</tr>
<tr>
<td>&gt; $30K - $50K</td>
<td>50.0</td>
<td>28.1</td>
<td>2.6</td>
<td>19.3</td>
</tr>
<tr>
<td>&gt; $50K</td>
<td>60.3</td>
<td>22.0</td>
<td>0.5</td>
<td>17.2</td>
</tr>
</tbody>
</table>

1. Surgery alone & surgery + any other treatments;
2. Radiation alone & radiation + any other treatment except surgery;
3. Hormone as main/only therapy;
4. Active surveillance/watchful waiting & no therapy

Percent Distribution of Treatment Type by SES Localized Prostate Cancers Diagnosed in Louisiana, 2010-2012

<table>
<thead>
<tr>
<th>Factors</th>
<th>Surgery 1%</th>
<th>Radiation 2%</th>
<th>Hormone 3%</th>
<th>No Tx 4%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Education</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Some HS or less</td>
<td>41.7</td>
<td>39.6</td>
<td>2.1</td>
<td>16.7</td>
</tr>
<tr>
<td>HS or some college</td>
<td>51.2</td>
<td>28.6</td>
<td>1.2</td>
<td>16.1</td>
</tr>
<tr>
<td>College or higher</td>
<td>52.9</td>
<td>25.9</td>
<td>1.2</td>
<td>20.0</td>
</tr>
<tr>
<td>Insurance</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Private</td>
<td>56.8</td>
<td>25.0</td>
<td>0.7</td>
<td>17.6</td>
</tr>
<tr>
<td>Public</td>
<td>40.3</td>
<td>34.5</td>
<td>3.6</td>
<td>21.6</td>
</tr>
<tr>
<td>No/Medicaid*</td>
<td>57.7</td>
<td>38.5</td>
<td>3.9</td>
<td>0.0</td>
</tr>
</tbody>
</table>

* Sample size pretty small - 26 cases, 10 with radiation, 14 with surgery and 1 with hormone.

Discussions

- Lower SES patients were more likely to have worse sexual functions than their higher SES counterparts before prostate cancer treatment.
- Sexual functions declined after prostate cancer treatment in all SES groups; larger decline in higher SES group.
- After adjustment for treatment and other SES factors, SES disparities in post-treatment sexual function no longer significant.

- It is well known that radical prostatectomy (RP) plays a critical role in decreased sexual function. Adverse sexual function is primarily attributable to non-nerve-sparing surgery.
- The recovery of erectile function after RP can take about year and may be up to 4 years depending upon many factors, such as age, pre-treatment erectile function, etc.
- The sexual function of RP subjects have a greater long-term improvement than those undergoing radiation therapy. Studies reported that erectile dysfunction induced by radiation therapy continued to develop for up to 3 years.

Limitations

- Response rate varied by SES.
- Low response rate.
- Patient reported treatment. Detailed treatment information such as surgical types (laparoscopic or robotic) and radiation types (BT, EBRT, and IMRT) from medical records was not ready for use yet.
- 12-month survey data was not ready for use.
- SES data was from the 6-month survey. Insurance and household income could change from the baseline survey.

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Thank You!

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