Care Utilization in a Pediatric Diabetes Clinic: Cancellations, Parental Attendance, and Mental Health Appointments

Jessica T. Markowitz, PhD, Lisa K. Volkening, MA, and Lori M. B. Laffel, MD, MPH

Objective To examine care utilization, family attendance, and hemoglobin A1c levels in a multidisciplinary pediatric diabetes clinic.

Study design This retrospective electronic record review of deidentified data included patients (99% with type 1 diabetes) with established diabetes care, aged <30 years (mean age, 15 ± 5.2 years), and duration of diabetes >1 year (mean 8.5 ± 5.1 years) at first visit during a 2-year period. Outcomes included care utilization, family attendance, and glycemic control, as indicated by hemoglobin A1c level. Analyses included *t* tests, ANOVA, χ^2 tests, ORs and 95% CIs, and multivariate analyses.

Results The study cohort comprised 1771 patients, with a mean of 5.8 ± 2.8 visits per patient. Roughly 15% of the scheduled appointments resulted in a cancellation or no-show; 61% of patients missed ≥1 visit. Patients with ≥2 missed appointments had higher A1c values and were older than those with <2 missed visits. Almost one-half of visits were attended by mothers alone; fathers attended 22% of visits. Patients whose fathers attended ≥1 visit had lower A1c values than patients whose fathers never attended. Eighteen percent of patients had onsite mental health visits. Patients with ≥1 mental health visit had higher mean A1c values, shorter duration of diabetes, and were younger compared with those with no mental health visits.

Conclusion Our observations suggest the need to encourage attendance at diabetes visits and to include fathers to improve A1c values. The high rate of missed visits, especially in patients with poor glycemic control, identifies wasted provider effort when late cancellations/no-shows result in vacant clinic time. It is important to explore reasons for missed visits and to identify approaches to maximizing attendance, such as extended evening/weekend clinic hours and virtual visits. *(J Pediatr 2014;164:1384-9)*.

See related article, p 1390

Given the demanding nature of diabetes management, psychosocial issues commonly arise in affected families.[1-11] Diabetes control can be anticipated to be more challenging during certain periods of childhood and adolescence (eg, puberty),[12-16] and may be accompanied by more frequent medical visits, as well as more frequent referrals to mental health specialists. Frequent visits can add to a family's burden in the form of additional missed school days for children and lost work for parents.[17] In addition to the daily demands of diabetes care, youth with diabetes are at risk for psychological disorders, such as depression, anxiety,[18] and disordered eating behaviors, which are more common in youth with diabetes compared with those without diabetes.[9,19,20]

Despite advances in treatment, glycemic control in children remains suboptimal.[21,22] Previous investigations have assessed the relationship between care-seeking behaviors and glycemic control and have found that patients with more frequent visits have better glycemic control.[23,24] A meta-analysis that examined paternal involvement[25] found that fathers had less responsibility than mothers for diabetes care. Other studies suggested that fathers' perceptions of greater family dysfunction were associated with poorer metabolic control.[26-28] Other reports found that fathers participated in less than one-half of their child's diabetes care[29] and that greater paternal involvement was associated with greater treatment adherence and better quality of life in teenage youth.[7] In addition, research has shown that increased paternal involvement is associated with better outcomes in terms of marital satisfaction, less maternal depression, and greater adherence to treatment.[30] However, there are little data on differences in clinic attendance rates between mothers and fathers, and on whether paternal involvement in diabetes care, marked by paternal attendance at diabetes visits, may be associated with lower A1c levels.

ADA	American Diabetes Association
CDE	Certified Diabetes Educator
EHR	Electronic health record
NP	Nurse Practitioner
RD	Registered Dietician
RN	Registered Nurse

From the Pediatric, Adolescent, and Young Adult Section, and the Section on Genetics and Epidemiology, Joslin Diabetes Center, Boston, MA

Funded by the National Institute of Diabetes and Digestive and Kidney Diseases (K23DK092335 and P30DK036836), the Eleanor Chesterman Beatson Fund, the Katherine Adler Astrove Youth Education Fund, and the Maria Griffin Drury Pediatric Fund. The authors declare no conflicts of interest.

http://dx.doi.org/10.1016/j.jpeds.2014.01.045

The widespread use of the electronic health record (EHR) now makes it possible to analyze utilization of care data and associations with glycemic control in large patient populations. We assessed the frequency of clinic visits, types of pediatric providers seen, cancellation rates, mothers' and/or fathers' attendance at visits, and glycemic control. We hypothesized that patients with more missed visits would have poorer control, and that youth who attended visits with both parents would have better control compared with those who attended visits with only 1 parent. In addition, we hypothesized that mental health visits would be more frequent in teens and in those with less optimal glycemic control.

Methods

The Joslin Diabetes Center is located in Boston in an urban setting. Approximately 95% of the clinic's pediatric patients reside in Massachusetts or in neighboring New England states. These patients reflect the ethnic mixture of New England and represent all socioeconomic strata.

Our multidisciplinary pediatric diabetes team recommends visits according to American Diabetes Association (ADA) guidelines (roughly every 3-4 months) with a medical provider (MD, nurse practitioner [NP], or registered nurse [RN]/certified diabetes educator [CDE] who follows protocols for insulin dosing). In addition, the goal is to have patients see a registered dietician (RD) at least once a year, although often this does not occur. Mental health visits are scheduled as needed, often in conjunction with other clinic visits. Mental health providers are social workers, psychologists, and psychiatrists.

Data were extracted from the Joslin Diabetes Center's EHR for a 2-year period (November 1, 2009, to November 1, 2011). Criteria for data extraction included patients with previously established care in the Pediatric, Adolescent, and Young Adult Section who were seen at least once during the 2-year period for a diagnosis of diabetes (*International Classification of Diseases, Ninth Revision* codes 250.X0, 250.X1, 250.X2, and 250.X3) and were aged <30 years at the first visit during the period. Visit status was ascertained from the electronic appointment scheduling system based on visit categories, including completed (visit occurred as scheduled), rescheduled (patient/family called office to reschedule), cancelled (patient/family called office to cancel), and no-show (patient/family did not arrive at visit and did not call to cancel or reschedule). Visits categorized as either cancelled or no-show were grouped together as missed visits. Visits solely for research purposes were excluded from these analyses. At the time of this study, the majority of our patients with type 2 diabetes were participating in a research study and thus were excluded. In addition, we included only "active patients," defined as those with ≥1 visit at the Joslin Diabetes Center within the year before the observation period. A mental health visit was defined as a visit with a social worker, psychologist, or psychiatrist at the center. Only visits with Joslin's mental health providers were counted in these analyses, because we do not have an accurate way to capture outside mental health visits. We received approval from Joslin's Institutional Review Board to collect these retrospective chart review data without informed consent.

Data collected from the EHR included date of birth, sex, diagnosis (type 1 or type 2 diabetes), date of diagnosis, clinic visit dates, discipline of the provider from the multidisciplinary pediatric team seen during the clinic visit (ie, MD, NP, RN/CDE, RD, or mental health provider), insulin regimen, A1c, and who (mother, father, other) was present at the appointment. A1c was measured at all diabetes medical and nursing visits using a laboratory assay standardized to Diabetes Control and Complications Trial guidelines (reference range, 4%-6%). Assessment of an individual's glycemic control was based on the mean of his or her A1c values obtained during the 2-year observation period.

Data were analyzed using SAS version 9.2 for Windows (SAS Institute, Cary, North Carolina) and are presented as mean ± SD, percentage, or median (IQR). Statistical analyses included t tests, ANOVA, χ^2 tests, ORs and 95% CIs, and multivariate analyses. A P value <.05 was considered to indicate statistical significance.

Results

The 1771 individual patients (51% female) eligible for inclusion in this study had a total of 17 984 scheduled appointments during the 2-year observation period. The mean patient age at the time of the first visit during this 2-year period was 15 ± 5.2 years. The age distribution was 3% young children (0-5 years), 31% school-aged children (6-12 years), 32% adolescents (13-17 years), and 35% young adults (18-29 years). The mean duration of diabetes was 8.5 ± 5.1 years. At the first visit during the observation period, the duration of diabetes was <2 years in 8%, 2 to <5 years in 22%, 5 to <10 years in 39%, and ≥10 years in 32%. The vast majority of patients (99%) had a diagnosis of type 1 diabetes. The mean A1c value during the 2-year period was 8.7% ± 1.4% (median 8.4%), and the mean number of A1c results per patient over this period was 5.5 ± 2.7 (median, 6.0; range, 4.0-7.0). More than one-half of the patients (55%) received insulin pump therapy.

Visits were scheduled with various providers, including MDs (35%), NPs (25%), RNs/CDEs (25%), RDs (7%), and mental health providers (8%). The mean number of completed medical visits (MD, NP, or RN/CDE) per patient over the 2-year period was 5.8 ± 2.8 (**Figure 1**). The majority of patients (60%) had ≥6 medical visits (MD, NP, or RN/CDE) over this period. Of the 17 984 scheduled appointments (MD, NP, RN/CDE, RD, or mental health care provider), 2758 (15%) resulted in a cancellation or no-show, with an average of 1.6 ± 2.1 missed visits per patient (median, 1; IQR, 0-2.0; range, 0-22). Patients often had more than 1 visit scheduled on a day and they could cancel 1 or all of these appointments; thus, each individually cancelled appointment is counted as a unique