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Original Research

Comorbidity Burden and Health Services Use in Community-Living Older Adults with Diabetes Mellitus: A Retrospective Cohort Study

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ABSTRACT

Objectives: Diabetes frequently coexists with other conditions, resulting in poorer diabetes self-management and quality of life, higher risk for diabetes-related complications and higher health service use compared to those with diabetes only. Few Canadian studies have undertaken a comprehensive, population-level analysis of comorbidity and health service utilization by older adults with diabetes. This study examined comorbidity and its association with a broad range of health services in a cohort of community-dwelling older adults with diabetes in Ontario, Canada.
Methods: We linked multiple administrative databases to create a cohort of 448,736 older adults with diabetes, described their comorbidities and obtained their 1-year use of health services (physician visits, emergency department visits, inpatient hospital admissions, home care use, nursing home admissions). We examined comorbidity patterns by age and gender and estimated the prevalence of 20 comorbid conditions and the most common condition clusters. The association between number of comorbidities and health service use was also examined.
Results: More than 90% of the cohort had at least 1 comorbid condition. The number of comorbidities increased with age for both genders, and hypertension was the most common, affecting 79.1% of the cohort. Other common conditions included other cardiovascular conditions, ischemic heart disease, arthritis and anxiety. Utilization of all health services increased with the number of comorbid conditions.
Conclusions: Health service use was driven by the number of comorbid conditions, including diabetes and nondiabetes-related conditions, highlighting the importance of aligning diabetes care plans with patients' comorbidities.

Mots clés :
vie dans la communauté
comorbidité
diabète, utilisation des services de santé
personnes âgées

RÉSUMÉ

Objectifs : Le diabète coexiste fréquemment avec d'autres maladies, ce qui entraîne une prise en charge autonome du diabète et une qualité de vie médiocres, un risque plus élevé de complications liées au diabète et une plus grande utilisation des services de santé comparativement à ceux qui souffrent uniquement de diabète. Peu d'études canadiennes ont entrepris une analyse exhaustive de la comorbidité et de l'utilisation des services de santé par les personnes âgées souffrant de diabète à l'échelon de la population. La présente étude examinait la comorbidité et son association avec une vaste gamme de services de santé dans une cohorte de personnes âgées souffrant de diabète qui vivent dans la communauté en Ontario, au Canada.
Méthodes : Nous avons relié de multiples bases de données administratives pour créer une cohorte de 448 736 personnes âgées souffrant de diabète, décrit leurs comorbidités et obtenu leur utilisation des services de santé durant 1 an (consultations chez le médecin, consultations au service des urgences, hospitalisations, utilisation des soins à domicile, admissions au foyer de soins de longue durée). Nous avons examiné les profils de comorbidité par âge et par sexe et estimé la prévalence de 20 facteurs de comorbidité et les groupes de maladies les plus fréquents. Nous avons également examiné l'association entre le nombre de comorbidités et l'utilisation des services de santé.

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Résultats : Plus de 90% de la cohorte avait au moins 1 facteur de comorbidité. Le nombre de comorbidités augmentait avec l'âge chez les deux sexes; l'hypertension qui était la plus fréquente touchait 79,1% de la cohorte. Les maladies qui sont également fréquentes sont les autres maladies cardiovasculaires, la cardiopathie ischémique, l'arthrite et l'anxiété. L'utilisation de tous les services de santé augmentait en fonction du nombre de facteurs de comorbidité.
Conclusions : L'utilisation des services de santé était déterminée par le nombre de facteurs de comorbidité, dont les maladies liées ou non au diabète, ce qui souligne l'importance d'aligner les plans de soins du diabète sur les comorbidités des patients.

Introduction

Multimorbidity, defined as the coexistence of 2 or more chronic conditions when one is not necessarily more central than others, is commonly experienced by older adults (age 65 years and older) and affects 55% to 98% of this population (1–3). Although the prevalence of multimorbidity and specific conditions vary across studies, some general patterns have been observed. For example, the prevalence of multimorbidity typically increases with age and is present in 80% of persons over the age of 85 (4). Trend analyses suggest that multimorbidity has increased consistently over the past decade (5). Multimorbidity has been linked to poorer health outcomes, more complex clinical management, reduced ability for diabetes self-management and increased healthcare utilization and costs (6–9). There is a growing body of evidence indicating that certain highly prevalent conditions tend to cluster together. Several studies have shown that the most prevalent conditions and combinations of conditions typically include diabetes, along with hypertension, arthritis, lipid metabolism disorders and ischemic heart disease (5,10,11).

Diabetes is a global health concern, with worldwide prevalence estimated to increase from 2.8% in the year 2000 to 4.4% by 2030 (12). The trend in Canada is similar, with the estimated prevalence of 7.3% in 2010 expected to increase to 9.9% (3.7 million people) by 2020 (13). Of the 3 types of diabetes (gestational, type 1 and type 2), type 2 diabetes comprises 90% to 95% of all diabetes cases in Canada (14) and worldwide (15). As with most chronic conditions, the prevalence is higher in older adults, with the majority of those with diabetes in developed countries being 65 years of age or older (16). In Canada, the prevalence of diabetes in adults aged 65 years and older ranges from 14% to 23% (13), with the higher end of the range reflecting rates generally seen in older age groups and certain provinces (Newfoundland, Labrador, Nova Scotia and Ontario) (14). The aging of the population is viewed as one of the primary risk factors accounting for the increase in diabetes, in addition to increasing levels of inactivity and obesity (15,17,18). For older adults with diabetes, multimorbidity is common, with the majority having more than 1 comorbidity and an estimated 40% to 50% having 3 or more (17,19–21).

Evidence suggests that comorbidity in people with diabetes significantly impacts their quality of life, ability to self-manage and healthcare services utilization. Some studies show that specific comorbidities and complications differentially impact self-management behaviour (9,22,23) and quality of life (24) in people with diabetes. The quality and amount of diabetes care has also been found to vary by type of comorbidity, with concordant conditions resulting in similar or better care and discordant conditions associated with diminished quality of care (25,26). Other studies suggest that the sheer number of conditions increases healthcare use, and this greater exposure to the healthcare system results in increased opportunities for monitoring and counseling for all conditions (8). All studies agree that comorbidity is a significant determinant of healthcare utilization, with the evidence suggesting that at least half of the total health services used by people with diabetes are unrelated to diabetes (27,28). These findings underscore the importance of understanding the comorbidity profiles of individuals with diabetes. They also suggest that the single-disease orientation of diabetes-management programs and guidelines implemented in many countries (29) are unlikely to address the full range of healthcare needs of persons with diabetes.

To date, there have been few Canadian studies that have undertaken a population-level analysis of the patterns of comorbidity in older adults with diabetes and the association between comorbidity and the use of health services. In addition, few studies have looked at a broad range of healthcare services, instead focusing on specific sectors such as primary care. The purpose of this study was to describe the number and type of comorbid conditions in a cohort of community-dwelling older adults with diabetes and to explore the association between the number of comorbid conditions and 1-year health service utilization for a comprehensive range of healthcare services. This information has important implications for the planning and evaluation of health services provided to older adults with diabetes. Understanding the burden of comorbidities and their impacts on the health system and the use of health services is crucial for determining future service demands and informing health policy debates about resource allocation. Moreover, this information can inform the design of diabetes treatment programs by aligning care with the full range of comorbidities to ensure that the diversity of healthcare demands of older adults living with diabetes are met and that treatments pertaining to comorbid conditions do not compromise the achievement of diabetes care goals.

Methods

Research questions

In community-dwelling older adults with diabetes residing in Ontario, Canada:

1. What is the prevalence of comorbid health conditions?
2. What are the age and gender trends in comorbidity?
3. What is the association between the number of comorbid conditions and 1-year health services utilization?

Study design

This was a retrospective cohort study of adults 66 years of age and older. The study used multiple linked population-based health administrative data from a number of sources for the full province of Ontario. The databases included the Registered Persons Database (RPDB), which consists of basic demographic data on all Ontario residents with valid health insurance cards; the Canadian Institute for Health Information Discharge Abstract Database (CIHI-DAD), which are chart abstraction summaries required for all inpatient hospital discharges; the National Ambulatory Care Reporting System (NACRS), which captures all emergency department visits; the Ontario Health Insurance Plan (OHIP) billing claims, which consist of billings for all physician visits; the Ontario Drug Benefit (ODB) claims, which are claims for outpatient prescription medications; and the Home Care Database, which consists of service records for all publicly funded home care services. These data were linked using