

Improving Health Equity Training with an Integrated Simulation-Based Curriculum

CASSANDRA MACKEY, MD; SIMI JANDU, MD, MEd; JAZMIN HAMPTON, MD, DrPH, MPH; JAMES FIDROCKI, MD; JENNIFER CAREY, MD

ABSTRACT

INTRODUCTION: Socioeconomic and environmental factors play a significant role in shaping an individual's overall health. Despite longstanding recommendations to integrate cultural competency and multidisciplinary training, health equity remains underemphasized in US medical schools. The Emergency Medicine (EM) clerkship is ideal to address this gap, given the diverse Emergency Department (ED) patient population.

METHODS: A health equity curriculum was integrated into clerkship simulations. Using the AAMC Core Entrustable Professional Activities (EPA), a score was assigned between 1–4 based on a scaled evaluation of students' ability to incorporate responses appropriate to age, gender, race, religion, disabilities, and/or sexual orientation into patient encounters. Beginning and end-of-rotation simulation were compared pre- and post-implementation using t-tests. Students were surveyed regarding experiences at the end of the rotation.

RESULTS: Mean scores were similar pre-implementation (2.48 vs 2.46; not significant). Post-implementation mean scores increased from 2.5 to 3.3 ($p < 0.01$). Baseline scores were similar pre- and post-implementation, while end-of-rotation scores improved ($p < 0.01$). Fifty-six students participated in the health equity curriculum; evaluations were sent to all students with an 87.5% response rate; 83.7% agreed or strongly agreed it helped build knowledge, 85.7% agreed or strongly agreed it improved patient care skills, and 89.8% agreed or strongly agreed that topics were relevant to future clinical practice.

CONCLUSION: Incorporating a focused health equity curriculum into EM clerkship simulations is feasible, impactful, well-received by students, and improved EPA scores. The curriculum equips learners with tools that can be applied to real-world patient care, which may enhance the physician-patient experience.

KEYWORDS: Health Equity; Simulation; Emergency Medicine; Clerkship; Undergraduate Medical Education

INTRODUCTION

Healthcare disparities persist in the United States despite decades of recommendations from national organizations for medical school curricula to prepare students to recognize and address bias and deliver culturally and structurally competent, equitable care.^{1,4} Despite accounting for 50% of an individual's overall health, socioeconomic and environmental factors are often not prioritized or absent in medical school's core curricula.⁵ Patients of racial and ethnic minorities report experiencing biases when seeking medical care. Evidence shows that perceived biases negatively impact clinical encounters, reducing patients' trust in their physician and decreasing the likelihood that they will follow treatment recommendations, leading to worse health outcomes.^{6–10}

Neglecting health equity training in medical education prevents the next generation of physicians from gaining the knowledge and tools they need to address factors that drive health disparities. This gap in students' knowledge can negatively influence patients' health and perpetuate disparities.¹¹ Educational approaches and curricular integration vary widely; a scoping review showed heterogeneity in the content, structure, and duration of social determinants of health (SDOH) curricula and found that students preferred interactive, experiential learning over traditional classroom-based methods.¹² Across the country, few Emergency Medicine (EM) clerkships report focused training in SDOH in their core curricula.¹³ Yet, the Emergency Department (ED) is a safety net for many patients, and EM physicians often care for community members with limited to no other health care access.¹⁴ The importance of health equity training in EM is outlined by studies showing differences in implicit race bias. One study found discrepancies in the administration of opioid analgesics in ED management of pain, with non-Hispanic White patients receiving higher doses than other racial and ethnic groups.¹⁵ These pro-White implicit biases even permeate to treatment of life-threatening conditions; studies looking at acute coronary syndromes in patients diagnosed with STEMI found that a non-White race was associated with increased likelihood of not undergoing percutaneous coronary intervention (PCI).^{16,17}

There is evidence supporting the use of simulation to teach, diversity, equity and inclusion (DEI) concepts within

EM residency programs.¹⁸ To our knowledge, no published literature to date describes an EM clerkship curriculum that uses simulated clinical encounters with structured debriefing to develop learner skills in identifying and addressing health inequities. To address gaps in this area, we developed and implemented a simulation-based curriculum that provides targeted education and hands-on practice in delivering care that is diverse, equitable, inclusive, and patient-centered. Simulation is a widely used training method across undergraduate and graduate medical education that provides a safe, realistic environment for learners to build knowledge, skills, and attitudes, and effectively enhances learner competence and confidence.¹⁹

METHODS

Study Design and Curriculum

EM physicians trained in simulation, education, and health equity used the Kern's 6-step approach to curriculum development. The existing simulation curriculum for the course was reviewed and modified to meet the following objectives: (1) teach students to understand the multidisciplinary nature of health equity, (2) demonstrate patient-centered interview skills, (3) identify barriers to health delivery in the clinical setting (including biases), (4) advocate for patients experiencing health inequalities, and (5) understand how SDOH impact clinical encounters in the ED. We identified areas in the current curriculum that could be modified and updated the cases to include: medication non-adherence due to financial barriers, patient accompanied by a same-sex partner, high-fidelity mannequin with a dark skin tone, and trained medical interpreters for non-English speaking patients. Students received formative feedback during the debriefing sessions from course faculty, simulated patients, and medical interpreters. All students participated in the weekly simulations pre- and post-implementation of the new curriculum; the course was modified to incorporate the SDOH as denoted above. The learning occurred during the simulation and the debrief, which was guided by simulation-trained faculty, with the added benefit of the trained standardized patients and interpreters providing real-time feedback.

Subjects

Fourth-year students at UMass Chan Medical School enrolled in a required four-week EM clerkship during the study period were included in the study. All participants were blinded to the study.

Curriculum Assessment

Outcomes measured were based on the Kirkpatrick's educational model levels: 1 (degree to which participants find

the training favorable, engaging, and relevant), 2 (degree to which participants acquire the intended knowledge, skills, attitude, confidence, and commitment based on their participation in the training), and 3 (degree to which participants' behaviors change as a result of the training).²⁰

Part 1. Assessment of Learners in Simulated Scenarios

Learners were assessed using the AAMC Core Entrustable Professional Activities (EPAs) for Entering Residency with the Physician Competency Reference Set (PCRS).²¹ EPA 1 and PCRS Professionalism (P) 5 were used to evaluate if students' ability to "demonstrate patient-centered interview skills and their ability to incorporate responses appropriate to age, gender, culture, race, religion, disabilities, and/or sexual orientation".²¹ There are four levels of achievement of learner behaviors, and teams were assigned a value of 1–4 based on their corresponding behaviors. Higher scores reflected greater demonstration of desired skills and behaviors, with level 1 representing behaviors requiring corrective response, and with level 4 indicating expected behaviors for an entrustable learner for entering residency.

Video review

Simulations were recorded and independently reviewed after the completion of the course by two education faculty, the clerkship director and simulation director. Each one was assigned a score for EPA1, P5 between 1–4 based on the categories for developing behaviors for published for effective communication, response to verbal and nonverbal cues, appropriate interactions surrounding age, gender, race, religion, disability, sexual orientation, and honoring autonomy. Scenarios from the beginning and end of the rotation were reviewed both pre- and post-curriculum implementation. Scores from the beginning versus end of the rotation were compared for the pre-implementation and post-implementation cohorts. T-test were used for comparisons using the statistical package SPSS v 29.0.2.0.

Part 2. Post-course Evaluations

Post-course evaluations were sent anonymously via RED-Cap using a unique link at the conclusion of the simulation curriculum, with a reminder sent one week later for non-responders. The survey asked students about their experiences with the health equity simulation curriculum and included both Likert scale and open-ended questions. Descriptive statistics were applied to the Likert scale responses along with thematic review for open-ended questions. For open-ended questions, two reviewers independently examined and categorized responses into codes to identify themes.

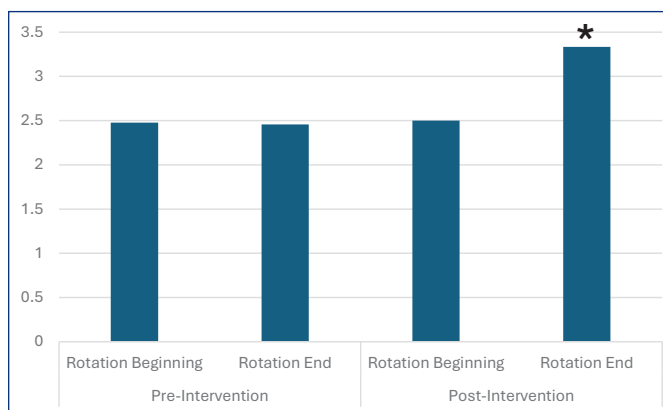
This study was reviewed by our institutional review board and determined to be exempt from full review.

RESULTS

Learner Assessment

Figure 1 shows pre- and post-implementation scores at the beginning of the rotation and end of the rotation. The pre-implementation of the curriculum, the mean score was 2.48 out of 4 at the beginning of the rotation versus 2.46 out of 4 at the end of the rotation, which was not statistically significant. During blocks when the curriculum was delivered, there was a significant difference in the scores with a mean of 2.5 out of 4 at the beginning of the rotation, which increased to 3.3 out of 4 by the end of the rotation ($P<0.01$). There was no significant difference between scores for the beginning of the rotation comparing pre- versus post-implementation. A difference was seen in scores at the end of the rotation when comparing pre-implementation versus post-implementation ($P<0.01$).

Figure 1. Simulation EPA Pre- and Post-intervention Scores



Post-course evaluations

Fifty-six students enrolled in the clerkship during the study period. 49 students (87.5%) submitted the post-course evaluation. Among respondents, 83.7% agreed or strongly agreed that the curriculum helped build their knowledge in health equity; 85.7% agreed or strongly agreed that it helped improve patient care skills related to health equity topics; 83% reported that it introduced new material in health equity topics; 89.8% agreed or strongly agreed that topics were relevant to their future clinical practice; 79.6% agreed or strongly agreed that prepared for handling different topics in health equity in the clinical environment. Our review of the open-ended survey question identified two major themes surrounding SDOH and communication. Representative comments for these themes are highlighted in **Table 1**.

Table 1. Participant Responses to Health Equity Curriculum

Theme	Representative Comments
Social Determinants of Health	"Brought up good points about the idea of "non-compliant" patients and how we need to change language and think more about the socioeconomic determinants of health that might prevent patients from being able to take care of their health."
	"It will definitely make me think about social determinants of health in all patients."
	"Discussion of cost of medications."
Communication	"I learned better ways of communicating with patients in equitable ways."
	"I learned about talking to patients about their health outcomes with more of an open-minded view than just the textbook answer of you say this to this patient."
	"I really enjoyed having a sim with an interpreter - it was helpful to hear from an interpreter on what we can do better as physicians."
	"Taught me how to effectively utilize an interpreter with non-English speaking patients. Taught me to never assume the identity/relationship of whoever is accompanying the patient."

DISCUSSION

Simulation is a widely used educational tool for practicing difficult and life-threatening clinical scenarios. Exposure to more complex social themes through simulation allows students to understand how navigating social scenarios an important part of effective clinical decision-making. By introducing a broader range of topics, such as LGBTQ+ health, language barriers, and limited economic resources, students had a safe space to explore their personal reactions to social differences, an important step in eliminating bias and improving patient care.

We found that adding this curriculum improved the student's EPA behaviors. There were similar baseline performances comparing pre- and post-curriculum implementation scores at the beginning of the rotation. Among blocks during the pre-implementation period, there were no significant changes from the beginning to the end of the rotation, while in contrast, during blocks when the curriculum was delivered, scores increased significantly from the beginning to the end of the rotation. This suggests that the curriculum was associated with improved performance in EPA1, P5.

Results from student evaluations demonstrated that incorporating health equity topics in simulation was effective and well-received. Across evaluation domains, the strongest endorsement was for relevance to future clinical practice (89.8%), while preparedness for handling health equity topics in the clinical environment was slightly lower (79.6%), suggesting an opportunity for further improvement

in practical application. Students were satisfied with the diverse standardized patients they encountered during the simulation scenarios, and they reported that they acquired more knowledge about health equity that is relevant to their patient care. The addition of trained standardized patients and interpreters also allowed students to obtain real-time feedback on clinical interactions, including communication. Even though students had experience using medical interpreters during clinical encounters in the hospital setting, students reported that the scenarios with non-English speaking patients and feedback from the patient and the interpreters was particularly valuable. Overall, these findings indicate a positive perceived impact on students' knowledge, skills, and readiness to address health equity in patient care.

While we implemented several topics in health equity, there are numerous other topics that could be included as well in the future. Studying clinical impacts on patient perceptions is beyond the scope of this study; future studies can examine whether improved learner skills translate into measurable patient care outcomes. Next steps include refining the health equity simulation curriculum based on data and student feedback for upcoming clerkship blocks and adding additional cases to encompass broader topics in health equity.

Healthcare equity and consideration of SDOH are critical components of patient-centered care and medical education. While their importance is widely recognized, incorporation can be challenging and often minimized. It is feasible to incorporate a health equity emphasized curriculum into EM clerkship simulations. We believe this study demonstrates such a curriculum can provide learners with important tools needed in their careers during real life patient encounters and will lead to improved engagement as well as patient experience.

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Authors

Cassandra Mackey, MD, Assistant Professor, University of Massachusetts Chan Medical School, Department of Emergency Medicine, Worcester, MA.

Simi Jandu, MD, MEd, Assistant Professor, University of Massachusetts Chan Medical School, Department of Emergency Medicine, Worcester, MA.

Jazmin Hampton, MD, DrPH, MPH, University of Massachusetts Chan Medical School, Department of Emergency Medicine, Worcester, MA.

James Fidrocki, MD, Assistant Professor, University of Massachusetts Chan Medical School, Department of Emergency Medicine, Worcester, MA.

Jennifer Carey, MD, Associate Professor, University of Massachusetts Chan Medical School, Department of Emergency Medicine, Worcester, MA.

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Correspondence

Jennifer Carey, MD

jennifer.carey@umassmemorial.org