The online educational activity, a Practice Challenge, was presented in the form of 3 case-scenarios that included questions assessed both knowledge and clinical decision-making (Figure 1). Clinical decision questions provided tailored feedback and clinical consequences based on the specific answer choice selected and allowed learners who answer the question incorrectly on the first attempt an opportunity to answer it again after feedback has been provided (Figure 1). Knowledge assessment questions were placed before exposure to educational content (pre-assessment) and repeated after exposure to the educational content (post-assessment). The educational intervention launched online on March 26, 2015, and data were collected through June 29, 2015, 16.

To determine measurable improvements in knowledge/competence/performance, first- and second-attempt answer choices were evaluated for the clinical decision questions and pre-assessment and post-assessment answer choices compared for the knowledge assessment questions.

For the clinical decision questions, an overall effect size was calculated to show the magnitude and strength of the consequence-based feedback's learning method, along with a percent improvement that measures the percentage of successes with the consequence-based feedback method (Figure 1).

For the knowledge assessment questions, a paired 2-tailed t-test was used to assess whether the mean pre-assessment score was different from the mean post-assessment score.

A percent of change was used to measure changes in responses to individual questions.

Probability values (P-values) were also calculated to determine significance level (α) that a value of P ≤ 0.05 indicates statistical significance.

Between 43% and 64% of dermatologists answered 6 clinical decision questions correctly on the first attempt, and there was 12% to 46% improvement after tailored feedback (n=478; p<0.05; medium effect), particularly in seeking laboratory-confirmed diagnosis of onychomycosis (61%), managing patients with comorbid diabetes (29%), and treating patients with topical antifungal agents (23%) (Figures 5 and 7).

Pre-CME, 17% of dermatologists answered all 4 knowledge questions correctly, improving to 79% post-CME (n=909; p<0.01; large effect size), with particular improvement in awareness that topical antifungals are appropriate first-choic onychomycosis treatments (60% improvement) (Figures 5 and 6).

Between 36% and 43% of PCPs answered 6 clinical decision questions correctly on the first attempt, and this improved 20% to 40% after tailored feedback (n=909, and 869 median value). This study assessed whether case-based online continuing medical education (CME) can improve knowledge competencies of dermatologists and primary care physicians (PCPs) who diagnose and manage patients with onychomycosis.

In addition to clinical decision questions, each case also includes questions that test your knowledge of the specific physical examination findings, laboratory results, or imaging findings that affects 10% to 12% of the US population and accounts for $1.26 billion in healthcare spending annually. The treatment of onychomycosis is difficult because of its slow growth rates, high rates of relapse, and reinfection. When not treated adequately, onychomycosis can be painful and disruptive to daily life and can progress to a disfigured and deformed nail.

First-attempt success with the consequence-based feedback learning method, along with the knowledge-based feedback method, closely resembled improvements with the case-based online continuing medical education (CME) activity that incorporates consequence-based feedback (Figures 2 and 3).

Knowledge-based feedback (KBFB) and case-based online continuing medical education (CME) activity, which incorporates consequence-based feedback (CBF), are both beneficial in improving knowledge outcomes in onychomycosis. This study assessed whether case-based online continuing medical education (CME) can improve knowledge competencies of dermatologists and primary care physicians (PCPs) who diagnose and manage patients with onychomycosis.

Technology-enhanced educational interventions using case-based online continuing medical education (CME) and consequence-based feedback closely model clinical care. The results of this study showed that online CME in this topic significantly improved knowledge, and clinical competence/performance in onychomycosis. Future education in case-based online continuing medical education (CME) activity can have important applications in closing the gap in onychomycosis diagnosis and management, which include confirming the causative organism, therapeutic selection, and patient education to improve therapeutic adherence and treatment outcomes.

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