



## Original Research

# Implementation of Resources to Support Patient Physical Activity Through Diabetes Centres in Atlantic Canada: The Effectiveness of Toolkit-Based Physical Activity Counselling



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## ABSTRACT

**Objective:** The purpose of this study was to determine the effectiveness of toolkit-based physical activity counselling on physical activity and exercise participation of type 2 diabetes patients attending diabetes centres in Atlantic Canada.

**Methods:** Patients with type 2 diabetes (n=198) were recruited to a quasiexperimental study comparing the effectiveness of counselling by persons trained to use a physical activity and exercise resource manual (i.e. toolkit) vs. a standard of care counselling situation. Effectiveness was assessed through questionnaires completed by patients, and clinical data were extracted from patient charts before and 6 months after a single appointment with a diabetes educator. Primary outcome measures were patient self-reported physical activity and exercise levels, efficacy perceptions and mean glycated hemoglobin.

**Results:** There were no significant differences in primary outcomes over time. Subanalyses of the toolkit-counselled patients revealed a significant interaction for moderate-to-vigorous physical activity (MVPA [ $p<0.0001$ ]), whereby patients who were not meeting Canadian Diabetes Association guidelines for physical activity at baseline (i.e. <150 MVPA a week; n=44) increased physical activity (from 20±23 to 120±30 minutes) and patients who were active at baseline (i.e. >150 MVPA a week; n=22) decreased physical activity (from 444±32 to 161±41 minutes) at 6 months.

**Conclusions:** A single counselling appointment using the toolkit did not elicit significant changes in physical activity or clinical outcomes measured 6 months later when compared with standard care condition; however, increased physical activity was observed for patients who were inactive at baseline. Repeated counselling or more intensive strategies may be required to increase patient physical activity levels and produce clinical outcomes.

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## R É S U M É

## Mots clés :

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diabète de type 2

**Objectif :** L'objet de cette étude était de déterminer l'efficacité du counseling en matière d'activité physique selon la boîte à outils sur l'activité physique et la participation à l'exercice physique des patients souffrant de diabète de type 2 fréquentant des centres du diabète du Canada atlantique.

**Méthodes :** Les patients souffrant du diabète de type 2 (n=198) ont été recrutés dans une étude quasi expérimentale comparant l'efficacité du counseling par des personnes formées pour utiliser le manuel des ressources sur l'activité physique et l'exercice (c.-à-d. la Boîte à outils) vs un contexte standard de counseling en soins. L'efficacité a été évaluée au moyen de questionnaires remplis par les patients et les données cliniques ont été extraites des dossiers de patients avant et 6 mois après un seul rendez-vous avec l'éducateur spécialisé en diabète. Les principaux critères d'évaluation étaient l'activité physique et les niveaux d'exercice rapportés par le patient, les perceptions d'efficacité et l'hémoglobine glyquée moyenne.

**Résultats :** Aucune différence significative n'a été observée dans les résultats principaux au fil du temps. Les sous-analyses des patients ayant été conseillés par la boîte à outils ont révélé une interaction

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significative de l'activité physique modérée à vigoureuse (APMV [ $p < 0,0001$ ]) selon laquelle les patients qui au début ne répondaient aux lignes directrices sur l'activité physique de l'Association canadienne du diabète (c.-à-d.  $< 150$  APMV par semaine;  $n=44$ ) ont augmenté leur activité physique (de  $20 \pm 23$  à  $120 \pm 30$  minutes) et les patients qui au début étaient actifs (c.-à-d.  $> 150$  APMV par semaine;  $n=22$ ) ont diminué leur activité physique (de  $444 \pm 32$  à  $161 \pm 41$  minutes) après 6 mois.

**Conclusions :** Un seul rendez-vous de counseling utilisant la boîte à outils n'a pas entraîné de changements significatifs dans la mesure de l'activité physique ou des résultats cliniques 6 mois plus tard par rapport aux soins standards. Cependant, l'augmentation de l'activité physique a été observée chez les patients qui étaient inactifs au début. Des séances répétées de counseling ou d'autres stratégies intensives s'avèrent nécessaires pour rehausser les niveaux d'activité physique des patients et donner lieu à des résultats cliniques.

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It is well established that regular physical activity is an effective modality for the prevention and management of type 2 diabetes mellitus (1,2). Although “physical activity” and “exercise” are often used interchangeably, these terms represent different behaviours. Physical activity is defined as any bodily movement producing energy expenditure (2) and is often unstructured and can take place in occupational, household or leisure time. Exercise is defined as a subset of physical activity and is planned, structured and repetitive and of an intensity and duration that leads to an improvement in physical fitness or changes in body composition (2). Research has clearly demonstrated that regular physical activity and exercise produce significant improvements in glycemic control, cardiometabolic outcomes and improved quality of life for persons either at risk of diabetes or with diabetes (1–6) in a dose-response manner (7–10). The Canadian Diabetes Association (CDA) guidelines for physical activity recommend 150 minutes of moderate to vigorous aerobic exercise per week and 2 but preferably 3 sessions of resistance exercise (2). Unfortunately, the great majority (>70%) of patients with type 2 diabetes do not meet the CDA 150 minutes guidelines for physical activity (11–14). It is clear that there is a major challenge in clinical practice to help clients meet target levels of physical activity (15).

A meta-analysis by Umpierre et al (16) concluded that simply providing physical activity advice is far less effective than structured exercise in eliciting improved glycemic control in type 2 diabetes patients. A more recent review and meta-analysis by Vuori et al (17) concluded that physical activity promotion in primary care is effective at increasing physical activity in a range of populations when done in 1 or more face-to-face sessions by various health professionals with tailored physical activity prescriptions. Vuori et al (17) stated that physical activity counselling effectiveness in clinical practice is improved when 1) it begins with individual assessment of needs and barriers; 2) the message is simple, specific and realistic; 3) it employs valid behaviour change methods; 4) it includes clear, proximal goals, and 5) it focuses on internal motivation and factors that support self-efficacy. The use of these strategies by trained professionals in diabetes care can improve glycemic control and diabetes outcomes (18). Supervised exercise typically targets a motivated group of healthy people, is expensive to develop and maintain and results in poor long-term adherence; therefore, effective physical activity counselling likely shows greater promise for wide-scale dissemination and overall effectiveness in changing patient behaviour (17–21).

In Canada, the primary provider of ongoing diabetes lifestyle support for diabetes patients are diabetes educators in diabetes centres. Unfortunately, diabetes educators report that they have low knowledge and confidence in their ability to counsel patients about physical activity or provide appropriate exercise recommendations (22,23). We developed a physical activity resource manual (i.e. the toolkit [24]) and education program, the details of which are described elsewhere (25), that were designed to support

diabetes educators in their abilities to counsel regarding physical activity and to make appropriate recommendations for exercise. In brief, the manual and program are an evidence-based, theory driven and practically oriented approach that integrates physical activity recommendations and behavioural management strategies designed to build self-efficacy in both providers and patients and to elicit incremental improvements in patient physical activity behaviour. This program was effective at increasing diabetes educator's confidence regarding physical activity counselling (25) and was adopted by the CDA as a primary resource manual for diabetes education (26).

Although the improvement in diabetes educator confidence for toolkit-based physical activity counselling has been established, the impact of such counselling on patient behaviour was unknown. Therefore, the purpose of this study was to examine the effect of the toolkit-based counselling intervention delivered by diabetes educators in regular clinical practice (i.e. as a portion of a single diabetes centre visit), compared to a standard care condition, on self-reported physical activity and exercise, efficacy perceptions and self-reported fitness and health, as well as on clinical variables before and 6 months after a single counselling appointment.

This evaluation was part of an action-research program, which involves the process of engaging in a change in the professional practice by a group or organization while concurrently conducting research on the process and outcomes of that change, with the goal of improving the way a specific issue or problem is addressed (27). In the context of the current study, the Diabetes Care Program of Nova Scotia “Best Practice” Committee requested the involvement of researchers at Acadia University to develop, implement and evaluate resources to assist diabetes educators to better counsel patients on physical activity and provide exercise recommendations in situations where they did not have access to exercise professionals or exercise facilities. There was extensive involvement by the Diabetes Care Program of Nova Scotia and diabetes care professionals in the field on all aspects of the study design, administration and evaluation. This was an evaluation of the effectiveness of translation into practice, which is an area of research that is greatly needed (15,28). It was hypothesized that patients who received toolkit counselling would improve their participation in regular physical activity more than the standard care group.

## Methods

### Design

Ethics approval for this study was obtained through the Acadia University Research Ethics Board and the respective District Health Research Ethics Boards. A quasiexperimental design was used to compare the effectiveness of a single toolkit counselling

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