



A Retrospective Analysis of the Relationship Between Changes in Glycemic Control and Health Care Resources Utilized in a Naturalistic Setting

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Introduction

In the United States, diabetes mellitus (DM) is the fourth leading cause of death, and the major cause of blindness and heart diseases¹. Studies have demonstrated that tight glycemic control prevents long-term microvascular and macrovascular complications and may offset the associated subsequent healthcare costs. It has been demonstrated that 1.0% or greater improvement in glycemic control resulted in cost saving of \$685-\$950 per patient per year². Previous studies have not examined the association of costs and glycemic control measured by HbA_{1c} during a short time period in a managed care setting.

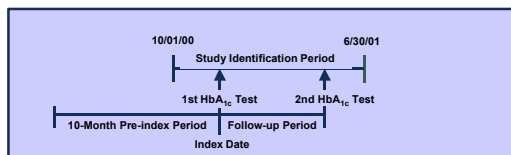
Objective

To evaluate the relationship between the changes in glycemic control and health care resources utilized in a naturalistic setting.

Methods

Design: Retrospective database analysis
Perspective: Managed care
Population: Patients from a diabetes registry in a large medical group in Southern California
Database: Electronic prescription, physician, and hospital claims, as well as laboratory data
Inclusion: 1) Patients with two HbA_{1c} levels evaluated 3 to 9 months apart during the period 10/01/00 through 6/30/01; and
2) Patients taking oral anti-diabetic therapy 10 months prior to index date
Exclusion: 1) Patients younger than 18 years old
2) Patients not continuously enrolled in the health plan during the entire study period
Statistical: ANCOVA was applied to control for observable confounding factors that may influence outcomes

Study Timeline:



Results

Table 1. Baseline and Demographics

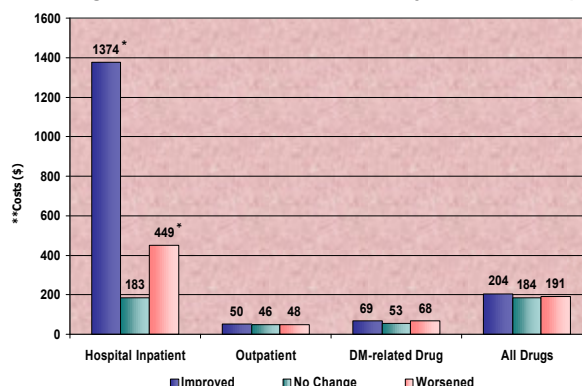
	Improved Glycemic Control	No Change in Glycemic Control	Worsened Glycemic Control	Overall	p-value
Number of Patients, N (%)	222 (45.2)	29 (5.9)	240 (48.9)	491 (100.0)	< 0.001
Female, N (%)	106 (47.8)	16 (55.2)	107 (44.6)	229 (46.6)	0.505
Age, Mean (+/- SD)	70.5 (10.7)	70.6 (10.4)	71.2 (10.4)	70.8 (10.5)	0.730
Chronic Disease Score ³ , Mean (+/- SD)	8.1 (2.9)	7.2 (2.7)	7.8 (2.9)	7.9 (2.9)	0.143
Baseline HbA _{1c} (+/- SD)	7.7 (1.5)	6.6 (0.7)	6.7 (1.1)	7.2 (1.4)	< 0.001

Improved glycemic control: $\geq 1\%$ decrease in HbA_{1c} value from baseline

No change in glycemic control: $-1\% < \text{change HbA}_{1c} < 1\%$

Worsened glycemic control: $\geq 1\%$ increase in HbA_{1c} value from baseline

Figure 1: Post Period PMPM Costs by Outcome Groups



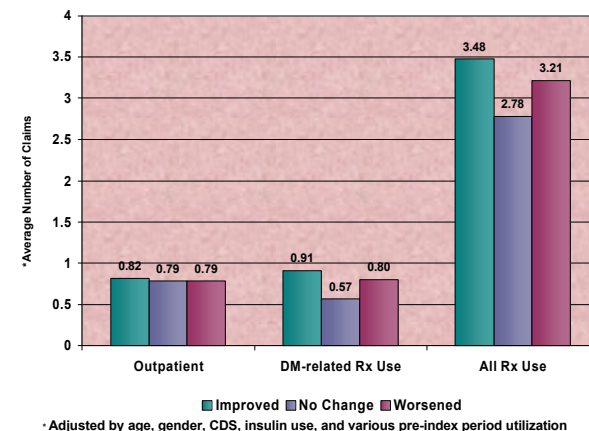
* Statistically significant difference between improved and worsened groups ($p < 0.05$).

** Adjusted by age, gender, CDS, insulin use, and various pre-index period costs

PMPM=Per member per month

Poisson regression was conducted to compare risk of incident hospitalization adjusting for age, gender, insulin use, and pre-index period healthcare utilization. Patients who had no change in their HbA_{1c} values were excluded from the model due to small sample size. The model showed that the improved glycemic control group had approximately 2.9 times higher risk of incident hospitalization compared to the group that had worsened glycemic control ($p < 0.0001$).

Figure 2: Post Period PMPM Utilization by Outcome Groups



Discussion/Conclusion

We examined the association between glycemic control and health care utilization. The study demonstrated that despite being relatively well controlled, patients in this population showed further improvement in glycemic control after hospital events. Although the causal relationship between hospital events and glycemic control could not be confirmed in the study, it may be concluded that an acute event may promote the improvement in glycemic control. One limitation of the study is the lack of information on diabetes severity in the database.

Additional research focusing on the general diabetes population is needed to identify the long-term, healthcare costs associated with changes in glycemic control. These studies would provide valuable information when considering whether to implement a diabetes management clinic or diabetes disease management program.

References:

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- Wagner EH, Sandhu N, Newton KM, et al. Effect of improved glycemic control on health care costs and utilization. JAMA 2001; 285(2): 182-189.2.
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