Assessing Medical Decision Making
Using Human Patient Simulation

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Background: This pilot study describes an Objective Structured Clinical Examination (OSCE) developed using Human Patient Simulation (HPS). Methods: Eight residents completed two iterations of this HPS OSCE containing seven stations and utilizing checklists, global ratings, and scoring sheets. Results: The first- and second-year residents scored similarly with mean scores of 64/104 and 62/123, respectively. No statistical difference was noted between the resident scores. Conclusions: The HPS OSCE is feasible for small groups. A larger study will be needed to determine the effectiveness of this tool for evaluation.

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a patient lying on an emergency room bed. Her voice was provided by an actor (at a cost of $17 per hour) so she could respond to residents’ questions in real time. The structure and content of the seven OSCE stations are described in Table 1, along with the Accreditation Council for Graduate Medical Education (ACGME) competency each was designed to measure. Two family medicine and one behavioral medicine faculty observed each session and timed and scored the stations. The Institutional Review Board of ETSU granted the study exempt status.

**Testing and Scoring**

In the traditional OSCE, checklists and global rating scales provide the basis for objective evaluation.6-8 We used checklists and global rating scales for stations 1–4. The electrocardiogram interpretation in station 6 was independently scored by family medicine faculty. Family medicine faculty observing the OSCE developed a narrative report of each resident’s performance and debriefed the resident at Station 7. The debriefing session addressed outcome results, process considerations, HPS interventions, differential diagnosis explanations, ECG interpretation, and overall performance. Additional information obtained from the resident during debriefing, such as clinical decision making and generation of differential diagnoses, was incorporated into the narrative report.

**Data Analysis and Results**

Descriptive and group statistics were compiled from the checklists and global rating forms used at the stations. Measures of central tendency were calculated for five OSCE stations as well as an overall score. For stations 1–4 and 6, the maximum score was 106 for PGY-1 and 123 for PGY 2. The physical examination checklist was piloted only in the second iteration. An independent t test was conducted to evaluate differences in PGY scores. There was no significant difference between the PGY-1 and PGY-2 residents at any of the five stations (t=.106, P=.92). OSCE Station means were: focused history 20 versus 15, differential diagnoses 4.3 versus 3.6, assessment and plan 3 versus 3.9, ECG interpretation 39 versus 41.6, for PGY-1 and PGY-2 groups respectively. The overall range for PGY-1 was 39.0–86.5 (mean=66.7, SD=24.7). The range for PGY-2 was 23.0–90.5 (mean=64.7, SD=25.6).

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**Table 1**

Human Patient Simulator OSCE Station Description

<table>
<thead>
<tr>
<th>OSCE Station</th>
<th>Resident Task</th>
<th>Assessment Method</th>
<th>Time</th>
<th>Competency Assessed</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Perform a focused history based on chief complaint.</td>
<td>Checklist of history components from direct faculty observation</td>
<td>7 minutes</td>
<td>PC, MK, ICS</td>
</tr>
<tr>
<td>2</td>
<td>Generate five differential diagnoses based on history, with the prioritization of each diagnosis.</td>
<td>Global rating scale</td>
<td>5 minutes</td>
<td>PC, MK</td>
</tr>
<tr>
<td>3</td>
<td>Perform a focused physical examination on the simulator (as it demonstrates physiologic and physical signs consistent with the presentation)</td>
<td>Checklist of physical examination components from direct faculty observation</td>
<td>4 minutes</td>
<td>PC, MK</td>
</tr>
<tr>
<td>4</td>
<td>Review, reevaluate, and reprioritize the differential diagnoses generated in station 2</td>
<td>Global rating scale</td>
<td>5 minutes</td>
<td>PC, MK</td>
</tr>
<tr>
<td>5</td>
<td>Return to human simulator. Continue to assess, evaluate, and intervene until diagnosis made. Use of print and electronic resources permitted. (Simulator programmed to respond with normal human physiology to therapeutic interventions. If acute coronary syndrome not recognized, simulator programmed to deteriorate into ventricular fibrillation.)</td>
<td>Direct faculty observation</td>
<td>20–30 minutes</td>
<td>PC, MK, ICS, PBL</td>
</tr>
<tr>
<td>6</td>
<td>After the scenario, resident provides a written explanation of the working diagnosis, with justification of the medical interventions, including electrocardiogram interpretation.</td>
<td>Faculty analysis of written explanation</td>
<td>20 minutes</td>
<td>MK</td>
</tr>
<tr>
<td>7</td>
<td>Debriefing</td>
<td>Faculty discussion and feedback</td>
<td>30 minutes</td>
<td></td>
</tr>
</tbody>
</table>

OSCE—Objective Structured Clinical Examination

* Competency: PC—patient care, MK—medical knowledge, ICS—interpersonal and communication skills, PBL—practice-based learning and improvement
Discussion/Conclusions

This article describes the first documented OSCE with the Human Patient Simulator involving family medicine residents. We determined the HPS OSCE to be practical, useful, and feasible for small groups. There were no statistical differences observed between the two resident groups. However, the study is limited by a small number of subjects in a single institution, and we cannot generalize our findings from this pilot session. We only presented a single cardiac case, and our residents may have performed better in another case. A single case in 8 to 10 simulation sessions and repeated in one or two simulations in a larger OSCE with SPs would provide more comparative data of resident performance.

We were disappointed by the low scores of both classes of residents. Either the residents did not know the material, did not know how to locate and search resources for information, or knew the material but this pilot intervention did not capture their abilities. However, we did identify deficiencies in our curriculum and faculty teaching. We changed our curriculum and faculty teaching styles as a result of this pilot study. The HPS OSCE may provide an objective means of assessment and evaluation in the core competencies and identify deficiencies in knowledge, clinical skills, and clinical decision making in individual residents for remediation planning. We also recommend the HPS OSCE as a method for curriculum evaluation and faculty development.

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References