The impact of self-monitoring of blood glucose adherence on glycemic goal attainment in an indigent population

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Abstract
Background
Self-Monitoring of Blood Glucose (SMBG) can be a useful tool in diabetes treatment to empower patient self-management and guide clinicians on adjustment of medications. The evidence supporting SMBG effectiveness is strong in patients with Type 1 Diabetes Mellitus (T1DM) and patients with Type 2 Diabetes Mellitus (T2DM) treated with insulin, however there is debate amongst the evidence in patients with T2DM treated without insulin. Lack of prescription coverage can make adherence to prescribed testing cost prohibitive for indigent patients. The University of North Carolina Medical Center Pharmacy Assistance Program (PAP) provides medications with minimal co-payment to patients without pharmacy insurance benefits.

Objective
The purpose of this study is to evaluate how adherence to self-monitoring of blood glucose (SMBG) affects glycemic goal attainment in an indigent population.

Methods
A retrospective cohort study was conducted. Claims data for test strips were used to calculate the proportion of days covered (PDC), with adherence defined as a PDC ≥ 0.8. The University of North Carolina Pharmacy Assistance Program (PAP) provides medications with minimal co-payment to indigent patients. This study included PAP
patients in 2016 with a glycosylated hemoglobin A1c (HbA1c) and at least one day covered by a test strip fill during the 90 days prior to the HbA1c. The primary outcome evaluates impact of test strip adherence on achievement of HbA1c goal (HbA1c < 7%). Secondary outcomes included subgroup analysis by diabetes type, anti-hyperglycemic therapy, and intensity of insulin regimen; association of SMBG adherence with the frequency and type of health system encounters; and the effect of testing frequency on HbA1c.

**Results**

498 patients were included in the primary analysis having received testing supplies through the UNC PAP program prior to a HbA1c lab. These patients were split evenly between adherent and non-adherent, 245 and 253 respectively. Test strips provided to patients came at a cost of > $200,000 to the health care system. Among the adherent group, 20% reached a goal HbA1c < 7%, whereas 26% of the non-adherent group reached goal (p=0.174). The adherent and non-adherent groups had an average HbA1c of 8.67% (+/- 1.95) and 8.76% (+/- 2.28) respectively (p=0.652). This remained non-significant for each subgroup except for those on multiple daily injections (MDI) of insulin. Among the MDI subgroup, the adherent group had a lower mean HbA1c than non-adherent group (8.86% vs. 9.57%, p=0.0094). The adherent group was 80% less likely to have a diabetes related hospitalization (OR 0.2; 95% CI 0.04-0.92).

**Conclusion**

In an indigent population, adherence to SMBG does not appear to correlate with glycemic goal attainment, except in those on MDI, while imposing a significant cost burden on the health care system. However, adherence to SMBG may reduce hospitalizations.