Evaluation and Assessment of High-Fidelity Simulation in a Third-Year, Clinical Toxicology Pharmacy Course

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Objective

To assess the effects of high-fidelity patient simulation on education and assessment of pharmacy students in a clinical toxicology course.

Background

High-fidelity simulation learning has resulted in improvement of pharmacy student confidence and knowledge scores when implemented in advanced cardiac life support training.[1] Mock acute care simulations implemented early in pharmacy curriculum have been shown to improve student APPE performance.[2]

Methods

01 Pre Test

Third year pharmacy students (n=73) completed a 6-question, multiple choice pre-test, focused on concepts introduced via didactic lectures

02 Classroom Simulation Session

Utilizing a high-fidelity simulation mannequin, students participated in hands-on patient cases reflecting the concepts they were tested on

03 Post-Test & Final Exam

A post test was required to be completed within 1 week of the simulation sessions. The same questions were then included on the final exam, which was taken 2 weeks after the simulation session

Primary Endpoint → **Difference in median scores between the 3 tests (pre, post and final exams)**

Secondary Endpoints → **Compared proportion correct for each individual question between the 3 tests**

Test scores were compared between groups using a repeated measures ANOVA, then post-hoc pairwise comparisons done with a Tukey test.

Figures A-C: Students participating in high-fidelity simulation cases at the University of Connecticut School of Pharmacy

Results

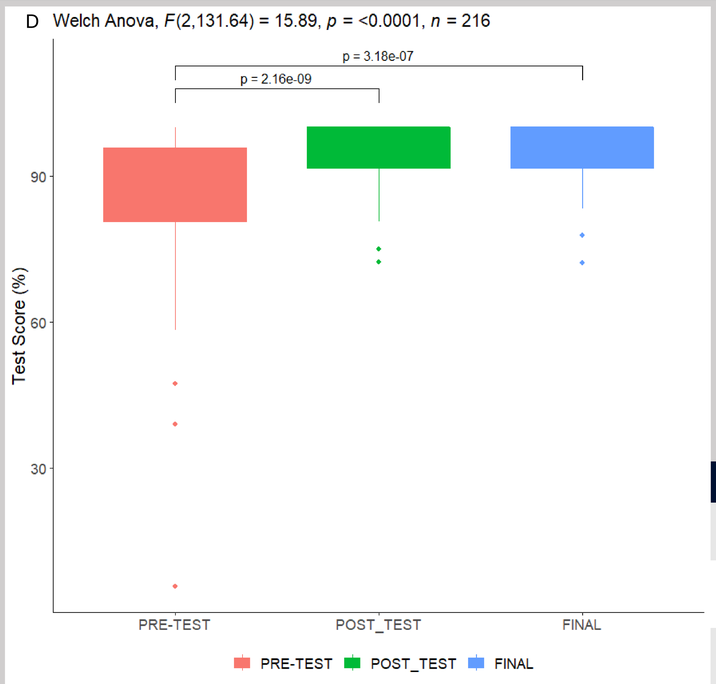


Figure D (above): Comparing test scores between Pre, Post and Final Exams

Median Test Scores (IQR)	
Pre-Test	88.9% (80.6%, 95.8%)
Post-Test	100% (91.7%, 100%)
Final	100% (91.7%, 100%)

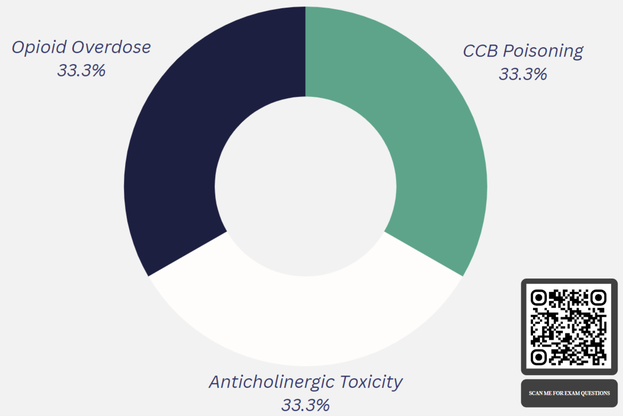
<u>Primary endpoint analysis</u>: Overall, a significant difference was seen between groups (p<0.0001), with post-hoc testing showing differences between PRE and POST (p<0.0001) and PRE and FINAL (p<0.0001)

Results (continued)

Figure E: Secondary Endpoints

Exam Key	Pre-Test (% Correct)	Post-Test (% Correct)	Final (% Correct)	P-value btwn groups	Post-Hoc Pre vs. Post	Post-Hoc Pre vs. Final	Post-Hoc Post vs. Final
Q1	38 (52.8%)	61 (84.7%)	63 (87.5%)	<0.001	<0.001	<0.001	0.911
Q2	27 (37.5%)	60 (83.3%)	49 (68.1%)	<0.001	<0.001	<0.001	0.103
Q3	68 (94.4%)	72 (100%	72 (100%)	0.017	0.035	0.035	1
Q4	61 (84.7%)	72 (100%)	72 (100%)	<0.001	<0.001	<0.001	1
Q5	67 (93.1%)	71 (98.6%)	70 (97.2%)	0.187	NA	NA	NA
Q6	66 (91.7%)	72 (100%)	71 (98.6%)	0.01	0.152	0.138	0.055

CASE & EXAM QUESTION TOPICS



Conclusion

Median test scores on post-test and final examinations significantly improved from baseline pre-test scores following attendance and participation in a high-fidelity simulation session.

References

1. Maxwell WD, Mohorn PL, Haney JS, et al. Impact of an Advanced Cardiac Life Support Simulation Laboratory Experience on Pharmacy Student Confidence and Knowledge. Am J Pharm Educ. 2016;80(8):140. doi:10.5688/ajpe808140

2. Baumgartner L, Israel H, Wong T, Sasaki-Hill D, Ip EJ, Barnett MJ. Performance on advanced pharmacy practice experiences after implementation of mock acute care patient simulations. Curr Pharm Teach Learn. 2021;13(12):1572-1577. doi:10.1016/j.cptl.2021.09.036

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