Interactive Web-Based Learning

Translating Health Policy Into Improved Diabetes Care

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In August 2014, the U.S. DHHS's Office of Disease Prevention and Health Promotion released the *National Action Plan for Adverse Drug Event Prevention,* highlighting prevention of diabetes agent–related hypoglycemia as a key area for improvement. In support of the Action Plan, the Office of Disease Prevention and Health Promotion then developed a web-based interactive module, or eLearning lesson, based on formative research and stakeholder feedback to educate healthcare professionals on strategies to prevent adverse drug events from diabetes agents. The training incorporates health literacy principles by demonstrating, through video scenarios, how to apply shared decision making when setting individualized glycemic targets, and how to use the teach-back method to confirm patients' understanding. Prior to release in September 2014, the training went through intensive usability testing and was pilot tested using a 36-item evaluation. Six months after its release (September 2014 to March 2015), the training landing page on health.gov had 24,334 unique page views. More than 90% of the 234 participants who earned continuing education credit agreed that they will be able to apply the knowledge gained from the lesson to their practice. Online trainings that model key prevention strategies are well received by health professional users and may play an important role in translating policy into improved outcomes.

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Introduction

Diabetes mellitus is a major public health problem, with >25 million people in the U.S. estimated to be living with diabetes.[1] A growing elderly population coupled with increasing rates of diabetes and concomitant medication use have contributed to greater risks for adverse drug events (ADEs) related to diabetes agents. An ADE has been defined by the IOM as "an injury resulting from medical intervention related to a drug" and may encompass adverse drug reactions, overdoses, medication errors, and allergic reactions.[2] Factors such as polypharmacy, altered pharmacokinetics, limited health literacy, and cognitive decline in the elderly increase the risk for ADEs. This rising burden has been increasingly highlighted as an important and largely preventable public health issue, with the potential to adversely affect millions of people and place a huge financial burden on annual healthcare expenditures, adding upwards of $3.5 billion to U.S. healthcare costs.[3–6] According to the 2010 Inspector General Report, hypoglycemia was the third most common ADE experienced in the inpatient setting among Medicare beneficiaries, and >50% of the ADEs were judged to be preventable.[4] With insulin and oral diabetes drugs implicated in approximately 25% of the nearly 100,000 annual emergent hospitalizations for ADEs in older adults, engaging healthcare professionals is an urgent priority as the U.S. population ages and the prevalence of diabetes and medication use continues to rise.[7]

In response to the increasing problem posed by ADEs, Congress requested that the U.S. DHHS convene a federal interagency taskforce to develop and establish the *National Action Plan for Adverse Drug Event Prevention* (ADE Action Plan), which was finalized and released in August 2014 by the Office of Disease Prevention and Health Promotion (ODPHP), within the Office of the Assistant Secretary for Health, U.S. DHHS.[8,9] Diabetes agents were selected as one of three initial drug classes to target, secondary to the morbidity and mortality associated with their harms and their well-established amenability for prevention.

The ADE Action Plan identifies individualizing glycemic targets as a key strategy in preventing hypoglycemic

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ADEs. Recent studies have found that setting glycemic targets too low increases the risk of hypoglycemia and mortality in many individuals with certain risk factors.[10–12] The most recent guidelines recommend individualized target hemoglobin A1c values for all individuals with diabetes.[11,13–15] Despite the body of evidence recommending individualized glycemic targets, some providers may still attempt to have their patients adhere to strict hemoglobin A1c goals. A recent study found that approximately 60% of adults with complex or very complex medical problems were treated with insulin or sulfonylureas to achieve tight glycemic targets.[16] Intensive glycemic goals may be influenced in part by current performance metrics for glycemic control that focus exclusively on achieving glycemic targets below a certain threshold. Based on recent guidelines, a higher hemoglobin A1c target may be appropriate for many patients, such as those with advanced microvascular complications, major comorbid illness, or limited life expectancy—in essence, those who are unlikely to benefit from aggressive glucose management.[11,13–15] Implementing these guidelines requires healthcare professionals to thoroughly integrate current evidence with patient-specific factors.

Health literacy is one of many patient-specific factors that must be considered when setting individualized glycemic targets. Individuals with low health literacy have been identified as being especially vulnerable to ADEs.[17] Nearly half of all American adults are estimated to have limited health literacy, and only 10% of Americans are proficient in understanding and using health information.[18] As such, the ADE Action Plan calls for provider education to emphasize health literacy principles.

To promote the recommendations outlined in the ADE Action Plan related to preventing hypoglycemic ADEs from diabetes medications, ODPHP, in collaboration with other federal agencies across the U.S. DHHS and non-federal subject matter experts, developed an interactive web-based eLearning lesson titled "Preventing Adverse Drug Events: Individualizing Glycemic Targets Using Health Literacy Strategies." The main goal of the project was to engage healthcare professionals through an eLearning platform designed to translate policy into improved diabetes care.

Methods

Identifying Gaps in Existing Training

As the ADE Action "Plan was being finalized in spring 2014, ODPHP conducted an environmental scan and background research to determine the need for a new training on hypoglycemic ADE prevention strategies" (e.g., individualized glycemic targets, health literacy principles). ODPHP found that few training opportunities existed to educate health professionals on how, when, and why to apply individualized glycemic targets. Even fewer incorporated health literacy strategies into the application of individualized targets.

After reviewing currently available trainings on diabetes management, ODPHP identified the following gaps in current trainings: integration of health literacy principles, information on the prevention of hypoglycemia, and behavior modeling. Most training focused primarily on diabetes management, with limited to no discussion regarding how to effectively prevent hypoglycemia. Few of the trainings used immersive learning techniques based on the behavioral learning theory, or modeled real-life situations to demonstrate how learners can implement ADE prevention strategies in their healthcare setting. The majority of trainings found were based on written, didactic materials rather than interactive content, further illustrating a need for an immersive online training.

Finally, through outreach to various professional organizations involved in the fields of diabetes management and public health (i.e., American Association of Family Physicians, American Board of Internal Medicine Foundation, American Association of Medical Colleges,[a] American College of Physicians,[a] American College of Preventive Medicine,[a] American Diabetes Association, American Geriatric Society, American Medical Student Association, American Public Health Association, Association of American Medical Colleges, Institute for Healthcare Improvement,[a] and National Association of Community Health Centers), ODPHP gauged their interest and need for an interactive eLearning lesson focused on hypoglycemia prevention and health literacy. Several organizations indicated that the proposed eLearning lesson would be valuable to their members, especially if continuing education (CE) credits were offered.

Development of Interactive Learning Lesson

To address the professional practice gap, an eLearning lesson was developed to teach health professionals how to:

1. apply health literacy strategies to provide personalized care for patients with diabetes;
2. help patients with diabetes understand and act on information to prevent hypoglycemia;
3. use current, evidence-based guidelines for individualizing glycemic target goals; and
4. adopt patient-centered communication strategies (teach-back and shared decision making) in the healthcare setting.

These learning objectives were foundational to the development of the lesson, a process that was overseen by an advisory group of subject matter experts. The eLearning lesson content was based on evidence-based resources adapted from the ADE Action Plan and from vetted sources within the U.S. DHHS and the U.S. Department of Veterans Affairs.

Evaluation

Prior to release, usability testing was performed to identify any barriers to effective learning and to explore ways to improve the overall user experience. Three remote usability testing sessions with healthcare professionals were conducted using usability software (TechSmith Morae). Testing among three users yielded a 58% chance to encounter usability issues at least once at the probability of

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