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Resident versus faculty member simulation debriefing

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SUMMARY

Background—Near-peer teaching is effective in graduate medical education, but it has not been compared with faculty member teaching in resident simulation. In this study, we sought to compare debriefing sessions of internal medicine (IM) intern simulation sessions led by academic faculty doctors with those led by senior IM residents in order to measure the effectiveness of near-peer teaching in this setting.

Method—Internal medicine interns participated in four simulation cases, two of which were debriefed by faculty members and two of which were debriefed by residents. Pre-simulation knowledge assessment was completed prior to the case. Following each debriefing, interns completed a Debriefing Assessment for Simulation in Healthcare (DASH) survey. Post-simulation knowledge assessments were completed 6 months after simulation. Debriefings were recorded and transcribed. Each statement made during debriefing was classified as either correct or erroneous by blinded reviewers.

Results—Fifty interns participated in simulation, and the response rate on the DASH survey was 88%. There was no difference between DASH scores ($p = 0.13$), post-simulation knowledge assessments or error rates during debriefing ($p = 0.31$) for faculty member and resident instructors.

Conclusion—Our study suggests that residents and faculty members provide a similar quality of simulation instruction based on qualitative and quantitative evaluation.

INTRODUCTION

Simulation is a growing part of the curriculum in graduate medical education (GME). Although internal medicine (IM) simulation debriefing at many institutions has traditionally been led by faculty members, time constraints on faculty members may limit the expansion of simulation programmes.¹ Peer and near-peer education in GME has been shown to be

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SUPPORTING INFORMATION

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effective, and IM residency programmes have begun to use near-peer teaching in simulation; ^{2,3} however, because near-peer debriefing has not been compared with faculty member debriefing in resident simulation, it is unknown whether residents can effectively replace faculty members in IM simulation, which has implications for both the expansion of simulation programmes and the structure of programmes already using resident instructors. In this study, we sought to compare debriefing sessions of IM intern simulation sessions led by academic faculty member doctors compared with senior IM residents in order to measure the effectiveness of near-peer teaching in this setting.

METHODS

Simulation

The spring IM intern curriculum at the University of Texas Southwestern Medical Center (UTSW) includes one half-day of simulation in which groups of interns participate in four different previously published cases, each lasting 15–20 minutes, immediately followed by debriefings of 10–15 minutes led by two faculty member instructors from the division of Pulmonary and Critical Care Medicine or Cardiology, or by two IM senior residents in their third year of training (PGY-3) instructors.⁴ Faculty members who had an active role in the simulation programme were not permitted to serve as instructors in order to minimise the confounding effect of prior simulation experience. Faculty member volunteers were recruited via e-mail, and senior resident volunteers were selected based on their availability. This study was approved by the Institutional Review Board at UTSW. The study was conducted in May–December 2016.

All faculty members and senior resident simulation instructors received an e-mail prior to the simulation that contained previously published simulation case scenarios, their case assignments, checklists, case notes and a document describing best practices for simulation debriefing.^{4,5} These cases, chosen to reflect the commonly encountered patient care scenarios in the intensive care unit, included acute coronary syndrome progressing to ventricular fibrillation (case 1), supraventricular tachycardia (case 2), ventricular tachycardia with a pulse (case 3) and bradycardia (case 4).⁴ For half of the simulation sessions, faculty members debriefed cases 1 and 3, and residents debriefed cases 2 and 4, whereas for the other half of the sessions residents debriefed cases 1 and 3, and faculty members debriefed cases 2 and 4.

On the day of each simulation session, instructors viewed a 15- minute recorded presentation on practices in debriefing and had the opportunity to ask questions to an experienced instructor.^{5,6} Learners were emailed the Debriefing Assessment for Simulation in Healthcare (DASH) handbook prior to their simulation and received an orientation to the survey on the day of their simulation.⁷ We used a multi- methodological approach to compare faculty member and resident instructors on their ability to create a learning environment, effectiveness in encouraging knowledge retention and factual accuracy.

On arrival to the simulation session, learners were asked to complete a 20- question knowledge assessment based on the pre- test for Advanced Cardiac Life Support (ACLS) by the American Heart Association (AHA).⁸ The test only contained questions that were

addressed in the case notes provided to instructors. Part 1 of the test included 10 questions based on cases 1 and 3, and part 2 included 10 questions based on cases 2 and 4. Immediately after each simulation case, learners completed the DASH participant short version to evaluate the debriefing (Appendix S1).⁷

All debriefing sessions were recorded, transcribed, without including any identifying information on the type of instructor, and divided into separate statements made by the debriefer, with each piece of factual content or short explanation of a concept counted as a separate statement. Two faculty members who were blinded to the type of instructor reviewed all transcripts, and classified each statement in the debriefing as either an error or a correct statement using previously published guidelines as a reference; the ACLS guidelines and training courses include basic commentary on teamwork, leadership and communication in addition to medical content.⁹ In the absence of specific guidelines relevant to the statement in question, reviewers were encouraged to seek out other references to support their classification of each statement. Discrepant reviewer responses were then adjudicated by a group of five blinded faculty member reviewers who determined whether each statement was correct or erroneous by consensus (Figure 1).

The same assessment administered on the day of simulation was re-administered to learners 6 months after completion of the simulation session.¹⁰

The median and interquartile ranges were computed for each DASH question, the composite DASH score and the post-simulation instructor survey. DASH results were then compared using the Mann–Whitney *U*-test.⁷ Post-simulation knowledge assessment scores and transcription error rates were analysed with a paired Student's *t*-test, as these results had a normal distribution. The anonymous survey data were analysed using JMP (https://www.jmp.com/en_us/home.html).

RESULTS

Ten simulation sessions were held with five intern learners per session. Fourteen PGY-3 residents and nine faculty members, ranging from first year attending to full professor, served as instructors during the study period.

Participants completed 176 (88%) DASH surveys. The median DASH score for all items for resident instructors was seven, whereas the median score for all faculty member items was six (Table 1). There was no significant difference between resident and faculty member instructor scores for any questions on the DASH survey or the composite DASH score (Table 1).

Forty-nine interns (98%) completed the 20-question pre-simulation knowledge assessment. Scores were calculated separately for parts 1 and 2 of the exam. There was no difference between the part-1, part-2 or cumulative pre-simulation test scores on days that the residents debriefed cases 1 and 3, compared with days that faculty members debriefed those cases (Table 2).

Forty- one residents (82%) completed the post- simulation knowledge assessment. There was no difference between the mean post- simulation score for parts 1 or 2 of the exam for residents compared with faculty member instructors ($p = 0.20$ and 0.89 , respectively; Table 2).

The kappa statistic for the two graders was 0.408 (95% confidence interval, 95% CI $0.272-0.543$). Of the 492 statements made during the debriefing, 21 statements (4.3%) were initially identified as errors by both reviewers. Of the 49 statements (10%) initially disagreed upon by the two reviewers, 18 (36.7%) were reclassified as correct and 31 (63.3%) were reclassified as erroneous after a group discussion by blinded reviewers. After evaluating all of the statements during a group discussion, 28 errors were found during resident debriefing, and 23 errors were found during faculty member debriefing ($p = 0.31$).

DISCUSSION

To our knowledge, this is the first study to directly compare resident and faculty member debriefing in resident simulation. Our results suggest that the learning experience and factual content of debriefing are similar between resident and faculty member simulation instructors.

Instructors should create a supportive climate for learners, yet in a recent study half of the participants found simulation to be stressful and intimidating, and expressed their fear of the educator.⁶ Our DASH survey results indicate that the learning experience is similar between groups, with both creating and maintaining an engaging learning environment. In our study, residents and faculty members achieved the broader goals of the advocacy inquiry model, which include the identification of knowledge gaps among learners and engagement in discussion about those topics in a non-judgemental manner.⁵ The ability of residents to teach in accordance with the advocacy inquiry model is important, as this model has been associated with high ratings of simulation by trainees.⁵

Our pre- test and post- test results demonstrate that learning outcomes are similar for faculty members and resident instructors. In addition, the numbers of factual errors made by resident and faculty member instructors were similar. These data are important to demonstrate that the quality of the debriefing content is similar for both types of instructors in programmes seeking to establish near- peer teaching models for simulation.

Limitations of our study include the sample size and ceiling effect of the DASH survey. Although UTSW has one of the largest IM residency programmes in the country, this is a single- institution study conducted in a single year, which limits the generalisability of the results. In addition, the use of a written post- simulation examination rather than a scored simulation scenario may reduce the strength of our conclusions regarding knowledge outcomes. Post- simulation test scores did not improve compared with pre- test scores; however, our results are consistent with other simulation studies, which demonstrate low knowledge retention over time following ACLS simulation.¹¹ Furthermore, in order to minimise experience as a confounding factor, we excluded faculty members with significant simulation experience. This exclusion criterion may limit the generalisability to simulation

programmes that rely on experienced faculty member instructors, but remains applicable for simulation programmes seeking to expand through the recruitment of new instructors.

Strengths include having each intern learner serve as a participant in both faculty member and resident debriefing groups, which helps to control for confounding factors. The multiple levels of evaluation included DASH, knowledge assessments and error rates during debriefing.

Peer and near- peer education in GME has been shown to be effective in radiology conferences, IM noon conferences and procedure simulation;^{3,12,13} however, peer debriefing has not been compared with faculty member debriefing for IM intern simulation in prior studies. Our data suggest that the success of near- peer teaching in noon conference and other GME fields extends to the use of near- peer teaching in IM simulation. Our findings are important, as faculty member time constraints have previously limited the expansion of simulation in programmes that rely on faculty member instructors.¹ The use of resident instructors in simulation programmes may allow the programmes to expand without placing additional burdens on faculty members. For programmes already using resident instructors, our study provides evidence to support the continued allocation of resident time to simulation instruction in the era of duty- hour restrictions.²

CONCLUSION

We suggest that residents are comparable with faculty members in debriefing IM intern simulation, but our study should be replicated in a larger cohort. Our findings support near-peer teaching as a viable alternative to faculty member teaching in IM resident simulation.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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Figure 1.
Flowchart of the evaluation of factual content in each debriefing

Table 1

Comparison of debriefing assessment for simulation in health care (DASH) scores for resident and faculty member instructors

Question	Resident instructor Median (Q1, Q3)*	Faculty member instructor Median (Q1, Q3)*	p
Establishes an engaging learning environment	7 (6, 7)	6 (6, 7)	0.14
Maintains an engaging learning environment	7 (6, 7)	6 (6, 7)	0.16
Structures the debriefing in an organised way	7 (6, 7)	6 (5, 7)	0.19
Provokes engaging discussion	7 (6, 7)	6 (5, 7)	0.06
Identifies and explores performance gaps	7 (6, 7)	6 (6, 7)	0.14
Helps trainees achieve or sustain good future performance	7 (6, 7)	6 (6, 7)	0.33
Composite score	40 (34.75, 42)	37 (33, 42)	0.13

* Q1, quartile 1; Q3, quartile 3.

Table 2

Comparison between pre- simulation and post- simulation test scores

	Resident instructor Median (Q1, Q3)*			Faculty member instructor Median (Q1, Q3)*			p value (faculty member pre test vs post post-test)
	Pre- test	Post-test	p value (resident pre- test vs post-test)	Pre-test	Post- test	p value (faculty member pre test vs post test)	
Part 1	80 (70, 90)	80 (70, 90)	0.50	80 (77.5, 90)	90 (80, 90)	0.23	0.20
Part 2	80 (70, 80)	70 (70, 80)	0.31	70 (60, 80)	80 (60, 90)	0.85	0.89

* Q1, quartile 1; Q3, quartile 3.