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Review

A Comprehensive Review of the Literature Supporting Recommendations From the Canadian Diabetes Association for the Use of a Plant-Based Diet for Management of Type 2 Diabetes

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ABSTRACT

Type 2 diabetes mellitus is considered one of the fastest growing diseases in Canada, representing a serious public health concern. Thus, clinicians have begun targeting modifiable risk factors to manage type 2 diabetes, including dietary patterns such as a plant-based diets (PBDs). The Canadian Diabetes Association has included PBDs among the recommended dietary patterns to be used in medical nutrition therapy for persons with type 2 diabetes.

To support knowledge translation, this review summarizes the current literature relating to PBDs and the prevalence of type 2 diabetes, its clinical applications and its acceptability in the management of type 2 diabetes as well as its application in community settings.

This comprehensive review seeks to close the literature gap by providing background and rationale to support the use of PBDs as medical nutrition therapy. Within this review is support from large observational studies, which have shown that PBDs were associated with lower prevalence of type 2 diabetes. As well, intervention studies have shown that PBDs were just as effective, if not more effective, than other diabetes diets in improving body weight, cardiovascular risk factors, insulin sensitivity, glycated hemoglobin levels, oxidative stress markers and renovascular markers. Furthermore, patient acceptability was comparable to other diabetes diets, and PBDs reduced the need for diabetes medications.

Diabetes education centres in Canada could improve patients' perceptions of PBDs by developing PBD-focused education and support as well as providing individualized counselling sessions addressing barriers to change. The development of more standardized and user-friendly PBD practice guidelines could overcome the disparity in recommendations and, thereby, increase how frequently practitioners recommend PBDs. Based on current published research, PBDs lend support in the management of type 2 diabetes.
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RÉSUMÉ

Le diabète sucré de type 2 est considéré comme étant l'une des maladies à connaître la croissance la plus rapide au Canada et constitue une préoccupation sérieuse de santé publique. Par conséquent, les cliniciens ont commencé à déterminer les facteurs de risque modifiables pour prendre en charge le diabète de type 2, dont les modèles de consommation alimentaire tels que les régimes alimentaires à base de végétaux (RABV). L'Association canadienne du diabète a intégré les RABV aux modèles de consommation alimentaire à utiliser lors de la thérapie nutritionnelle médicale des personnes souffrant du diabète de type 2.

Afin de soutenir le transfert des connaissances, la présente revue résume la littérature actuelle sur les RABV et la prévalence du diabète de type 2, leurs applications cliniques et leur acceptabilité dans la prise en charge du diabète de type 2 ainsi que leur application dans les milieux communautaires.

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Cette revue exhaustive cherche à combler les lacunes de la littérature en fournissant le contexte et les raisons pour appuyer l'utilisation des RABV comme thérapie nutritionnelle médicale. Cette revue s'appuie sur de vastes études observationnelles qui ont montré que les RABV étaient associés à une prévalence plus faible du diabète de type 2. Aussi, les études d'intervention ont montré que les RABV étaient tout aussi efficaces, sinon plus, que les autres régimes alimentaires destinés aux personnes diabétiques pour améliorer le poids corporel, les facteurs de risque cardiovasculaire, l'insulinosensibilité, les concentrations d'hémoglobine glyquée, les marqueurs du stress oxydatif et les marqueurs rénovasculaires. De plus, les RABV dont l'acceptabilité par les patients se comparait à celle des autres régimes alimentaires destinés aux personnes diabétiques réduisaient les besoins en médicaments contre le diabète.

Les centres d'enseignement sur le diabète du Canada pourraient améliorer la perception des patients au sujet des RABV en développant l'enseignement axé sur les RABV et le soutien ainsi qu'en offrant des séances de counseling individuel pour surmonter les obstacles au changement. L'élaboration de lignes directrices de pratique en matière de RABV plus standardisées et faciles à utiliser pourrait surmonter les disparités des recommandations et, ainsi, augmenter la fréquence à laquelle les praticiens recommandent les RABV. Reposant sur la publication de recherche actuelle, les RABV apportent un soutien à la prise en charge du diabète de type 2.

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Introduction

Plant-based diets (PBDs) have received increasing interest for their use in the management of various chronic diseases, including cancer, cardiovascular disease, obesity, hypertension and type 2 diabetes mellitus (1,2). A PBD is defined as "a regimen that encourages whole, plant-based foods and discourages meats, dairy products and eggs as well as all refined and processed foods" (3). Type 2 diabetes is considered 1 of the fastest growing diseases in Canada, with more than 60 000 new cases each year (4), and it has become a focal point of clinicians to target modifiable risk factors, such as diet, as a method of preventing and managing type 2 diabetes (1,2).

Dietitians in Canada have stated that vegetarian and vegan diets are nutritionally adequate and, when appropriately planned, can meet the guidelines for the management of type 2 diabetes (5). The Canadian Diabetes Association (CDA) has acknowledged these diets as appropriate in medical nutrition therapy for persons with type 2 diabetes (6). Previous reviews that have summarized the numerous observational studies on PBDs and type 2 diabetes management have not fully explored randomized controlled trials (RCTs) involving PBDs in type 2 diabetes management. Clinical practice guidelines (CPGs) have not provided in-depth quantitative data describing its effectiveness, nor have they mentioned its acceptability and application outside of experimental settings. Moreover, current research has not fully addressed how patients' and clinicians' perceptions could deter its use in clinics outside of experimental settings. Therefore, we sought to summarize the current literature relating to PBDs and the prevalence of type 2 diabetes, along with their experimental applications and acceptability in type 2 diabetes management, as well as their application in community settings, for the purposes of knowledge translation, specifically to researchers and practitioners in Canada.

Methods

Searches of PubMed, ProQuest and Google Scholar were conducted for scientific articles published through March 31, 2015. The following search terms were used: *plant-based diet*, *vegetarian*, *vegan*, *diabetes mellitus* and *type 2 diabetes mellitus*. The search was limited to human studies published in English. Reference lists of all relevant studies as well as relevant systematic reviews, meta-analyses and reviews were examined for further studies. The following criteria were used for study inclusion: studies involving participants with type 2 diabetes who were following PBDs and studies involving PBDs with outcome variables relevant to type 2 diabetes management or risk, including glycated hemoglobin (A1C) levels, fasting blood glucose levels, etc. PBDs included both vegan and vegetarian diets. Figure 1 provides an overview of the comprehensive research strategy and the reasons for exclusions employed in this literature review.

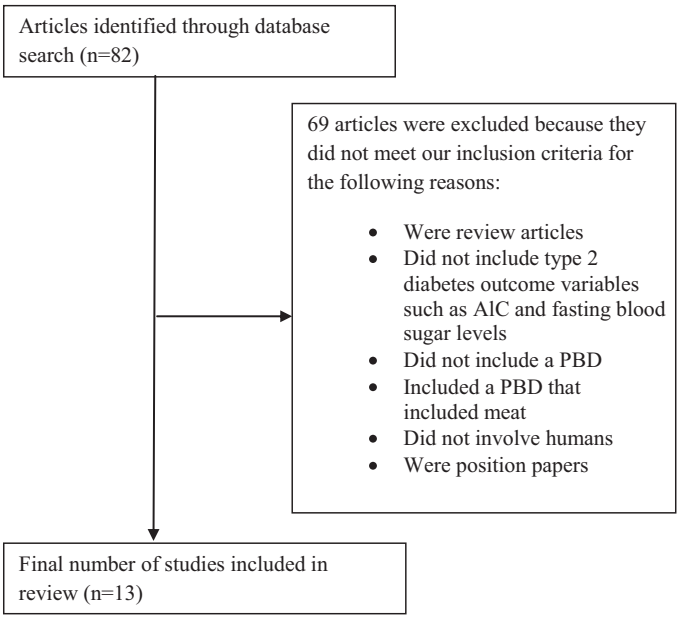

Figure 1. Research strategy algorithm.

Discussion

Prevalence and incidence of type 2 diabetes

Observational studies have shown that the prevalence of type 2 diabetes is lower among individuals who consume PBDs (7,8). A majority of this evidence comes from a long-term observational study investigating the effects of lifestyle and dietary behaviours on disease and mortality in a large sample (N=60 904) of Seventh Day Adventists in Canada and the United States. This population's low incidence of confounding variables (alcohol consumption, smoking and illicit drug use) provides valuable insight into the true associations between diet and diabetes (7).

Initially, cross-sectional analyses of the cohorts' baseline data were conducted (7). In logistic regression analysis, compared with

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