

The Impact of Dementia on the Quality of Diabetes Care in Ontario

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OBJECTIVES

Comorbid dementia presents considerable challenges for diabetes (DM) management. This study aims:

- To examine differences in the quality of diabetes care and the prevalence of DM-related complications in diabetes patients with and without comorbid dementia in Ontario;
- To study the association between quality of diabetes care and DM-related complications in people with diabetes;
- To test whether the association between quality of diabetes care and DM-related complications in diabetes patients was modified by presence of dementia.

DATA SOURCES & STUDY POPULATION

- Population-based retrospective cohort study.
- Data sources:** Administrative & Clinical databases at ICES:
 - Ontario Diabetes Database (ODD);
 - Ontario Mental Health Reporting System (OMHRS);
 - Ontario Health Insurance Plan claims database (OHIP);
 - Registered Persons Database (RPDB);
 - Ontario Drug Benefits claims database (ODB);
 - Discharge Abstract Database (CIHI DAD);
 - Client Agency Program Enrolment (CAPE) table.

The study population included:

- All eligible Ontarians with diabetes aged 18 and older alive on April 1, 2007;
- Diagnosed 2 years prior to index date;
- Registered with OHIP.

MEASURES & ANALYSES

Study outcome:

- Number/proportion of DM-related short-term, including severe hypo- and hyperglycemia, and long-term, including macro- and microvascular complications, in the period 2009-2011.

Process indicators:

- HbA1c testing:** DM patients who received at least 4 HbA1c tests in the period 2007-2009.
- LDL-C testing:** DM patients who received at least 2 LDL-C tests in the period 2007-2009.
- Eye exam:** DM patients who received at least one dilated eye exam by an eye care professional in the period 2007-2009.
- Composite quality indicator:** the presence of all 3 process quality indicators in the period 2007-2009.

Independent variables:

- Presence/absence of dementia and other CC (cardiovascular, respiratory, musculoskeletal conditions, depression, renal failure and cancer), age, sex, duration of diabetes, rurality index, income quintile, continuity of care, primary care models.

Analyses

- Descriptive analyses - to assess process and outcome indicators for DM with and without dementia.
- Multiple logistic regression analyses separately for individual process indicators and composite measure, as well as for interaction terms.

RESULTS

Figure 1: Receipt of DM monitoring tests in DM patents with and without dementia

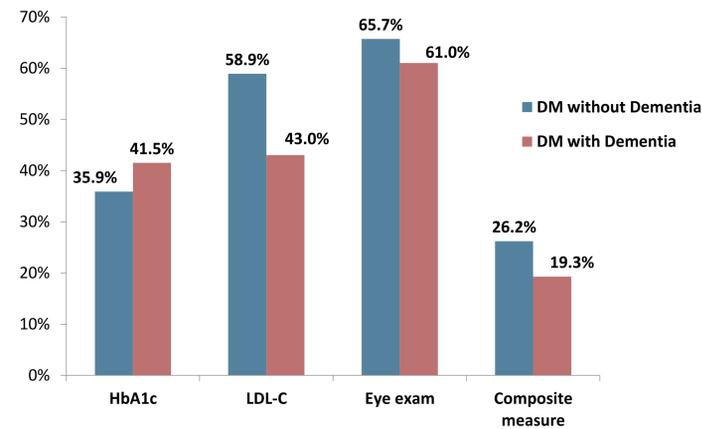


Figure 2: DM-related complications in DM patents with and without dementia

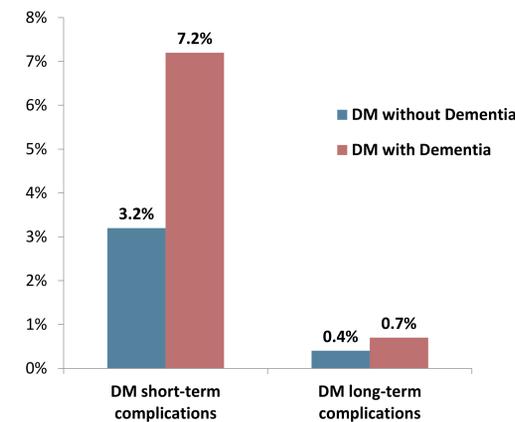


Table 1: Association between outcome and process measures and dementia among people with diabetes

Parameter	HbA1c (at least 4 tests) OR* (95% CI)	LDL-cholesterol (at least 1 test) OR* (95% CI)	Eye examination OR* (95% CI)	Composite measure OR* (95% CI)	DM short-term complications OR* (95% CI)	DM long-term complications OR* (95% CI)
DM without dementia	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.
DM with dementia	1.09 (1.06, 1.13)	0.51 (0.50, 0.53)	0.44 (0.43, 0.45)	0.47 (0.46, 0.49)	1.45 (1.39, 1.52)	1.43 (1.23, 1.66)

*Controlling for age, gender, rurality index, primary care model, COC, income quintile, duration of diabetes, depression, cardiovascular, musculoskeletal, respiratory conditions, cancer, and renal failure.

Table 2: Association between composite measure and DM long-term complications, and modifying effect of dementia

Parameter	DM long-term complications OR* (95% CI)
Model 1	
No composite measure	Ref.
Composite measure	0.75 (0.69, 0.82)
Model 2	
DM without dementia without composite measure	Ref.
DM without dementia with composite measure	0.81 (0.75, 0.89)
DM with dementia without composite measure	1.12 (0.71, 1.24)
DM with dementia with composite measure	1.24 (0.91, 1.64)

*Controlling for age, gender, rurality index, primary care model, COC, income quintile, duration of diabetes, depression, cardiovascular, musculoskeletal, respiratory conditions, cancer, and renal failure.

Table 3: Association between HbA1c tests and DM short-term complications, and modifying effect of dementia

Parameter	DM short-term complications OR* (95% CI)
Model 1	
HbA1c tests (<4 test)	Ref.
HbA1c test (≥4 tests)	1.12 (1.10, 1.16)
Model 2	
DM without dementia +HbA1c <4	Ref.
DM without dementia + Hb1c ≥4	1.47 (1.38, 1.56)
DM with dementia + HbA1c <4	1.29 (1.21, 1.38)
DM with dementia +Hb1c ≥4	1.16 (0.89, 1.61)

*Controlling for age, gender, rurality index, primary care model, COC, income quintile, duration of diabetes, depression, cardiovascular, musculoskeletal, respiratory conditions, cancer, and renal failure.

KEY FINDINGS

- Cohort size:** 861,354; 37,739 (4.4%) diabetes patients had comorbid dementia diagnosis.
- Overall, quality of diabetes care in Ontario was low (target being 80% and above).**
 - 36.2 for HbA1c testing;
 - 58.2% for LDL-C testing;
 - 65.5% for eye exam;
 - 25.9% for composite measure.
- Differences in quality of diabetes care and risk of DM-related complications according to dementia status were statistically significant.**
 - Diabetes patients with comorbid dementia were significantly more likely to receive HbA1c tests and less likely to receive LDL-C tests and eye examination.
 - Diabetes patients with comorbid dementia were significantly more likely to experience DM-related short-term and long-term complications.
- There was a protective association between good quality of DM care and risk of DM-related long-term complications among participants.**
 - DM patients who received DM monitoring tests were significantly less likely to develop DM-related long-term complications, compared to those who did not.
- Diabetes patients had a higher risk of DM-related short-term complications even in the presence of good quality of DM care.**
 - DM patients who received optimal number of HbA1c tests showed significantly higher risk of DM-related short-term complications, compared to those who did not.

IMPLICATIONS

Study results identified dementia as a barrier to the receipt of optimal number of recommended diabetes monitoring tests and a higher likelihood of developing DM-related short-term and long-term complications.

Future research is needed to identify to what extent a mismatch of current clinical guidelines with patient-centered care contributes to poor diabetes monitoring in patients with comorbid dementia.

Future research is required to identify what constitutes good diabetes care for this vulnerable population to best organize their on-going care and treatment and maximize patients' quality of life, and clinical and functional outcomes.

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