The Utility of Blood Pressure in Predicting Traditional and Everyday Cognition in Older Women

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Blood Pressure (BP) and Cognition
- Hypertension is a leading risk factor for mortality.
  - Older women demonstrate a higher prevalence and lower BP control than men.
- Mid-life hypertension is associated with earlier and accelerated cognitive decline in late life.
- BP in very old adults has been associated with cognitive deficits (cerebral hypoperfusion)
- Focusing on a hypertensive diagnosis may mask cognitive differences across the BP range.

Everyday Problem Solving (EPS)
- Form of everyday cognition that assesses real-world functioning.
- Superior predictive utility regarding functional outcomes than traditional tasks.
  - Elderly, chronically ill, psychiatric patients
- Traditional cognitive tests may underestimate how older adults perform in their normal environment.

Research objective
In addition to traditional cognitive abilities, does BP during assessment predict EPS performance, focusing on the following variables?
- Systolic BP (SBP)
- Diastolic BP (DBP)
- Pulse Pressure (PP)
- Hypertensive status/use of antihypertensive medication

Method
Participants
- 74 community-dwelling women (51-91 yrs) in metro Vancouver, Canada were recruited through local/online advertisements and community centres.

Table 1. Demographic and Health Variables

<table>
<thead>
<tr>
<th>Predictors</th>
<th>N</th>
<th>Age (mean)</th>
<th>Education (mean)</th>
<th>MMSE (mean)</th>
<th>SBP (mmHg)</th>
<th>DBP (mmHg)</th>
<th>PP (mmHg)</th>
<th>% diabetes</th>
<th>% ↑ cholesterol</th>
<th>% CVD</th>
<th>% smoking</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>74</td>
<td>66.2 (8.4)</td>
<td>14.7 (2.7)</td>
<td>28.7 (1.4)</td>
<td>120.4 (17.1)</td>
<td>75.1 (11.0)</td>
<td>45.2 (12.5)</td>
<td>12.2</td>
<td>37.8</td>
<td>9.5</td>
<td>6.8</td>
</tr>
</tbody>
</table>

Select Measures
- Demographic medical questionnaire
- Blood pressure (4 readings taken)
- Traditional Cognitive Measures: EF/Speed
  - Executive Function (D-KEFS)
  - Trail Making, Color-Word
  - Perceptual Speed
  - Digit-Symbol coding task (WAIS-III)
- EPS task
  - Participants wrote down as many solutions as possible to 8 everyday problem vignettes.
  - # safe & effective solutions (r = 0.85)

Results
- Hierarchical regression analyses were performed to determine whether BP predicted EPS and/or EF/Speed.

Table 2. EPS Regression : SBP & DBP

<table>
<thead>
<tr>
<th>Predictors</th>
<th>B</th>
<th>S.E.</th>
<th>β</th>
<th>p</th>
<th>R²</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>-0.56</td>
<td>.14</td>
<td>-.40</td>
<td>&lt;.001</td>
<td>.31</td>
</tr>
<tr>
<td>Education</td>
<td>1.46</td>
<td>.44</td>
<td>.33</td>
<td>&lt;.01</td>
<td>.63</td>
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<tr>
<td>SBP</td>
<td>.21</td>
<td>.10</td>
<td>.201</td>
<td>&lt;.05</td>
<td>.44</td>
</tr>
<tr>
<td>DBP</td>
<td>-.18</td>
<td>.15</td>
<td>-.17</td>
<td>n.s.</td>
<td>.36</td>
</tr>
<tr>
<td>ΔR²</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>.045</td>
</tr>
</tbody>
</table>

Table 3. EPS Regression : PP

<table>
<thead>
<tr>
<th>Predictors</th>
<th>B</th>
<th>S.E.</th>
<th>β</th>
<th>p</th>
<th>R²</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age &amp; Education (See Table 2)</td>
<td>.31</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PP</td>
<td>.23</td>
<td>.10</td>
<td>.24</td>
<td>&lt;.05</td>
<td>.36</td>
</tr>
<tr>
<td>ΔR²</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>.05</td>
</tr>
</tbody>
</table>

Conclusions
- BP during assessment may better predict traditional and everyday cognitive abilities than a hypertensive diagnosis across middle-aged and older women.
- In women with low-normal BP to mild hypertension, a minimum BP level may be required to ensure optimal cognitive function.
- Appropriate BP control may be important in maintaining everyday cognition and solving everyday problems in older age.

Select References

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