Louisiana Diabetes Excellence Initiative: Accomplishing Excellence in Diabetes Self-Management in a Rural Community

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Abstract   *Aims:* To evaluate the impact of diabetes self-management interventions implemented as a part of Louisiana Diabetes Excellence Initiative (LaDEI) *Methods:* Mixed methods were used for impact evaluation. Quantitative measures included clinical measures, self-management activities and participation rates. Qualitative measures included individual interviews with the clinical staff at the intervention site as well as with the clinical staff of a comparison clinical site that did not offer any specific interventions targeting type-II diabetes. *Results:* Clinical measures including lipid profile, controlled hypertension and obesity (body mass index) improved over the two-year period. Qualitative data indicated a high level of satisfaction among the providers and improved patient compliance. The comparison site indicated a high drop-out rate of their patients with diabetes and demonstrated a need to have community-based interventions targeting diabetes. *Conclusions:* Results if this initiative indicates a need to implement more interventions involving self-management activities to reduce the burden of diabetes among rural and underserved populations.

Keywords   Diabetes self-management, Health disparities, Qualitative methods

1. Introduction

Type-II Diabetes affects 26 million Americans and results in premature death and serious health conditions[1]. Disparities in outcomes among people with diabetes care are related to differences in self-management. Helping these patients better self-manage their diabetes can avoid diabetes-related complications. However, engaging in self-care activities is especially challenging for the 70% of those having diabetes who suffer from co-morbid conditions such as chronic pain, hypertension and obesity[2]. Patients with diabetes who have comorbid conditions face substantial challenges in disease self-management, interfering with their ability to take medications, exercise, follow an eating plan, self-monitor, and foot care[3]. There are many different approaches to diabetes self-management that have been shown to improve health outcomes (including glycemic control) and reduce emergency room visits.

The prevalence of type-II diabetes in the U.S. has been increasing in the last two decades mainly due to higher obesity rates, rise in ageing population and co-existing morbidities such as hypertension and depression.[1] Based on the hemoglobin A1C (HbA1C) measures, about 35% of the US adults ages 20 and above have pre-diabetes and every year about 2 million new cases of diabetes are being reported.[2] Diabetes is a major cause of cardiovascular diseases as well as the leading cause of kidney failure, non-traumatic limb amputations, and new cases of blindness in the U.S.[2,3] Type-II diabetes is the fifth leading cause of death in the US, although many more people with diabetes die due to other complications such as cardiovascular diseases.[1,4] In addition to the above complications, about 60 – 70% of people with diabetes suffer from neurological problems including impaired sensation in hands and feet, carpal tunnel syndrome, erectile dysfunction and other nerve problems.[5] In 2007, the estimated direct and indirect costs related to diabetes in the US were $174 billion of which $116 was attributable for direct medical costs. The substantial indirect costs ($58 billion) include disability, work-loss, and premature mortality.[1,3,4] These costs are estimated to continue to rise. The majority of the costs related to diabetes complications and treatment can be avoided by patient self-management leading to behavioral modifications and stricter adherence to medications.[5,6]

Similar to the US, diabetes is a public health concern in Louisiana. In 2011, an estimated11.8% of the adult population of Louisiana was diagnosed with diabetes.[7]

Theprevalenceof diabetes has steadily increased from 6.6% in 2000 to 11.6% in 2011, with Louisiana rates consistently exceeding national rates.[7] In addition, another 7.5% of adults were identified as having pre-diabetes in 2011. The prevalence of diabetes was higher among males than females (12.2% vs. 11.4%, respectively). African Americans (15.8%) reported a higher prevalence rate than any other racial/ethnic groups.[7] Individuals of lower socioeconomic status (i.e., education and income) seem to be at greater risk for Type 2 diabetes and pre-diabetes. Diabetes is the fifth leading cause for deaths among Louisiana residents.Louisiana has the 5th highest diabetes mortality rate (26.4/100,000 population) in the nation for 2010.

Despite having significant benefits, the percentage of people having diabetes adhering to self-management protocols is very low.[8] Socio-economic status (SES) is a significant determinant of self-management as it directly impacts access to health care, utilization of resources and lack of understanding of the disease (driven by lower education status).[9,10] Besides SES, several co-morbid conditions including chronic pain, hypertension and depression contribute towards decreased adherence to self-management protocols.[5,8] Chronic pain is the most important factor interfering with self-management, more important than any other condition.[2] This project explicitly addresses the personal, social, and clinical factors that complicate diabetes self-management. The long-term goal of this study is to learn if better self-management activities improve patient outcomes.

Several interventions have been implemented nationally, based on DSME and other standardized guidelines.[5, 8] The use of evidence-based performance and outcome measures has been adopted by organizations and initiatives such as the Centers for Medicare and Medicaid Services (CMS), the National Committee for Quality Assurance (NCQA), the Diabetes Quality Improvement Project (DQIP), the Health Plan Employer Data and Information Set (HEDIS), and the Veterans Administration Health System.

The Louisiana Diabetes Excellence Initiative (LaDEI) is a collaborative program between the Louisiana Department of Health and Hospitals (DHH), Diabetes Prevention and Control Program (DPCP) and designated health care systems. The LaDEI goals were to (1) reduce health disparities related to diagnosis and treatment of diabetes, (2) improve chronic disease health care delivery for patients diagnosed with diabetes, (3) reduce risk factors for diabetes related complications, (4) and to develop systems to capture health care delivery data and information that will be used to define a seamless and well coordinated approach to reducing chronic disease prevalence and health care disparities within the State of Louisiana. The Louisiana DPCP used funds from another funding source (FLEX Medicare grant, Quality improvement) within the Bureau of Primary Care and Rural Health to help a Rural Health Clinic (RHC) purchase an electronic diabetes registry (DiaMed). This interdepartment al collaboration with the Bureau was essential to the success of the LaDEI initiative with the RHC. The RHC adopted the National Committee for Quality Assurance Diabetes Recognition Program (NCQA DRP) and populated the registry with the NCQA-DRP measures. Staff was educated on tracking and reporting clinical measures on all patients of the two LaDEI providers.

The American Association of Diabetes Educators recognized program for patient self –management education at RHC and continue to share the registry with the rural health clinic to successfully achieve the goals of LaDEI. Educational information and webinars were shared through the diabetes list-serv and available for clinic providers and staff, billing and coding staff and LaDEI staff. Tobacco cessation was monitored and referred to a community network for tobacco cessation help.

2. Subjects

Participants for this initiative included patients attending the RHC who had a diagnosis of type-II diabetes. Initial assessments of patients were conducted and entered in the database from September 2011 through February 2012. The patients were followed up until June 2013. Initial goal of the initiative was to follow-up 100 patients from baseline till completion. However, the number of participants of LaDEI exceeded the initial goals and 196 were registered during the first six months. The final assessment had a sample of 149, which was significant considering the drop-out rates in other initiatives. All the intervention activities including foot exam, nephrological exams, eye care, smoking cessation, and nutrition / physical activity sessions were offered to all the participants at no cost. Participation in all the activities were entered in the registry and every effort was made to protect the confidentiality of the patients.

3. Materials and Methods

A mixed methods approach was used for evaluating the impact of LaDEI. Quantitative measures included clinical assessments including HbA1C, blood pressure (systolic and diastolic) and lipid profile (LDL). Obesity status was measured through body mass index (BMI) and smoking status was assessed during routine clinical visits. Referrals to foot exam, eye exam and counseling for smoking cessation were tracked on the DiaMed registry as well. Constant staff training and validation by co-workers accomplished quality control in data management.

Qualitative measures included data from in-person key informant interviews at the clinical site as well as a comparison site that did not have any specific diabetes self-management interventions. Individual interviews were conducted with two lead physicians, two diabetes educators (nurses) and a data coordinator (also a nurse). Table 1 represents the list of questions that were asked during the in-person interviews. The set of questions were slightly modified for the interviews at the comparison clinic. The comparison clinic had very similar geographic and

demographic characteristics but no specific intervention related to diabetes. All the interviews were conducted in a secure room to assure privacy and maintain confidentiality. The interviews were audio-recorded and decoded into a text format to enable interpretation and coding. An interpretative coding technique was used to analyze qualitative data.

Table 1.   List of Qualitative Interview Questions for the LaDEIClinical Site

Clinic A: Participating LaDEI Clinic
   1) Brainstorming questions:
      a. Can you describe your everyday patient population?
      b. What do you see are some special needs of your patient population?
      c. What is your level of experience in participating/implementing LaDEI prior to getting funded by DHH?
   2) How did LaDEI help you to address specific needs of your patient population?
      a. Pre and post changes upon implementing LaDEI
      b. Eye and foot examinations
      c. Diabetes self-management
   3) In what ways LaDEI has helped you in establishing goal settings for your patients?
      a. Weight management (Physical activity and nutrition)
      b. Blood glucose/BP/other numbers
      c. What were some new techniques you learned upon implementing LaDEI related to establishing goal settings for your patients?
   4) What community programs/initiative have you tried to refer your patients?
      a. Community initiative outside of the clinic
      b. Special programs initiated by the clinic
      c. Screenings/other health-related activities
   5) What were the main challenges/barriers in implementing LaDEI in your clinical setting?
      a. Financial
      b. Personnel
      c. Community support
      d. Technical support (Diamed)
   6) What did you see as the main benefits of implementing LaDEI in your clinical setting?
      a. Patient satisfaction
      b. Improved health outcomes
      c. Interaction with the QI team (improved synergy in working as a team)
   7) How do you perceive the level of communication /support you received from DHH in implementing LaDEI?
   8) General comments
      a. What is your overall satisfaction level with regard to implementing LaDEI
      b. Do you intend to continue using diabetes self-management interventions in the future years?
      c. What are your suggestions for effective implementation of future projects that would benefit the needs of the clients and clinics?

4. Results

Summary results of LaDEI are reported in Table 2 during the two-year funding period. The project exceeded in meeting the number of patients (compared to original goal of 100 patients) served in rural areas for promoting diabetes self-management. The project had an initial patient pool of 196 and the sample for the final measures was 149. Although the primary outcome measure (HbA1C under control) did not show any improvements, the secondary outcome measures (LDL under control, BP under control) improved. In addition to the outcome measures, percentage of patients with BMI less than 30 increased by 7.8%.

Table 2.   Pre-post Changes in Clinical Measures of LaDEI Participants

Measure	Baseline (N=196)	Follow-up (N=149)	% Change
% Patients HbA1C <7	52	49	-3.00%
% Patients BP <=140/90	70.4	70.5	0.10%
% Patients LDL <=130	78.6	82.6	4.00%
% Patients BMI <30	20.4	28.2	7.80%

Five interviews were conducted at the intervention site while three participants were interviewed at the comparison clinic. The qualitative interviews were coded based on the four main themes:

Specific Needs of Patients:

Participants at both sites stated that their patient population was predominantly African American, with very low income and educational status. The communities were highly underserved and majority of the patients had transportation issues. Physicians indicated that having multiple chronic conditions in majority of the patients (heart diseases, diabetes, obesity and chronic pain) made their treatment options very complex. The complexity of the co-morbid conditions also seemed to affect the compliance in medication adherence as well as performing self-management behaviors.

Select Quotes:

"Some of our patients live in such remote places – they have no access to for any health care if we don't offer transportation"

"The reading levels of our patients is so low that we can barely provide any educational materials – so, we are spending as much time with them talking one-to-one"

LaDEI Implementation:

The nurse / technical coordinator appreciated the trainings received on data management as well as educational interventions. The DiaMed system aided all the health professionals in the clinic to better manage their patients by having follow-up reminders, tracking clinical indicators, as well as monitoring for self-management behaviors. Diabetes educators reported that in-house sessions were conducted on healthy recipes and consuming diabetic-friendly foods. Physical activity sessions were also conducted as a part of the interventions. Physicians indicated that they were spending more time with their patients upon implementing LaDEI and were better able to understand the needs of their patients.

Select Quotes:

"The best part of LaDEI is that it allows us to refer patients to foot exam and eye exams without going through physician all the time"

"We had some cooking demonstrations and some of our patients were amazed at the kind of healthy choices they can make"

Satisfaction:

All participants of the interviews expressed a high level of satisfaction in implementing LaDEI from a provider perspective. They also indicated that their patients were being provided with a comprehensive care by incorporating behavior / lifestyle choices as well as providing eye and foot exams. However, the physicians were not too satisfied with some of the clinical outcomes as the comorbidities were hard to manage.

Select Quotes:

"LaDEI was very easy to implement especially using the software – it has given us a new way of looking patients from an overall perspective"

"We can only do so much to push the healthy behaviors in our patients, but having chronic pain and other comorbid conditions just doesn't allow them to be physically active"

Challenges / Practical Issues:

Implementing LaDEI had several challenges / practical issues. All interview participants indicated that behavioral changes were the most challenging to accomplish among their patients. Referrals to foot and eye exams could not be tracked with fidelity since some of the vendors for eye /foot care would not submit referral reports. Although majority of the patients reported to have attended the eye/foot exams, the numbers seemed to be highly under-reported. Another challenge in implementation was low attendance rates to some of the sessions, particularly smoking cessation. Although educational materials were distributed and reminders were sent to the patients, the clinicians found it very challenging to have their patients attend the smoking cessation sessions.

Select Quotes:

"A large number of our patients still smoke – and it has been a challenge to even make them attend the smoking cessation sessions"

"I am not sure what else we can make to treat our patients – there needs to be a lot of emphasis on personal responsibility and consequences in future interventions"

"We need a lot of support from our community – being a rural town we have too few options to bring behavioral interventions to our patients"

Comparison Clinic:

As the patient demographics were similar, the specific needs of the patients reported by the comparison clinic were not much different than the intervention site. Not having any structured intervention in place, the participants in the comparison clinic indicated that one of their biggest challenges in treating patients with diabetes was very low compliance. The clinicians and the administrators indicated that ability to track patients and follow-up regularly would help significantly in reducing the burden of diabetes in their clinics. Being a rural health clinic, the community had no resources in providing foot exams or eye exams unless the patients had the ability to travel to nearest urban centers.

Select Quotes:

"We wish we could bring in an optometrist and a podiatrist at least once a week so that our patients can benefit from some self-management activities. We just don't have the funding or resources to provide these services now"

"The biggest challenge we face is patient compliance – it makes our treatment options very complicated as we don't see them at regular intervals"

"We would like to have our nurses get certified in diabetes education and offer more services in the future"

5. Discussion

According to the National Diabetes Self-management Education (DSME), self-management of diabetes includes compliance to the medication protocols (taking insulin as well as oral medications regularly), obtaining annual eye and foot examinations, exercising regularly, maintaining a healthy diet as well as adhering to medical protocols for pre-existing conditions, particularly hypertension.[1,6] Adherence to self-management protocols leads to significant reductions in diabetic complications.[5] There are many documented factors that contribute to successful blood glucose control, but the ability of patients to manage their diabetes is critical because adherence with therapeutic regimens can prevent or delay the onset of complications and improve health outcomes.[9,10] The key to successful diabetes management is heavily dependent upon the education, knowledge and diabetes self-management skills of each individual.[11] This project has addressed critical barriers to self-management of diabetes by focusing on comorbid conditions as well as increasing the knowledge and skills related to diabetes control.

Implementing self-management intervention like LaDEI in a rural health center provided number of benefits both to the clinic as well as for the community. The intervention provided patients with free access to eye exams, foot care, smoking cessation and behavior modifications to reduce the complications of diabetes and improve their clinical outcomes. It should be noted that HbA1C changes represent intermediate outcomes of the project and sustained interventions are needed to see further improvements in numbers. Given the rural nature of the population as well as the socio-economic challenges in the community served, the project provided positive results to indicate a need for self-management initiatives to control chronic diseases elsewhere in the state. Qualitative measures indicated a need for patient education and motivation due to very low education status / reading levels of the target population.

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