Racial and Socioeconomic Disparities in Healthcare- and Community-Associated Clostridium difficile Infection: A Rapid Review

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BACKGROUND

- *Clostridium difficile* infection (CDI) involves bacterial infection of the large intestine, causing complications like colitis and diarrhea (CDC).
- 2 main settings:
  - Healthcare-Associated CDI (HA-CDI): infection in or due to healthcare settings
  - Community-Associated CDI (CA-CDI): infection outside of healthcare settings
- Both HA-CDI and CA-CDI caused an estimated 462,000 infections nationwide in 2017 (Guh et al., 2020). CDI is classified by CDC as an “Urgent Threat”.

OBJECTIVES

1. Update the current status of racial disparities in HA-CDIs in last 5 years.
2. Explore racial disparities in CA-CDIs.
3. Explore socioeconomic disparities in HA- and CA-CDIs.

METHODS

Data Sources

- Two databases: PubMed and Scopus.

Representative Search Terms:

<table>
<thead>
<tr>
<th>Risk Factors</th>
<th>Nosocomial Infection</th>
<th>Clostridium difficile</th>
</tr>
</thead>
<tbody>
<tr>
<td>Social Determinants</td>
<td>Healthcare-Associated Infection</td>
<td>Clostridoides difficile</td>
</tr>
<tr>
<td>Health Disparities</td>
<td>Cross Infection</td>
<td></td>
</tr>
<tr>
<td>Social Factors</td>
<td>Community-Associated Infection</td>
<td></td>
</tr>
</tbody>
</table>

Inclusion Criteria

- Published in last 5 years: May, 2015, to May, 2020
- United States patient sample
- Quantitative analysis using cohort, case-control, ecological, cross-sectional, or experimental study designs
- Association between race and/or socioeconomic status as predictor and CDI incidence or related measures as outcomes measured through a multivariable regression model for which effect sizes or p values are provided.

RESULTS

<table>
<thead>
<tr>
<th>Racial Disparity Studies</th>
<th>Total</th>
<th>No significant differences</th>
<th>Whites vulnerable</th>
<th>Blacks vulnerable</th>
<th>Mixed results</th>
</tr>
</thead>
<tbody>
<tr>
<td># of studies</td>
<td>13</td>
<td>6</td>
<td>5</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Socioeconomic Disparity Studies</th>
<th>Total</th>
<th>No significant differences</th>
<th>Higher SES vulnerable</th>
<th>Lower SES vulnerable</th>
<th>Mixed results</th>
</tr>
</thead>
<tbody>
<tr>
<td># of studies</td>
<td>8</td>
<td>1</td>
<td>3</td>
<td>2</td>
<td>2</td>
</tr>
</tbody>
</table>

Racial disparities:

- Whites generally faced higher incidence for both HA- and CA-CDI in a variety of patient samples.
- Argamany et al. (2016) showed in a large nationally representative sample that Blacks faced higher severity, mortality, and costs.

Socioeconomic disparities:

- At the census tract level, lower socioeconomic status (as measured by poverty, education, unemployment, insurance type, public assistance, and home crowding) was associated with higher CA-CDI
- At the individual level, results were mixed with higher income and government insurance were associated with higher HA- and CA-CDI rates.

DISCUSSION

Importance to literature:

- Strengthens previous evidence for White burden in HA-CDI and provides new evidence in CA-CDI burden; however, Blacks might face harsher CDI consequences.
- There is new evidence for SES disparities, which differ based on census tract vs. individual levels.

Potential reasons for disparities:

- Differential access to healthcare and medications: higher healthcare, antibiotic, and proton pump inhibitor use can predispose certain groups to higher CDI burden.
- Differential access to nucleic acid amplification tests (NAAT): high-sensitivity tests like these may explain observed differences between sociodemographic groups.

Public health research implications:

- Need to standardize race, SES, and CDI definitions.
- Further research is needed in large national samples to determine extent to which disparities depend on access.

<table>
<thead>
<tr>
<th>Data Sources</th>
<th>Records identified through PubMed and Scopus database searches (n = 1,206)</th>
<th>Additional records identified through Google search (n = 5)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Screening</td>
<td>Records screened (n = 326)</td>
<td>Records excluded by abstract and title (n = 204)</td>
</tr>
<tr>
<td>Eligibility</td>
<td>Full-text articles assessed for eligibility (n = 290)</td>
<td>Full-text articles excluded (n = 275)</td>
</tr>
</tbody>
</table>
| Included     | Studies included in quantitative synthesis (n = 15)                       | Pre-2015: Race/SES not a predictor
|              |                                                                            | CDI not main outcome
|              |                                                                            | Data not provided
|              |                                                                            | Only bivariate & no multivariable analysis