Using Simulation-based Education to Pinpoint Curriculum Deficiencies in an Anesthesiology Teaching Program

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Introduction
The aim of this study was to use Objective Structured Clinical Examination (OSCE)-driven modalities as a teaching/learning tool in simulation-based medical education (1-3), in order to pinpoint and define deficiencies in teaching. The anesthesia fields/domains tested and evaluated were operating room (OR) mishaps, trauma, and resuscitation (2).

Methods and Materials
The examination was administered to 66 residents in postgraduate years (PGY) 2-4 (Table 1). The residents were tested in crisis management in 3 major anesthesia domains (Tables 2-4). Each scenario (#1 or #2, in each field) was evaluated according to a preset checklist for performance evaluation.

Residents received a “pass” score on the scenario if they successfully performed 70% of the station’s checklist items, including all "yes" actions/items. In each scenario and in every domain, the error rate and performance grade for each item were calculated in each PGY group and for all residents. If the error rate was >0.3 or performance grade <0.7 in any item (for PGY-4 residents or all residents) -- we further investigated the particular “problematic” item.

Results
The error rate for all residents in Trauma and Resuscitation fields was lower than OR domain, and lower in Resuscitation than Trauma (Table 5), and the error rate was lower for PGY-4 residents compared to PGY-2 residents in each domain, and also in each scenario – except in scenario OR #1 and Trauma #2, where the error rate was relatively high in all PGY groups (Table 5).

When we analyzed the specific type of deficiencies (= performance grade <0.7), we found that:

(a) In the OR domain (Table 2), most (15/22) deficiencies were related to thinking process and differential diagnosis, but none of these deficiencies were critical

(b) in the Resuscitation domain (Table 3), most (8/9) deficiencies were related to basic knowledge of treatment, and >half of them (5/8) were critical

(c) in the Trauma domain (Table 4), most deficiencies were equally distributed and related to either decision on a choice of action/intervention (8/9) or basic knowledge of treatment (4/9), and most of them (7/9) were not critical.

Conclusions

• The differences in deficiencies found between the 3 domains tested (Table 5) and the lower success rate/graded for PGY-4 residents, found more in the OR/Trauma/Resuscitation fields can be related to the increased "missed" items associated with decision and choice of action or advanced knowledge[4] rather than to basic knowledge or treatment.

• The differences in success rate/graded for between scenarios #1 and #2 in Trauma can be explained on the same basis.

• It appears that even though only 45% of the tasks/items were in the frame of advanced knowledge, these tasks were more "problematic" to learn or teach to most of the residents, including the graduating PGY-4 residents.

• It also appears that there is a real need for improvement not only in evaluating the performance of anesthesia nontechnical skills, but also in teaching goals directed to enhance this aspect.

References