

Intervention to Improve Glycemic Control in Diabetic Patients

Aubert RE, Herman WH, Waters J, Moore W, Sutton D, Peterson BL, et al. Nurse case management to improve glycemic control in diabetic patients in a health maintenance organization. *Ann Intern Med* 1998;129:605–12.

Study Overview

Objective. To compare glycemic control in diabetic patients receiving case management and patients receiving usual care.

Design. Randomized, controlled trial.

Setting and participants. Patients with uncomplicated type 1 ($n = 17$) or type 2 ($n = 121$) diabetes mellitus receiving care in primary care clinics in a group-model health maintenance organization (HMO) in Florida.

Methods. Patients were randomized in blocks to receive either usual care or case management. Case management was provided by a registered nurse (a certified diabetes educator trained in adhering to detailed management algorithms) under the direction of a board-certified family physician and an endocrinologist. These physicians were responsible for all diabetes management decisions for patients in the intervention group but were not the patients' primary care providers. Case management consisted of an initial assessment, a 2-week follow-up visit, follow-up telephone calls every 1 to 2 weeks, and quarterly in-person follow-up visits. Methods to achieve glycemic control included medication adjustments, meal planning, and exercise.

Main outcome measures. Hemoglobin A_{1c} (HbA_{1c}) levels and fasting glucose levels at 12 months. Self-reported health status (using the validated Behavioral Risk Factor Surveillance System [1] questions on general status, physical function, mental function, and functional capacity), medication type and dose, body weight, blood pressure, lipid levels, and adverse events (severe hypoglycemia and emergency department and hospital admissions) also were assessed.

Main results. At baseline, patients in the case management group ($n = 71$) were more likely to smoke and to have type 1 diabetes, but for the most part they were similar to patients in the usual care group ($n = 67$). Patients lost to follow-up did not differ significantly by type of diabetes, baseline mean HbA_{1c} levels, or treatment group. 72% of the patients randomized at baseline completed the 12-month follow-up. The case management group had mean decreases of 1.7 percentage points in HbA_{1c} levels and 43 mg/dL in fasting glucose

levels, whereas patients in the usual care group had decreases of 0.6 percentage points in HbA_{1c} levels and 15 mg/dL in fasting glucose levels ($P < 0.01$). Maximum glycemic control occurred at 6 months and was sustained through 12 months in both groups. Self-reported health status improved in the case management group ($P = 0.02$). No statistically significant differences between the groups were observed in medication type or dose, body weight, blood pressure, lipid levels, hospital admissions, emergency department visits, or outpatient visits.

Conclusion

In a group-model HMO, the implementation of detailed case management algorithms by nurse case managers can help improve glycemic control in patients with diabetes.

Commentary

This study illustrates the benefits of a physician-directed nurse case management program for patients with diabetes. This particular program, conducted within a Prudential HealthCare HMO, focused on close nurse follow-up, continuous reinforcement of meal planning and exercise, and systematic treatment adjustments. The finding of improved glycemic control with case management is similar to the results of previous observational, uncontrolled research in diabetic patients [2]. Positive findings regarding the benefit of nurse-implemented disease management in other therapeutic areas, such as congestive heart failure, have also been reported.

Applications for Clinical Practice

The diabetes management program in this study helped patients achieve near-normal HbA_{1c} and blood glucose levels. The Diabetes Control and Complications Trial (DCCT) and similar research [3,4] showed that tight glycemic control can significantly reduce long-term morbidity associated with diabetic complications. Programs with demonstrated

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effectiveness in maintaining this level of control should no longer be considered experimental; rather, the training and processes necessary to put such programs into practice should be widely implemented so that the programs become "usual care."

References

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