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Diabetes self-management education improves medication utilization and retinopathy screening in the elderly

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ABSTRACT

Aims: To evaluate the effect of diabetes education program attendance, which provides patients with diabetes self-management education, on prescriptions for cardiovascular risk reduction, prescriptions for diabetes treatments, and visits for retinopathy screening.
Methods: A population based cohort study of residents of Ontario, Canada with diagnosed diabetes aged ≥65 years was performed using administrative databases. Diabetes education program attendance was identified using a registry of visits to all diabetes education programs in the province in 2006. Using propensity score methods, 22,606 diabetes education program attendees were matched to an equal number of non-attendees. The proportions of patients with prescriptions filled and with ophthalmology/optometry visits were compared.
Results: Patients attending diabetes education programs had greater utilization of statins (70.6%) than non-attendees (69.4%, $p < 0.0001$). Diabetes education program attendance was also associated with greater utilization of glucose lowering medications (83.7% vs. 82.0%, $p < 0.0001$), antihypertensive medications (90.2% vs. 89.7%, $p < 0.0001$), angiotensin converting enzyme inhibitors/angiotensin receptor blockers (79.8% vs. 78.9% $p < 0.0001$), and glucose monitoring strips (82.2% vs. 65.6%, $p < 0.0001$); and visits to ophthalmology/optometry (78.7% vs. 72.7%, $p < 0.0001$).
Conclusions: Diabetes self-management education at diabetes education programs is associated with better quality of care in the elderly in Ontario.

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1. Introduction

Diabetes education provides patients with self-management skills necessary for management of diabetes [1]. The self-care responsibilities for optimum control include modification of lifestyle with diet, exercise, and weight loss, self-monitoring of blood glucose, foot care, and the administration of oral medications and insulin injections. The objectives of diabetes self-management education are to increase individual's involvement in, confidence with and motivation for control of their diabetes. Diabetes self-management education is a fundamental component of diabetes care and most beneficial when working in conjunction with the healthcare team [2]. It can be individualized to patient's metabolic stability, treatment recommendations, learning style, ability, resources, motivation, and readiness for change. It incorporates the physical, psychological and social management of living with a chronic condition. It uses didactic and non-didactic education sessions along with social, behavioral and psychological interventions.

Diabetes education programs which provide diabetes self-management education are an important part of the diabetes care team [2] and will continue to be as the burden of diabetes increases [3,4]. There is evidence from randomized controlled trials that diabetes education improves glycemic control, self-monitoring of blood glucose, blood pressure, weight and lipids [5–8]. There is little evidence of the effect of diabetes education in a real world setting. Patients attending diabetes education programs learn about diabetes and its complications, and how best to treat it, and may become motivated to become advocates for their health; therefore, they may press their primary care providers to improve quality of care by seeking or being more likely to fill prescriptions for statins and other medications and to attend retinopathy screening. This study is designed to examine the effect of diabetes education program attendance on prescription drug utilization and retinopathy screening in routine clinical care in Ontario.

Use of these medications is a marker of quality of care provided by diabetes education programs because the use of statins [9,10] as well as glucose lowering medications [11,12], antihypertensive medications [13] and angiotensin converting enzyme inhibitors or angiotensin receptor blockers [14,15] is supported in patients 65 years and older with diabetes and most people in this group would require these medications to reach the treatment targets. People attending diabetes education programs would learn about the importance of these treatments in preventing diabetes complications and be more likely to accept or seek a prescription for these medications from their primary care provider. Similarly, increases in self-monitoring of blood glucose and retinopathy screening are self-care behaviors that may be associated with diabetes education program attendance.

2. Methods

2.1. Data sources

We conducted a population based cohort study of residents of Ontario aged ≥65 years diagnosed with diabetes on or before January 1, 2005. We used health care administrative databases of the Ontario Ministry of Health and Long Term Care. They include the Ontario drug benefits program database which contains the prescriptions filled under the provincial formulary for all residents aged ≥65 years; the physician service claims database of Ontario Health Insurance Plan which includes claims for fee-for-service reimbursement for all physician and optometry services provided in Ontario; the hospital discharge abstracts prepared by the Canadian Institute for Health Information; and a demographic database (Registered Persons Database) which includes birth and death dates, sex and postal code of home residence. Individual patients can be linked between all of these databases and across time via their reproducibly encrypted personal health card number.

Attendance at a diabetes education program was identified using a registry of diabetes education program attendance which was created for research purposes and contains all patients who attended any diabetes education programs in Ontario in 2006 [16]. The Ontario Diabetes Database was used to identify patients with diabetes [17]. The data were linked with the administrative data sources via each patient's unique health card number.

2.2. Patient selection

The cohort included all residents of Ontario aged ≥65 years who were diagnosed with diabetes on or before January 1, 2005 according to the Ontario Diabetes Database. The cohort was restricted to seniors to ensure that drug utilization data was complete, as drug dispensation information is incomplete for younger patients. The cohort was restricted to those alive until December 31, 2007 to ensure follow up was complete. Those without a valid Ontario postal code were excluded to ensure only residents of Ontario were used in the analysis.

Diabetes education program attendance in 2006 by patients in the cohort was determined by linking with the diabetes education program database. The date of their first diabetes education program visit was assigned as the index date for patients who did attend a diabetes education program. The comparison group was members of the cohort who did not attend a diabetes education program in 2006. For non-attendees, an index date was randomly assigned following the same distribution of index dates seen in attendees.

2.3. Baseline characteristics

Baseline characteristics were obtained on the index date and included: age, gender, region of residence, low income (defined based on eligibility for a reduced co-payment in the Ontario drug benefits program, $16,018 Canadian dollars for a single person or $24,175 Canadian dollars for a married person), duration of diabetes, comorbidity (defined as the number of unique medications dispensed in the previous year [18], health care utilization (defined as the number of visits to a primary care physician in the previous year), the presence or absence of service claims in the previous year from diabetes specialists, cardiologists, or nephrologists, hypoglycemia or hyperglycemia hospital admissions or emergency department visits, number of days in hospital during the previous year, and

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