The Effect of Room Temperature on Anesthesia and Surgical Staff’s Ability to Perform Clinical and Cognitive Tasks

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Background
- Medical providers’ competence in the operating room (OR) is a key component of patient safety.
- Ambient temperature in pediatric operating rooms may impact performance of surgical and anesthesia staff.
- The current study examined the impact of intraoperative ambient temperature on the clinical performance of anesthesiology and surgical residents, fellows, and nurse anesthetists.

Methods
- All participants completed 3 phases (baseline temperature, hot, and cold) of a 10-minute psychomotor vigilance test (PVT) to measure reaction time (RT).
- To simulate operative conditions, surgery residents/fellows completed the study in sterile surgical scrubs and nurse anesthetists in scrubs.
- After every phase, participants rated their performance on a scale of 1 (lowest) to 21 (highest).
- Objective performance (RT on PVT) and subjective performance scores were compared between baseline and hot or cold conditions using paired t-tests.

Results
- 22 participants were enrolled
- Mean RT on PVT was comparable among baseline (280 ± 47 ms), hot (286 ± 55 ms, p=0.171), and cold (303 ± 114 ms, p=0.378) conditions.
- On the 1-21 scale, the baseline subjective self-rated performance score was 14 ± 6. Under the hot condition, self-rated performance was significantly worse (12 ± 6, p=0.003), while under the cold condition, self-rated performance was similar to baseline (13 ± 6, p=0.331).
- Physical demand (p=0.013) and frustration (p=0.004) were both elevated under the hot condition as compared to baseline.

Conclusion
- Excessive heat in the OR environment was associated with worse self-rated performance among anesthesia and surgery residents and nurse anesthetists.
- Self-rated physical demand and frustration were greater under the hot condition.
- A balance needs to be obtained between heating the OR for the pediatric population and potential impact on staff performance.

Table 1. Questionnaire responses by study phase (N=22).

<table>
<thead>
<tr>
<th>Question*</th>
<th>Baseline Mean (SD)</th>
<th>Hot Mean (SD)</th>
<th>Cold Mean (SD)</th>
<th>Hot vs baseline p</th>
<th>Cold vs baseline p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Performance: How successful were you in accomplishing what you were asked to do?</td>
<td>14 (6)</td>
<td>12 (6)</td>
<td>13 (6)</td>
<td>0.003</td>
<td>0.331</td>
</tr>
<tr>
<td>Physical demand: How physically demanding was the task?</td>
<td>3 (3)</td>
<td>5 (5)</td>
<td>3 (3)</td>
<td>0.013</td>
<td>0.815</td>
</tr>
<tr>
<td>Mental demand: How mentally demanding was the task?</td>
<td>7 (6)</td>
<td>8 (6)</td>
<td>6 (5)</td>
<td>0.211</td>
<td>0.617</td>
</tr>
<tr>
<td>Temporal demand: How hurried or rushed was the pace of the task?</td>
<td>7 (5)</td>
<td>7 (5)</td>
<td>6 (5)</td>
<td>0.625</td>
<td>0.140</td>
</tr>
<tr>
<td>Effort: How hard did you have to work to accomplish your level of performance?</td>
<td>7 (5)</td>
<td>8 (5)</td>
<td>7 (5)</td>
<td>0.119</td>
<td>0.924</td>
</tr>
<tr>
<td>Frustration: How insecure, discouraged, irritated stressed and annoyed were you?</td>
<td>8 (6)</td>
<td>13 (6)</td>
<td>8 (6)</td>
<td>0.004</td>
<td>0.973</td>
</tr>
</tbody>
</table>

* Rated on 1-21 scale from lowest to highest.
* Paired t-test.

References: