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What do I eat? Impact of an interactive teaching method for improving pharmacy students' diabetes nutrition knowledge and comfort in providing nutrition counseling

Morgan S. Herring^{a,*}, Emily A. Beckett^a, Chayla A. Stanton-Robinson^{b,1},
Matthew J. Witry^c

^a University of Iowa College of Pharmacy, Department of Pharmacy Practice and Science, Division of Applied Clinical Sciences, 115 South Grand Avenue, Iowa City, IA 52242, United States

^b Xavier University of Louisiana College of Pharmacy, Division of Clinical and Administrative Sciences, 1 Drexel Drive, New Orleans, LA 70125, United States

^c University of Iowa College of Pharmacy, Department of Pharmacy Practice and Science, Division of Health Services Research, 115 South Grand Avenue, Iowa City, IA 52242, United States

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ABSTRACT

Background and purpose: Didactic approaches for instructing students about diabetes nutrition and self-management have been described previously in the pharmacy education literature. There is a need for diabetes nutrition active learning approaches that can be incorporated into the advanced pharmacy practice experience (APPE) setting so students can apply previous didactic learning in a real world setting. The goal was to add to students' knowledge of diabetes nutrition thereby increasing their comfort in discussing nutrition with patients.

Educational activity and setting: The nutrition tour activity was implemented in the APPE setting and involved pharmacy students on ambulatory and inpatient rotations. The nutrition tour included several active learning exercises such as evaluation of nutrition labels and development of a day-long carbohydrate-consistent meal plan to encourage student engagement and application of information. Student pre- and post-activity survey data was collected two weeks before and two weeks after the tour to assess retention of knowledge of diabetes nutrition and comfort in diabetes nutrition education. Changes in knowledge and comfort were assessed using *t*-tests.

Findings: Fifty-five pharmacy students participated in the nutrition tour with 45 completing the pre-activity survey and 40 completing the post-activity survey. Comparison of student pre- and post-activity survey scores identified statistically significant increases in both total nutrition knowledge ($p < 0.001$) and student comfort in counseling on diabetes nutrition ($p < 0.001$).

Discussion and summary: A diabetes nutrition tour guided by a pharmacy preceptor for APPE students was associated with increased diabetes nutrition knowledge and comfort in educating on diabetes nutrition.

* Corresponding author.

E-mail addresses: Morgan-Herring@uiowa.edu (M.S. Herring), Ebeckett@broadlawns.org (E.A. Beckett), cstanton@xula.edu (C.A. Stanton-Robinson), matthew-witry@uiowa.edu (M.J. Witry).

¹ Dr Stanton-Robinson was a PGY-1 resident with the University of Iowa College of Pharmacy at the time of this project.

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Background and purpose

In 2015 an estimated 30.3 million people in the United States were diagnosed with diabetes, at a total cost estimate of \$245 billion in medical costs and lost wages each year.¹ A key element in the prevention and treatment of diabetes is patient education and lifestyle modifications.² Patient management of factors such as diet and exercise can delay the progression of diabetes and provide long-term disease control, improving patient quality of life.³ Emphasis on improvement of blood glucose management has recently been placed in national quality measures, underscoring not only the importance of improving patient quality of life, but also adding financial incentives to providers by improving diabetes outcomes.^{4,5} With growing attention on the benefits of improving diabetes outcomes, a team-based management approach that includes pharmacists is recommended.^{2,6} Prior literature demonstrates pharmacist intervention and collaboration with other health professionals improves diabetes outcomes such as hemoglobin A1c, medication adherence, and other related measures such as blood pressure, low density lipoprotein (LDL) levels, and triglyceride levels.^{7,8} Pharmacist intervention specifically on diabetes nutrition education may also improve diabetes outcomes.

Patients with diabetes have varying degrees of general nutrition understanding with many having important knowledge gaps, potentially impacting health outcomes. In a recent assessment of 124 individuals with type 2 diabetes, 92% recognized that sugar increased blood glucose levels while only 36.3% knew that protein did not directly influence blood glucose levels.⁹ Pharmacists are accessible health care professionals with a unique skill set and expertise. Thus, pharmacists may be able to help with diabetes nutrition education, particularly due to their in-depth knowledge of interactions among diabetes, medications, and diet. Pharmacists are also increasingly being included in interprofessional collaborations and disease state management programs. Given this important role, it is necessary to ensure pharmacists are comfortable with diabetes nutrition information when entering practice.

Diabetes nutrition, however, is an area that may be overshadowed by drug therapy problem identification and resolution during the training of pharmacists. A 2007 survey of pharmacy schools showed less than 25% of schools offered some type of required or elective course that incorporated lifestyle modification topics.¹⁰ The Accreditation Council for Pharmacy Education (ACPE) Standards 2016 appear to acknowledge this deficit and mandate the inclusion of nonpharmacologic therapies, health and wellness, and public health education in current pharmacy school curricula.¹¹

Recently published relevant educational activities have mainly focused on implementation of nutrition education into didactic courses. This includes pharmacy students keeping food diaries, debating current diet trends, and reading nutrition labels.¹²⁻¹⁵ These reports of classroom instruction have demonstrated an improved nutrition knowledge-base by pharmacy students. Lectures and activities relating specifically to diabetes self-care knowledge and carbohydrate-specific nutrition education also have been shown to be valuable by improving student diabetes nutrition knowledge, self-efficacy, and empathy.¹⁶⁻¹⁹

Less attention has been given to active learning approaches that can be incorporated into advanced pharmacy practice experiences (APPEs). Previously published APPE diabetes educational activities include home use of glucometers, self-administration of subcutaneous saline, and A1c screening, while fewer studies have focused on nutrition and meal planning. Overall, these clinical experiences have shown increases in student empathy, knowledge, and confidence relating to diabetes education similar to classroom studies.²⁰⁻²² With pharmacists' accessibility as healthcare providers as well as the growing number of patients with diabetes, it is incumbent upon the profession to ensure current pharmacists and pharmacy students are adequately trained and prepared to deliver diabetes self-management education, including nutrition goals and recommendations.

Reports describing the development and assessment of hands-on diabetes nutrition education in pharmacy APPEs are lacking. A diabetes nutrition tour was designed to help fill this knowledge gap as well as add to published literature to promote APPE nutrition education learning ideas. This goal of adding to the student knowledge base through a nutrition activity was assessed by measuring the change in student knowledge about diabetes nutrition and change in student comfort level with diabetes nutrition counseling through a pre- and post-activity survey. Hands-on diabetes nutrition activities such as this can help pharmacy students familiarize themselves with the key education points that need to be addressed when counseling patients with diabetes. By increasing comfort in this complex area, pharmacy students may be better equipped to positively influence diabetes management after graduation.

Educational activity and setting

Fourth year pharmacy students on APPEs from the University of Iowa College of Pharmacy and Drake University College of Pharmacy and Health Sciences participated in the diabetes nutrition tour activity and online assessments. Pharmacy students were on an ambulatory care, acute care, or general hospital rotation. The activity occurred once per five-week rotation cycle for eight cycles. The activity was limited to eight pharmacy students per tour due to space and time limitations. If more than eight students were on rotation at the aforementioned sites then the students on the ambulatory and acute care rotations took priority for involvement. The tours were given by one of two residency-trained, board-certified APPE preceptors who developed and delivered content in a consistent manner. These pharmacy preceptors were faculty that had experience with clinical diabetes patient education and taught didactic diabetes lectures at the University of Iowa College of Pharmacy.

Each student was sent a pre-activity survey ([Appendix A](#)) via email during the first week of the rotation block to gather baseline assessment data. The survey was completely voluntary, allowing pharmacy students to opt-out of survey participation at any time. All students who were sent a survey participated in the nutrition tour, regardless of whether they filled out the pre-activity survey. No experiential grades were tied to the activity. This study was approved via both the University of Iowa and Drake University's Institutional Review Boards (IRB).

The survey ([Appendix A](#)) asked pharmacy students one item on their degree of comfort with diabetes nutrition counseling. This item used a 5-point scale (not at all comfortable to very comfortable). Students were asked whether or not they had previous diabetes

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