Use of high-fidelity simulated cases to improve third-year medical students' ability to manage an acutely unwell patient

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INTRODUCTION

A major issue for medical students is that they do not obtain adequate experience on the management of unwell patients.[1] As soon as a patient is noted to be unwell, students may be excluded and a great educational opportunity is missed. High-fidelity simulation provides a great opportunity for students to treat acutely unwell patients in a controlled and structured environment, and the benefits of these sessions have already been documented in the literature.[2]

Although simulation is used for final-year medical students, those in earlier clinical years are generally overlooked, with the assumption that they have not yet had the experience or knowledge to find simulations useful. Thus, hybrid sessions, combining high-fidelity simulation with a tutorial, were created to allow third-year medical students the opportunity to experience treating sick patients. Although not the primary aim of the sessions, any change in the students' ability to assess an unwell patient were investigated using presimulation and postsimulation surveys.

METHODS

In total, there were nine groups of third-year students on placement at Princess Alexandra Hospital NHS Trust throughout the year, with each group containing three to four students. We initially carried out an assessment of their knowledge on the ABCDE approach—airway, breathing, circulation, disability and exposure.[3] This was marked against a peer-reviewed checklist, which was created in conjunction with the local resuscitation department. Each group of students received four simulation scenarios over two 2-hour sessions, held at least a week apart. The scenarios used a high-fidelity manikin in a simulation suite and were led by a senior teaching fellow. During each simulation scenario, two students actively participated in the scenario, another student was a scribe and noted down the relevant events on a white board, and the final student, in groupswhich contained four students, was the observer but could act as a 'phone a friend' who could be called upon if required. All students were present within the simulation suite. The simulation was paused at various points to allow discussion to occur around diagnostic, management and referral skills. After each scenario, there was a debriefing session in an adjacent room, during which technical and non-technical skills could be discussed, feedback obtained from the observer and a critique of the note-taking skills of the scribe. Evaluation was obtained after each session and students were encouraged to write down their experiences within their logbook to support self-reflection. A repeat ABCDE survey was performed at least 24 hours after the final simulation session to investigate the impact. There were 32 potential 'marks' allocated to the survey(see table 1 for a list of scenarios and sequence of events).

The cases for the scenarios were based on the current module which the group of students were studying and thus were relevant to their curriculum.

RESULTS

We received 52 feedback forms. Students were asked to report on a Likert scale from 1 to 5 how strongly they agreed with the following statements, with 1 being strongly disagree and 5 being strongly agree.

All the students strongly agreed with the statement 'The session was relevant to my curriculum'; the mean score for 'I feel that simulations should play a vital part of my ongoing clinical education' was 4.9 (range: 4–5), and the mean score for 'I feel overall that simulations will help me become a better doctor' was 4.9 (range: 4–5).

There were a number of positive comments, with several students stating that this was one of the best teaching sessions they had ever had.

Regarding the impact of the sessions on the students' ability to assess an acutely unwell patient, a paired t-test demonstrated a statistically significant ($P < 0.0001$) improvement in average assessment scores from 10.25 presimulation to 16.50 postsimulation, showing an improvement in around 6.25 points or 61% (95% CI 4.26 to 8.24).

DISCUSSION

The major advantage of these sessions was that students were able to actively participate in a controlled environment, thus allowing them to practise and develop their diagnostic and management skills. According to Kolb's cycle of experiential learning,[4] for true learning to occur after an experience, a period of reflective observation and abstract conceptualisation is required before active experimentation and recurrence of the cycle. During each scenario, the debriefing sessions allowed for this reflective observation to occur. Likewise, having the scenarios split over 2 days ensured the students had time for conceptualisation to occur via self-reflection after the first day of scenarios and allowed active experimentation to occur during the second day of simulation. It is interesting to note that despite receiving a number of teaching sessions on

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Table 1 List of scenarios and sequence of events per group of students

Scenarios simulated	Sequence of events
Upper gastrointestinal bleed Pancreatitis Large bowel obstruction Dissected aortic aneurysm Warfarin-induced rectal bleeding Acute coronary syndrome Acute cardiac failure Acute asthma attack Blood transfusion reaction Chest sepsis Acute kidney injury Hypoglycaemia Diabetic ketoacidosis Renal vasculitis	Simulation session 1: 1. Initial ABCDE questionnaire completed by students 2. First scenario: discussion points (during which the scenario would be paused): a. ABCDE assessment b. Investigations and results c. Treatment plan d. Referral to appropriate specialty e. Review of the note-taking by the scribe 3. Summing up of clinical scenario and answering questions regarding the case 4. Second scenario: with similar discussion points Simulation session 2: 1. Third and fourth scenarios with similar discussion points 24 hours about simulation session 2—repeat ABCDE questionnaire

ABCDE, airway, breathing, circulation, disability and exposure.

the ABCDE assessment during the first few years of undergraduate medical education, the presimulation survey results were relatively poor, with the students only obtaining around 32% of the available points. Indeed, although this result did increase to around 52% after the simulations, there remains a large scope for improvement and this is suggestive that further similar sessions may be useful. It may be that the experiential style of learning during the simulated cases and the process of 'putting what they had learnt into practice' enabled deeper learning and thus better recall and understanding to occur.

CONCLUSION

Simulated cases involving a high-fidelity simulation suite is a useful teaching method for medical students in their earlier clinical years. These sessions allow students to actively participate in the investigation, diagnosis and treatment of an acutely unwell patient whilst in a safe environment. The combination of simulation with tutorial ensures that students do not feel overwhelmed and allows them to learn by doing but in a relaxed atmosphere.

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