Simulation-Based Mastery Learning for Internal Medicine Residents in Procedures

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Background

Procedural competency is an integral component of Internal Medicine clinical practice and resident training. However, insufficient procedural training during residency particularly in ambulatory settings has been reported as a consistent concern by residents and program directors.

Deliberate practice through simulation-based mastery learning (SBML) of inpatient IM procedures improves long-term skill retention and patient outcomes. This learning is reinforced when temporally paired with clinical experience.

Purpose

- Bedside procedures are an essential component of internal medicine (IM) ambulatory care, but rates of procedures performed and self-perceived procedural confidence continue to decline among IM faculty and residents.

Questions

Does JiT (same-rotation) and JiP (similar environment) SBML for procedures:

- Reduce trainee self-perceived cognitive load during procedures?
- Improve technical performance?
- Improve patient experience and/or the confidence they have in the proceduralist?

Methods

![Diagram](chart.png)

- Procedure Clinic (Tuesdays 9–12h)
- Each resident will perform any or all 4 procedure types each clinic.
- Attending will supervise.
- Blinded research assistant will assess performance.

Results

- [Table]

<table>
<thead>
<tr>
<th>Procedure</th>
<th>Number of observed encounters</th>
<th>Average number of observed mistakes (total possible)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subcutaneous Injection</td>
<td>30</td>
<td>2.5 (23)</td>
</tr>
<tr>
<td>Knee Injection</td>
<td>45</td>
<td>2.3 (13)</td>
</tr>
<tr>
<td>Paracentesis</td>
<td>38</td>
<td>2.2 (9)</td>
</tr>
<tr>
<td>Totals</td>
<td>113</td>
<td></td>
</tr>
</tbody>
</table>

- Reduced anxiety and increased confidence.
- Most effective learning occurred when residents performed the same procedure that they had simulated that same day.

Discussion

- Just-In-Time and Just-in-Place Simulation Based Mastery Learning could catalyze changes to resident procedural education.
- Data could support curriculum development.
- Beyond training and education, improved patient safety and healthcare quality.
- Limitations: medical student RAs, assessment burden on residents, checklist assessment variability

Conclusion and Future Directions

- A same-day simulation-paired procedural clinic with standardized educational materials and clinic protocols may provide a psychologically safe and effective learning environment for IM PGY-1s to acquire common ambulatory IM procedural skills.
- Measure trainees’ long-term retention of these procedural skills

References

- No references provided.