RISK FACTORS FOR INCIDENCE OF DEMENTIA IN PRIMARY CARE SETTINGS

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Background

- Dementia is a long-term, chronic condition caused by progressing physical damage in the brain.
- It is the third ranked cause of years of life lost in Canada[1].
- Among Canadian patients over age 65y, the prevalence in the whole population was 8%[2], and in community-dwelling patients was 7.3%[3].
- Evidence suggests that cardiovascular disease risk factors may contribute to the onset of dementia.
- At least 23% of new dementia cases can be prevented if seniors are not exposed to CVD risk factors[4]; however, data on this association are inconsistent.
- To our knowledge, no study that has explored the occurrence of cardiovascular risk factors prior to a diagnosis of dementia using national primary care data in North America.

Objectives & Methods

We used primary care data in electronic medical records from the Canadian Primary Care Sentinel Surveillance Network 2017 to conduct a retrospective analysis to

(1) determine the number of incident diagnoses of dementia in primary care among community-dwelling seniors;
(2) compare the risk of developing dementia in seniors (aged 65 and older) with and without modifiable cardiovascular risk factors; and
(3) estimate the effect of BMI on risk for dementia.

Our cohort includes all patients aged 65 on or before January 1st, 2008 with at least five years of subsequent EMR data, and without any record of dementia before 2009.

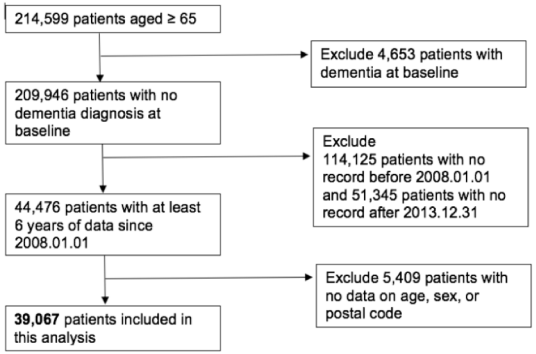

Figure 1. Data available for analysis and selection criteria

Database & Case Definitions

- CPCSSN is the first pan-Canadian chronic disease surveillance system based on primary care electronic medical records (EMR).
- CPCSSN extracts de-identified clinical information from EMRs in eight provinces and territories, standardizes the data, and stores it in a high security environment. The data is available for surveillance, research and quality improvement initiatives.
- CPCSSN has reliable data that can be used to investigate the incidence, prevalence, and management of various diseases in primary care from 2008 onwards.

	Sensitivity % (95% CI)	Specificity % (95% CI)
Dementia	96.8 (93.3–100.0)	98.1 (97.5–98.7)
Hypertension	84.9 (82.6–87.1)	93.5 (92.0–95.1)
Diabetes	95.6 (93.4–97.9)	97.1 (96.3–97.9)

Table 1: Validity of CPCSSN case definitions[5]

- In the context of CPCSSN data, a case definition is a set of rules which identifies patients with a specific condition using ICD-9 codes and text words in the Billing and Problem List tables, drugs (categorized by ATC codes) in the Medication table, and Lab results.
- CPCSSN has so far developed and validated case definitions for 11 common chronic conditions: chronic obstructive pulmonary disease (COPD), dementia, depression, diabetes mellitus, hypertension, osteoarthritis, parkinsonism, epilepsy, pelvic floor disorders, herpes zoster, and paediatric asthma
- Table 1 displays the sensitivity and specificity of the case definitions used in this study: dementia, hypertension, and diabetes mellitus.
- We used Body Mass Index (BMI) data to identify patients with obesity and lab results (total cholesterol, HDL, LDL, and triglyceride) to identify people with dyslipidemia.

Findings

- The cohort identified 39,067 eligible patients. During nine years of follow-up, 4,935 individuals developed dementia. The number of patients with dementia or heart disease risk factors increased slightly but steadily over the ten-year follow-up period. Cumulative incidence rates is 15 cases per 1,000 person-year over nine years.

	65-79 years old		80+ years old	
	AHR [95% CI]	p-value	AHR [95% CI]	p-value
Age	***1.13 [1.12-1.14]***	***< 0.001***	***1.05 [1.03-1.06]***	***< 0.001***
Male	1.01 [0.94-1.09]	0.747	0.95 [0.86-1.04]	0.254
Urban	1.05 [0.95-1.16]	0.359	1.08 [0.95-1.24]	0.239
Smokers	***1.09 [1.01-1.18]***	***0.037***	1.01 [0.91-1.13]	0.807
Depression	***1.38 [1.20-1.58]***	***< 0.001***	***1.33 [1.11-1.60]***	***0.002***
Osteoarthritis	***1.15 [1.05-1.26]***	***0.004***	1.10 [0.98-1.23]	0.108
Hypertension	0.96 [0.89-1.04]	0.305	0.94 [0.86-1.03]	0.207
Diabetes	***1.19 [1.08-1.32]***	***< 0.001***	1.14 [1.00-1.30]	0.053
Obesity	0.93 [0.82-1.05]	0.254	0.92 [0.76-1.12]	0.381
Dyslipidemia	1.04 [0.96-1.12]	0.329	0.96 [0.87-1.06]	0.403

Table 2: Adjusted hazard ratio for incidence of dementia in older adults

	All cohort		65-79 year-old		80+ year-old	
BMI	AHR* [95% CI]	p-value	AHR* [95% CI]	p-value	AHR* [95% CI]	p-value
≤ 20	***1.50 [1.02-2.22]***	***0.040***	1.34 [0.78-2.36]	0.283	1.71 [0.98-3.00]	0.060
20-25	1.00	--	1.00	--	1.00	--
25-30	0.89 [0.75-1.07]	0.214	0.98 [0.79-1.22]	0.859	0.75 [0.56-1.01]	0.057
≥ 30	0.91 [0.75-1.11]	0.348	0.98 [0.77-1.25]	0.876	0.78 [0.55-1.01]	0.165

Table 3: Adjusted hazard ratio of dementia onset using BMI values before baseline

Conclusion

Overall, dementia is a gradually decline in cognitive function, which yet has no effective treatment. The incidence of dementia diagnosed in primary care has increased. Diabetes mellitus, osteoarthritis, depression and gradual weight loss associate with an increase in risk of dementia.. Diagnosed hypertension, obesity, and dyslipidemia are not significantly associated with dementia diagnosis, while diagnosed diabetes mellitus increases the risk of subsequent dementia onset.

This study is limited by:

- BMI data missing non-randomly may cause misclassification bias by by missing overweight/obesity people because of not having their BMI measurements.
- CPCSSN data cleaning processes may be a source of error.
- Data available to CPCSSN are dependent upon primary care providers recording accurately and in the electronic medical record.

References

[1] Abubakar, et al. Lancet. 2014 (9963); 385: 117-171
[2] McDowell CMAJ. 1994;150(6):899–913
[3] Drummond, et al. CMAJ Open. 2016; 4(2)
[4] Bruijn, et al. *BMC Medicine*. 2015;13
[5] Williamson, et al. *Ann Fam Med*. 2014, 12(4):367

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