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PROGRAMME DESCRIPTION

A dose of reality: Continuous glucose monitoring simulation in pharmacy education

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Abstract

Background: Continuous glucose monitoring (CGM) is recommended for many patients with diabetes. Little is known about how best to teach this topic in pharmacy education. A simulation was developed to improve pharmacy students' knowledge, empathy, and confidence regarding CGMs. **Methods:** Twenty-six third-year pharmacy students enrolled in a diabetes elective attended a 50-minute lecture and completed a 26-item pre-survey assessing knowledge, empathy, and confidence. After using a CGM for up to 14 days, they completed a 2-week post-survey to measure changes in these areas, with a matched control group for comparison. **Results:** Twenty-three simulation and five control students completed educational activities and pre- and post-surveys. Knowledge scores improved more in the simulation group (+14.2 percentage points, p = 0.002) than in the control group (+0.4 percentage points, p = 0.475). Both groups showed increases in empathy and confidence, with a larger change in the simulation group, and students reported high satisfaction with the experience. **Conclusion:** Simulation students gained knowledge and confidence in counselling and using CGM devices from the CGM-wearing experience, compared to those who only attended lectures. This small study suggests incorporating CGM experience into pharmacy curricula, though a larger sample size is needed to validate the findings.

Introduction

Continuous glucose monitors (CGMs) are devices that may be worn by persons with diabetes to continuously monitor their blood glucose (BG) levels every one to five minutes. By significantly reducing or even eliminating the need for finger pricks, these devices provide a real-time pattern of daily BG data that may not be apparent with traditional glucose monitoring methods (Oser *et al.,* 2022). As a result, CGMs can improve quality of life and provide more data for informed diabetes management, allowing for optimised BG stability. Overall, CGMs can lead to a reduction in A1c and long-term complications (ADCES and APhA/APhA Foundation, 2020). CGM use is recommended by the American Diabetes Association, the American Association of Clinical Endocrinologists, and the European Association for the Study of Diabetes for all persons with diabetes who can access and utilise the devices, particularly those who are insulin-dependent or at risk of hypoglycaemia (American Diabetes Association Professional Practice Committee et al., 2024; Blonde *et al.,* 2022; Davies *et al.*, 2022). Despite being on the market for over two decades, only about 48% of persons with type 1 diabetes and 3-4% of persons with type 2 diabetes utilise a CGM in the United States (Sears *et al.,* 2022). The potential reasons for this large gap in CGM utilisation are multifactorial and includes patient-level access concerns such as cost and technology literacy, provider-level misconceptions or inadequate training, and systems-level barriers such as limited visit time or insufficient support staff to manage paperwork and patient training (Walker *et al.,* 2021; Barchiesi *et al.*, 2025). While advocacy efforts have expanded insurance coverage of CGMs, the average wholesale cost in the United States can vary widely between 150-

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400 US dollars, placing these devices out of reach for many uninsured patients.

Beyond financial barriers, another major barrier to CGM uptake is provider education, including primary care providers and pharmacists (Nimer *et al.,* 2021; Oser *et al.,* 2022; Stewart *et al.,* 2025). The World Health Organization estimates that the number of persons with diabetes will increase to over one billion by the year 2050 (Ong *et al.,* 2023). Given that pharmacists play an integral role in diabetes care across the spectrum of practice areas, including community, hospital, and ambulatory settings, it is crucial that pharmacists are trained and stay up to date in the latest technologies that can positively impact quality care (Ulrich & Bowen, 2021; Sears et al., 2022; DeSalvo et al., 2023; Stewart et al., 2025;).

Little is published about the best way to provide education to pharmacy students about CGMs. A 2022 cross-sectional survey study regarding CGM education in US pharmacy education found that 89.5% of programs included CGM education for a median of 1 hour, with 60.4% of programs including it in required lectures (Knezevich *et al.,* 2022). Only 10.5% of programs taught CGMs in skills laboratory settings, and 33.3% of programs indicated hands-on education (Knezevich *et al.,* 2022). With diabetes care moving towards increased utilisation of CGMs, there is a need to identify educational methods to ensure graduating student pharmacists are prepared to navigate diabetes-related technologies (Litten *et al.,* 2025).

Simulations in learning are experiences or activities that “represent actual or potential situations in education and practice” and have been utilised in pharmacy and medical education for various topics and skills (Korayem *et al.,* 2022). Simulations of utilising glucometers and injecting subcutaneous saline (to mimic insulin injections) can increase empathy and confidence in pharmacy students (Parker *et al.,* 2019). There have been minimal reports published on the impact of a hands-on CGM training activity incorporated into pharmacy curricula each with inconsistent findings with variable positive or neutral impact on knowledge, confidence, and empathy (Sherrill *et al.,* 2022; H. Folz *et al.,* 2023; Lobkovich *et al.,* 2025). Given the limitation of curricular time, more studies are needed to assess if a shorter lecture time with hands-on experience still has a positive impact. Additionally, further studies are needed to evaluate if a CGM-wearing experience has an impact on empathy in a different institution.

At The University of Texas at Austin College of Pharmacy (UTCOP), a diabetes elective entitled “Patient-Centered Diabetes Care” is offered to third-year Doctor of Pharmacy (PharmD) students. This course occurs after PharmD students complete a required diabetes pharmacotherapy course one year prior. The diabetes elective is structured as a hybrid course, with approximately half of the course occurring asynchronously via online modules and the other half occurring synchronously through onsite 2-hour class sessions. UTCOP is a split campus for third-year PharmD students, with the majority of students learning in Austin, TX, and other distance learners at the San Antonio, TX campus. A diabetes technology module with an accompanying CGM-wearing experience was offered in this diabetes elective in 2023 and 2024. This analysis aimed to evaluate the effectiveness of a hands-on educational activity followed by a CGM-wearing experience as measured by changes in student knowledge and confidence related to CGM application and counselling, as well as empathy towards persons with diabetes using a CGM.

Description of module

The diabetes technology module took place during week seven of the 14-week diabetes elective course, with the first half of the course covering diabetes complications, guidelines overview, pharmacotherapy treatment, new patient counselling, conducting a patient interview, nutrition, complementary alternative therapies, and social determinants of health. Students had also already completed an experience called “Living with Diabetes,” in which they were asked to self-monitor their BG four times daily for one week via traditional finger stick glucometers. Week seven’s theme was “Diabetes Technology,” which included instruction on CGMs and automated insulin delivery systems. This module began with a 50-minute onsite lecture during a synchronous class time, followed by students self-applying a CGM device and wearing it for up to two weeks, depending on the brand applied. During the lecture, students learned about the different types of CGMs currently on the market, how to apply and troubleshoot devices, and how to read ambulatory glucose profiles (AGP).

CGMs worn included the FreeStyle Libre 2 sensor in 2023 and FreeStyle Libre 3 in 2024 (Abbott Diabetes Care) and the Dexcom G6 sensor in 2023 and 2024 (DexCom, Inc.). The Freestyle Libre devices were obtained through an Abbott Diabetes Care Educational Grant, and the Dexcom devices were obtained via samples; both devices were ordered and sponsored by an endocrinologist from a local clinic with which the faculty members were affiliated. No readers were provided by either company; therefore, students utilised their personal cellular devices as readers.

Before the class session, students were asked to verify their phone's compatibility with the CGMs offered.

To measure the change in students' knowledge, empathy, and confidence regarding CGMs, students completed a 26-item, optional, ungraded, instructor-developed pre- and post-survey. (Appendix A). Students completed the pre-survey before the lecture and before applying the CGM, followed by the post-survey two weeks later. All surveys were self-completed by participants via an online form through Qualtrics® (Provo, Utah). Knowledge was assessed using a nine-item multiple-choice quiz created by course faculty, who are practicing ambulatory care pharmacists. Questions were designed to align with the lecture learning objectives and reflect practical considerations encountered in clinical practice, while being appropriate for the students' year in the curriculum. (see Table I and Appendix A). An 8-item empathy scale was created using a modified and shortened version of the validated Kiersma-Chen Empathy Scale (Aronson *et al.,* 2022). Items were selected to reduce redundancy, minimise survey fatigue, and ensure direct relevance to the module content. A seven-point Likert scale rating from 0 = unnecessary to 6 = extremely necessary was assessed for each question, with higher scores indicating higher empathy (see Table II). Confidence was assessed by having students rate their self-perceived ability to meet the session learning objectives using a 7-point Likert scale from 0 = not confident at all and 6 = extremely confident (see Table III). The pre- and post-survey asked identical questions to assess knowledge, empathy, and confidence. Additionally, the pre-survey collected student demographics, and the post-survey included a 2-item section about activity satisfaction.

In 2023, a control group of third-year students who were not enrolled in the elective class nor participated in the hands-on CGM-wearing experience was also surveyed to compare outcomes to those who completed the CGM-wearing experience. The control group volunteered to watch the 50-minute lecture and took the same pre- and post-surveys at the same time intervals. A non-monetary incentive of complementary lunch was offered to the control group to encourage participation. After the 2023 cohort, CGMs were incorporated into the 2nd-year pharmacotherapy curriculum, and therefore no control group could be collected.

Descriptive statistics and unpaired, one-tailed student's t-tests were used to assess improvement in pre-post scores for each item and overall within experimental and control groups. Participants were included in data analysis if they answered at least 50% of the questions on both the pre- and post-surveys; and of those, if a section did not have at least 50% of questions answered, the section was removed for that participant. This study was deemed exempt by the University of Texas at Austin Institutional Review Board.

Results

Sixteen students were enrolled in 2023 and ten in the 2024 elective course. Of those, 23 students completed the pre-survey (88.5% response rate) and 18 completed the post-survey (69.2% response rate). In the pre-survey, confidence scores were excluded for three students and knowledge for one due to lack of at least 50% response in that section, but none were excluded in the post-survey. Six students in the control group completed the pre-survey, with only five completing the full post-survey. Many of the respondents were female (47.8% and 67% for the simulation and control group, respectively), with an average age of 25 years for both groups. Most had already completed or were currently completing their ambulatory introductory pharmacy practice experience (IPPE) (87% vs 83%). Furthermore, some students in both groups reported prior experience with counselling or encountering CGMs on their ambulatory IPPE rotation (47.8% vs. 83%). Students who completed the CGM simulation felt that the activity helped them learn the material (4.80/5) and that the activity was enjoyable (4.80/5).

Knowledge

There was a significant increase in knowledge for the simulation group exhibiting a 14.2 percentage points increase from baseline (60.6% vs. 74.9%, $p = 0.002$). In contrast, the control group's score did not significantly improve (68.5% to 68.9%, $p = 0.475$) (See Table I). This improvement in the simulation group was largely driven by significant changes in knowledge regarding applying CGM on a patient (Knowledge Item 8), improving from 61.5% answering correctly to 100% (p= 0.018), compared to relatively no change among the control group. The control group also exhibited a decreased score by 20 percentage points on Knowledge Item 2 related to identifying differences between CGM products, whereas the simulation group had a 27.3 percentage points increase (p=0.006). Both groups scored relatively low on Knowledge Item 6 related to interpreting data on an AGP. Additionally, the lowest scoring question for both groups (Knowledge Item 4) was a select all that apply type question and was marked correct for data analysis only if respondents chose all three correct answers; respondents were not given credit for partially correct answers, which may have led to a lower score seen in both groups. Most of the time, the student correctly selected all three correct components of an AGP, but also selected that it included a BG on a specific date and time, which is included in the report, but not the AGP itself.

Table I: Change in mean knowledge pre-survey and post-survey*

Learning objective	Simulation group				Control group			
	Pre (n=22)	Post (n=19)	Change	*P*-Value	Pre (n=6)	Post (n=5)	Change	*P*-Value
1. Explain the pros/cons of continuous glucose monitors (CGMs)	95.5.0%	100.0%	4.5%	0.180	100.0%	100.0%	0.0%	---
2. Explain the difference between CGMs on the market	72.7%	100.0%	27.3%	**0.006**	100.0%	80.0%	-20.0%	0.105
3. Identify patients who would be a good candidate for a CGM	59.1%	68.4%	9.3%	0.274	100.0%	80.0%	-20.0%	0.105
4. Describe the data on the ambulatory glucose profile (AGP)†	9.1%	15.8%	6.7%	0.263	0.0%	20.0%	20.0%	0.105
5. Identify the glucose goals of AGP	68.2%	84.2%	16.0%	0.122	66.7%	60.0%	-6.7%	0.404
6. Interpret the AGP to develop a patient-specific diabetes plan	18.2%	31.6%	13.4%	0.166	16.7%	20.0%	3.3%	0.445
7. Counsel a patient on application and set up of the CGM	59.1%	78.9%	19.9%	0.091	66.7%	100.0%	33.3%	0.072
8. Apply a CGM on a patient	63.6%	94.7%	31.1%	**0.008**	83.3%	80.0%	-3.3%	0.445
9. Describe accessibility for CGMs	100.0%	100.0%	0.0%	---	83.3%	80.0%	-3.3%	0.445
Overall	**60.6%**	**74.9%**	**14.2%**	**0.002**	**68.5%**	**68.9%**	**0.4%**	**0.475**

*Scores based on average number of students with the correct answer.

†This question was asked in the format of 'choose all that apply' and was marked correct' for data analysis if respondents chose all 3 correct answers; partial credit was not given.

Empathy

Overall, both groups saw a significant increase in average total empathy scores, with a more prominent change seen in the simulation group (Table II). The pre-survey revealed a high baseline self-reported empathy score in both groups. For both groups, the questions that were focused on the student's own personal ability to empathise (Empathy Items five to eight) improved. The questions that focused on healthcare professionals as a whole (Empathy Items one to four) trended towards an increase in empathy in the control group (p=0.088) and was significantly improved in the simulation group with an average change of +0.31 (p= 0.020).

Table II: Change in mean empathy pre-survey and post-survey

	Simulation group				Control group			
	Pre (n=23)	Post (n=18)	Change	*P*-Value	Pre (n=6)	Post (n=6)	Change	*P*-Value
Section 1: How necessary is it for healthcare professionals to be able to.... *								
1. Comprehend patients using continuous glucose monitors (CGMs) experiences	5.09	5.40	0.31	0.150	5.33	5.67	0.34	0.275
2. Express an understanding of patients using CGM's feelings	5.13	5.55	0.42	0.070	5.33	5.50	0.17	0.367
3. Value patients who use CGM's point of view	5.39	5.45	0.06	0.410	5.33	5.50	0.17	0.367
4. View the world for patients taking CGM's perspective	5.04	5.50	0.46	0.074	5.00	5.70	0.70	0.130
Section 1 Overall	**5.16**	**5.48**	**0.31**	**0.020**	**5.25**	**5.59**	**0.35**	**0.088**
Section 2: I am able to... †								

	Simulation group				Control group			
	Pre (n=23)	**Post (n=18)**	**Change**	***P*-Value**	**Pre (n=6)**	**Post (n=6)**	**Change**	***P*-Value**
5. Comprehend patients using CGM's experiences	3.48	5.22	1.74	**<0.001**	3.50	4.67	1.17	**0.017**
6. Express an understanding of patients using CGM's feelings	3.57	5.22	1.65	**<0.001**	3.67	5.00	1.33	**0.019**
7. Value patients who use CGM's point of view	4.09	5.44	1.35	**<0.001**	4.83	5.67	0.84	0.071
8. View the world from patients taking CGM's perspective	3.30	5.33	2.03	**<0.001**	4.17	5.00	0.83	0.098
Section 2 Overall:	**3.63**	**5.31**	1.68	**<0.001**	**4.04**	**5.09**	**1.04**	**<0.001**
Section 1 and 2 Overall	**4.40**	**5.39**	**0.99**	**<0.001**	**4.65**	**5.34**	**0.69**	**<0.001**

*Questions were assessed using a 6-point rating where 0 = unnecessary and 6 = extremely necessary

†Questions were assessed with a 6-point rating where 0 = does not describe me and 6 = describes me extremely well

Confidence

Analysis of the pre-surveys revealed a low baseline level of confidence in many different aspects of CGM competencies for both groups (Table III). The control group had slightly higher baseline confidence (2.72) as compared to the simulation group (2.51). In both groups, confidence increased for each individual question as well as overall ($p < 0.001$ for both). Notably, the simulation group saw a net improvement of over 3 points for counselling patients regarding the application and set up of the CGM (Confidence Item 7) and applying a CGM to a patient (Confidence Item 8). Of note, some students may have ranked lower than their actual response due to a typographical error in the instructions of the survey that 5 was the highest ranking rather than 6, though students still had the option to choose 6. However, this would have impacted both groups to the same degree.

Table III: Change in mean confidence pre-survey and post-survey

	Simulation group				Control group			
	Pre (n=20)	**Post (n=18)**	**Change**	***P*-Value**	**Pre (n=6)**	**Post (n=6)**	**Change**	***P*-Value**
Rate each of the following statements regarding your confidence level*								
1. Explain the pros/cons of continuous glucose monitors (CGMs)	3.25	5.22	1.97	**<0.001**	4.17	5.33	1.16	**0.048**
2. Explain the differences between CGMs on the market	2.25	4.5	2.25	**<0.001**	1.83	4.67	2.84	**<0.001**
3. Identify patients who would be a good candidate for a CGM	3.45	5.11	1.66	**<0.001**	3.33	5.50	2.17	**0.002**
4. Describe the data on the ambulatory glucose profile (AGP)	2.35	4.61	2.26	**<0.001**	1.33	4.33	3.00	**<0.001**
5. Identify the glucose goals of AGP	2.55	4.89	2.34	**<0.001**	3.00	4.83	1.83	**0.031**
6. Interpret the AGP to develop a patient-specific diabetes plan	2.30	4.56	2.26	**<0.001**	2.50	4.33	1.83	**0.017**
7. Counsel a patient on application and set up of the CGM	2.20	5.28	3.08	**<0.001**	3.00	5.50	2.50	**0.004**
8. Apply a CGM on a patient	1.95	5.39	3.44	**<0.001**	2.50	4.83	2.33	**0.001**
9. Describe accessibility for CGMs	2.25	4.89	2.64	**<0.001**	2.83	5.00	2.17	**0.008**
Overall	**2.51**	**4.94**	**2.43**	**<0.001**	**2.72**	**4.92**	**2.20**	**<0.001**

*Questions were assessed using a 6-point rating where 0 = not confident at all and 6 = extremely confident

Discussion

Overall, pharmacy students benefited from the opportunity to learn about CGMs, with some advantages for those who engaged in the hands-on application and CGM-wearing experience. Notably, the simulation group exhibited higher and improved knowledge scores two weeks following the initial lecture than the control group. Moreover, confidence levels improved in both groups, with a more pronounced increase in the simulation group, particularly in the ability to apply a CGM on a patient and counsel them. These improvements occurred despite the control group's small sample size and their higher proportion of students with prior CGM experience, which would typically bias results toward the control group. These skills translates directly to student preparedness for pharmacy practice in patient-facing roles where competency and confidence in counselling and handling CGM devices are critical.

These findings of increased knowledge and confidence after the CGM-wearing experience align with prior studies, which despite small sample sizes, have shown benefits in knowledge, confidence, and empathy to varying degrees. For example, Research showed that participants had increased knowledge and confidence levels (Sherrill *et al.,* 2022). Similarly, Folz and authors (2025) found enhanced counselling confidence and performance post-experience, but no significant changes in knowledge or empathy (Folz *et al.,* 2025). Another study observed increased empathy and counselling knowledge following CGM wear, though foundational knowledge did not improve (Lobkovich *et al.,* 2025). These mixed results likely reflect the limited sample sizes of these studies (41, 63, and 29 participants, respectively) and highlight the need for validation through larger, longer-term investigations to better understand how a CGM user wear experience impacts all three domains (knowledge, confidence, and empathy) in pharmacy students. Additionally, while these findings have been statistically significant, it remains unclear whether they represent changes that are educationally or clinically meaningful.

One of the most rewarding parts of this activity was its impact on student satisfaction and empathy for patients utilising these products. Empathy is a vital component of patient care, especially in managing chronic disease states. Previous studies have shown a positive correlation between clinician empathy and clinical outcomes for persons with diabetes (Hojat *et al.,* 2011). Interestingly, students understood that healthcare providers required empathy at baseline, but had lower scores amongst their own baseline empathy. This increased significantly in both groups, with a larger change in the simulation group. Though no difference was seen between the groups, the high baseline empathy scores suggest a possible ceiling effect, which may have limited the ability to detect meaningful changes in empathy following the intervention. Moreover, some students reported common challenges experienced by persons living with diabetes while wearing the CGM, including alarms waking them up in the middle of the night and experiencing the sensor falling off early, which necessitated a call to the manufacturer for a replacement. Immersive learning and simulation of living as a person with diabetes utilising a CGM facilitated a deeper comprehension of patient needs and challenges. This finding further emphasises the importance of implementing learning activities that ensure future pharmacists are fully equipped to improve outcomes and meet the needs of the growing incidence of diabetes worldwide.

There are some limitations to this study. Class size, and therefore sample size of this analysis, was small despite recording data over two years. The control group was especially limited due to curricular changes after the 2023 cohort, which prevented further enrollment. While the statistical tests used (t-tests) are valid for small samples, the limited n reduces statistical power and the precision of effect estimates. Nonetheless, including the control group provides valuable comparative context, demonstrating that improvements in the simulation group were not solely due to the lecture. In addition, the control group included students who volunteered their time to learn about CGMs, indicating a higher baseline interest in the subject. Due to the control group's small size, there may be selection bias among the responses and inflated baseline scores compared to the general third-year PharmD student population. Baseline scores may also be higher for both groups since most indicated prior experience counselling patients on CGMs. This study was conducted at a single institution with a short follow-up period of two weeks, which may limit the generalizability of the findings to other pharmacy programs with different curricula, student populations, or resources. The short follow-up period of two weeks also limits the ability to assess the durability of knowledge, confidence, or empathy changes over time, as well as whether these translate into sustained behavioural changes in clinical practice. Additional data with a larger and more diverse group of students over a longer period of time is needed to fully assess the activity's impact. Although the empathy scale used was a modified version of a validated instrument, other survey items, including knowledge and confidence measures, were developed by faculty and have not undergone formal psychometric validation, which may affect the reliability and validity of these results. Missing post-survey data could introduce bias, as participants who did not complete the post-survey may differ in important ways, such as engagement, from those who did, potentially impacting the observed outcomes.

One barrier/challenge to implementing this activity widely in pharmacy curricula is the availability and cost of CGM products. Educational grants have been made available by some CGM manufacturers, but it is unclear how long or how often these are awarded each year. Additionally, because most CGM products currently require a prescription, pharmacy faculty need to be supported by a practising independent prescriber to sign for these devices. Although, the availability of over-the-counter CGM devices could change this limitation. Furthermore, because “curricular overload” is a challenge in pharmacy academia, another barrier is identifying where in the curriculum this type of activity would fall and/or if it could be offered to an entire class (Kelley *et al.,* 2023). The time it took to lecture and demonstrate CGM placement may not be available in required courses that are already scheduled. However, it is a topic that can be introduced in pharmacotherapy courses and expanded upon in laboratory-based skills labs or related elective courses to support students’ knowledge of digital health options before independent practice. Likewise, a CGM-wearing experience may not be readily available to trial as a practicing pharmacist. While pharmacists may seek out their local representatives to obtain samples and training devices, it would be very difficult for an independent pharmacist to access a wearable device without paying for it themselves. As such, it is unclear the extent of return on investment for these types of educational opportunities but does support its need to be placed in the curricula, so pharmacists are prepared for patient care.

Through this analysis, the authors identified the largest area for improvement for this educational activity was student evaluation of AGP. While this concept was reviewed briefly during the lecture component, this CGM-wearing experience did not include active opportunities to practice assessment of AGPs or the creation of pharmacotherapy plans. Simply wearing the device did not provide this practice. Assessment and interpretation of AGP is a skill that is particularly important for clinical pharmacists who provide chronic disease state management, and the course faculty of this diabetes elective plan to enhance the diabetes technology module in the next iteration of the course through patient cases. Further studies indicating practice readiness or the impact of this type of activity on CGM interventions during practice are needed.

As data continues to support the growing use of CGMs in diabetes care, healthcare providers must be prepared to prescribe, counsel, dispense, and manage CGM devices for persons with diabetes. This experience allowed students to translate concepts gained from diabetes pharmacotherapy and knowledge of CGMs into tangible, patient-centred actions such as CGM application, counselling, and empathy towards persons with diabetes. This hands-on experience helped bridge the gap from classroom learning to real-life diabetes management while providing students with practical skills they can utilise to provide comprehensive care. Therefore, educational institutions should ensure that CGMs are included within their diabetes pharmacotherapy modules and/or associated skills labs. This would support the ACPE 2016 Standards goal to produce practice-ready pharmacists and meet AACP’s COEPA goal of incorporating digital health into the curriculum (Accreditation Council for Pharmacy Education, n.d.; Medina *et al.,* 2023). Providing comprehensive diabetes education, including CGM hands-on experiences, should also be a goal when feasible based on the results of this study. While more studies with more students and across institutions are warranted to pinpoint the optimal timing of this topic within the curriculum, it is clear that pharmacy students can benefit from not only CGM education but also hands-on experience. Institutions may need to support faculty with resources to obtain CGM devices. Education to pharmacy students regarding these technologies may increase their uptake and, subsequently, improve outcomes for persons with diabetes.

Conclusion

Overall, pharmacy students benefited from a CGM-wearing experience showing improvements in knowledge retention, confidence, and empathy related to diabetes and CGMs. This small study supports the integration of a CGM-wearing experience into pharmacy curriculums, but a larger sample size would be beneficial to further validate these findings.

Declaration of interest

The authors received an Educational Grant from Abbott Diabetes Care Inc. for provision of the FreeStyle Libre 2 sensors used by students enrolled in this elective course. DexCom, Inc. donated sample Dexcom G6 sensors to be used by students enrolled in this elective course. Procurement of CGM devices occurred prior to the conception of this research analysis; Abbott and Dexcom were not involved in the research process, including the methods employed or data analysis conducted. Outside of this, the authors declare no other conflicts of interest or financial interests that the authors or members of their immediate families have in any product or service discussed in the manuscript, including other grants (pending or received), employment, gifts, stock holdings or options, honoraria, consultancies, expert testimony, patents, and royalties.

Ethics approval and Informed consent

This study was deemed exempt by the University of Texas at Austin Institutional Review Board.

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