Simulation and Case-Based Education: Improving Evidence-Based Decision Making for Pulmonary Arterial Hypertension Management

Nimish Mehta, PhD, MBA; Catherine C. Capparelli, CCMEP

Methods

A series of (1) interactive, simulation-based learning activities and (2) video-scenario vignettes with expert commentary were developed and implemented to assess learner performance and decision-making skills. For this purpose, 179 pulmonologists and cardiologists participated in the simulation activity, while 50 did not. The simulation sessions were designed to replicate the clinical setting and included multiple decision points where learners were asked to select from various options. Performance-level outcomes were assessed using a 2-tailed paired t-test. The results showed a significant improvement in performance for those who participated in the simulation versus those who did not.

Results

In total, more than 1500 pulmonologists and cardiologists were evaluated using different case-based educational activities. Pulmonologists and cardiologists who participated in these educational activities were more likely to make evidence-based decisions compared to nonparticipants (simulation: 25% more likely, medium effect size of 0.54; paired t-test of interaction: 34% more likely, medium effect size of 0.61 vs. 0.32). Significant improvement was observed in several specific areas as a result of participation in these activities:

- **Diagnosis:** Participants in the simulation were more likely to make a correct diagnosis (80% vs. 74%, P < .001).
- **Management:** The simulation led to a higher percentage of patients receiving appropriate therapy (87% vs. 80%, P < .001).

Conclusion and Clinical Implications

This study demonstrated the success of simulation and case-based education in improving the clinical decision-making of pulmonologists and cardiologists in the assessment and treatment of pulmonary hypertension. These activities provide a valuable tool for improving patient outcomes by fostering evidence-based decision-making and enhancing clinical performance.

Acknowledgements

This research was supported by a career development award from the American Thoracic Society. The authors are grateful to the participating pulmonologists and cardiologists for their contributions to this study.