Adherence to American Diabetes Association Guidelines in a Volunteer-run Free Clinic for the Uninsured: Better than Standards Achieved by Clinics for Insured Patients

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ABSTRACT

To determine whether Type 2 diabetes care for the uninsured is comparable to care provided to insured patients, we compared a free clinic's compliance with American Diabetes Association (ADA) clinical practice guidelines to 6 adherence evaluations in the literature. We examined diabetes management-related biomarkers, compliance with ADA-recommended health monitoring events, and presence of other health-promoting behaviors via retrospective chart review (n = 33). Results demonstrate that standards achieved by the free clinic were commensurate with, if not outperforming, published standards achieved in settings for insured patients. This evaluation emphasizes that free clinics can provide high-quality diabetes management care to patients with limited resources. This review also provides a benchmark against which results of future diabetes management interventions in both free and conventional clinic settings can be compared.

KEYWORDS: Type 2 Diabetes, Free Clinic, Uninsured, Health Disparities, ADA Recommendations

INTRODUCTION

Diabetes self-management education is a critical element of care for all people with diabetes and is necessary in order to prevent or delay the complications of diabetes. Clínica Esperanza/Hope Clinic (CEHC) provides free primary care, health screening, and health education to uninsured individuals living in the largely Hispanic/Latino communities surrounding Olneyville, a low-income neighborhood in Providence, RI. Free clinics for uninsured patients aspire to achieve the same standard of care that is attained in clinics for patients who have insurance.

To determine whether "free care" was comparable to care provided at clinics for insured patients, we examined whether CEHC diabetes care is compliant with the American Diabetes Association (ADA) clinical practice guidelines (Table 1) for glycemic control, blood pressure, lipid management, and preventative services. A chart review was performed for all 33 diabetic patients actively engaged in follow-up at CEHC during the study period (January 1, 2011 to April 1, 2012). Results for this patient cohort were compared to other published ADA compliance studies. The intent of this study was to provide a benchmark against which a range of clinical interventions to improve ADA compliance can be compared in free clinic and conventional clinic settings.

VIDEO: A visit with Dr. Anne S. De Groot at Clinica Esperanza

EXPERIMENTAL DESIGN AND METHODS

Study Design:

Data for this study was collected from the period January 1, 2011 to April 1, 2012. A retrospective chart review was performed for patients actively attending CEHC during the study period (at least two visits during the study period). The study population consisted of a cohort of 33 active diabetic patients. Diabetic patients who failed to follow up for any reason were excluded from the study. De-identified EMR-eClinicalWorks-derived data for each diabetic patient was entered into an Excel spreadsheet. The following values were obtained: Laboratory values pertinent to diabetes management (hemoglobin A1c (HbA1c), LDL, systolic and diastolic blood pressure) and processes indicative of quality of care in diabetes (HbA1c, fasting lipid panel, body mass index (BMI), urine microalbumin and creatinine testing at appropriate intervals as suggested by the ADA). The resulting clinical and demographic data were summarized and compared to results from 6 similar studies (Tables 2-4) and to current ADA guidelines (Table 1).

Demographics

Fifty-seven percent of the residents of Olneyville are Hispanic/Latino, 22% White, 13.6% African American, 7.4% Asian, and 1.6% Native American. The median family income is $19,046, well below the Providence average of $32,058. Forty-one percent of families live in poverty. The mean age for the CEHC diabetic patient cohort evaluated in this study was 52.9 years. Twenty of the 33 patients were male and 13 were female. Twenty-five of the 33 (76%) identified as Hispanic, two were Caucasian, two were Pacific Islanders, two were African Americans, two were Native Americans and one was another race.

Table 1. **Summary of 2012 ADA "Standards of Medical Care" guidelines**.

This table provides a summary of the American Diabetes Association Standards of Medical Care guidelines. The suggested frequency of testing, goal values, and suggested courses of action are described for eight different categories of diabetes-monitoring behaviors. ACE: Angiotensin Converting Enzyme; ARB: Angiotensin Receptor Blockers; CHD: coronary heart disease; M/C: microalbumin/creatinine.

Assessment	Frequency of Monitoring	Goal	Take Action	Treatment
Metabolic Control				
Glycosylated hemoglobin (HbA1c)	Controlled, 2x/year; Uncontrolled, quarterly	<7%	>/=8%	Diet, exercise, insulin, oral agents
Self-monitored blood glucose (mg/dL)	As necessary for glycemic control, recommended 3+ times a day	-	-	Stepped approach to control
Whole blood - preprandial	-	80-120	<80 of >140	-
Whole blood - bedtime	-	100-140	<100 or >160	-
Plasma - preprandial	-	90-130	<90 or >150	-
Plasma - bedtime	-	110-150	<110 or >180	-
Hypoglycemic/hyperglycemic episodes	Each visit	No episodes	Episodes have occurred	Change in lifestyle or treatment
Cardiovascular				
Blood pressure	Each visit	<130/80 mm Hg	>130/80 mm Hg	ACE Inhibitors or ARB or diuretics (130-139, 80-89 = lifestyle changes)
Lipid profile (mg/dL)	Annual; every 2 yrs if low risk	-	-	Stepped approach to lipid control with lipid lowering medications (statin therapy), diet, and exercise
LDL-C	-	<100	No CHD, >/=130; CHD, >/=100	-
HDL-C	-	>50 (women) >40	-	-
Triglycerides	-	<150	-	-
Complications				
Retinopathy: dilated eye exam by eye care	Annual	Normal	Abnormal	Refer to ophthalmologist
Nephropathy: test for microalbuminuria	Annual	<30 mg/24 h; <20 M/C ratio	>30 mg/24 h	ACE Inhibitors and glycemic control
Foot Examination	Annual (more often if problems)	No complications	Corns, calluses, diminished pulses	Refer to podiatrist
Oral/periodontal	Each visit	Healthy teeth/gums	If no routine dental visits or poor hygiene	Refer for dental care
Lifestyle				
Exercise	Each visit	150 min/week (across more than 3 days) of moderate physical activity most days, normal BMI (18.5-25)	<3x/week	Exercise counseling related to type, frequency, duration, and intensity
Immunizations				
Influenza Vaccine	Annual, begin in September	-	-	Recommended for all patients aged >/=6 months
Pneumococcal Vaccine	One-time revaccination for people aged >64 yrs if previously immunized before age 65, or if given >5 years ago	-	-	Other indications for repeat vaccination include nephrotic syndrome, chronic renal disease, and immuno-compromise
Smoking				
Smoking	Each visit	No cigarette smoking	Cigarette smoking	Smoking cessation program
Nutrition				
Nutrition	As needed	Healthy eating, weight control, metabolic control	Poor glucose or lipid control or increased weight	Refer to nutritional counselor
Overall diabetes self-management practices				
Self-management	After diagnoses, as needed afterwards	Healthy diabetes management with metabolic control	-	Referral to diabetes educator or formal diabetes education classes

"-" indicates data is not available and/or specified

RESULTS

Clinically Relevant Biomarkers

The average HbA1c of patients receiving ongoing diabetes care at CEHC was 8.4 ± 2%; 27% of patients had an HbA1c ≤7%, which was slightly lower than results reported in Puerto Rico[8] and higher than results reported for the US Air Force[11] and rural health care providers[9] (Table 2). The average total cholesterol was 194 ± 47 mg/dL, slightly better than national clinical studies[7] and 63% of patients had a total cholesterol <200 mg/dL, which was better than the average achieved in a family practice setting[6] (Table 2). The average LDL was 89 ± 28 mg/dL; 48% of patients had an LDL <100 mg/dL, which was similar to published studies.[6-11] The average HDL was 42 ± 8.5 mg/dL; 50% of patients had HDL >40 mg/dL. The average triglycerides were 182 ± 108.11 mg/dL; 52% of patients had triglycerides <150 mg/dL. These

Category		A1c	Cholesterol (mg/dL)			Triglycerides (mg/dL)	Microalbumin and/or Creatinine	Blood Pressure (mm Hg)			BMI (kg/m²)
			Total	LDL	HDL			Total	Systolic	Diastolic	
CEHC	Goal	≤7%	<200	<100	>40	<150	Ratio <20	<130/80	<130	<80	<25
	Success Rate	26.92%	62.50%	47.62%	50%	52%	77.77%	24.24%	54.54%	39.39%	12.50%
	Mean ± SD	8.43±2.21	194.04±47.46	89.43±28.49	42.46±8.45	182±108.11	14.33±16.29	-	130.42±16.44	79.33±10.22	31.98±7.44
Family Practice Clinic (2002)[7]	Goal	<7%	<200	<130	-	<200	-	<130/85	<130	<85	<27
	Success Rate	21.80%	55%	58%	-	60%	-	37.90%	38.70%	84.60%	18%
	Mean ± SD	8.63±2.3	201.3±47.8	119±42.3	40.7±11.2	219.2±136.3	-	-	135.5±20.8	75±10.3	-
National Clinical Practice (2006)[8]	Goal	<7%	-	<100	>45	<200	<30 µg/mg creatine	<130/80	<130	<80	-
	Success Rate	49.80%	-	36%	27.40%	65%	65.80%	39.60%	-	-	-
	Mean ± SD	-	203.6±3.1	-	-	-	-	-	-	-	31.8±0.4
Puerto Rico National Clinical Practice (2012)[9]	Goal	<7%	-	<100	≥40	<150	<30 µg/g microalbumin	<130/80	<130	<80	<25
	Success Rate	28.70%	-	47.80%	44.10%	57.40%	60.30%	41.20%	-	-	5.90%
	Mean ± SD	8.6±2.3	183.6±41.8	107.8±40.4	-	153.3±86	-	-	129.2±20.8	74.4±10.9	31.8±6.4
Rural Health Care Providers (2002)[10]	Goal	<7%	-	<100	-	-	-	<130/85	<130	<85	-
	Success Rate	47.60%	-	26%	-	-	-	27%	28.60%	79.30%	-
	Mean ± SD	7.43±1.7	206±45	119±33	45±12	-	-	-	139±18.8	75±11.5	-
Low-Income Patients, North Carolina (2001)[11]	Goal	≤9.5%	-	<130	-	-	-	<140/90	<140	<90	-
	Success Rate	39.60%	-	23.60%	-	-	-	37.10%	-	-	-
	Mean ± SD	-	-	-	-	-	-	-	-	-	-
USAF Ambulatory Clinic (2004)[12]	Goal	<7%	-	<100	-	-	-	<130/85	<130	<85	-
	Success Rate	50.60%	-	28.80%	-	-	-	15.20%	-	-	-
	Mean ± SD	7.85±1.60	-	119.1±33.6	-	-	-	-	141.2±19.2	79.2±11.8	-

Table 2. Comparison of diabetes-related biomarkers of CEHC patients with results of similar studies.

A shaded cell indicates that at least 50% of patients met or exceeded the goal value for that category. At least 50% of CEHC patients met or exceeded the goal for half of the 10 biomarker categories. Only one other study achieved a similar accomplishment (i.e., at least half of patients met goals in half of all categories for which values were available).

results were slightly worse than published studies but the small size of our study precludes statistical comparisons.

For patients who received microalbumin testing, the average microalbumin/creatinine ratio was 14 ± 16; for those patients who had the test done, 78% had a microalbumin/creatinine ratio in the desired range of <20.

The patients' mean systolic blood pressure (BP) was 130 ± 16 mm Hg; 56% of patients had systolic BP <130 mmHg, an achievement that is better than most published studies. Their mean diastolic BP was 79 ± 10 mm Hg; 39% of patients had a diastolic BP <80 mm Hg. 24% of patients had a total BP <130/80 mm Hg.

The average BMI for this cohort was 32 ± 7.4 kg/m2 (in the obese range) and only 12.5% of patients had a BMI <25 kg/m2 (in the desirable, "normal" range). These results are similar to other published reports.

Laboratory Testing Frequency

Seventy-three percent of patients had their HbA1c measured within 6 months of their first visit. Seventy-one percent of patients had a lipid panel measured within 6 months of their first visit. Sixty-three percent of patients completed microalbumin/creatinine ratio testing within 1 year of their first visit. Each of these tests was performed at approximately the same rate as other published studies (Table 3).

Podiatry and ophthalmology referrals were poorly documented: 49% of patients had documented podiatry visits, whereas 12.2% of patients had documented ophthalmology referrals (Table 3). Patient self-monitoring of feet, glucose levels and physical activity was not documented in the EMR.

Related Positive Health Behaviors

Ninety percent of patients denied smoking; 66% of patients denied alcohol consumption; and 58% of patients had received the pneumococcal vaccine in the clinic. Diabetes self-management education had not been initiated at CEHC at this time. Four of the 6 other studies included in this review reported any of these measures; each of these studies achieved ≥50% compliance in at least one category (Table 4).

Summary of Comparison with Published Standards

Comorbid conditions of hypertension were within the range of the comparators, while LDL levels were better than (lower than) and HDL levels slightly better than (higher than) the comparators (Table 2). The frequency of appointment dates was also within the range of the comparators. None of the comparators reported microalbumin/creatinine ratios, and few reported data on diabetes-related positive health behaviors. CEHC was slightly less compliant with ADA recommendations for podiatry and ophthalmology than the comparators. Due to the small sample size and the absence of a control group, no statistical tests were performed.

At least 50% of CEHC patients met or exceeded the goal for half of the 10 biomarker categories included in Table 2 (see shaded cells). CEHC was also the only study to report success rates and mean values for all 10 categories. Only one other study[6] included in this review reached a similar accomplishment (ie, at least half of patients met goals in half of all categories for which values were available). Of the remaining studies, each achieved 50% compliance across 1-2 categories; one study[10] did not reach 50% compliance in any category.

Category		A1c	Lipid Panel	Microalbumin	Podiatrist	Eye Exam	Self-Monitoring Feet	Self-Monitoring Blood Glucose
CEHC	Goal	6 Months	6 Months	Annually	Scheduled Appt.	Scheduled Appt.	-	-
	Success Rate	73.07%	70.83%	63.63%	48.50%	12.12%	-	-
Puerto Rico National Clinical Practice (2012)[9]	Goal	6 Months	-	-	Annually	Annually	Daily	Daily
	Success Rate	52.30%	-	-	43.80%	49.20%	60.20%	37.50%
Rural Health Care Providers (2002)[10]	Goal	6 Months	Results on file	Results on file	-	Annually	-	-
	Success Rate	60%	61%	15%	-	12%	-	-
Low-Income Patients, North Carolina (2001)[11]	Goal	Annually	Annually	-	Annually	Annually	-	-
	Success Rate	52.70%	44.50%	-	3.30%	6.30%	-	-
USAF Ambulatory Clinic (2004)[12]	Goal	Annually	Annually	Annually	Annually	Annually	-	-
	Success Rate	83%	66%	42%	88%	41%	-	-

Category		Physical Activity	Diabetes Education[3]	Not Smoking	Not Drinking	Pneumococcal Vaccine Receipt (Ever)	Absence of CVD
CEHC	Success Rate	-	-	90.00%	66.66%	57.57%	-
National Clinical Practice (2006)[8]	Success Rate[1]	28.20%	-	81.20%	-	38.20%	76%
Puerto Rico National Clinical Practice (2012)[9]	Success Rate[2]	33.80%	28.90%	90.40%	78.70%	-	84.60%
Rural Health Care Providers (2002)[10]	Success Rate	-	-	-	-	30%	-
Low-Income Patients, North Carolina (2001)[11]	Success Rate	-	-	78.10%	-	-	-

Table 3. ADA suggested frequencies of diabetes-related health monitoring events. A shaded cell indicates that at least 50% of patients met or exceeded the goal value for that category. Four of the 6 studies included in the review reported any results for these categories. CEHC achieved at least 50% compliance in three categories; only one other study achieved this accomplishment. Of note, only one study reported compliance with feet and blood glucose self-monitoring.

Table 4. Other ADA health behavior recommendations for improving diabetes management. A shaded cell indicates that at least 50% of patients met or exceeded the goal value for that category. Four of the 6 studies included in the review reported any results for these categories. CEHC achieved at least 50% compliance in all categories for which we have data on.[1] Physical activity for ≥30 min., most days;[2] moderate physical activity for 30 min., 5 days/wk or vigorous physical activity for 20 min., 3 days/wk;[3] as defined by ADA: "at diagnosis and as needed afterwards."

DISCUSSION

This study established a clear baseline for ADA guideline compliance at CEHC. This volunteer-run free clinic for the uninsured achieved a standard of success that is clearly in line with published results obtained at other clinics. In fact, CEHC diabetes care actually exceeded the compliance across more categories than all other compliance studies identified for this review, many of which were performed at clinics that do not depend on volunteer providers (who may not be as expert in diabetes care as providers who routinely provide diabetes care in clinics for insured patients).

This retrospective chart review demonstrated that HbA1c testing of CEHC patients was adequate (73%), and the average HbA1c level was 8.4 ± 2%, which was lower than the level achieved in some recent studies. These levels, as well as systolic BP; LDL, HDL, and total cholesterol; triglycerides; and frequency of clinic appointment dates were within the range established by other published ADA compliance studies (comparators). And while we were not surprised to find that there is significant room for improvement at CEHC, we were dismayed to find that poor adherence to recommended diabetes care guidelines is prevalent in clinics serving both insured and uninsured patients on a national level. For example, at least 50% of CEHC patients met or exceeded the goal across at least half of all categories; only one other study achieved similar results with regard to biomarkers,[7] recommended testing frequency,[12] or documentation of health-related behaviors.[9]

It should be noted that due to our small population size (33 patients), the significance of any major differences between CEHC and the comparators is difficult to assess. Poor documentation of podiatry appointments that were known to have taken place and limited access to specialized care takers (such as ophthalmologists) may explain some of the differences in the achievements of our clinics as compared to published data.

In the future, CEHC will use a "push-pull" intervention to improve adherence to ADA guidelines. The "pull" component of this intervention will involve patient-centered diabetes education and diabetes "social clubs" that encourage self-management. The patient education program to be used at the clinic has been adapted for low literacy, Spanish-speaking populations. The "push" component of our intervention will involve EMR-driven individual clinic healthcare provider quality control. Clinic volunteers will review charts on a provider-by-provider basis, informing the volunteer providers about ADA guidelines and reinforcing adherence through chart review and patient-specific reminders (through the EMR system). These methods have been tested in other settings and have been determined to be successful.[12]

In summary, compliance with recommended diabetes care guidelines is a critical element of care for all people with diabetes and is necessary in order to prevent or delay the complications of diabetes.[3-5] Effective management of diabetes can be a significant contributor to long-term, positive health outcomes, reducing the risk of diabetes-related morbidity and mortality. CEHC aspires to achieve a level of ADA compliance that is more consistent with ADA recommen-

dations, and hopes to model simple interventions that might also be useful for insured patients, so as to reduce morbidity and mortality associated with diabetes, and to redress health inequity in Rhode Island.

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