Gender, race, and ethnicity among stone formers at academic medical centers in Birmingham, Alabama and Dallas, Texas

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Background

- Nephrolithiasis is a growing public health problem in the United States.
- While nephrolithiasis is more common in men, the gender ratio is decreasing [1].
- Significant increases in stone prevalence have been reported for Black and Hispanic patients in the U.S. [2].
- The gender-specific contribution to this trend requires further evaluation.

Objective

- To evaluate the distribution of stone formers by gender, race, and ethnicity in contemporary cohorts.

Methods

- Patients with a nephrolithiasis diagnosis (ICD-10 code N20) at two large academic medical centers from 1/2015-6/2020 were identified and stratified by location:
  - University of Alabama at Birmingham Medical Center (Birmingham Cohort).
  - University of Texas Southwestern Medical Center/Parkland Memorial Hospital (Dallas Cohort).
- Gender, race, and ethnicity were determined using electronic medical record search tools at each center.
- Differences in gender distribution among Black/White and Hispanic/non-Hispanic stone formers were assessed using Fisher’s exact test.

Results

<table>
<thead>
<tr>
<th>Race</th>
<th>Birmingham</th>
<th>p</th>
<th>Dallas</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Black female</td>
<td>2,992 (12.0%)</td>
<td>4,399 (9.0%)</td>
<td>0.001</td>
<td></td>
</tr>
<tr>
<td>Black male</td>
<td>2,356 (9.4%)</td>
<td>3,422 (7.0%)</td>
<td>0.001</td>
<td></td>
</tr>
<tr>
<td>White female</td>
<td>8,663 (34.6%)</td>
<td>19,530 (40.2%)</td>
<td>0.001</td>
<td></td>
</tr>
<tr>
<td>White male</td>
<td>11,694 (44.0%)</td>
<td>21,202 (43.8%)</td>
<td>0.001</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>25,005</td>
<td>48,632</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Ethnicity</th>
<th>Birmingham</th>
<th>p</th>
<th>Dallas</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hispanic female</td>
<td>178 (0.7%)</td>
<td>10,451 (20.0%)</td>
<td>0.06</td>
<td></td>
</tr>
<tr>
<td>Hispanic male</td>
<td>164 (0.7%)</td>
<td>9,448 (18.1%)</td>
<td>0.001</td>
<td></td>
</tr>
<tr>
<td>Non-Hispanic female</td>
<td>11,401 (46.1%)</td>
<td>15,017 (29.9%)</td>
<td>0.001</td>
<td></td>
</tr>
<tr>
<td>Non-Hispanic male</td>
<td>12,999 (52.5%)</td>
<td>17,244 (33.1%)</td>
<td>0.001</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>24,742</td>
<td>32,116</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 1: Distribution of stone formers at academic medical centers in the Birmingham and Dallas Cohorts from 1/2015-6/2020 based on gender, race, and ethnicity. p-values correspond to the difference in percentage of women for Black vs. White and Hispanic vs. non-Hispanic stone formers.

Cohort characteristics

- 77,161 total stone formers with race and/or ethnicity data available.
- Birmingham Cohort had a greater percentage of Black stone formers compared to Dallas Cohort (21% vs. 16%).
- Dallas Cohort had a greater percentage of Hispanic stone formers compared to Birmingham Cohort (38% vs. 1%).

Gender ratio differences

- Majority of Black and Hispanic stone formers in both cohorts were female.
- Majority of White and non-Hispanic stone formers in both cohorts were male.
- In both cohorts, the percentage of women was significantly greater among Black stone formers compared to White stone formers.
- In the Dallas Cohort, the percentage of women was significantly greater among Hispanic stone formers compared to non-Hispanic stone formers.
- The above relationship did not meet conventional levels of statistical significance in the Birmingham Cohort.

Conclusions

- At academic medical centers in two large cities, the majority of Black and Hispanic stone formers are female, whereas the majority of White and non-Hispanic stone formers are male, demonstrating a significant difference in gender distribution.
- Nephrolithiasis in Black and Hispanic women may be driving increases in prevalence reported for Black and Hispanic individuals.
- Further evaluation of these findings and their potential associations with obesity, chronic medical conditions, and socioeconomic variables is needed in order to understand disparities in kidney stone disease.

References