Patient Satisfaction With Diabetes Care in a Student-Run Free Medical Clinic: A Quality Improvement Study

Journal of Pharmacy Technology
2020, Vol. 36(2) 61–67
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DOI: 10.1177/8755122519899084
journals.sagepub.com/home/pmt

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Abstract

Background: Diabetes prevalence continues to be a concern and the management of diabetes is important but costly. The prevalence of diabetes is greater among persons with a low income, including those who are uninsured or underinsured. Student-run free clinics (SRFC) are one resource to these patients who may otherwise lack access to medical care. **Objective:** The purpose of this study was to assess patient satisfaction with diabetes care at a SRFC in order to assist in identifying areas of improvement. **Methods:** A quality improvement survey was designed to assess patient satisfaction with overall care, as well as with routines and perception of care related to self-management, healthy eating, and exercise. **Results:** The survey was completed by 25 patients at a Toledo area SRFC. Established patients who were aged 18 years or older and diagnosed with diabetes, were invited to complete the survey. The majority of patients were satisfied with their diabetes care at the SRFC (88%). Fewer patients, however, reported satisfaction with the treatment for their diabetes (72%) and with their knowledge about diabetes (76%). Subanalyses of survey responses also showed significant differences when comparing sex, age, and length of diabetes diagnosis. **Conclusions:** The survey helped identify key areas in which the diabetes care provided at the SRFC could be improved. These areas included education about diabetes in general, as well as in understanding treatment, self-monitoring, and healthy eating and exercise options. Future research could explore survey results after specifying and implementing changes made to the education provided to the patients.

Keywords

diabetes, diabetes type 2, ambulatory care, clinical pharmacy, patient education

Introduction

The prevalence of diabetes continues to be a concern at both the national and local level. In 2015, an estimated 30.3 million people, or 9.4% of the US population, had been diagnosed with diabetes.¹ In Lucas County, Ohio where this study was conducted, 12% of the adult population had been diagnosed with diabetes in 2017.² Successfully managing diabetes is critical to patient safety and well-being, but the management of diabetes is costly.³ Patients diagnosed with diabetes can accumulate more than \$16 000 worth of medical expenses every year with more than \$9000 of the total costs being attributed specifically to care for diabetes.³ As a result, medical costs can average \$800 per month for patients with diabetes to manage their chronic disease. The cost of diabetes care can be burdensome then, especially for uninsured or underinsured patients.

There is also a disparity in the prevalence of diabetes based on one's socioeconomic status. One study indicated that there is a greater prevalence of diabetes among people who have a low income.⁴ Data from Lucas County, Ohio

supports this finding. Twenty-one percent of people in Lucas County with an annual income <\$25 000 per year have a diagnosis of diabetes compared with only 8% of those with an annual income >\$25 000.² In another study, the prevalence of diabetes was also noted to be higher among groups with a lower annual income. Nine percent of people in the lower income category (≤\$29 999 annually) had a diagnosis of diabetes, compared with only 2.7% of those in a higher income category (>\$80 000 annually).⁵ With an increased prevalence of diabetes among low-income patients, the services provided at a student-run free clinic (SRFC) may be one solution that can be utilized by uninsured and underinsured patients to gain access to care

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and lessen the financial burden of managing a chronic disease state.⁴

There are a growing number of SRFCs in the United States, surpassing 150 known clinics.⁶ One such SRFC initiative, the Community Care Clinics, serves residents of Lucas and Wood Counties in Northwest Ohio. It is organized and administered by interprofessional health care students from The University of Toledo and supervised by local providers and other health care personnel. Its mission, simply stated, is to “provide free, quality health care to the underserved, and to raise health care awareness in the Toledo community.”⁷ The Community Care Clinic oversees 3 unique clinic operations in the Toledo area, including the Mildred Bayer Clinic for the Homeless, the Community Care Women’s Health Clinic, and the Community Care Free Medical Clinic (CCFMC), where this study was conducted. The CCFMC provides primary medical care services to uninsured and underinsured patients free of charge, including pharmacy services, HIV testing, and referrals for services not available at the clinic such as nonstocked prescriptions, X-ray, laboratory testing, or other diagnostic testing.

A patient encounter at the CCFMC begins with a health professional student collecting demographic information, vital signs, and a health history from a patient and then performing a physical examination when indicated. Physical examinations are indicated for first-time patients and patients with new chief complaints or requesting to see a physician. In addition, patients are required to receive a physical examination every 3 months at CCFMC. These students then present their findings to a supervising provider, who evaluates the patient and develops an assessment and plan for the patient’s care in collaboration with the learners. Prescriptions, diagnostic testing, and outside referrals for services not available at the clinic are then ordered by the medical team. There is an on-site dispensing pharmacy at the CCFMC operated with assistance of pharmacy students under the supervision of a licensed pharmacist. Any prescription written by the physician for a medication that is in stock at the clinic is dispensed from the pharmacy at no charge to the patient. Medications stocked in the pharmacy at the CCFMC are supplied primarily through donations, which limits the formulary for each disease state. Diabetes medications commonly dispensed from the CCFMC pharmacy include insulin, metformin, and sulfonylureas. Prescriptions at CCFMC are only filled for 30-day supplies and patients can come into the clinic solely for refills if a physical examination is not indicated. Point of care blood glucose and hemoglobin A1c testing can also be done on-site at the CCFMC to evaluate a patient’s glucose control if needed, though personal diabetes testing supplies are not provided by CCFMC.

Since many uninsured and underinsured patients may use SRFCs to obtain primary care, SRFCs are well

positioned to assist with the care of patients with diabetes. Noting the demographics and prevalent health conditions of the patients cared for at the CCFMC, focusing on the diabetes care provided at the clinic was determined to be an area that would offer the greatest potential impact. In order to successfully initiate interventions aimed at improving diabetes care provided at a SRFC, it is important to first identify the patient perceived areas for improvement. This quality improvement (QI) study was aimed to identify the areas of the care provided at the CCFMC in which patients feel could be improved on.

Objectives

The primary objective of this quality improvement study was to assess patient satisfaction with diabetes care at an SRFC. In addition to satisfaction of overall diabetes care, the study focused on satisfaction of self-management of diabetes, nutrition, and exercise. Secondary objectives included evaluating satisfaction between ages, sex, length of diabetes diagnosis, and time attending the CCFMC.

Methods

This study was reviewed by The University of Toledo Social, Behavioral, and Educational Institutional Review Board and was exempted as a QI project.

Participants

To be eligible to participate, patients had to meet the following inclusion criteria: age 18 years or older, a diagnosis of diabetes (either type 1 or type 2), and be an established patient at the CCFMC (at least 1 visit prior to study inclusion). A patient was ineligible to participate if it was their first clinical visit at the CCFMC, or if they did not meet the specified inclusion criteria. The study planned to recruit a total of 25 participants for this QI pilot study. Patient enrollment spanned 7 consecutive weeks, from January 10, 2019, to February 21, 2019. Patients typically returned to the clinic once a month to receive refills of medications, which meant that the majority of study-eligible patients would be seen within a 4-week period allowing a more limited enrollment window.

Survey Design

The QI survey assessed patient satisfaction with overall care, as well as routines and perception of care related to self-management, healthy eating, and exercise. Survey questions either were developed independently or were modified from 3 validated questionnaires: the Shade Tree Patient Satisfaction Survey, Diabetes Treatment Satisfaction Questionnaire, and Diabetes Self-Management Questionnaire.⁸⁻¹⁰ Final survey

statements were further revised in order to attain a Flesch-Kincaid Grade Level Readability of 5. The survey consisted of 6 demographics questions and 26 survey questions (6 in overall satisfaction, 8 in self-management, and 12 in healthy eating and exercise) with an open comment box following each of the 3 sections.

Chart Review

When patients checked-in for their CCFMC visit, their medical charts were reviewed to see if they met the enrollment criteria. All identified patients meeting inclusion criteria were approached to see if they were willing to complete the survey while waiting for their care at the clinic. The survey typically was completed within 10 minutes. Participation in the study was voluntary and anonymous. Survey responses and demographics were recorded on a paper survey and marked using a participant code to keep the information anonymous. Study participation, or declining to participate, did not affect the patient's care at the clinic.

Statistical Analysis

Analyses were performed using SPSS Statistics for Windows, Version 23.0 (IBM Corp, Armonk, NY). Patient demographics were analyzed using descriptive statistics and were reported as percentages of patients meeting the characteristic. Age was reported as mean $\pm$ range. Data from each survey statement were also analyzed using Mann-Whitney *U* test or McNemar's χ^2 test to compare responses among ages (<65 or $\geq$ 65 years old), sex (male or female), length of diabetes diagnosis (<1 or $\geq$ 1 year), or time attending the CCFMC (<1 or $\geq$ 1 year) in order to identify other potential areas of improvement. *P* < .05 was considered to be statistically significant.

Results

Twenty-five patients (80.6%) of 31 identified as eligible agreed to complete the survey. Baseline characteristics (Table 1) showed that participants tended to be younger (<65 years old), male (63%), white (68%), had attended the clinic longer than 1 year (64%), and had been diagnosed with diabetes longer than 1 year (84%). The majority of patients (88%) were either on oral diabetes medications or a combination of oral diabetes medications and insulin, indicating insulin resistance. Only 1 patient (4%) reported only the use of insulin indicating insulin dependence. Type of diabetes was not collected from patients in the survey in order to avoid the possibility of patients not knowing and therefore potentially misclassifying the type of diabetes they were diagnosed with.

Survey results related to overall satisfaction with diabetes care provided at the clinic showed the majority of

Table 1. Baseline Characteristics.

	Mean (range) n (%)	N = 25 56 (25-67)
Age		
<65 years old		21 (84)
$\geq$ 65 years old		4 (16)
Sex		N = 24
Male	n (%)	15 (62.5)
Female		9 (37.5)
Race		N = 25
White	n (%)	17 (68)
Hispanic/Latino		3 (12)
Black/African American		3 (12)
Native American		1 (4)
Asian/Pacific Islander		1 (4)
Time attending CCFMC		N = 25
<1 year	n (%)	9 (36)
$\geq$ 1 year		16 (64)
Time diagnosed with diabetes		N = 25
<1 year	n (%)	4 (16)
$\geq$ 1 year		21 (84)
Prescribed medications		N = 25
Metformin	n (%)	21 (84)
Sulfonylurea		12 (48)
GLP-1 agonist		1 (4)
DPP-IV inhibitor		2 (8)
SGLT-2 inhibitor		0 (0)
Insulin		5 (20)
Not taking medication		1 (4)

Abbreviation: CCFMC, Community Care Free Medical Clinic; GLP-1, glucagon-like peptide 1; DPP-IV, dipeptidyl peptidase-4; SGLT-2, sodium-glucose co-transporter-2.

patients (88%) were satisfied marking "Strongly Agree" or "Agree" (Figure 1). Fewer patients reported being satisfied with the treatment for their diabetes (72%) and with their knowledge about diabetes (76%).

Regarding self-management survey results (Table 2), patients who reported using pills for diabetes tended to take their medication as prescribed (91.6% of respondents), while those who reported taking insulin tended to not take their medication as prescribed (60% of respondents). This finding may be related to the survey results showing that 60% of the insulin-taking patients responding to the survey were not able to get their insulin every month. Almost half of patients (44%) reported having high blood glucose levels within the past month (Figure 1). However, 20% of patients marked that they never check their blood glucose levels and 48% never record them (Table 2).

Results from the healthy eating and exercise portion of the survey showed that 88% of patients understand the importance of healthy eating for the control of their blood glucose (Figure 1). In contrast, only 64% understand the importance of exercise in blood glucose control. When comparing patients' responses, fewer patients were

Figure 1. Likert-type scale responses. Positive includes “Strongly Agree” and “Agree,” neutral includes “Neutral,” and negative includes “Disagree” and “Strongly Agree” responses.

Table 2. Survey Results—Non-Likert-Type Scale Questions—N (%).

	Yes		No ^a		NR	
I take my pills for diabetes as prescribed.	22 (88)		2 (8)		1 (4)	
I use my insulin as prescribed.	4 (16)		6 (24)		15 (60)	
I receive my pills for diabetes every month.	22 (88)		2 (8)		1 (4)	
I receive my insulin every month.	4 (16)		6 (24)		15 (60)	
	3+/day	2×/day	1×/day	1-2×/week	Never	NR
I check my blood sugar levels . . .	1 (4)	7 (28)	6 (24)	5 (20)	5 (20)	1 (4)
I record my blood sugar levels . . .	0 (0)	5 (20)	3 (12)	1 (4)	12 (48)	4 (16)
	2+/day	1×/day	1-2×/week	Rarely	Never	NR
I eat sweets or other foods rich in carbohydrates (sugary breakfast cereals, pastas, bread, etc)	7 (28)	4 (16)	4 (16)	7 (28)	2 (8)	1 (4)
	Highly Active	Active	Somewhat Active	Low Active	Inactive	NR
I describe my average daily level of physical activity as . . .	4 (16)	7 (28)	9 (36)	4 (16)	0 (0)	1 (4)

Abbreviations: NR, no response; 3+/day, 3 or more times per day; 2+/day, 2 or more times per day; 2×/day, twice per day; 1×/day, once per day; 1 to 2×/week, 1 to 2 times per week.

^a“No” responses may also include participants not taking either pills or insulin since there was no “Not Applicable” option to choose from.

Table 3. Significant Analyses^a.

Sex	Median (Range) ^b		P
	Male	Female	
I know the risk of high blood sugars.	4 (2-5)	5 (4-5)	.039
Overall, I am happy with the care I receive for my diabetes at the CommunityCare Clinic.	4 (3-5)	5 (4-5)	.039
I understand the importance of healthy eating for the control of my blood sugars.	4 (2-5)	5 (4-5)	.045
I find the exercise recommendations from my medical team to be reasonable.	3 (2-5)	3 (2-4)	.042
Diagnosis of Diabetes (Years)	<1	≥1	P
I understand the information the health care team provides me about my diabetes.	5 (3-5)	4 (2-5)	.024
The health care team spends enough time with me.	3.5 (3-4)	3.5 (3-4)	.043
Age (Years)	<65	≥65	P
I record my blood sugar levels . . . ^c	1 (1-1)	1 (1-4)	.040

^aAll analyses mentioned above were conducted using Mann-Whitney *U* tests.

^bMedian and range are presented as a representation of a Likert-type scale, where 1 = "Strongly Disagree," 2 = "Disagree," 3 = "Neutral," 4 = "Agree," and 5 = "Strongly Agree."

^cPresented as median and range of a scale where 1 = "Never," 2 = "1 to 2 times per week," 3 = "Once per day," 4 = "Twice per day," and 5 = "3 or more times per day."

provided exercise recommendations (48%) than healthy eating recommendations (64%); fewer patients were satisfied with the exercise education received (48%) than with the healthy eating education (64%); and fewer patients found the exercise recommendations to be reasonable (44%) than the healthy eating recommendations (68%). These results may support why less patients reported understanding the importance of exercise and why even smaller percentages of patients actually reported following the exercise and healthy eating recommendations (28% and 36%, respectively) provided by the medical team.

In order to gain insight on other potential areas for improvement in diabetes care, sub-analyses comparing various groups were also performed. In analyzing each individual survey statement, significant differences were noted when comparing sexes, length of diabetes diagnosis, as well as age cohorts (Table 3). Females, compared with males, reported an increased awareness of the risks associated with hyperglycemia (4.7 ± 0.5 vs 4.0 ± 0.85 , $P = .039$), a greater satisfaction with their diabetes care (4.7 ± 0.5 vs 4.1 ± 0.66 , $P = .039$), a stronger understanding of the effect diet has on controlling blood glucose levels (4.6 ± 0.52 vs 3.7 ± 0.64 , $P = .045$), and a greater finding of reasonableness in exercise recommendations given by the medical team (3.8 ± 0.97 vs 3.2 ± 0.69 , $P = .042$). Patients diagnosed with diabetes for ≥ 1 year, compared with those diagnosed < 1 year, reported a greater understanding about the information regarding diabetes provided by the medical team (4.4 ± 0.68 vs 3.5 ± 0.58 , $P = .024$) and a stronger belief that the medical team spends an adequate amount of time with them during their visit (4.3 ± 0.78 vs 3.5 ± 0.58). Patients who are younger than 65 years reported an

increased frequency of recording their blood glucose levels compared with those older than 65 years (2.1 ± 1.3 vs 1 ± 0 , $P = .040$).

On many questions, patients failed to respond on the survey, which is indicated as no response. The patients with no response were included in the descriptive statistics that analyzed each statement as percentage of respondents but were not imputed in the analysis using Mann-Whitney *U* or McNemar's χ^2 .

Discussion

This study found that overall, patients were satisfied with the care they receive at the CCFMC for their diabetes, but there are several areas where improvements can be made. Areas of continued QI could focus on consistent and continuous patient education and goal-setting centered on routine self-monitoring and tracking and with regard to changes in diet and physical activity. These discussions could be incorporated into every medical team patient visit for patients with diabetes.

Many study participants reported never checking their blood glucose levels, while more participants reported never recording their readings. Patient counseling on the importance of routinely checking and recording blood glucose levels could subsequently be incorporated into each visit a patient has with the medical team. Although the CCFMC is not currently able to provide diabetes testing supplies to patients, education and guidance could also be provided on ways to find more affordable testing supplies and on establishing a routine to regularly monitor blood glucose levels.

Integration of exercise and healthy eating into a patient's routine is essential in management of diabetes and in prevention of further complications. Patients struggle to incorporate these lifestyle changes involving exercise and nutrition into their everyday lives. Key strategies to supporting successful nutrition and physical activity behavior change includes setting a goal with the patient who is focused and attainable. Healthy eating and exercise counseling could also be incorporated routinely into each medical team visit. A more formalized structure for the process of lifestyle counseling could involve the use of educational materials to provide the patients with concrete information to take home with them. In addition, exercise demonstrations and free exercise classes could be offered at the CCFMC site during clinic hours.

Females reported an increased awareness of the risks associated with hyperglycemia, a greater satisfaction with their diabetes care (specifically at the CCFMC), a stronger understanding of the effect a person's diet has on controlling blood glucose levels, and a greater finding of reasonableness in exercise recommendations given by the CCFMC medical team. These differences in response possibly could stem from sex differences in communication skills (eg, listening ability) or in nurturing/empathetic attitudes.

Patients who have been diagnosed longer have had more time to learn about their chronic disease state and its management, which could explain their improved understanding of the medical team's information. As a result, these patients might better understand the scope of responsibility in managing a chronic illness like diabetes, in turn be more comfortable and informed during their clinic visits, and therefore feel that the medical team spends adequate time with them. Although these patients report a greater understanding, consistent education is still essential for their continued management of diabetes. The patients in this population should have their baseline knowledge of diabetes assessed by the medical team to further determine which aspects of diabetes care require attention.

Although this study did not ask patients how they record or track (ie, paper vs electronic) their blood glucose levels, younger patients oftentimes may have a better awareness of available technology and for what it can be used. A variety of phone applications are available that patients can use to easily and quickly record and track their blood glucose levels over time. Younger patients' increased frequency in recording their blood glucose levels may be a result of a greater comfort with use of technology. Education regarding the availability of phone applications is important to inform the patients what tools there are to assist in the management of diabetes.

This study also has limitations. The sample size is small. Whether or not the sample is representative of the total CCFMC population was not assessed. Although the

population appeared to be a fair representation of patients at CCFMC, patients new to the clinic could not be included in the study. In addition, the study was conducted at a single site. Another limitation is that the survey was produced only in English. CCFMC patients with diabetes who only spoke Spanish were unable to participate due to the language of the survey. In addition, on the majority of the survey questions, at least one participant did not provide a response. No response from a patient could indicate the question did not apply to themselves, a misunderstanding of the question, or error to respond. Finally, there is an inherent potential for bias since the data were self-reported. Although patients' medical care was not affected by their study participation or survey results, patient responses could have been biased in this regard.

Future studies should include a larger patient population. The survey also could be conducted at additional sites in order to assess satisfaction across multiple SRFCs. Producing 2 surveys, 1 in English and 1 in Spanish, would eliminate the language barrier to study participation. In addition, future research could focus more specifically on patient behaviors in monitoring and recording their blood glucose levels, as well as on nutrition and physical activity lifestyle change. Changes in survey responses could also be studied after specific adjustments to the education provided to patients was implemented.

Conclusions

The survey helped to identify key areas in which the diabetes care provided at the SRFC could be improved. These areas included education about diabetes in general, as well as in understanding treatment, self-monitoring, and healthy eating and exercise options. SRFC may be one resource that pharmacists and pharmacy technicians could use to refer their uninsured or underinsured patients in order to receive free medical care, medications, as well as other services such as point-of-care testing and patient education.

Acknowledgments

We acknowledge Dr. Diane Cappelletty, Dr. Julie Murphy, and the CommunityCare Clinic Executive Board for their guidance and support of this project.

Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding

The author(s) received no financial support for the research, authorship, and/or publication of this article.

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