Developing Clinical Skills using a Virtual Patient Simulator in a Resource-limited Setting

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Plan

- Background
- Objective and research hypothesis
- Material and Methods
- Results
- Discussion and Conclusion
Background

- Virtual Patient (VP)

- The VP-based training method promotes the learning of know-how.
  - Learning of procedures or gestures (technical)
    - Surgery, anesthesia and intensive care, endoscopy, etc.).
  - Clinical reasoning or decision analysis
    - Medical consultation
Background

- VP is increasingly used to train HCPs (students, physicians) as its potential to develop the acquisition of knowledge, skills and clinical reasoning has been demonstrated.  
  
  *Cook, 2010.*

- The learning outcomes after a VP-based training are often measured through:
  
  • multiple choice questions
  • “concordance of scripts” tests
  • “key features” (critical points of the case)
Background

- There is little evidence on the ability of VP systems, whose educational activity are based on medical consultations to develop real-life operational clinical skills.

- Such impact could be demonstrated by using standardized patients (SP) which is a validated pedagogical method to teach and assess clinical skills.
Objective and Research hypothesis

Objective:
- To measure the effect of training with a medical consultation VP simulator on clinical skills of HCPs in Africa.

Research hypothesis:
- Training using a medical consultation VP simulator does improve information collection and decision-making in real-life clinical scenarios.
Design of VP System:

- Virtual Internet Patient Simulator (VIPS)
- A web application for improving decision-making skills of general practitioners in Switzerland.
- Its main educational activity is the simulation of a medical consultation.
- It relies on the paradigm of the “blank sheet”
  - Answers are given in response to questions only.
  - Training of the ability to search and find information for interpretation.
Methods

- **Place:** Yaounde, Cameroon
  - Faculty of Medicine and Biomedical Sciences (FMBS)
  - Yaoundé Central Hospital (YCH)

- **Duration:**
  - April 24 - May 10, 2012

- **Participants:**
  - 20 medical students
    - 12 of them were 5th year medical students
    - 50% of them were female.
  - 4 actors (standardized patients)
**Methods**

- **Study Design: RCT**
  - Randomly assignment of participants into the two groups
  - Training of each group on one of the two clinical vignettes implemented in VP
    - Medical consultation and decision-making of the VP case.
      - Acute Renal Failure
      - Chronic Subdural Hematoma
    - Electronic feedback for the proper management of case was given at the end of each session.
  - Training of the standardized patients
    - Two 2-hour sessions
  - Assessment of clinical skills of participants in both groups with the SP
Methods

- **Primary outcome**
  - Performance score (percentage) for each group on each type of vignette.
  - Comparison between the two groups for each vignette.
    - Average score of the group (VIPS group) in which participants were electronically trained on one of the vignettes *versus* average score of the other group (control group) for which the participants were not trained.

- **Data collection**
  - by an investigator during the medical consultation of SP with support of an evaluation matrix.

- **Statistics analysis**
  - Student’s t-test
Results

- **Effects on the intervention**
  - Differences on performance between VIPS and Control groups
  - VIPS groups scored above to controls
  - Significant \( p \) when considering the relevant items only

<table>
<thead>
<tr>
<th>Vignette</th>
<th>VIPS</th>
<th>Control</th>
<th>( p^* )</th>
</tr>
</thead>
<tbody>
<tr>
<td>ARF (%)</td>
<td>73.9 (4.4)</td>
<td>63.8 (11.7)</td>
<td>0.019</td>
</tr>
<tr>
<td>CI 95%</td>
<td>71.3 – 76.5</td>
<td>56.6 – 71.1</td>
<td></td>
</tr>
<tr>
<td>Median</td>
<td>74.4</td>
<td>59.9</td>
<td></td>
</tr>
<tr>
<td>Min-Max</td>
<td>65.0 - 80.0</td>
<td>50.0 - 80.0</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Vignette</th>
<th>VIPS</th>
<th>Control</th>
<th>( p^* )</th>
</tr>
</thead>
<tbody>
<tr>
<td>CSDH (%)</td>
<td>66.1 (6.2)</td>
<td>60.2 (7.9)</td>
<td>0.077</td>
</tr>
<tr>
<td>CI 95%</td>
<td>62.6 – 70.0</td>
<td>55.5 – 64.3</td>
<td></td>
</tr>
<tr>
<td>Median</td>
<td>65.7</td>
<td>62.1</td>
<td></td>
</tr>
<tr>
<td>Min-Max</td>
<td>55.6 - 74.1</td>
<td>44.4 - 68.5</td>
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Table 2: Overall group scores for each vignette and their comparison.

<table>
<thead>
<tr>
<th>Key item scores (%)</th>
<th>VIPS</th>
<th>Control</th>
<th>( p )</th>
</tr>
</thead>
<tbody>
<tr>
<td>ARF</td>
<td>86.6</td>
<td>55.0</td>
<td>0.005</td>
</tr>
<tr>
<td>(77.7-93.1)</td>
<td></td>
<td>(36.6-72.7)</td>
<td></td>
</tr>
<tr>
<td>CSDH</td>
<td>80.00</td>
<td>63.3</td>
<td>0.014</td>
</tr>
<tr>
<td>(72.0-87.9)</td>
<td></td>
<td>(55.3-72)</td>
<td></td>
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</tbody>
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Table 3: Comparison of the groups with respect to their scores on the relevant items for proper case management.
Discussion and Conclusion

- These results suggest that participants who received training by a VP, significantly improve their operational clinical skills compared to those who did not receive.

- VIPS fosters the development of the user transferable skills.

- The use of a VP represents an opportunity to supplement or compensate the lack of teachers for the supervision of students during their medical courses and lack of hospital infrastructure as observed in most African countries.
Discussion and Conclusion

- This study demonstrated the feasibility of assessing the clinical skills using standardized patients in a situation where this pedagogical approach is not yet known.

Some limitations

- The small number of participants (reducing the power)

- The non investigation of an outcome of interest which could consist to measure the progress of one group, before and after training on VP. This design could help to more precise the level of transferability of real clinical skills.
Thank you for your kind attention

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