Impact of Capstone Simulations on Student Knowledge and Self-Perceived Confidence in Managing Cardiovascular Diseases

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Background

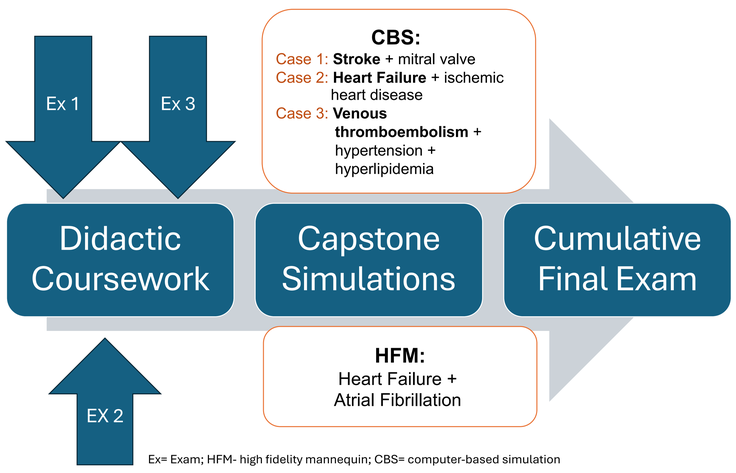
- **Simulation-based modalities** can emulate real-world patient care environments and provide immersion and feedback that helps students practice and apply their knowledge (without risk)
- Available modalities include High fidelity mannequins (HFM) and Computer-based simulations (CBS)

Objective

To assess the impact of capstone simulations on student knowledge and self-confidence in managing cardiovascular diseases.

Methods

- **Subjects:**
  - Second year PharmD students enrolled in a Cardiovascular therapeutics course.
- **Intervention:**
  - All didactic course content was completed by week 12 and tested through three exams.
  - This was followed by two weeks of capstone simulations followed by a cumulative final exam (multiple choice).
- **Capstone simulations include:**
  - Three computer-based simulations (1 hour each)
  - One high-fidelity mannequin simulation (20-minute simulation and 20-minute debrief by instructors)



Ex= Exam; HFM- high fidelity mannequin; CBS= computer-based simulation

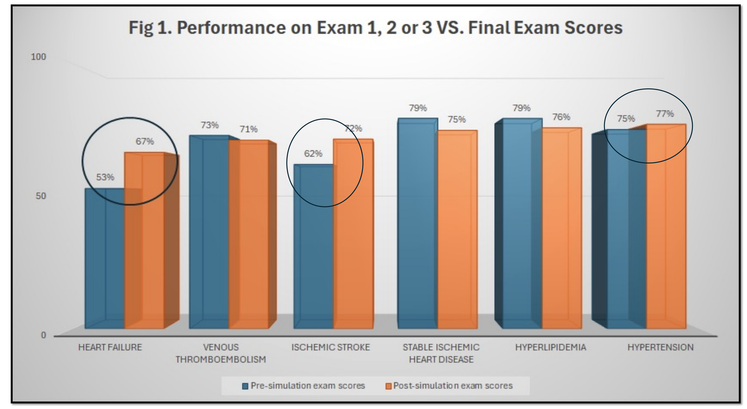
- **Outcomes**
  - **Exam performance:** Comparison before and after simulation
  - **Self-perceived confidence, competency and APPE readiness:** measured through pre- and post-survey and focus group interviews.
- **Data Analysis:**
  - Confidence surveys: Paired t-test
  - Focus group statements were coded by an independent analyst and a thematic analysis was performed.

Capstone simulations administered at the end of a Cardiovascular therapeutics course improved students' knowledge and confidence in managing cardiovascular diseases, and self-reported APPE readiness

Results

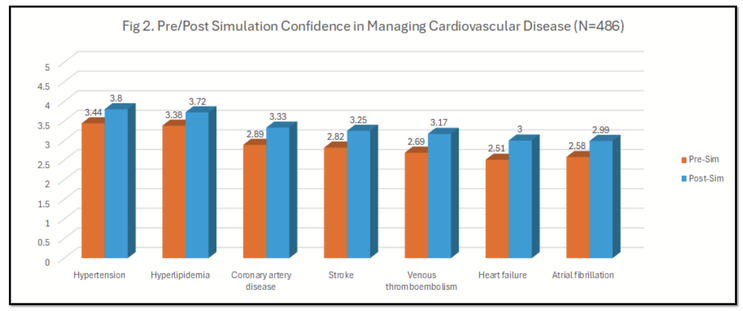
- **Exams and surveys:** A total of 486 students completed the exams and surveys
- Figure 1: Improved exam scores for heart failure, stroke, and hypertension
- Figure 2: Confidence improved for managing all diseases covered in the simulations
- **Focus groups**: A total of 15 students participated in the interviews
- A total of 70 and 114 unique statements were coded pre/post focus groups, respectively.
- The number of **negative statements decreased by 67%** after capstone simulations.
- Most positive statements were within the following categories:
  - **Disease assessment:** 12 positive statements stating that simulation enhanced their ability to assess different disease states.
  - **Creating therapeutic plan**: 14 positive statements stating that simulations enhanced their ability to create and monitor therapeutic plan
  - **APPE Preparedness**: 44 positive statements that simulations helped them feel more prepared for APPEs.

RESULTS



Focus group post-positive statements

Assessment: 'It was helpful to see how a provider assesses a patient'
Plan: 'The cases helped me create a comprehensive plan for several comorbidities'
APPE-readiness: 'Simulation helped me visualize real practice, and helped with APPE readiness'



Conclusion

Strengths:
- A capstone simulation design in therapeutics course is unique
- Positive impact on knowledge and confidence
- Large number of subjects in the study

Limitations:
- Lack of a validated confidence survey
- Exam questions were not validated

Summary:
- Capstone simulations were a successful strategy for improving student confidence and exam performance.

References

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3. Vyas D, Bray BS, Wilson MN. Use of simulation-based teaching methodologies in US colleges and schools of pharmacy. Am J Pharm Educ. 2013;77(3):53.