

Is Frequency of Self-Monitoring of Blood Glucose a Marker for Poorer Control in Type 2 Diabetes? Preliminary Results from the Diabetes Remote Monitoring Evaluation (DREME) Study

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Background and Objectives

- Approximately 17.5 million people in the US have diabetes,¹ and 90-95% have type 2 diabetes²
- The American Diabetes Association (ADA) recommends that patients with diabetes conduct self-monitoring blood glucose (SMBG) tests to check their blood glucose levels³
- Objectives: (1) conduct preliminary analyses of baseline data from the ongoing DREME study, and (2) determine if a relationship exists between SMBG testing and control (i.e., HbA1c, blood glucose levels) among subjects with type 2 diabetes

Methods

DREME Study Design

- Ongoing study assessing whether a remote monitoring system for blood glucose levels in a disease-management (DM) program setting improves key outcomes
- Subjects 18-64 years of age with diabetes mellitus were telephonically recruited from a DM company with large employer customers throughout the US
- Eligibility was determined via administrative claims, a telephone survey, and laboratory data (Figure 1)
- Subjects randomly assigned 1:1 to groups:

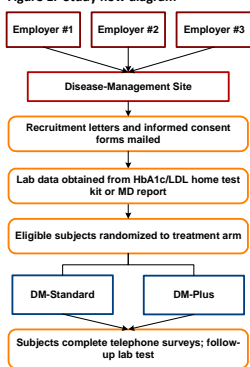
Conventional DM (DM-Standard)

- Subjects receive management under the DM site's usual program offering (e.g., compliance with prescribed treatment regimens, dietary management)

Conventional DM with remote monitoring (DM-Plus)

- Subjects receive a OneTouch® Ultra2® glucometer and a remote monitoring system that includes a mobile phone and Bluetooth™ glucometer cradle
- Subjects test blood glucose and upload data to a secure web site
- Subjects access trends over time in glucose values through simple graphs on the phone and on a personal web page
- Nurses at the DM site review the data and provide feedback on management
- Primary study measures: glycemic control, satisfaction with diabetes care, adherence to diabetes medications and self-monitoring recommendations, healthcare resource utilization

Figure 1. Study flow diagram



Methods (cont.)

Preliminary Analyses

- We analyzed baseline data from the following assessments:
 - HbA1c home test kit
 - Diabetes Treatment Satisfaction Questionnaire (DTSQ): consists of 8 questions answered on a 7-point Likert scale ranging from 0-6, with 0 being very dissatisfied and 6 being very satisfied^{4,5}; questions 2 and 3 assess perceived frequency of hyperglycemia or hypoglycemia
 - Sociodemographic survey: consists of questions on age, sex, race/ethnicity, type and length of diabetes, SMBG testing frequency
 - For type 2 diabetics, we created 3 SMBG testing frequency categories (low= <1 time/day; medium= ≥1-<2 times/day; high= >2 times/day)

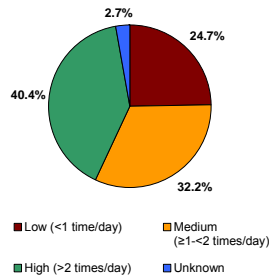
Results

- Between April 1, 2008 and December 31, 2008, 172 subjects were randomized to a study intervention (Table 1)

Table 1. Demographics of study subjects

Characteristic	Estimate
Age	
Mean (SD)	54.2 (7.6)
18 to 34 (%)	1.2%
35 to 49 (%)	25.6%
50-64 (%)	72.7%
Unknown (%)	0.6%
Male (%)	64.0%
Patient race/ethnicity (%)	
White	75.0%
African American	12.8%
Hispanic	1.7%
Asian	2.3%
Other	4.1%
Unknown	4.1%
Type of diabetes (%)	
Type 1	11.6%
Type 2	84.9%
Unknown	3.5%
Mean (SD) length of time with diabetes (years)	9.8 (8.9)
Measured HbA1c level	
Mean (SD)	7.0 (1.3)
<7.0 (%)	58.1%
7.0-7.5 (%)	18.6%
>7.5 (%)	23.3%

Figure 2. SMBG testing frequency for type 2 diabetics

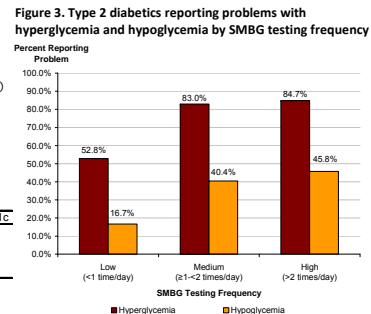


Results (cont.)

- In comparison to type 2 diabetics who tested less frequently (low), type 2 diabetics who tested more frequently (medium, high) were more likely to:
 - Have higher HbA1c values (Table 2)
 - Report problems associated with hyperglycemia and hypoglycemia (Figure 3)

Table 2. HbA1c levels by SMBG testing frequency for type 2 diabetics

SMBG Testing Frequency	Mean HbA1c
Low (<1 time/day)	6.6
Medium (≥1-<2 times/day)	6.9
High (>2 times/day)	7.1



Conclusions

- Baseline findings suggest that subjects with type 2 diabetes who tested blood glucose more frequently were more likely to report problems with hyperglycemia or hypoglycemia and have poorer HbA1c control
- This suggests that the frequency of self-testing of blood glucose could serve as a potential marker for poorer diabetes control

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