Simulation in Continuing Education: Improving Evidence-Based Decisions for Rheumatoid Arthritis Management

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Background

Undergraduate and graduate medical education programs are increasingly using simulation as an effective educational format, and their success has been well-documented in the literature. However, use of simulation in continuing education is lagging. Moreover, in many patients with rheumatoid arthritis (RA), the disease is not adequately controlled, and only a minority of patients attain the goal of consistent remission or low disease activity. Underlying clinical practice gaps and educational needs were identified, and a study was conducted to determine if online, simulation-based educational interventions could improve competence and performance of rheumatologists in managing patients with RA.

Methods

A cohort of US practicing rheumatologists who participated in 1 or more of 4 simulation-based educational interventions was evaluated.

Instructional Methods

A unique interactive, virtual, simulation-based learning platform was selected to deliver this education. Physicians choose from numerous tests, diagnoses, drugs, and procedures as an artificial intelligence engine dynamically analyzes more than 1 billion possible diagnostic and treatment decisions. This virtual electronic health record includes present and past history/physical exam and expects users to choose appropriate tests to establish a diagnosis, assess severity of the disease, and order appropriate treatments. Each action is recorded and evaluated, and real-time feedback and drug database feedback with selected references is provided. When appropriate, use of recent society guidelines and oversight through peer reviews are employed. This environment includes 25 patient cases per program and is well-suited to reinforce evidence-based recommendations and treatment plans while providing a genuine interactive adult learning experience and suggesting how clinicians can incorporating key principles. An overview of the 4 cases (2 programs) and clinical decisions captured are shown in Figure 1.

Assessment Methods

The clinical decisions made by the participants were analyzed using artificial intelligence technology, and instantaneous or delayed clinical guidance was provided, emulating current evidence-based and expert responses on management of RA. Participant decisions were collected after clinical guidance (CG) and compared with each user’s baseline data using a 2-tailed paired T-test to provide P values for assessing the impact of simulation-based education on the clinical decisions made by participants.

Results

The assessment sample consisted of 185 rheumatologists who made at least 1 clinical decision within the intervention period. As a result of CG provided through simulation, significant improvements were observed in several areas of management of patients with RA, specifically:

• 30% improvement in the selection of a biologic agent in a patient with inadequate response to methotrexate (62% post-intervention vs 30% baseline; P < .001) (Figure 1A);
• 11% improvement in recommendations for corticosteroids (77% post-intervention vs 66% baseline; P = .044) (Figure 1C);
• 39% more participants correctly ordered CD4 or RAMP-3 to determine the level of disease activity (89% post-intervention vs 50% baseline; P < .002) (Figure 1C); and
• 16% improvement in selection of non-TNF biologic agent in a patient with RA not adequately controlled on methotrexate plus trials of etanercept and then adalimumab (60% post-intervention vs 44% baseline; P = .004) (Figure 1D).

Conclusions

Based on the statistically significant improvements in clinical decisions as a result of clinical guidance, this study demonstrated the success of simulation-based educational interventions on improving evidence-based practice patterns of rheumatologists in the management of patients with RA. These metrics provide strong evidence that online, simulation-based instruction in continuing education that leads to improvement in physician performance in a consequence-free environment can result in more evidence-based clinical decisions for RA and improvement in patient outcomes.