e-learning to reduce intravenous medication errors?
Simulation study in a room of errors

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Background
• Errors occur frequently during the medication process, more particularly with injectable (IV) drugs
• Nurses’ education and training is crucial to prevent errors
• New education technologies like simulation and e-learning could be useful

Purpose
To evaluate the impact of a self-made e-learning lesson, focused on the safety of IV drug preparation and administration, on the ability of nurses and pharmacy students to detect errors voluntarily placed in a simulated patient’s room (« room of errors »).

Conclusion
• Number of detected errors significantly improved, particularly administration errors
• Impact of e-learning higher on nurse’s
• High satisfaction with the learning concept

Material and Method
• Selection of errors and installation of the « room of errors »
  ▪ 5 preparation errors
  ▪ 5 administration errors
  ▪ 1 identity error
• Conception of the e-learning focused on the safety of IV drug preparation and administration
• Study design:
  1st pass in the room (15 min)
  e-learning completion (30 min)
  2nd pass in the room (15 min)
  Debriefing (10 min)
• Evaluation of the improvement of the number of detected errors (mean ± SD)
• Satisfaction evaluation (standardized questionnaire)

Results
• 28 participants: 16 nurses + 12 pharmacy students
• Mean number of detected errors increased significantly:

<table>
<thead>
<tr>
<th>Number of errors</th>
<th>Before e-learning [mean ± SD]</th>
<th>After e-learning [mean± SD]</th>
<th>Difference (95%CI)</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>All kind of errors</td>
<td>2.6 (±1.8)</td>
<td>4.6 (±2.3)</td>
<td>2.0 (1.5 to 2.4)</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>Preparation</td>
<td>0.6 (±0.7)</td>
<td>1.3 (±1.0)</td>
<td>0.7 (0.4 to 1.0)</td>
<td>0.0001</td>
</tr>
<tr>
<td>Administration</td>
<td>1.3 (±1.4)</td>
<td>2.4 (±1.4)</td>
<td>1.1 (0.8 to 1.5)</td>
<td>&lt;0.0001</td>
</tr>
</tbody>
</table>

• Percentage of detected errors after e-learning (that were not detected before):  p = 0.0001

<table>
<thead>
<tr>
<th></th>
<th>Nurses</th>
<th>Students</th>
</tr>
</thead>
<tbody>
<tr>
<td>Preparation</td>
<td>21.6% (CI 12.1-35.8)</td>
<td>3.8% (CI 1.0-14.1)</td>
</tr>
<tr>
<td>Administration</td>
<td>34.7% (CI 20.5-52.4)</td>
<td>27.3% (CI 17.2-40.4)</td>
</tr>
</tbody>
</table>

Satisfaction evaluation
100 % of nurses and 83% of pharmacy students appreciated this learning concept but it was judged more suitable for nurses’ practice.