



Research

# Diabetes-focused rotation's impact on student confidence and knowledge

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## Abstract

**Objective:** To assess the impact of a diabetes-focused advanced pharmacy practice experience on students' diabetes-related confidence and knowledge.

**Methods:** A survey tool was created, including 22 confidence and 30 knowledge questions centered on diabetes care. Students entering into a diabetes-focused advanced pharmacy practice experience (APPE) during rotation 7 served as the intervention group, whereas students without this experience were the control group. Both groups completed the survey before and after rotation 7.

**Results:** Twenty-two students (13 intervention, 9 control) completed the baseline survey and 14 students (9 intervention, 5 control) completed the follow-up. The intervention group showed a significant improvement in total confidence compared with control (3.92–5.52,  $p = 0.002$ ). Within-group analyses showed a significant improvement in knowledge in the intervention group (18.6–22.4,  $p = 0.04$ ) compared with no difference in the control group (17.8–18.3,  $p = 0.85$ ).

**Conclusions:** This pilot study suggests that a diabetes-focused APPE improves students' diabetes-related confidence and knowledge.

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**Keywords:** Diabetes mellitus; Pharmacy students; Advanced pharmacy practice experience; Confidence; Knowledge

The incidence and prevalence of diabetes in the United States continues to increase at an alarming rate, posing a serious threat to the nation's health care resources. There has been a 24% increase in the national prevalence of diabetes from 2005 to 2011, bringing the estimated number of people with diabetes in the US to 25.8 million, with a projected doubling of this number within the next 25 years.<sup>1,2</sup>

The role of the pharmacist in diabetes management is strongly established. Several articles published over the past decade have demonstrated the strong positive impact pharmacists have on diabetes-related outcomes in a variety of

practice settings.<sup>3–8</sup> In recognition of these contributions, the American Diabetes Association (ADA) revised their standards for Diabetes Self-Management Education (DSME) in 2008 to include pharmacists as one of three different health care members who should be responsible for implementation, management, oversight, and assessment of the DSME program.<sup>9</sup>

## Role of disease management within pharmacy education

The standards for pharmacy education have evolved rapidly over the last two decades, changing most recently with the new accreditation standards for the professional program of pharmacy implemented in July 2007.<sup>10</sup> These new standards placed a much larger emphasis on the role that experiential education would play within the professional pharmacy curriculum and emphasized that students

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should be given opportunities for supervised direct patient care and should participate in chronic disease management.<sup>10</sup> The Joint Commission of Pharmacy Practitioners (JCPP) released a Future Vision of Pharmacy in Practice 2015 that also described expanded roles of pharmacists, including the promotion of wellness, health improvement, and disease prevention.<sup>11</sup>

We reported in 2007 the development of a group of community pharmacy-based, self-care education programs for patients with diabetes in rural and underserved Colorado communities that depended on a year-round workforce of students in advanced pharmacy practice experience (APPE) training.<sup>12</sup> This model has grown to a network of 12 student-supported diabetes clinics across the state of Colorado. This initial pilot was designed to evaluate these sites' impact on students' diabetes-related confidence and knowledge, in an effort to assess their effectiveness in enhancing students' learning.

## Methods

This study was previously reviewed and approved by the University's institutional review board. Students entering into a diabetes-focused, patient-centered APPE during rotation 7 were identified as the intervention group. The curriculum has eight rotations, so APPE 7 falls late into the program, occurring in the mid-spring before graduation in May. A diabetes-focused, patient-centered APPE was defined as a community pharmacy site that partnered with the Skaggs School of Pharmacy and Pharmaceutical Sciences (SOP) to receive training and equipment to establish a student-supported one-on-one education program for patients with diabetes. Patients would attend these sessions monthly for six months. The individual number of appointments at each site varied, from students seeing three to four patients per day to seeing one to two patients per week.

The control group was identified from students entering into a nondiabetes APPE during rotation 7. Controls were excluded if they had previously rotated through a diabetes-focused patient-centered APPE during rotations 1 through 6. Participation in this project was voluntary, and responses were de-identified by experiential administrative staff before data analysis.

A two-part survey tool was created that included 22 confidence and 30 knowledge questions related to the care of patients with diabetes. The confidence section of the survey included five different categories: patient assessment, patient education, diabetes monitoring, diabetes medications (oral hypoglycemic agents and insulin), and complications. Responses to these questions were measured using a 1- to 7-point Likert scale (1 = not at all confident to 7 = very confident). Students were asked to self-rate their confidence in delivering the specific education or training for each topic. The knowledge section of the survey consisted of six categories: diabetes standards of care, diabetes pathophysiology, diet/lifestyle, monitoring, medications

(oral hypoglycemic agents and insulin), and complications. The majority (29) of these questions were in short-answer format. Short answers were evaluated by two separate evaluators and average scores were used for each response.

Students in both the control and the intervention groups were given this survey to complete before entering their rotation 7 APPE and again after rotation completion. Student-specific information was also collected, including age, gender, number of diabetes APPE rotation experiences, overall grade point average (GPA), their grade in the specific course where diabetes information was delivered, and, for the intervention group, the amount of time their preceptor discussed diabetes-related topics per week during their diabetes APPE. Student responses were collected by experiential administrative staff and separated by intervention and control groups. Survey responses were de-identified before data analysis. Answers in the knowledge section were evaluated independently by two diabetes educators. The overall knowledge score was derived from averaging the scores from both evaluators. After scoring the surveys, both within group and between group comparisons were analyzed for overall knowledge and confidence. Differences within and between groups for each of the five confidence and six knowledge subcategories were also compared. Paired *t*-tests were used to compare within-group data using Statistical Analysis Software, version 8.0 (Cary, NC).

## Results

### *Response rate*

Thirteen students entering into a diabetes-focused rotation were identified as the intervention group and nine students were identified to serve as control subjects. All 22 of these students completed the baseline survey for diabetes knowledge and confidence. Upon completion of the rotation, nine intervention students and five control students completed the follow-up survey.

### *Demographics*

The students in the control and intervention groups were well-matched in regard to basic demographic characteristics of age, gender, semester grade for the diabetes course, and overall GPA in pharmacy school. The average age of participants was 26 to 30 years, with an average semester grade of B and average overall GPA between 3.0 and 4.0. There were significantly more females than males in both groups (89% vs. 85% in the control and intervention groups, respectively).

### *Total confidence*

Total confidence, as measured by the average of the means of all students' responses to 23 confidence questions, approached significance but was not statistically different at baseline in the control and intervention groups (3.73–4.55,  $p = 0.06$ ). All responses were included in this analysis,

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