Walking behaviour and glycemic control in type 2 diabetes: Seasonal and gender differences--Study design and methods

Abstract:

BACKGROUND: The high glucose levels typically occurring among adults with type 2 diabetes contribute to blood vessel injury and complications such as blindness, kidney failure, heart disease, and stroke. Higher physical activity levels are associated with improved glycemic control, as measured by hemoglobin A1C. A 1% absolute increase in A1C is associated with an 18% increased risk for heart disease or stroke. Among Canadians with type 2 diabetes, we postulate that declines in walking associated with colder temperatures and inclement weather may contribute to annual post-winter increases in A1C levels. METHODS: During this prospective cohort study being conducted in Montreal, Quebec, Canada, 100 men and 100 women with type 2 diabetes will undergo four assessments (once per season) over a one-year period of observation. These assessments include (1) use of a pedometer with a concealed viewing window for a two-week period to measure walking (2) a study centre visit during which venous blood is sampled for A1C, anthropometrics are assessed, and questionnaires are completed for measurement of other factors that may influence walking and/or A1C (e.g. food frequency, depressive symptomology, medications). The relationship between spring-fall A1C difference and winter-summer difference in steps/day will be examined through multivariate linear regression models adjusted for possible confounding. Interpretation of findings by researchers in conjunction with potential knowledge "users" (e.g. health professionals, patient groups) will guide knowledge translation efforts. DISCUSSION: Although we cannot alter weather patterns to favour active lifestyles, we can design treatment strategies that take seasonal and weather-related variations into account. For example, demonstration of seasonal variation of A1C levels among Canadian men and women with T2D and greater understanding of its determinants could lead to (1) targeting physical activity levels to remain at or exceed peak values achieved during more favourable weather conditions. Strategies may include shifting to indoor activities or adapting to less favourable conditions (e.g. appropriate outdoor garments, more frequent but shorter duration periods of activity) (2) increasing dose/number of glucose-lowering medications during the winter and reducing these during the summer, in anticipation of seasonal variations (3) examining the impact of bright light therapy on activity and A1C among T2D patients with an increase in depressive symptomology when sunlight hours decline.
Geographic Feature: General

Geographic Location: Non-United States
  Non-United States: Non-U.S. North America

Health Impact: Diabetes/Obesity, Other Health Impact, Specify
  Other Health Impact: Decreased physical activity levels

Resource Type: Research Article

Special Topics: Adaptation, Communication, Sociodemographic Vulnerability, Vulnerable Population
  Adaptation: Secondary Health Impacts of Adaptation, Vulnerability Assessment, Intervention
  Communication: Health Professional
  Mitigation: Secondary Health Impacts of Mitigation