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IMPROVE PATIENT EMPATHY THROUGH DIABETES SIMULATION: DESIGN AND ASSESSMENT OF INSTRUCTIONS

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ABSTRACT

Pharmacy students will be given the opportunity to engage in a diabetes simulation as part of an advanced pharmacy practice experience with the aim of improving their empathy for diabetes patients. A standardized diabetes log was submitted along with a narrative reflection on the week's activities that were recommended for individuals with type 2 diabetes. Interpretive phenomenology and thematic analysis were used to evaluate this experience. The experience contributed to 95% of students developing empathy, 95% finding it beneficial, and 65 percent improving their ability to relate to patients and counsel them. Most people had difficulty adhering to the regimen. It is estimated that students consume approximately 150 grams of carbohydrates each day and exercise approximately five days a week. Moreover, 65 percent of respondents made health-promoting changes to their daily routines. Student pharmacists' ability to relate to diabetic patients was greatly impacted by the 7th day active-learning exercise. Personal behavior may be altered for the better after this experience is completed.

Key words: Design, Public Health, Pharmacy Practice, Diabetic mellitus.

INTRODUCTION

Learner-centered approaches to active learning are increasingly being used in healthcare-related education [1]. A simulation project in some health-related courses further emphasizes aspects of certain diseases and patient populations to enhance the learner-centered nature of the education. Disabilities/rehabilitation, low vision, schizophrenia, HIV/AIDS, pediatrics, and geriatrics are among the most common [2-7]. Accreditation Council for Pharmacy Education Guidelines recognize such active-learning strategies as a way to stimulate higher-order mental abilities like critical thinking and problem solving within pharmacy curricula [8, 9].

Whether a student learns from traditional lecture structures or through more innovative methods, such as team-based or problem-based learning, the completion of a course does not guarantee that they will gain empathy for patients suffering from specific diseases. Students' empathy, altruism, and morality are diminished by the time they graduate from a health program [1]. The development of caring, therapeutic relationships with patients depends on empathy-building activities, which should be incorporated into all health care curricula [10]. Instead of improving student confidence, knowledge base, or problem-solving skills, this active-learning exercise improved students' empathy for diabetic patients. In addition to helping them provide patient-centered diabetes management services, this training should help them provide clinical pharmacy services for other illnesses.

DESIGN

Student pharmacists participated in rural medicine ambulatory care, during which 4-half-day encounters with patients were conducted in two rural areas 4 half-days a week. Pharmacy duties included providing pharmacists with informational in-service programs to healthcare practitioners and providing pharmaceutical care to patients with diabetes mellitus. Students from a variety of health-related disciplines were able to gain experience in both clinics.

Approximately 1.5 hours are spent with the rural medicine ambulatory care preceptor on the first day of each 5-week practice experience. The active-learning diabetic simulation experience was completed during this orientation. In addition to a glucose meter, 25 testing strips, lancets, a lancing device, a carbohydrate counting book, a demonstration device, and a placebo insulin pen, pharmaceutical companies provided students with the tools needed to improve their diabetes management. Moreover, each student was provided with a standardized documentation log.

This diabetes mellitus immersion investigation could be conducted during any of the seven days in the fifth week of practice. The students were required to commit to a day by the end of the first week on which this experience would begin. Every student was expected to incorporate these tasks into their daily routine on their predetermined days: check their feet every day for circulation, sensation, and integrity; initiate a routine for exercise based on the American Diabetes Association's recommendations [11]. Calculate how many carbohydrates are consumed at each meal & snacks, and monitor your blood sugar at least twice a day before meals, two hours after meals, and at least once a day at 3:00 a.m. Their self-monitored blood glucose values were to be elevated by adding 50 mg/dL to each. In order to adequately lower blood glucose to 60 mg/dL, the students were to calculate the correct rapid-insulin dose based on the insulin sensitivity factor of 1:5 and insulin-to-carbohydrate ratio of 1:2.5. Before eating two meals daily, and as often as necessary, students administered the calculated number of units into the demonstration device using the placebo insulin pen. Diabetes mellitus patients and people who use rapid-acting insulin were advised to follow these specific activity requirements based on commonly prescribed recommendations [5].

Student pharmacists had been exposed to numerous diabetes mellitus educational modules during their second and third years of pharmacy school. The third-year Integrated Pharmacotherapy course consists of two team-based problems related to type I and type II diabetes that students open and solve. After the school's extensive diabetes education provided earlier in the curriculum, no additional background education was given concerning the diabetes simulation experience. For activities and concepts that students found difficult to perform, calculate, or apply, they were expected to engage in additional self-directed learning efforts.

Three unrelated individuals with diabetes mellitus were interviewed in order to gain insight into their ability to maintain health care recommendations as a result of the disease state. The students selected the interviewees and scheduled and conducted the interview themselves, rather than being assigned individuals to interview. The interviewer could choose to speak to family members, friends, community members, patients at the clinic, or anyone with diabetes he or she knew. Students were instructed to conduct interviews rather than standard medical exams to understand how people affected by the disease live with, view, and cope with it. A standardized log was to be kept throughout the week, and each student was expected to prepare and submit a typewritten 2-page single-spaced personal reflection within four days of completing the exercise. A grade was not determined by whether or not students commented on the 3 interviews conducted, nor was their absence considered when evaluating empathy. Failure to meet the submission deadline and spelling or grammar errors were cited as reasons for grading the reflective compositions. This paper is intended to facilitate students' exploration of their feelings and thoughts about their unique experience with diabetes mellitus, enabling them to gain a deeper understanding of how they grew as healthcare providers through the simulation.

The students were expected to achieve four learning objectives by the end of their seven-day diabetes simulation experience and reflective compositions:

- Applying (Perform particular diabetes mellitus self-management tasks, such as counting carbohydrate intake, monitoring blood sugar levels with a glucometer, calculating insulin doses, injecting insulin, and exercising daily).
- Understanding (A standard diabetic regimen is unique in that it has challenges, i.e., identifying and assessing these challenges).
- Evaluating (In other words, consideration should be given to long-term obstacles to self-management).
- Creating (The development of empathy for diabetics is an important part of achieving this goal).

EVAUATION AND ASSESSMENT

According to interpretive phenomenology, subjective measurements were found in reflective narratives of students. As a qualitative interpretive method, thematic analysis was used to interpret the students' reflective narratives according to interpretive phenomenology [12, 13]. Studies regarding numerous disease states, including diabetes mellitus, have used both

techniques in qualitative research [15]. Data collected through qualitative research is analyzed via thematic analysis, while interpretive phenomenology is used to gather qualitative data. In thematic analysis, participants' reflective writing about their active-learning diabetes simulation experience was examined retrospectively in detail in order to identify patterns and themes in their lives and/or behavior [14]. Transcriptions were coded after intensive analysis, allowing recurring patterns of meaning to be discovered throughout the narratives. Superordinate themes uncovered included developing empathy, finding the experience beneficial/useful, changing personal lifestyles, expressing difficulty adhering to regimens, and identifying ways to improve adherence. In accordance with the analyzed codes, every subordinate theme was further subdivided into subthemes. Students' superordinate themes were quantified systematically in standardized data collection forms. As part of a cooperative inquiry, five student pharmacists validated the utility of the data collection form and ensured that concepts were accurately interpreted. The data was systematically collected using the standardized form by two blinded student pharmacists independently reading the reflections. After the data collection was completed, the preceptor reviewed the outcome data and verified that it was accurate using the same method. Data interpretation was further ensured by this triangulation method. Excel (Microsoft, Redmond, WA) was used to analyze data obtained from the standardized collection form.

In their reflective narratives, 20 student pharmacists mentioned having a family history of diabetes; 263 of them were female. N=268 of the 268 students who participated in this experience reported developing empathy, and n=269 reported a positive experience. The most common report of experience benefits related to counseling/relating to patients was n=263. As a result of changed perspectives gained through participation, approximately n=263 of students altered their personal lifestyle habits, and the majority of students, n=288, reported having difficulty adhering to the regimen. There were 263 students who found carbohydrate-counting books or electronic applications helpful: 256 found them useful, 255 found meal repetition helpful, and 29 found the setting of reminders/alarms helpful.

Objective measurements were made based on data reported in students' standardized logs. These logs were created in Excel. Exercises were conducted an average of five days per week for 215 minutes and foot inspections an average of six days per week during the simulation experience. Approximately 150 grams of carbohydrates are consumed each day by students. A blood glucose level of 85 mg/dL was measured at 3:00 AM on average. In an overall accuracy rate of 75.8 percent, based on an average of 20 dosing attempts per week, students were able to correctly calculate their insulin doses based on their self-monitored blood glucose levels, reported carbohydrate intake, and insulin sensitivity factors and insulin-to-carbohydrate values. Students expressed that they enjoyed the simulation regimen, appreciated learning about sugar counting and device use, as well as feeling more empathy for those who suffer from diabetes.

Table No. 1. Diabetes Simulation and Empathy Development among Student Pharmacists

ENDPOINTS	Number
Found experience useful	19
Developed empathy	19
Improved patient counseling	13
Assessed personal glycemic control	4
Refreshed self-monitored blood glucose technique	4

Table No. 2. In response to conducting a diabetes simulation, student pharmacists reported a perceived change in their personal behavior to improve their health

Anticipated Behavioral Change	Number
11 Lifestyle Change	13
21 Lifestyle Changes	5
31 Lifestyle Changes	2
Gained self-health awareness	9
Dietary modifications	7
Exercise routine	4

Table No. 3. As Part of a Diabetes Simulation, Student Pharmacists' Self-Reported Trouble Sticking to a Self-Care Regimen.

DIFFICULTY	Number

Difficulty in regimen adherence	18
Found difficulty in 21 adherence areas	15
Found difficulty in 31 adherence areas	8
Self-monitoring schedule	11
Anxiety with needles	9
Carbohydrate counting	9
Time consuming	7
Self-monitoring technique	6
Exercise regimen	4
Foot inspections	1

DISCUSSION

Diabetes mellitus is a disease that is on the rise and has a significant economic impact across the nation, which is why a majority, if not all, doctor of pharmacy programs across the country likely provide student education regarding proper treatment and management. Students have not yet been shown to benefit from interventions aimed at developing empathy.

Young adults in generally good health enroll in pharmacy programs. Students participating in this project did not have diabetes mellitus, based on objective self-monitored blood glucose measurements; this finding was confirmed through personal interactions with students. The majority of them did not take medications on a daily basis or had to test their blood glucose levels, count carbs, or check their feet every day like they did in the past. The student pharmacists likely didn't appreciate the struggles of monitoring a disease state every day before participating in the simulation experience, so they couldn't relate well to patients in that position. As demonstrated in their reflective narratives, adding the diabetes simulation experience enabled student pharmacists to develop empathy. Several students commented that they would provide self-care recommendations to patients much more considerately and honestly, and that they would be more understanding and compassionate when patients did not adhere to the prescribed treatment plan.

After completing the diabetes simulation experience, most students met the expected learning outcomes. Throughout the weeklong activity, all students were assigned diabetes mellitus self-management tasks. Despite the fact that clinical accuracy was not assessed for these tasks, 29 students expressed in their reflective narratives that they had become more comfortable and capable of performing technique-related tasks, such as counting carbohydrates, using a glucometer, and administering insulin. There was general agreement that the experience was challenging and that students were able to identify hindrances associated with maintaining self-management efforts for a mere one week and that they could not do it for a longer period of time. It was reported by almost all (95% of respondents) that they developed empathy for patients with diabetes. A standardized and validated survey instrument may be used in future studies to assess empathy at baseline and postintervention. As part of these programs, pre- and post-interventional diabetes knowledge assessments may be administered to provide additional insight into how self-monitoring blood glucose and insulin administration techniques are improving, dietary and disease state assessments are being administered, and a progression in learning may be observed.

Students had a positive experience, but modifications could be made in the future to provide a more realistic simulation of someone with DM. Students may be forced to choose a date for initiating the exercise rather than choosing it themselves and preparing for its initiation on an unannounced practice experience day. Patients often receive a diagnosis suddenly, which is why this modification would be more likely to closely mimic that experience. Students evaluated and reflected on their current eating habits in the current simulation experience without adjusting their diet. Rather than an enforced and unwelcome dietary change, a personal assessment of carbohydrate content in common foods may have more long-term impact. Patients with a less-resistant insulin sensitivity factor and insulin-to-carbohydrate ratio could be adjusted to match those for more-resistant individuals. It would be better to adjust the postprandial goal of 130 mg/dL to 170 mg/dL or 130 mg/dL instead of 130 mg/dL, which is an unnecessarily low level. It was decided to force the insulin dose calculation toward higher units by choosing an exceptionally strict postprandial goal, a low insulin-to-carbohydrate ratio, and an insulin sensitivity factor, which allowed a more sensitive assessment of the accuracy of students' insulin dose calculations. For the purpose of simulating basal insulin therapy, an additional placebo insulin pen could be added. To better simulate real-life situations, students could self-administer saline placebo insulin injections instead of using a demonstration device. A normal saline placebo insulin pen could also be used, along with a 1-time self-injection, so that students could understand the level of pain and anxiety associated with the event. Aspirin, metformin, HMG-CoA reductase inhibitors, and angiotensin-converting enzyme inhibitors are some of the oral medications commonly used by people

with type II diabetes. Placebo tablets could be added to mimic these oral medications. The diabetes simulation experience was challenging and beneficial to the students despite a lack of funding for these additional aspects of the disease. For people with diabetes mellitus who use rapid acting insulin with carbohydrate counting, this diabetes simulation experience most closely resembles 1. A high prevalence of diabetes mellitus in rural Alabama (e.g., 14.5% in Hale County and 11.7% in Walker County) and an even greater prevalence in rural counties of Alabama (e.g., 14.5% in Hale County and 11.7% in Walker County) [24] makes insulin-based regimens, including both basal and bolus insulin, common among patients in these locations. A simulation exercise provided students with an opportunity to become familiar with commonly prescribed products, including those for extremely uncontrolled diabetes mellitus.

Diabetes simulation experience reflects most closely activities carried out by insulin users, but patients who use oral medications may also gain empathy through this experience. The most commonly reported difficulty is monitoring blood glucose levels and counting carbohydrates rather than calculating or administering insulin. Self-reported empathy gained through this simulation exercise may also apply to patients with diabetes who are commonly prescribed glucose monitoring and carbohydrate counting.

A unique and unexpected benefit resulted from the addition of the diabetes simulation experience. Approximately 70% of students changed their personal behaviors as a result of completing the experience to improve their health or became more aware of their current health status. Improvements in dietary habits and physical activity were the most common changes. This is a notable public health benefit in the state with the second highest obesity rate in the most obese nation in the world. Over time, major benefits could be achieved if each and every student in the health professions engaged in a similar active-learning exercise that positively impacted two-thirds of them regarding their own health. Besides reducing personal health risks, these students would also model healthy lifestyle choices for their families, communities, and patients, which in turn would facilitate improved lifestyle activities among others. The Special Topics Week has been adapted from a third-year course for pharmacists to be completed by medical students, based on the benefits student pharmacists gained from this experience. As a result of grant funds secured to cover supplies, the first cohort of medical students graduated from the program. It is planned to analyze data comparing pharmacists' and doctors' reflective narratives as well as objective measures in the future.

There have been several efforts to develop empathy for diabetes mellitus patients through educational means, but few have been successful in quantifying this achievement. By including the diabetes simulation experience into pharmacy school coursework, however, pharmacists were able to reinforce material previously learned in earlier years, as well as improve their self-perceived empathy for patients. Reflecting on personal experiences without predefined guidelines encourages students to reflect introspectively. A noncoerced approach was used for thematic analysis to quantify the frequency of common themes, including self-reported empathy. As a whole, this simulation exercise, including a method of free-form exploration and free-form reflection and a thematic design facilitated an exceptional learning opportunity for students. It may help future practitioners identify similar obstacles to medication and behavior adherence with other disease states even though this simulation experience focused on one disease state. In order to specifically improve health care professional student pharmacists' empathy, institutes could use an active-learning simulation experience based on the most common disease states taught in all courses.

SUMMARY

The implementation of this 7-day experience helped fourth-year PharmD students develop greater empathy for patients, improve their ability to relate to patients, and increase their comfort level with patient interactions. It also helped them become more aware of personal health habits and bolster their behavioral modifications. Using adherence measures and comparing students' reactions to those of student pharmacists, future versions of the experience may be modified.

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